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**U.S. Fish and Wildlife Service**  
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In Reply Refer To:  
AESO/SE  
02-21-05-F-0607

December 15, 2005

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

File Number: 2004-00459-MB

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 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) (Act) on the construction of the Cascada mixed-use master-planned community and its effects on the endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*; pygmy-owl) and its proposed critical habitat. Your request for formal consultation and conference was dated January 27, 2005, and we received it on February 7, 2005. On July 27, 2005, we requested a 60-day extension of this consultation and indicated that our biological and conference opinion would be completed on or before August 19, 2005. This letter constitutes the FWS' biological and conference opinions based on our review of the information you provided.

This biological and conference opinion (collectively BO) is based upon your January 27, 2005, request for formal consultation, Westland Resources' January 14, 2005, biological assessment (BA), the September 2004 Cascada Specific Plan, and various site visits, email communications, and phone conversations with New World Development (Applicant) and Westland Resources, consultant for the Applicant. A complete administrative record of this consultation is on file at this office.

## **BIOLOGICAL OPINION**

### **Consultation History**

- September 24, 2004 – The FWS received the revised Cascada Specific Plan.
- January 31, 2005 – The FWS received the request for formal consultation from the U.S. Army Corps of Engineers (ACOE).
- April – June 2005 – The FWS, the Applicant, and Westland Resources conducted four site visits to clarify issues related to habitat linkages and project design.
- July 27, 2005 – The FWS requested a 60-day extension of the consultation from the Applicant and the ACOE.
- September 12, 2005 – The FWS provided a draft BO to the ACOE.
- November 2, 2005 – The ACOE provided comments on the draft BO.

### **Description of the Proposed Action**

The project area is approximately 1,202 acres in Marana, Pima County, Arizona. The Project Plan includes large-lot residential development in the northern portions (north of the Lambert Lane alignment) and moderate- to high-density residential and commercial development in the southern portions. The Project Plan provides for approximately 3,506 residential units, approximately 60 acres of commercial lands and employment centers, and approximately 119 acres of lands set aside as district and neighborhood parks and trails. Protected open space areas include the undisturbed lands within lots and common areas north of Lambert Lane, Enhanced Conservation Lands (also referred to as dispersal corridors) that are associated with the seven primary drainage ways that traverse the property, and the 50-foot planted buffer along portions of the western boundary of the Multi-Use areas. These lands are collectively referred to in the BA as the Conservation Lands. The majority of the Conservation Lands are located in the northern portion of the Project Area, where it is more beneficial to the pygmy-owl. The remaining Conservation Lands in the southern portion of the Project are established to benefit and facilitate habitat connectivity through Cascada.

The proposed residential lot configuration for the low-density portion of the Project Area located north of the Lambert alignment will include no more than 104 residential lots and a reservoir site, with a maximum allowable disturbance area of 25,000 ft<sup>2</sup> per lot. Total anticipated disturbance of these areas<sup>1</sup> is approximately 113.7 acres (approximately 24.1 percent of the

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<sup>1</sup> Acreage and percent disturbance values are rounded to the nearest 1/10 percent.

portion of the Project north of Lambert Lane) for grading and vegetation clearing for building sites, utilities, septic systems, driveways, and other landscape features, and for private roadways, drainage and utility infrastructure, and a reservoir site located along the Project's eastern boundary. The remainder of the Project Area north of Lambert, which includes some of the Project's highest quality potential habitat for the pygmy-owl, will be preserved as open space to benefit the pygmy-owl. This protected area includes areas outside of designated lots and the undisturbed area within each lot, totaling an estimated 360.3 acres. No more than five utility crossings resulting in approximately four acres of vegetation clearing will traverse the Conservation Lands north of Lambert Lane. The utility crossing locations within the Conservation Lands are unknown at this writing. Grade control structures and trails may be placed within utility crossings to further minimize impacts within the Conservation Lands. The Cascada Specific Plan would allow for a cluster-type development in this area. If that were pursued at some future date, the overall acreage of surface disturbance would not exceed 24.1 percent. The cluster option would be planned in such a way as to not preclude the potential movement of pygmy-owls or other wildlife through and within the northern portion of Cascada.

The washes throughout the area north of the Lambert Lane alignment will remain natural, and sheetflow conditions will be the prevailing drainage pattern. The low-density development within this area will be sited to avoid sheetflow areas to the extent possible; however, fill will be needed to elevate some building pads above flood elevation. Most of the roadway crossings of sheetflow areas will be done as dip sections. The dip sections will be broad so that the existing willow sheetflow conditions will remain and all-weather access can be provided.

The sheetflow condition that encumbers the property will necessitate the construction of several interceptor channels along the west boundary of the lands north of Lambert Lane, along the Lambert Lane alignment, and along the east boundary of the land south of Lambert Lane. These interceptor channels will collect storm water and convey it to one of several channels that will direct flow toward the southwest. These interceptor channels will require the installation of erosion-protection improvements. These improvements may range from the least intensive, which include the installation of grade control structures in combination with lined banks and earthen bottom channels, to the most intensive improvements, which include the lining of the channel bottom and banks with concrete, grouted rock, or soil cement. Combinations of these methods may also be used on the same interceptor channel. These stabilization measures must also be provided to maintain adequate velocity for the sediment conveyance. The interceptor channels are generally aligned parallel to contour so that channel slope will be minimal. The width of the interceptor channels will vary from 30 to 66 feet and depths will range from 3 to 6 feet. As depicted in the Specific Plan, the interceptor channels along the Lambert Alignment will have a pedestrian pathway, planted with native vegetation that will be constructed at the top of the downstream embankment of the interceptor channel. This area will be landscaped with native trees and shrubs. The upstream embankment of the interceptor channel along the Lambert Alignment will have a 16-foot maintenance road paralleling the channel. Freeboard for the interceptor channels will be provided in accordance with standard Pima County/Town of Marana design procedures. These interceptor channels will collect and convey storm water to one of

several drainage ways that convey storm water southwesterly toward the detention basins and Multi-Use area. The interceptor channel located on the eastern boundary of the project, south of the Lambert Lane alignment, will be widened and vegetated with native trees to provide a buffer and habitat link in the north-south direction.

Within the more intensely developed portions of the Project Area (south of Lambert), seven naturally vegetated drainages, each approximately 200 to 250-foot-wide, will be preserved in place to the extent possible, and enhanced with native vegetation (the Enhanced Conservation Lands). These drainages will convey onsite and offsite storm water flows through this portion of the Project Area. Within the approximately 250- to 300-foot drainage bottoms, existing vegetation will be retained to the greatest extent practicable. The side slopes of these drainages, where necessary, will be reinforced with gunnite, soil cement, or other suitable stabilization methods to prevent lateral erosion. A 25-foot trail and native vegetation planting area will be located on both sides of the Enhanced Conservation Lands. These open space drainage areas, totaling approximately 98.8 acres, will be enhanced with plantings of native trees and shrubs to enhance their wildlife value. No more than 11 utility crossings resulting in approximately 3.7 acres of vegetation clearing will traverse the Conservation Lands south of Lambert Lane.

The specific location of utility crossings within the enhanced conservation lands cannot be determined at this point in the planning process. Grade-control structures and trails may be placed within utility crossings to avoid further impacts within the Conservation Lands. At the downstream extent of each channel, an approximately 400-foot-long sediment basin will be constructed to protect downstream detention basins and recreational facilities in the Multi-use Areas. Vegetated buffers 50-feet wide will be maintained within and along both sides of the channel. Outside of the channel, the 25-foot trail and natural landscape area will be maintained as in the upstream portions of the channels. The total vegetated width (including trails) on each side of the channel at the sediment basins will be 75 feet.

The Multi-Use Area on the Project Plan will be set aside for open space, recreation, and other multi-use opportunities, and storm water retention/detention. Some of the basins will be constructed within set-aside areas used solely for the purpose of storm water retention/detention. While other basins may be incorporated into the parks, the areas that are set aside solely to function as retention/detention storage will be defined by basins having a significant inflow sediment incompatible with the multi-use function. Storm water retention/detention within the parks will be confined to areas where storm water is accepted from subdivisions having a negligible sediment component. Within the Multi-Use Area along the western Project boundary, recreational facilities and a 50-foot habitat buffer, consisting of approximately four acres of planted vegetation, will be provided to improve the quality of habitat for the pygmy-owl along the western boundary of the Project. Native tree plantings will be placed within the 60-foot wide interceptor channel south of Lambert Lane, along the project's eastern boundary. These native plantings will enhance wildlife movement at the project's interface with adjacent wildcat development to the east.

Project drainage design features in the vicinity of the Camino de Mañana and Interstate 10 intersection will be designed and/or modified as necessary to be compatible with drainage improvements constructed in conjunction with the Twin Peaks Road interchange presently being designed by Town of Marana. Final design of the drainage features within this area will be coordinated with the Town of Marana to insure that the drainage design elements of both projects are compatible.

Tree and shrub species used for enhancement in the Enhanced Conservation Areas and the multi-use area will include whitethorn acacia (*Acacia constricta*), catlaw acacia (*Acacia greggii*), desert hackberry (*Celtis pallida*), velvet mesquite (*Prosopis velutina*), and foothill palo verde (*Cercidium microphyllum*) salvaged from the Project Area, along with additional nursery grown stock of these same species. Saguaro and other smaller cacti salvaged from on-site will be transplanted to these areas at densities similar to those currently existing on the Property. Temporarily disturbed areas within the enhancement areas will be reseeded with a native seed mix composed of native sub-shrubs, forbs, and grasses suitable for the site. Trees and shrubs will be irrigated by an automatic drip irrigation system until established.

As a component of the Specific Plan, not part of the 404 permit request, the Applicant proposes to add 77.5 feet to the west boundary of the Hartman Vistas North Mitigation Parcel and to grant Marana a 75-foot half right-of-way (ROW) along the south boundary of the same mitigation area. There are no plans to extend Lambert Lane east as part of the proposed project; however, this exchange at this time would simplify future road construction activities by Marana along this segment of Lambert Lane should they choose to pursue them. The 77.5 feet added to the west boundary is not counted as part of the natural open space calculation in the BA. Likewise, the half ROW dedication is not part of this project and is not counted towards project impacts.

## Conservation Measures

Conservation measures to be implemented at Cascada include long-term protection, management, and maintenance of the Conservation Lands<sup>2</sup> for the benefit of the pygmy-owl. Implementation of the Conservation measures will be accomplished by the Applicant or its successors who will: (1) implement specific conservation measures as part of site-development activity (Section 3.2.1 of the BA); (2) record specific conservation element covenants, conditions, and restrictions (the “Conservation Covenants”) that are beneficial to the pygmy-owl, and will run with the land and be implemented by the Homeowner's Association (HOA; Section 3.2.2 of the BA); (3) continue surveys for the pygmy-owl in conformance with recommended survey protocols until such time as vegetation-clearing activities are completed; (4) implement

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<sup>2</sup> Protected open space areas include the undisturbed lands within lots and common areas north of Lambert Lane and Enhanced Conservation Lands (also referred to as dispersal corridors) that are associated with the seven primary drainage ways that traverse the property, and the 50-foot planted habitat buffer along portions of the western boundary of the Multi-Use areas. These lands are generally referred to in this BA as the Conservation Lands.

specific measures should an active pygmy-owl territory be detected on or near the Conservation Land (Section 3.2.3 of the BA); and (5) enhance certain habitats within the Conservation Lands (Section 3.2.2 of the BA). Long-term management of the Conservation Lands will be the responsibility of the HOA. Collectively, these are referred to as the Conservation Measures. A more detailed description of the Conservation Measures that will be implemented by the landowner/developer during site development and by the HOA is provided in the following sections.

### **Measures Implemented by Landowner/Developer**

The landowner/developer, prior to the HOA assuming control and responsibility of the Conservation Land, will complete the Development Conservation Measures described below.

**Development Conservation Measure 1 – Surface Disturbance.** Consistent with the final Project Plan, the landowner/developer will, prior to initiating grading activities, install t-post and wire fence or an equivalent barrier at the Project clearing limits on a phase-by-phase basis to protect the Conservation Land. This barrier will remain in place during the construction of each phase of the project.

**Development Conservation Measure 2 – Native Plant Preservation Ordinance Compliance.** The landowner/developer will be responsible for compliance with applicable Native Plant Preservation Ordinance (NPPO) requirements for the Town of Marana. An approved Native Plant Preservation Plan (NPPP) for each subdivision in the Project will be implemented consistent with the NPPO. As required by the NPPP, large trees and saguaros occurring within development envelopes will be preserved in place when practical. Where preservation in place is not possible, the landowner/developer will comply with applicable NPPO regulations.

**Development Conservation Measure 3 – CFPO Survey and Monitoring Restrictions.** In the event the landowner/developer or FWS become aware of a pygmy-owl within 600 meters of the Project, Project activities will be subject to the constraints described in Section 3.2.3 of the BA. The landowner/developer will conduct pygmy-owl surveys in undeveloped portions of the property in accordance with FWS pygmy-owl survey protocol until vegetation clearing has been completed. Once vegetation clearing has been completed, further pygmy-owl surveys will not be required.

**Development Conservation Measure 4 – Baseline Documentation.** Upon completion of grading activities associated with each block or subdivision plat, the landowner/developer will produce a final site plan for each block or subdivision plat that clearly delineates the “as-built” condition and compliance with the grading limitations described in this BA. The as-built site plan will be submitted to the ACOE and FWS. The landowner/developer will also record baseline conditions of the Conservation Land by establishing a sufficient number of permanent photo point monuments and photographing the condition of the access roads, future water line

access areas, natural drainages, and boundary lines of the Conservation Land prior to the HOA assuming control and/or management responsibility of the Conservation Land. The direction of the photo (compass bearing), the monument identification, and time and date of the photograph will be recorded. These baseline photographs will be given to the HOA to become part of a permanent file on record with the HOA for use in future monitoring efforts.

**Development Conservation Measure 5 – Revegetation of Temporarily Disturbed Areas.**

Areas temporarily disturbed by construction within the Conservation Land will be seeded with native seed mix composed of sub-shrubs, forbs, and grasses indigenous to the site.

**Development Conservation Measure 6 – Perimeter Fencing.** The landowner/developer may install a perimeter fence around the subject property or around portions of the property.

Perimeter fencing will not be constructed of woven wire, chain link, or other similar fencing materials. Access points through the fence will be minimized so as to better protect the Conservation Land. Individual lot fencing restrictions, applicable to the large lot portion of the Project north of Lambert Lane, are described under CC&R Conservation Element 6.

**Development Conservation Measure 7 – Enforcement Actions.** The Conservation Covenants, a set of conservation elements identified in Section 3.2.2 that will be included as part of the recorded covenants, conditions, and restrictions for Cascada, will clearly define FWS and ACOE authority to pursue enforcement actions if the landowner/developer or the HOA are not in compliance with the Conservation Covenants. Conservation Measures and Conservation Covenants will be tied to the final plats for each phase of the Cascada development. The Town of Marana will have enforcement authority for violation of such plat notes if the HOA fails to remedy any violations of the Conservation Measures or Conservation Covenants outlined in the BA and this BO.

**Development Conservation Measure 8 – Enhanced Conservation Lands/Dispersal**

**Corridor.** Vegetation along the seven dispersal corridors south of Lambert Lane, totaling approximately 98.8 acres, will be enhanced with native tree and shrub plantings to enhance their habitat value and the value of the jurisdictional waters within these areas to improve their utility for wildlife movement, including pygmy-owl dispersal. Tree and shrub species used in this enhancement effort will include whitethorn acacia, catlaw acacia, desert hackberry, velvet mesquite, and foothill palo verde salvaged from the Project Area, along with additional nursery-grown stock of these same species. Saguaro and other smaller cacti salvaged from on-site will be transplanted to these areas at densities similar to those currently existing on the Property. Transplanted and containerized trees and shrubs will be irrigated by an automatic drip irrigation system until establishment. The enhancement activities in these areas will be conducted in accordance with the Habitat Mitigation and Management Plan approved by the ACOE and the FWS as part of the Project's CWA Section 404 Habitat Mitigation and Monitoring Plan.

**Conservation Covenants to be Recorded for Cascada**

The Conservation Covenants are to be included as part of the recorded covenants, conditions, and restrictions for Cascada, and will also be tied to the final plat for each phase of development.

The final form of the Conservation Covenants will be submitted to the FWS and ACOE for review and approval. In the event the FWS and the ACOE have not responded to the proposed form of the Conservation Covenants within thirty (30) days of submittal, the proposed form will be deemed approved.

**Conservation Element 1 – Management of the Conservation Land.** The HOA will be responsible for managing the Conservation Lands. Management is defined as: 1) implementing and enforcing the Conservation Covenants; 2) allowing human access to the Conservation Lands for only those uses allowed in the BA for construction, maintenance, and repair of appropriate gates, wildlife compatible fencing, or other barriers as necessary; 3) maintaining and repairing permanent markers installed to delineate the boundaries of the Conservation Lands; 4) periodic inspection of the Conservation Lands for vandalism, dumping, and other habitat damage and the restoration of such damage; 5) annual removal of trash and inorganic debris; 6) restoring unauthorized trails and paths; and 7) conducting monitoring of the Conservation Lands and submittal of an annual report to the FWS and the ACOE as prescribed in the Conservation Covenants.

**Conservation Element 2 – Surface Disturbance.** To facilitate maintenance and monitoring of the Conservation Land, permanent markers will be installed by the landowner/developer to indicate the boundaries of the Conservation Land. These markers will be maintained in perpetuity by the HOA. No vegetation or surface disturbance will be allowed to occur within the Conservation Lands, except for future utilities or as otherwise specifically allowed by the Conservation Covenants and this BA.

In the event of trespass or damage to habitat within the Conservation Lands by lot owners or others, the HOA will seek compliance with the requirements of the Conservation Covenants and/or restoration of disturbed areas through a process of resolution/agreement with the individual landowner and/or responsible party following the applicable procedures provided in the covenants, conditions, and restrictions for Cascada. If efforts to resolve the trespass or damage are unsuccessful, the HOA will be responsible for completing necessary restoration efforts. The HOA may then proceed with any enforcement actions available under the law as it deems appropriate to secure reimbursement for the cost of restoration efforts and to ensure future compliance with the Conservation Covenants and the requirements of this BA.

**Conservation Element 3 – Landscape Restrictions.** Areas temporarily disturbed by construction, such as roadways for construction purposes and future utilities, will be seeded with native plant species indigenous to the region.

Vegetation management is limited to non-native weed control (list of non-native weeds will be provided as part of recorded Conservation Covenants), fire safety measures, and restoration activities. Management activities that restrict the ability of the disturbed area(s) to recover are not permitted. The HOA will hire qualified professionals familiar with the habitat within the Conservation Lands to carry out this duty.

**Conservation Element 4 – Domestic Animals.** The lot owners will be required to contain domestic pet animals in the enclosed portion of their lot or within the established clearing limits and/or under strict control at all times. Dogs outside of enclosed areas will be leashed in conformance with Pima County Code 6.04.030. For protection of domestic cats and native wildlife, all domestic cats will be restricted to the inside of the home or leashed.

**Conservation Element 5 – Trails and Paths.** Pedestrian activities on the Conservation Land will be confined to existing roadways, trails, and paths. Unauthorized clearing of trails and paths through the Conservation Lands will not be permitted. The HOA will discourage the establishment of unauthorized paths through education and enforcement of the Conservation Covenants. In the event that an unauthorized trail or path is constructed, the HOA will seek compliance and/or restoration. If resolution with the responsible persons is unsuccessful, the HOA will be responsible for completing restoration and may then proceed with enforcement actions to seek reimbursement and ensure future compliance with the Conservation Covenants.

**Conservation Element 6 – Fence Restrictions.** To maintain a network of interconnected open space, the construction of fencing beyond the clearing limits of each lot north of Lambert is prohibited. Perimeter fencing along the clearing limits of each lot will not be constructed of woven wire, chain link fencing, or other similar material. Recommended fencing types/materials include masonry, wood, wrought iron, tubular steel, or other equivalent materials.

**Conservation Element 7 – Allowable Uses and Management of the Conservation Land.** The Conservation Land will be maintained as natural open space, consistent with the conservation of the pygmy-owl, and the landowner/developer (or the HOA, as applicable) will make periodic inspections for vandalism, dumping, and other habitat damage within the Conservation Lands. Specific uses allowed in the Conservation Lands include: (1) hiking and equestrian trail use on approved trails by parties of 10 or less in the Conservation Lands north of the Lambert Lane<sup>3</sup> Alignment, and hiking and equestrian trail use on approved trails on the Conservation Lands south of Lambert Lane; (2) The enjoyment of Conservation Lands within individual lots by lot

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<sup>3</sup> The identification of allowable uses of the Conservation Land outlined in the BA and made part of the Conservation Restrictions will not grant the right of such use on any private lands or HOA owned lands within the Conservation Lands. For example, hiking on Conservation Land within a private lot by members of the community other than the lot owner would only be allowable if a public or semi-public trail were constructed across that lot in conformance with the requirements of the Specific Plan and this BA.

owners and their guests in adherence with the 'leave no trace'<sup>4</sup> land use ethic; (3) the construction of the 11 utility line/grade control structures south of Lambert Lane and five utility line crossings north of Lambert Lane; (4) the maintenance and construction of trails within the utility line easements across the Conservation Lands; and (5) the construction of small community hiking trails through the Conservation Lands provided average trail width does not exceed six feet, and no large trees, large cacti, or shrub greater than three feet in height are removed for its construction. Trail plans will be submitted to FWS and ACOE prior to the initiation of construction.

**Conservation Element 8 – Monitoring and Reporting.** Upon transfer of responsibility by written instrument recorded with the Pima County Recorder, the HOA will be responsible for implementation and enforcement of the Conservation Covenants and the overall management of the Conservation Land. This includes annual inspection/monitoring and reporting to the FWS and ACOE in regard to compliance with the Conservation Covenants. Annually, during the first quarter of each calendar year, a monitoring report will be submitted to the FWS and ACOE. This report will provide a brief summary of monitoring activities completed over the past year and the project's compliance with the Conservation Covenants. One requirement of annual monitoring efforts will be to physically locate boundary markers and determine if impacts have occurred within the Conservation Lands. For each Annual Monitoring Report, the HOA will take photographs at each of the permanent photo points that match as closely as possible the aspect of the original monitoring point photograph.

After completing planned grading activities on each block or parcel adjacent to any Conservation Lands, the landowner/developer will record baseline conditions of the Conservation Lands through photo documentation. These baseline photographs will become part of a permanent file on record with the HOA for use in future monitoring efforts.

Several permanent photo point monuments will be installed throughout the Conservation Lands for monitoring purposes. Additional photographs will be recorded for the access roads, future water line access areas, along the natural drainages, and along the boundary lines of the Conservation Lands. The direction of the photo (compass bearing), the monument identification, and time and date of the photograph will be recorded. Each year photographs will be taken from each of the permanent photo points that match as closely as possible the aspect of the original monitoring point photograph.

The HOA will prepare and submit to the ACOE and FWS an Annual Monitoring Report that will include, as attachments, color copies of monitoring photographs and a monitoring log

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<sup>4</sup> In essence, the visitor to the Conservation Lands should leave no evidence of their passing. "Leave No Trace is a nationwide (and international) program designed to assist visitors with their decisions when they travel and camp on America's public lands. The program strives to educate visitors about the nature of their recreational impacts as well as techniques to prevent and minimize such impacts. Leave No Trace is best understood as an educational and ethical program, not as a set of rules and regulations." (<http://www.Int.org/programs/index.html>)

summarizing results of the ground inspection and maintenance activities or enforcement activities conducted during the past year. The ACOE and FWS will have 90 days from the submittal date to review the Annual Report. If ACOE or FWS do not respond to the Annual Report within the 90-day time limit, the HOA's report will be deemed complete and acceptable.

**Conservation Element 9 – Amendments to the Conservation Covenants Subject to FWS and ACOE Approval.** Any material changes to the Conservation Covenants are subject to approval by the FWS and ACOE. Upon written request of the HOA, the FWS and ACOE may approve changes to the Conservation Covenants. If ACOE or FWS do not respond to the request for proposed changes within the 90-day time limit, the changes will be deemed approved provided that they do not substantively change the protections provided by the Conservation Covenants.

**Conservation Element 10 – Prohibited Uses.** The following uses or activities are expressly prohibited within the Conservation Land:

- Use of herbicides, pesticides, rodenticides, biocides, fertilizers, or other agricultural chemicals or weed-abatement activities except as provided in Conservation Element 3;
- Incompatible fire protection activities;
- Use of off-road vehicles and use of any other motorized vehicles except on existing roadways and as necessary to restore native plant communities or accomplish utility construction activities specified in the BA;
- Once the Final Plat has been recorded on parcels within any block, livestock grazing will not be permitted within that block. Other agricultural activities of any kind are not permitted;
- Residential development, commercial development, or industrial uses (except as provided for utility line construction);
- Construction, reconstruction, or placement of any building or other improvement, billboard, or sign except gates, fences, and boundary markers;
- Depositing or accumulation of soil, trash, ashes, refuse, waste, bio-solids, or any other material;

- Planting, or other intentional introduction or dispersal of non-native or exotic plant or animal species;
- Filling, dumping, excavating, draining, dredging, mining, drilling, removing, or exploring for or extraction of minerals, loam, gravel, soil, rock, sand, or other material on or below the surface of the Conservation Land, except for the installation of utility lines;
- Altering the general topography of the Conservation Land, including but not limited to, building of roads, paths, trails, and flood control work, except during construction, maintenance, or repair of the utility lines and as otherwise specified in the BA;
- Removing, destroying, or cutting of trees, shrubs or other vegetation, except for (1) emergency fire protection as required by fire safety officials having jurisdiction over the Project, (2) prevention or treatment of plant disease or pathogens, (3) construction, maintenance and repair of the utility lines, and (4) trail construction and maintenance on any allowed trail;
- Manipulating, impounding or altering any natural watercourse, body of water, or water circulation on the Conservation Land and activities or uses detrimental to water quality, including, but not limited to, degradation or pollution of any surface or sub-surface waters, except as authorized by the Clean Water Act Section 404 permit that may be issued for the Project or general storm water permit issued for the Project;
- Artificial lighting such as light poles or other permanent lighting fixtures;
- Organized events that consist of more than 10 individuals, except as specified in the BA;
- Use of fires or outdoor cooking;
- Equestrian use by parties of 10 people or more;
- The boarding of horses; and

- The staging of equestrian events.

**Conservation Element 11 – Rights of the ACOE and FWS.** The ACOE and FWS will have all rights set forth in the Conservation Covenants, which rights will include:

ACOE

- The right to enter upon the Conservation Land to monitor compliance with and to otherwise enforce the Conservation Covenants; and
- The right to prevent any activity on or use of the Conservation Land that is inconsistent with the purpose of the Conservation Covenants and to require the restoration where reasonable and practicable, of such areas or features of the Conservation Land that may be damaged by any act, failure to act, or any use that is inconsistent with the purpose of the Conservation Covenants; and
- The right to enforce by any means, including, without limitation, injunctive relief, the terms and conditions of the Conservation Covenants, except that they will have no right to exact monetary damages from the HOA or the Applicant.

FWS

- The right to oversee and review the process for monitoring compliance with and enforcement of the Conservation Covenants, including the right to enter upon the Conservation Land; and
- The right to review and make recommendations regarding any proposed changes to activities on or use of the Conservation Land that is inconsistent with the purpose of the Conservation Covenants and to oversee the restoration where reasonable and practicable, of such areas or features of the Conservation Land that may be damaged by any act, failure to act, or any use that is inconsistent with the purpose of the Conservation Covenants.

**Conservation Element 12 – Conservation Land Funds.** The HOA will establish a Conservation Land Operating Fund for the deposit of Conservation Land Contributions. The payment of the costs of maintaining, managing, and ensuring protection of the Conservation Land will be from this fund. The Operating Fund will be evaluated annually by the HOA Board to confirm its adequacy to comply with the obligations of the Conservation Covenants. The HOA will also establish a Conservation Land Contingency Fund, to be maintained with a minimum balance of \$5,000, which sum is to be originally contributed by the landowner/developer. The minimum balance of the Conservation Land Contingency Fund will be increased by the HOA in each successive two (2) year periods by two percent (2%) of the minimum balance in effect during the preceding two (2) year period. This Contingency Fund will be used to fund extraordinary maintenance, management, or insurance expenses of the Conservation Land and unforeseen shortages in the Conservation Land Operating Fund as may

be necessary to comply with the terms of the Conservation Covenants. The amount by which the Contingency Fund is reduced by expenditure below the minimum balance will be replenished by assessment no later than the fiscal year following the expenditure.

**Conservation Element 13 – General Obligation.** A copy of the Conservation Covenants will be kept in the office of the HOA for review by all Owners and interested persons. All conveyances by the HOA and Owners of any interest in the Conservation Land will be subject to the Conservation Covenants.

### **Development Constraints – If a Pygmy-Owl Is Detected**

The landowner/developer will follow the specific guidelines outlined below in the event that a pygmy-owl nest site or territory center is detected within 600 meters of the Project (except as described under the paragraph below). These guidelines establish four zones (Zone 1 through IV) based upon the distance of construction activity from a known nest or activity center. Certain levels of construction can occur within each of these zones without resulting in levels of effect not already considered in the analysis of Project impacts. Situations falling outside of the parameters established by the guidelines will require that the landowner/developer coordinate with the FWS to determine if consultation is required prior to continuing with the construction activities in question. The specific parameters that apply to each of the four zones are described below.

Should pygmy-owl augmentation in association with a Habitat Conservation Plan (HCP) proceed prior to or concurrent with development of the project and should a pygmy-owl establish a territory within 600 meters of the Project, then the HCP provisions under “changed circumstances” will apply if they are less restrictive than the measures proposed in this BA. Conversely, if the HCP procedures are more restrictive, then they will not apply to the Cascada project. In the event the HCP restrictions apply to this Project, the FWS will expeditiously provide the applicant written authorization to proceed with their project in conformance with the relevant requirements of the HCP.

#### ***Zone I. 0 to 100 Meters from the pygmy-owl activity center***

1. No additional clearing of vegetation will occur without prior review by the FWS.
2. Construction-related activities may continue on lands that have already been cleared of vegetation provided that they do not exceed the levels/intensity of activity that was occurring during the period of time that the territory was established.
3. Activities that would be more intense or cause greater levels of noise disturbance than was occurring during the period of time that the territory was established cannot proceed without prior review by the FWS.

***Zone II. 100 to 400 Meters from the pygmy-owl activity center***

1. No additional clearing of vegetation will occur without prior review by the FWS.
2. No restrictions on the nature or type of construction activity (excluding the clearing of vegetation) from August 1<sup>st</sup> through January 31<sup>st</sup> of the following calendar year.
3. Construction activities during the breeding season (February 1<sup>st</sup> to July 31<sup>st</sup>) cannot exceed the levels or intensity of activities that occurred at the time the territory was established without prior review by the FWS.

***Zone III. 400 to 600 Meters from the pygmy-owl activity center***

1. No additional clearing of vegetation will occur without prior review by the FWS.
2. No restrictions on the levels or intensity of construction activity (excluding the clearing of vegetation) at any time of the year.

***Zone IV. Greater than 600 Meters from the pygmy-owl activity center***

1. No restrictions. Any activity consistent with the Project description provided in the BA is allowed.

**Status of the Species/Critical Habitat**

A detailed description of the life history and ecology of the pygmy-owl can be found in the *Birds of North America* (Proudfoot and Johnson 2000), *Ecology and Conservation of the Cactus Ferruginous Pygmy-owl in Arizona* (Cartron and Finch 2000), and in other information available from the Arizona Ecological Services Office website ([www.fws.gov/arizonaes](http://www.fws.gov/arizonaes)). Information specific to the pygmy-owl in Arizona is preliminary. Research completed in Texas has provided useful insights into the ecology of this subspecies and, in some instances, represents the best available scientific information. However, habitat and environmental conditions are somewhat different than in Arizona, and conclusions based on information developed in Texas and elsewhere may require qualification.

### Species Description

The pygmy-owl is in the order Strigiformes and the family Strigidae. They are small birds of prey, averaging 6.75 inches in length. Males average 2.2 ounces with females slightly larger, averaging 2.6 ounces. The pygmy-owl is reddish brown overall, with a cream-colored belly streaked with reddish brown. The crown is lightly streaked, and a pair of dark brown/black spots outlined in white occurs on the nape suggesting “eyes”. The species lacks ear tufts and the eyes are yellow. The tail is relatively long for an owl and is reddish brown in color with darker brown bars. Pygmy-owls have large feet and talons relative to their size.

### Listing and Critical Habitat

The Arizona population of the pygmy-owl was listed as an endangered distinct population segment on March 10, 1997 (USFWS 1997) without critical habitat. In response to a court order, approximately 731,712 acres of critical habitat were designated on July 12, 1999 (USFWS 1999) in areas within Pima, Cochise, Pinal, and Maricopa counties in Arizona. Subsequent litigation resulted in the court-ordered vacature of designated critical habitat and a subsequent proposal in the Federal Register on November 27, 2002 (USFWS 2002) to redesignate critical habitat on approximately 1,208,000 acres in portions of Pima and Pinal counties, Arizona. On August 3, 2005, we proposed to delist the Arizona distinct population segment of the pygmy-owls and withdraw our proposed designation of critical habitat (FR 70: 44547-44552). Until a final rule delisting the pygmy-owl is published, the listing and all protections under the Act remain in place.

Because conservation and recovery of the pygmy-owl may rely upon a landscape mosaic of appropriate habitat, we have proposed critical habitat areas that will link a network of State, private, and Federal lands. The proposed system of critical habitat is designed to provide an interconnected system of suitable habitat essential to Arizona pygmy-owl conservation and maintain the viability of groups of pygmy-owls that are dependant upon continued genetic interchange and population immigration. Two premises were considered in proposing this system: 1) protecting verified pygmy-owl sites and areas with the presence of one or more of the constituent elements within the mean straight-line dispersal distance (8 km (5 mi)) from nest sites, and three of the four recovery team-recommended Special Management Areas (SMAs); and 2) providing for the linkage of these verified sites with areas of suitable habitat for which we have adequate scientific information indicating that they are essential to the conservation of the listed population and in need of special management. A complete description of the primary constituent elements of proposed critical habitat and the proposed critical habitat units can be found in the Federal Register announcement of the proposed rule to designate critical habitat for the pygmy-owls (USFWS 2002).

### Recovery

In September 1998, we appointed the Cactus Ferruginous Pygmy-Owl Recovery Team. The Team is comprised of a Technical Group of biologists (pygmy-owl experts and raptor ecologists) and an Implementation Group, which includes representatives from affected and interested parties (i.e., Federal and State agencies, local governments, the Tohono O’odham Nation, and private groups).

The Recovery Team has prepared a draft recovery plan dated January 2003 for the pygmy-owl and recommended “Recovery Areas” that they believe are necessary for the survival and recovery of the pygmy-owl in Arizona (USFWS 2003). The action area for the Cascada development considered in this BO falls within Recovery Area 3. The team has also recommended specific areas within Recovery Areas for special management (i.e., SMAs) that are of the highest concern because: (1) they contain high concentrations of pygmy-owls, particularly nesting owls, that are important sources of young owls to increase the population; (2) pygmy-owl recovery is dependent on the availability of suitable habitat near breeding areas not currently known to have owls where juvenile owls can disperse into and successfully breed; and (3) they are threatened by rapid urban development or other immediate threats.

### Life History

Pygmy-owls are considered non-migratory throughout their range. There are winter (November through January) pygmy-owl location records from throughout its historical range in Arizona (University of Arizona 1995, Tibbitts 1996, Abbate *et al.* 1999, 2000). These winter records suggest that pygmy-owls are found within Arizona throughout the year and do not appear to migrate seasonally. The pygmy-owl is primarily diurnal (active during daylight) with crepuscular (active at dawn and dusk) tendencies.

Usually, pygmy-owls nest as yearlings (Abbate *et al.* 1999, Gryimek 1972), and both sexes breed annually thereafter. Territories normally contain several potential nest-roost cavities from which responding females select a nest. Hence, cavities/acre may be a fundamental criterion for habitat selection. Historically, pygmy-owls in Arizona used cavities in cottonwood, mesquite, and ash trees, and saguaro cacti for nest sites (Millsap and Johnson 1988). Recent information from Arizona indicates nests were located in cavities in saguaro cacti for all but two of the known nests documented from 1996 to 2002 (Abbate *et al.* 1996, 1999, 2000, AGFD 2003). One nest in an ash tree and one in a eucalyptus tree were the only non-saguaro nest sites (Abbate *et al.* 2000).

Pygmy-owls exhibit a high degree of site fidelity once territories (the area defended) and home ranges (the area used throughout the year) have been established (AGFD 2003). Therefore, it is important that habitat characteristics within territories and home ranges be maintained over time in order for them to remain suitable. This is important for established pygmy-owl sites, as well as new sites established by dispersing pygmy-owls. Pygmy-owls are more likely to be affected by

projects within their home range because of the species' strong site fidelity. Behaviorally, the option for resident pygmy-owls to seek alternative areas outside of the home range appears limited, at least for males.

Data on the size of areas used by pygmy-owls on an annual basis in Arizona are limited. Most telemetry data are gathered during the breeding season due to increased capture success and the limited battery life of transmitters. Until more complete information is available from Arizona, the home range size estimate we are using is based on telemetry work completed in Texas. In Texas, Proudfoot (1996) noted that, while pygmy-owls used between 3 and 57 acres during the incubation period, they defend areas up to 279 acres in the winter. Proudfoot and Johnson (2000) indicate males defend areas with radii from 1,100 - 2,000 feet. Initial results from ongoing studies in Texas indicate that the home range of pygmy-owls may also expand substantially during dry years (G. Proudfoot, pers. comm.). Therefore, we consider a 280-acre home range necessary for pygmy-owls to meet their life history requirements on an annual basis.

Little is known about the rate or causes of mortality in pygmy-owls; however, they are susceptible to predation from a wide variety of species. Documented and suspected pygmy-owl predators include great horned owls (*Bubo virginianus*), Harris' hawks (*Parabuteo unicinctus*), Cooper's hawks (*Accipiter cooperii*), screech owls (*Otus kennicottii*), and domestic cats (*Felis domesticus*) (Abbate *et al.* 2000, AGFD 2003). Pygmy-owls may be particularly vulnerable to predation and other threats during and shortly after fledging (Abbate *et al.* 1999).

Vegetation communities that provide a diversity of structural layers and plant species likely contribute to the availability of prey for pygmy-owls (Wilcox *et al.* 2000). Pygmy-owls also utilize different groups of prey species on a seasonal basis. For example, lizards, small mammals, and insects are utilized as available during the spring and summer during periods of warm temperatures (Abbate *et al.* 1999). However, during winter months, when low temperatures reduce the activity by these prey groups, pygmy-owls likely turn to birds as their primary source of food and appear to expand their use area in response to reduced prey availability (Proudfoot 1996). Therefore, conservation of the pygmy-owl should include consideration of the habitat needs of prey species, including structural and species diversity and seasonal availability. Pygmy-owl habitat must provide sufficient prey base and cover from which to hunt in an appropriate configuration and proximity to nest and roost sites.

Freestanding water does not appear to be necessary for the survival of pygmy-owls. During many hours of research monitoring, pygmy-owls have never been observed directly drinking water (Abbate *et al.* 1999, AGFD 2003). It is likely that pygmy-owls meet much of their biological water requirements through the prey they consume. However, the availability of water may contribute to improved vegetation structure and diversity, which improves cover availability. The presence of water also likely attracts potential prey species, improving prey availability.

### Habitat

Pygmy-owls were historically recorded in association with riparian woodlands in central and southern Arizona (Bendire 1892, Gilman 1909, Johnson *et al.* 1987, Johnson *et al.* 2003). However, recent records have documented pygmy-owls in a variety of vegetation communities such as riparian woodlands, mesquite (*Prosopis velutina*) bosques (Spanish for woodlands), Sonoran desertscrub, semidesert grassland, and Sonoran savanna grassland communities (see Brown 1994 for a description of these vegetation communities).

In recent years, pygmy-owls have been primarily found in the Arizona Upland Subdivision of the Sonoran desert, particularly Sonoran desertscrub (Phillips *et al.* 1964, Monson and Phillips 1981, Davis and Russell 1984, Johnson and Haight 1985, Johnsgard 1988). It is described as a low woodland of leguminous trees with an overstory of columnar cacti and with one or more layers of shrubs and perennial succulents. Within the United States, columnar cacti include either saguaros (*Carnegiea gigantea*), or organ pipe cactus (*Stenocereus thurberi*). Trees within this subdivision include blue paloverde (*Parkinsonia florida*), foothills paloverde (*P. microphyllum*), ironwood (*Olneya tesota*), mesquites (*Prosopis* spp.), and cat-claw acacia (*Acacia* spp.) (Brown 1994). The paloverde-cacti mixed scrub series is described as developed on the bajadas and mountainsides away from valley floors. A list of plant and wildlife species associated within this subdivision can be found in Appendix II of Brown (1994), and is incorporated herein by reference.

While there are hundreds of thousands of acres of Sonoran Desertscrub, not all of this plant community is vegetatively suitable for pygmy-owls. Preliminary habitat assessment data appears to indicate that those areas of Sonoran Desertscrub characterized by high plant species diversity, high structural diversity, and the presence of tall canopy are the areas being used by pygmy-owls (Wilcox *et al.* 2000, Flesch 2003a). These types of areas are typically located along drainages and wash systems, or in areas with better soil and moisture conditions such as bajadas. The occurrence of these areas is more limited than the overall distribution of Sonoran Desertscrub.

In addition to Desertscrub, pygmy-owls have also been found in riparian and xeroriparian communities and semidesert grasslands as classified by Brown (1994). An abundance of saguaros or large trees and a diversity of plant species and vegetation strata characterize occupied Desertscrub communities. Xeroriparian habitats contain a rich diversity of plants that support a wide array of prey species and provide cover. Semidesert grasslands contain linear woodlands of various tree species occur along bottoms and washes. In Arizona, these grassland communities often transition into desertscrub, which results in the availability of some saguaros for nesting.

While plant species composition differs among these communities, there are certain unifying characteristics, such as the presence of vegetation in fairly dense thickets or woodlands, the presence of trees, saguaros, or organ pipe cactus large enough to support cavities for nesting, and elevations below 1,200 meters (m) (4,000 feet (ft)) (Swarth 1914, Karalus and Eckert 1974,

Monson and Phillips 1981, Johnsgard 1988, Enriquez-Rocha *et al.* 1993, Proudfoot and Johnson 2000). Large trees provide canopy cover and cavities used for nesting, while the density of mid- and lower-story vegetation provides foraging habitat and protection from predators, and it contributes to the occurrence of prey items (Wilcox *et al.* 2000). Perch substrates used by pygmy-owls for calling are typically the tallest trees available within a home range, though pygmy-owls have also been noted calling from within saguaro cavities (Flesch 2003a).

The density of trees and the amount of canopy cover preferred by pygmy-owls in Arizona has not been fully defined. However, preliminary results from a habitat selection study indicate that nest sites tend to have a higher degree of canopy cover and higher vegetation diversity than random sites (Wilcox *et al.* 2000). Overall vegetation density may not be as important as patches of dense vegetation with a developed canopy layer interspersed with open areas. Vegetation structure may be more important than species composition (Wilcox *et al.* 1999, Cartron *et al.* 2000a). Flesch (1999) indicated that areas with large trees and canopy coverage are likely important areas for pygmy-owls in the Altar Valley, though the author also noted (Flesch 2003a) that the presence of large, columnar cacti was also a potentially critical factor due to a greater availability of cavities relative to broadleaf trees. Riparian and xeroriparian (dry washes) areas, which are often used by pygmy-owls, are generally characterized by increased vegetation layers, higher plant diversity, and larger tree sizes because of increased moisture availability.

### Species Status and Distribution

Only the Arizona population of the pygmy-owl is listed as an endangered species (USFWS 1997). Documentation of the total number of pygmy-owls and their current distribution in Arizona is incomplete. This is due to the lack of systematic or comprehensive surveys throughout the pygmy-owl's historical range in Arizona, and respect for Tohono O'odham Nation's request to keep information related to pygmy-owls on the TON within tribal control. Survey and monitoring work in Arizona has documented an average of about 29 adult pygmy-owls per year for the past six years (1999 – 2004). Over this same period, an average of eight nests per year has been recorded. In 2004, we documented a total of 20 adult pygmy-owls and only four nests, a continuation of the low numbers observed in 2003. For comparison, the highest number of adult pygmy-owls recorded for a single year was 37 in 1999, and the most nests documented in a single year was 13 in 2001 (AGFD 2002a)<sup>5</sup>. Most of the pygmy-owls have been distributed in four general areas: northwest Tucson, southern Pinal County, Organ Pipe Cactus National Monument, and the Altar Valley. We believe that more pygmy-owls exist in Arizona, but for the reasons mentioned above, we do not have complete information.

In addition, recent survey information has shown pygmy-owls to be more numerous adjacent to and near the Arizona border in Mexico than early information indicated (Flesch and Steidl 2000). There also exists considerable unsurveyed habitat on the Tohono O'odham Nation, and, although we have no means of quantifying this habitat, the distribution of recent sightings on

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<sup>5</sup> These figures do not include documented pygmy-owl locations on the Tohono O'odham Nation.

non-Tribal areas east, west, and south of the U.S. portion of the Tohono O'odham Nation lead us to reasonably conclude that these Tribal lands may support meaningful numbers of pygmy-owls.

Consequently, we believe that it is highly likely that the overall pygmy-owl population in Arizona is maintained by the movement and dispersal of pygmy-owls among groups of pygmy-owls in southern Arizona and northern Mexico resulting from the connectivity of suitable habitat. The extent to which pygmy-owls disperse across the U.S./Mexico border is unknown, but recent survey work indicates that pygmy-owls regularly occur along the border (Flesch and Steidl 2000, Flesch 2003b). However, addressing habitat connectivity and the movements of pygmy-owls within Arizona is a primary consideration in the analysis of this project due to the importance of maintaining dispersal and movement among pygmy-owl groups within Arizona.

The patchy, dispersed nature of the pygmy-owl populations in Arizona (Abbate et al. 2000) and Mexico (Flesch 2003b) suggests that the overall population may function as a metapopulation. A metapopulation is a set of subpopulations within an area, where movement and exchange of individuals among population segments is possible, but not routine. A metapopulation's persistence depends on the combined dynamics of the productivity of subpopulations, the maintenance of genetic diversity, the availability of suitable habitat for maintenance and expansion of subpopulations, and the "rescue" of subpopulations that have experienced local extirpations through recolonization of these areas by dispersal from adjacent population segments (Hanski and Gilpin 1991, 1997). The local groups of pygmy-owls within Arizona may function as subpopulations within the context of metapopulation theory. However, more information is needed regarding the population dynamics of pygmy-owls in Arizona.

The ability and opportunity for pygmy-owls to disperse within population segments, as well as emigrate to adjacent population segments is likely important for the long-term persistence of pygmy-owls in Arizona. Pygmy-owl dispersal patterns are just beginning to be documented. A banded juvenile in Arizona was observed in 1998 approximately 2.4 miles from its nest site following dispersal. Five young monitored with radio telemetry during 1998 were recorded dispersing from 2.17 miles to 6.5 miles for an average of 3.6 miles (Abbate *et al.* 1999). In 1999, six juveniles in Arizona dispersed from 1.4 miles to 12.9 miles for an average of 6.2 miles (Abbate *et al.* 2000). In Arizona, the maximum documented dispersal distance is 21.8 miles (AGFD 2002b). However, monitoring of a dispersing female pygmy-owl in 2004 has revealed a total distance traveled of over 80 miles (AGFD 2004).

Juveniles typically disperse from natal areas in July and August and do not appear to defend a territory until September. They typically fly from tree to tree instead of longer flights, but may move up to a mile or more in a night (Abbate *et al.* 1999). Trees of appropriate size and spacing appear to be necessary for successful dispersal, but specific data describing this pattern are currently unavailable. Once dispersing male pygmy-owls settle in a territory (the area defended by a pygmy-owl), they rarely make additional movements outside of their home range (the area used on an annual basis). For example, spring surveys have found male juveniles in the same

general location as observed the preceding autumn (Abbate *et al.* 2000). However, unpaired female dispersers may make additional movements that sometimes continue into the subsequent breeding season (AGFD 2003).

### Threats to the Species

In determining whether listing of the pygmy-owl was warranted, we were required under section 4(a)(1) of the ESA to consider five listing factors: a) the present or threatened destruction, modification, or curtailment of its habitat or range; b) overutilization for commercial, recreational, scientific, or educational purposes; c) disease or predation; d) the inadequacy of existing regulatory mechanisms; or e) other natural or manmade factors affecting its continued existence. Below we provide a brief summary of current threats to the species; a full discussion can be found in the final listing rule (USFWS 1997).

#### *Factor A - The present or threatened destruction, modification, or curtailment of the species' habitat or range.*

The pygmy-owl is threatened by present and potential destruction and modification of its habitat throughout a significant portion of its range in Arizona (Phillips *et al.* 1964, Johnson *et al.* 1979, Monson and Phillips 1981, Johnson and Haight 1985, Hunter 1988, Millsap and Johnson 1988). One of the most urgent threats to pygmy-owls in Arizona continues to be the loss and fragmentation of habitat (USFWS 1997, Abbate *et al.* 1999). The complete removal of vegetation and natural features required for many large-scale and high-density developments, and the increased fragmentation of habitat caused by urban sprawl, directly and indirectly affect the pygmy-owl within some portions of its range in Arizona (Abbate *et al.* 1999).

#### *Factor B – Overutilization for commercial, recreational, scientific, or educational purposes.*

The pygmy-owl is highly sought by birders who concentrate at several of the remaining known locations of pygmy-owls in the United States. Oberholser (1974) and Hunter (1988) suggest that recreational birding may disturb pygmy-owls in highly visited areas, affecting their occurrence, behavior, and reproductive success.

#### *Factor C – Disease or predation*

Predation - Little is known about the rate or causes of mortality in pygmy-owls; however, they are susceptible to predation from a wide variety of species. Recent research indicates that predation likely plays a key role in pygmy-owl population dynamics, particularly after fledging and during the post-breeding season (AGFD 2003). Additional research is needed to determine the effects of predation, including nest depredation, on pygmy-owls in Arizona and elsewhere.

Disease - Trichomoniasis also can cause mortality of raptors (e.g., Cooper's hawks in Tucson) (Boal *et al.* 1998) that ingest doves and pigeons, but the effects of this disease on pygmy-owls in Arizona are unknown. Most species of raptors in the Tucson area, including small owls such as screech-owls and elf owls, have had documented cases of trichomoniasis (AGFD pers. comm.). House finches and doves are prey items for pygmy-owls in Arizona and are carriers of trichomoniasis (Abbate *et al.* 1999). Recent investigations in Texas and Arizona have indicated the regular occurrence of avian parasites in the materials inside of pygmy-owl nest cavities. The numbers of parasites may be high enough to affect nestling pygmy-owls (Proudfoot 2004). Hence, further study is needed in Arizona and Texas to assess the potential for diseases and parasites to affect pygmy-owl populations. The West Nile Virus has been identified as the cause of a number of raptor mortalities throughout the United States, including Arizona.

*Factor D - Inadequacy of existing regulatory mechanisms.*

Although the pygmy-owl in Arizona is considered non-migratory, it is protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712). The MBTA prohibits "take" of any migratory bird; however, unlike the ESA, there are no provisions in the MBTA preventing habitat destruction unless direct mortality or destruction of an active nest occurs. Other Federal and State regulations and policies such as the Clean Water Act, military policies (Barry M. Goldwater Range), National Park Service policy, and inclusion of the pygmy-owl on the State of Arizona's list of Species of Special Concern provide varying levels of protection, but have not been effective in protecting the pygmy-owl in Arizona from further decline. There are currently no provisions under Arizona statute addressing the destruction or alteration of pygmy-owl habitat.

*Factor E - Other natural or manmade factors affecting its continued existence.*

Genetics - Recent genetic research suggests that pygmy-owls in northwest Tucson show evidence of genetic separation from other populations in Arizona and Mexico (Proudfoot and Slack 2001). They have found that the low level of genetic variation and the absence of shared haplotypes between pygmy-owls in northwestern Tucson and the remainder of the State and Mexico increase the potential for the natural divergence of this population from the rest of the pygmy-owl population in Arizona. In addition, these owls have extremely low levels of average haplotype diversity. Researchers acknowledge this may also be a product of sampling (i.e., sampling from one maternal lineage) and/or an extremely high level of inbreeding as a result of low population numbers and geographic isolation.

Pesticides - Application of pesticides and herbicides in Arizona occurs year-round, and these chemicals may pose a threat to the pygmy-owl. The presence of pygmy-owls in proximity to residences, golf courses, agricultural fields, and nurseries may cause direct exposure to pesticides and herbicides (Abbate *et al.* 1999). Furthermore, ingestion of affected prey items may cause death or reproductive failure. Illegal dumping of waste also occurs in areas occupied

by pygmy-owls and may be a threat to pygmy-owls and their prey; in one case, drums of toxic solvents were found within one mile of a pygmy-owl detection (Abbate *et al.* 1999). No specific research has been conducted to determine what, if any, effects pesticides are having on pygmy-owl populations in Arizona.

### Additional Threats

Human-related Mortality - Direct and indirect human-caused mortalities (e.g., collisions with cars, glass windows, fences, power lines; predation by domestic cats, etc.), while likely uncommon, are often underestimated, and probably increase as human interactions with pygmy-owls increase (Banks 1979, Klem 1979, Churcher and Lawton 1987). This may be particularly important in the Tucson area where pygmy-owls are located in proximity to urban development.

### Rangewide Trend

Data collection related to the pygmy-owl has only been consistent throughout the state for the past few years. Even with expanded survey efforts since the pygmy-owl was listed as endangered in 1997, there are still many areas within Arizona that have not been surveyed or for which survey efforts are inadequate. Because research has been conducted for only a few years and because research and survey efforts have not been comprehensive or random in nature, it is not possible to determine a reliable population size or trend within Arizona. Additionally, the Tohono O'odham Nation supports pygmy-owls, but due to cultural and political considerations, complete information on the numbers and distribution of pygmy-owls on the Nation are not available. Given the historical distribution of pygmy-owls in Arizona, it is clear that they have declined throughout the state to the degree that they are now much more limited in distribution (Monson and Phillips 1981, Davis and Russell 1984, Millsap and Johnson 1988, Proudfoot and Johnson 2000, Johnson *et al.* 2003). Johnson *et al.* (2003) hypothesized that large-scale water development (damming and diversion of the Salt and Verde rivers) led to initial declines in species' abundance and distribution in Maricopa County. Habitat loss and fragmentation, climatic factors, predation, and low population numbers all likely contribute to the current low pygmy-owl population numbers in Arizona.

Information about populations of pygmy-owls in Mexico is limited. Based on personal observations and anecdotal information, Russell and Monson (1998) recorded no decline in numbers from Sonora, Mexico. However, the first systematic surveys for pygmy-owls in Sonora were conducted in 2000 and 2001 from the international border south to the Sonora/Sinaloa border. We are not aware of any management or conservation practices in Mexico that are directed towards pygmy-owls. The expansion of agricultural and urban land uses increases habitat loss and fragmentation in Mexico, and the stability of pygmy-owl populations cannot be determined. In Mexico, millions of acres of Sonoran Desert and thornscrub are being converted to buffelgrass (*Pennisetum ciliaris*), which represents both a direct and an indirect loss of habitat because of invasion into adjacent areas and increased fire frequency and intensity (McLaughlin and Bowers 1982, Burquez-Montijo *et al.* 2002). Thus, the long-term potential for Mexico to

provide this source of immigrant pygmy-owls is uncertain. Therefore, the importance of existing Arizona pygmy-owl populations may increase if populations south of the border become imperiled.

Under the current taxonomic classification, cactus ferruginous pygmy-owls also occur in southern Texas. However, recent genetic work (Proudfoot and Slack 2001) may indicate that the pygmy-owls in Texas are genetically distinct from the pygmy-owls in Arizona, possibly to the subspecies level. Regardless of the genetic distinction, pygmy-owls in Texas are found primarily on large private ranches where the levels of threat to habitat are reduced when compared to those found in most of the currently occupied range in Arizona. Pygmy-owl populations in Texas are geographically separated from Arizona and currently provide no genetic or demographic support for Arizona populations.

Since listing in 1997, we have evaluated approximately 889 actions that have had potential effects to pygmy-owls. The number of actions we evaluate continues to increase every year. In addition, two Habitat Conservation Plans have been completed for pygmy-owls, and three large multi-species Habitat Conservation Plans are being developed which include the pygmy-owl. As a reference for current levels of activity, in 2004, we evaluated 156 actions, including one emergency consultation, 49 informal consultations (these are actions that included sufficient measures to avoid or minimize impacts to the pygmy-owls so that the effects were insignificant or discountable), five formal consultations (these are actions where adverse effects to pygmy-owls are anticipated), and 101 technical assistance projects. Technical assistance is given for projects that have no Federal nexus. These actions have no legal requirement to follow the recommendations we provide, and we have no way of monitoring if or to what extent the recommendations are incorporated. They may or may not contribute to the conservation of the pygmy-owl, but they certainly contribute to ongoing effects to pygmy-owl habitat. Already in 2005, we have evaluated 210 actions, including 2 emergency consultations, 24 informal consultations, six formal consultations, and 178 technical assistance projects.

While many of these actions evaluated since the listing of the pygmy-owl have had adverse effects on the pygmy-owl, it is important to note that we did not anticipate lethal “take” of a pygmy-owl for any of them. “Take” was anticipated only in the form of harm or harassment.

### **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 in the action area that have undergone formal or early section 7 consultation; and the impact of State and private actions that 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 is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). In the BA, the Applicant defined the action area as the project site plus a 600-meter buffer area. We believe that this determination fails to consider all of the indirect effects likely to occur as a result of the action.

In addition to the direct effects to the project area, the action area is also based on the extent of the indirect effects resulting from the proposed action. The effects considered in determining the action area include the noise and disturbance effects that occur within 600 meters of the project as described in the BA, but also the area affected by (1) increased traffic and other urban effects, and (2) the potential increase in predation from subsidized predators and household pets, domestic cats in particular.

The presence of transportation infrastructure (i.e. roads) often degrades and fragments habitat and, given that such infrastructure is typically part of a network or system, the effects are often synergistic and widespread (Seiler 2001). Where such features are already present, the initial adverse effects of new residential development are the result of increased use of that infrastructure. Roads present a mortality hazard to pygmy-owls. While narrower roads, or wider roads with medians that incorporate trees, can minimize the risk of mortality, it cannot be eliminated. Further, the risk of vehicle-strike mortality is likely related to the number of vehicles using the road; a greater number of vehicles (or a greater frequency of use) can reasonably be expected to increase the probability that a pygmy-owl will be struck. Given the pygmy-owl's rarity and patchy distribution, any vehicle strike mortality could have serious adverse consequences to a regional subpopulation.

The action area can be partially defined by the portion of the existing transportation network likely to be affected by the construction of the Cascada residential and commercial project. The proposed project does include some commercial development and residential amenities, however, it is unlikely that all the needs of the future residents of this subdivision will be able to be met in the immediate area and it is likely that an appreciable portion, if not all, of the residents will travel by car to work, regional shopping centers, schools, etc. Clientele of the commercial portion of this project will also contribute to traffic flowing into the project area. This project is proposing the development of approximately 3,506 residential units. This translates to an increase of approximately 5,675 vehicles (the mean number of vehicles per household in Pima County is 1.62 (CTTP 2004)) in this area. With each of these vehicles making the mean number of trips per capita (3.5 in Pima County (PAG 2004)), the result is potentially an additional 19,862 vehicle trips per day resulting from this project.

It is also reasonable to assume that, because of this incremental increase in traffic volume, it will eventually necessitate the improvement of existing arterial roads. Such improvements are likely to include widening to accommodate additional traffic, left-turn lanes, wider shoulders, etc. Local governing bodies, including Pima County and the towns of Marana and Oro Valley, assess impact fees on new development; funding for roads is included in these surcharges. Marana

raises a large proportion of its money for roads from a 2% tax on new-home construction (The Arizona Daily Star 2003), and Oro Valley recently increased its roadway development impact fee to increase the capacity of the town's roadways system (The Northwest Explorer 2003), thus indicating that road construction and/or improvements are indirect effects of that construction. Pima County's proposed improvements to Thornydale Road and Cortaro Farms Road may become a higher priority as this development occurs in an area serviced by these major roadways. Pima County has anticipated that growth in northwest Tucson would necessitate widening Thornydale and Cortaro Farms roads and included these roads in their 1997 bond package.

Because the effects from the project define the action area, the action area for Cascada includes all pygmy-owl territories and dispersal corridors intersected by those roads likely to be affected by the incremental increases in vehicular traffic from this subdivision. The extent of those effects can be defined by evaluating average trip distance. The Bureau of Transportation Statistics (2003) determined the average mileage of person-trips in personal vehicles to be approximately 10 miles. We thus apply this average trip distance to the major arterial streets and highways serving the proposed Cascada project, including Thornydale Road, Cortaro Farms Road, Linda Vista Boulevard, Lambert Lane, Hartman Lane, Camino de Manana, and Tangerine Road. Furthermore, an interchange has been proposed by the Town of Marana to connect the Linda Vista Boulevard/El Camino de Mañana junction to Interstate 10. This interchange, which will likely receive high use because of its proximity to Cascada and its design to avoid train delays, and because of current and past growth in the area, renders this route reasonably certain to be subjected to increased traffic volume from the Cascada project.

Because domestic cat predation of pygmy-owls has been documented in Arizona (AGFD 2004), the area that could be affected by subsidized predators, such as household cats, resulting from this project can further define the action area. Certainly, house cats already occur within the vicinity of this project; however, the project will result in an influx of new residents, some of whom will own household pets. As the number of potential predators increases, the chance of predation on pygmy-owls increases. It is this introduction of additional potential predators that is an effect of the proposed development, particularly given that many of the proposed homes will occur adjacent to natural open space. Of the proposed 3,506 lots, 1,122 are likely to have cats based on the national average indicating that 32% of all households have cats (HSUS 2004). Given the national average of 2.0 cats per cat-owning household (HSUS 2004), this development could be expected to contribute 2,244 additional cats at a given point in time to the area.

The scope of this effect is related primarily to the home-range size of the predator. While home range data exist for a variety of predators, the effects of potentially increased prey bases near irrigated urban areas confounds the determination. House cats, however, have been studied in wildland/urban interfaces. Goltz *et al.* (2001) studied feral cat predation of passerine birds in dry, high-altitude areas in Hawaii National Park and determined that home ranges of male cats ranged from 10 to 95 square kilometers (2,471 to 23,475 acres). The authors also noted that two

of the male cats tracked roamed up to 25 kilometers (15.5 miles) between sites. Edwards *et al.* (2001) studied male feral cats in a semiarid woodland in central Australia and noted long-term mean home ranges as large as 2,210.5 hectares (5,462 acres), 24-hour mean home ranges of 249.7 hectares (617 acres), and movements of up to 34 kilometers (21.1 miles). These numbers represent movement of feral cats in relatively wild lands; home ranges of house cats are more applicable to this analysis. Regardless, it should be noted that feral cats originate as escaped pet house cats or are their progeny. As mentioned in the BA, the potential for feral cats may be reduced due to predation by coyotes, but with the potential numbers of new cats associated with this development, and the proximity of shelter and available food, it is likely that feral cats can persist within the Cascada development.

Barratt (1995) conducted *house* cat home range and predation studies in Canberra, Australia in a system of suburbs interspersed within remnant grassland, woodland, and open-forest habitats and found that the largest day-time home range among the four cats who entered the woodlands was 17 hectares (42 acres), the largest night range was 28 ha (69 acres), and the furthest distance moved into adjoining habitat was 900 meters (0.6 mile). In Tucson, a telemetry study showed that house cats rarely moved more than 300 meters (0.2 mile) from their homes (Goldsmith *et al.* 1991), but a study in Illinois, using similar methodology, showed the mean maximum distance both sexes of domestic cats moved from farmsteads was 1,697 meters (1.1 miles) (Warner 1985).

Moreover, the animals taken by the cats (small mammals, birds, and reptiles) overlap with the prey base of the pygmy-owl, indicating that interspecific competition for prey could occur (Banks 1979, Churcher and Lawton 1987). We thus consider the action area defined by the effects of pets (house cats) to include the project site and not less than a 900-meter (0.6 mile, or 2953 feet) buffer around it. The 900-meter buffer originates from a published study and is used because it falls between the extremes represented by the data above (300 meters for the Tucson study and 1,697 meters for the Illinois study). This 900-meter buffer accounts for approximately 1,015 acres of indirect effects, and overlaps at least two known pygmy-owl home ranges, as well as known dispersal routes adjacent to the project.

The action area for the Cascada project is thus defined by the direct and indirect effects resulting from this project, including the effects of habitat disturbance (742.9 acres), noise and activity disturbance and habitat loss within potential, adjacent pygmy-owl home ranges (600 meter buffer), house cats (900 meter radius), and increased traffic and road effects (10 mile mean trip distance). These effects influence the function of proposed Critical Habitat Units 2 and 3 (CHU 2, CHU 3).

### **Status of the Species Within the Action Area**

The action area is within the Arizona Upland Subdivision of the Sonoran Desertscrub community (Brown 1994). Plant density and diversity is greater in the northern and eastern portions of the action area and grades from trees and columnar cacti to creosote-dominated areas as you move southwest. Xeroriparian habitat is found along the drainages. The action area is

situated within the bajada of the Tortolita Mountains and drainages are characterized by braided wash channels within areas of sheet flow. Xeroriparian species are similar to upland species, but exhibit greater structural development and densities as a result of increased moisture availability.

The action area is also characterized by existing and ongoing urbanization, which has had the effect of removing and fragmenting suitable pygmy-owl habitat. The action area falls within proposed critical habitat for the pygmy-owl.

The action area intersects six sites that are or have been occupied by pygmy-owls within the past five years and intersects dispersal habitat and known dispersal pathways for an additional three pygmy-owl nesting territories during the same time period. The action area supports important dispersal pathways for pygmy-owls. The exchange of individual pygmy-owls between population groups in Pinal County and Pima County has occurred within northwest Tucson. This exchange of individuals between population groups is extremely important for the long-term existence of pygmy-owls in the action area. Pygmy-owl dispersal between occupied areas in Pima County and occupied areas in Pinal County has occurred within the immediate vicinity of the Cascada project.

In northwest Tucson, the number of adult owls and nests has declined from a high in 2000 of 12 adults and four nests to the current status of two unpaired males. The immigration of additional pygmy-owls (particularly breeding females) is critical to the long-term persistence of this population group. Maintaining adequate habitat and dispersal pathways within the action area is necessary for this to occur. As indicated in the STATUS OF THE SPECIES, the current known population of pygmy-owls within Arizona has declined from the levels documented from 1999 – 2001. Some factors contributing to this decline within the action area may improve (precipitation, fire, prey availability, etc.), but other factors, such as urbanization and water use, are likely to continue, if not increase. New, un-banded pygmy-owls are documented each year indicating an unknown source within Arizona or movement northward from Mexico or from the TON. This is positive from the perspective of metapopulation rescue and genetic diversity, but negative from a population viability perspective, considering that known breeding adults are replaced almost annually on nesting territories. A site in Altar Valley has had three different breeding females over the past three years. The lack of long-term survival of breeding adults at nesting sites does not bode well for population stability.

### **Factors Affecting the Species' Environment Within the Action Area**

Critical habitat units were proposed based on pygmy-owl occupancy status and/or their contribution to habitat connectivity and habitat availability needed for population expansion. The action area is contained within proposed Critical Habitat Units (CHU) 2 and 3. The dominant vegetation is Arizona upland Sonoran desertscrub, and the area contains stands of trees including ironwood, mesquite, palo verde, and other species important for pygmy-owl roosting, perching, foraging, and predator avoidance (primary constituent elements 1, 3 and 4). Saguaros occur in relatively high densities and are used for nesting (primary constituent element 2). Based on our current understanding, CHU 3 includes the most contiguous and highest-quality pygmy-

owl habitat in Arizona (Wilcox *et al.* 1999, Wilcox *et al.* 2000). CHU 2 provides important habitat connectivity to known pygmy-owl population groups to the west. CHU 2 and the southern portion of CHU 3 are mostly privately owned, the central portion is primarily State Trust, while the rest of CHU 3 is a mixture of private, State, and BLM lands.

CHU 2 and 3 have both been occupied by pygmy-owls. In particular, CHU 3 has supported a high density of active pygmy-owl nesting territories and dispersal pathways. Currently, the nesting and dispersal habitat are threatened by existing and on-going land uses, affecting primary constituent element 5. This CHU has had one of the highest known densities of pygmy-owls in Arizona, and is one of only four areas in the State with documented breeding. Since 1999, CHU 3 has accounted for 35% of the known pygmy-owls in Arizona and 40% of the known nests (Abbate *et al.* 1999, 2000, AGFD unpubl. data). Therefore, the primary purpose of this CHU is to provide and protect adequate breeding habitat for the maintenance and expansion of this local population. Dispersal pathways within the southern portion of this CHU are limited, and so this CHU also protects remaining areas of connectivity for movement within this CHU and among adjacent CHUs. CHU 2 was specifically established to provide habitat connectivity. Some of the private land within these CHUs has been developed and is not considered critical habitat if it does not contain the primary constituent elements. Development pressure continues to be the main activity affecting conservation of the species in these CHUs. We determine that CHU 3 remains an essential component of pygmy-owl conservation because it has supported one of the highest densities of breeding pygmy-owls in Arizona, has contributed to recruitment in the population, contains a significant amount of high-quality habitat, and provides all of the primary constituent elements. CHU2 provides an important habitat connector.

Effects on the past and current function of these areas within the action area have occurred as a result of capital improvement projects, residential and commercial development, and agricultural activities. In particular, these activities have affected the amount of available pygmy-owl breeding habitat and have resulted in loss of habitat connectivity and increased fragmentation. Remaining areas of pygmy-owl habitat within the action area are very important. Researchers in Arizona have found that pygmy-owls require habitat linkages, within and among territories, for movement and dispersal, consisting of continuous cover or patches of trees and large shrubs spaced at regular intervals, to provide concealment and protection from predators and mobbing, as well as shade and cool temperatures (Abbate *et al.* 1999, Wilcox *et al.* 2000). Pygmy-owls, particularly juveniles, are susceptible to predation, weather extremes, human-related injury/mortality factors (e.g., cars, buildings, fences, domestic cats, etc.) and other mortality factors. Therefore, it is essential to maintain habitat conditions that reduce their exposure to these threats and provide protection as they disperse from their natal areas. A high degree of cover throughout the landscape increases the likelihood of survivorship to the next breeding season. Limiting these mortality factors is critical, especially for small, depressed populations, such as pygmy-owls in Arizona.

The general trend for the action area is for increasing residential and commercial development. The Town of Marana, which contains a large portion of the action area, experienced 467%

growth and Oro Valley had 310% growth from 1990-1999; the Arizona State Department of Economic Security stated that Marana is one of the two fastest growing communities in Arizona (The Arizona Daily Star 2000b). Housing starts in the area have continued to increase with Marana issuing over 1,000 permits for the first time in 1999 (The Arizona Daily Star 2000a). More recently, from 2000 to 2002, total permits issued by Marana increased approximately 26% (PAG 2003). We have received, and continue to receive notification of numerous new housing subdivisions and commercial developments in this region as well. Pima County's population has grown from 666,000 in 1990 to estimates of at least 850,000 in 2000, or a 30% increase. This annual growth rate has varied from 15,000 to 30,000 persons each year, consuming at the present urban density approximately 7-10 square miles of Sonoran Desert each year (Pima County 2001). Not all of this growth occurs within the action area, nor are pygmy-owls affected by all types of growth. However, within Marana, growth increased 52% between 2000 and 2003, compared to only 8% for Pima County as a whole (PAG 2003). Within the action area, a number of developments have initiated construction within the past five years, including Sky Ranch, The Preserve at Dove Mountain, The Estates at Dove Mountain, Butterfly Mountain, Hartman Vistas, Hardydale II, and Cortaro Crossing. Plans have been approved for a number of additional projects such as Talavera, Tangerine Hills, and Oasis Hills.

Additional effects within the action area occur in Pinal County. The Town of Marana is reviewing a proposal for a mixed-use community that will extend into Pinal County, covering approximately 1,895 acres. Pinal County has recorded 19.3% growth since 2000. Officials expect the Town of Florence in Pinal County to grow by more than 100,000 people in the next 10 years based on average growth statistics, but leaders think those numbers could go even higher. Developments in Florence that are under construction or proposed include Anthem at Merrill Ranch (9,000 homes), Desert Color at Merrill Ranch (20,000 homes), Skyview Ranch (7,500 homes), and Walker Butte (7,700 homes) (eastvalleytribune.com, 6/26/2005). While this growth is occurring some distance from the action area, as these areas build out, development pressure will move southward. Already, development proposals have been submitted for southern Pinal County in the vicinity of the action area.

Large areas of State Trust land are located throughout the action area. State Trust lands may be sold or exchanged and could be used by future owners for development. The extent of development and the ability to address impacts on pygmy-owls on State Trust lands depends on if they are sold or exchanged, the type of development proposed, and the presence of a Federal nexus. Presently, State Trust lands are being leased for grazing. Other activities (e.g., recreational off-road vehicle use, shooting/target practice, hunting, etc.) also occur on these lands. The State Trust lands located north of Cascada currently provide undeveloped open space that is important from the perspective of both available pygmy-owl nesting habitat and habitat connectivity for dispersal.

As described above, portions of the action area are highly likely to continue to experience effects from urbanization. New housing construction, and its associated commercial developments and

capital improvements, will continue to contribute to the loss and fragmentation of pygmy-owl habitat within the action area.

The majority of projects we evaluate for effects to pygmy-owls occur within the northwest Tucson area (see STATUS OF THE SPECIES). Our evaluations include formal and informal consultations under section 7 of the Act, as well as technical assistance for private actions on private property. In the vicinity of the action area, these projects have resulted in the loss and fragmentation of pygmy-owl habitat. However, as a result of the discussions with project proponents, many of these effects have been avoided or minimized. Projects have been designed to include habitat linkages and other areas of open space. As a result of section 7 consultations, conservation lands have been established as part of development projects. These conservation lands contribute to the availability of pygmy-owl nesting and dispersal habitat within the action area. Pygmy-owl conservation lands are located immediately adjacent to the Cascada project.

While none of the actions we have evaluated have resulted in effects that rose to the level of jeopardy, "take" through harassment of one or more pygmy-owls was anticipated on four of the above projects. Additionally, the two existing HCPs within the vicinity of this project also authorize non-lethal "take" of pygmy-owls. Previously authorized "take" of pygmy-owls in the region containing the action area requires consideration of the already potentially diminished pygmy-owl population baseline. It is clear that portions of the action area for this project are experiencing ongoing loss and fragmentation of habitat that may affect the pygmy-owl in northwest Tucson. This trend is expected to continue.

The Recovery Team has prepared a draft recovery plan dated January 2003 for the pygmy-owl (Draft Recovery Plan) and recommended "Recovery Areas" that they believe are necessary for the survival and recovery of the pygmy-owl in Arizona (USFWS 2003). With regard to this project, all areas are within a recommended Recovery Area. The team also has recommended specific areas within Recovery Areas for special management (i.e., SMAs) that are of the highest concern because: (1) they formerly contained high concentration of pygmy-owls, particularly nesting pygmy-owls, that are important sources of young pygmy-owls to increase the population; (2) pygmy-owl recovery is dependent on the availability of suitable habitat near breeding areas not currently known to have pygmy-owls where juvenile pygmy-owls can disperse into and successfully breed or when population augmentation can occur; and (3) they are threatened by rapid urban development or other immediate threats. Within the action area, two SMAs have been recommended by the Recovery Team: (1) Northwest Tucson SMA "located generally north of Cortaro Farms Road, south of the 136000 N street alignment, east of Interstate 10, and west of La Cholla Blvd."; and (2) Tortolita Fan SMA" containing major washes and upland corridors connecting the Northwest Tucson SMA to southern Pinal County."

The draft Recovery Plan states, "Because of the significance of habitat within SMAs, development within these areas should be subject to more detailed analyses. Specifically, consideration should be given to spatial needs, breeding requirements, dispersal patterns, home range and landscape-level movement requirements, and habitat conditions needed for foraging

and predator avoidance. These considerations and levels of disturbance should be evaluated at the project level and implemented in a manner that disturbs the least amount of the highest quality pygmy-owl habitat within a project area and results in habitat being distributed in a uniform and connected fashion across the landscape. Additional disturbance, beyond the footprint of construction, from lights, noise, and traffic, should be considered during the assessment of large projects. Implementation of this guideline should also strive to maintain, where possible, relatively large blocks of nesting habitat and, as noted above, habitat for the movement of pygmy-owls within and among Recovery Areas. Maintaining adequate habitat for dispersal and nesting in proximity to known nest sites is needed for expanding, maintaining, and establishing subpopulations that are essential to the long-term maintenance of pygmy-owls in Arizona. We also suggest that relatively high conservation values be placed on areas within SMAs that are deemed especially important for maintaining habitat or movement corridors for pygmy-owls (e.g., the southern portion of the Northwest Tucson SMA)" (USFWS 2003).

### **Effects of the Proposed 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, which will be added to the environmental baseline. Interrelated actions are those that are part of the 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.

Residential and commercial development proposed for this project will result in the direct loss of approximately 742.9 acres (approximately 62% of the 1,202-acre project site) of Sonoran desertscrub vegetation. Of this, approximately 460 acres occur within vegetation that lacks adequate canopy cover and nest substrates to be of meaningful value to pygmy-owls.

Approximately 282.9 acres of disturbance will occur within vegetation that provides both potential pygmy-owl nesting and dispersal habitat. When the habitat quality within the project site is considered, approximately 50.4% of existing pygmy-owl nesting and dispersal habitat will be disturbed. The project also includes approximately 459.1 acres of conservation land which will be managed to benefit the pygmy-owl. In the area north of Lambert Lane, approximately 75.9.4% of the area will be left as undisturbed open space. This is the area within the project that supports the highest pygmy-owl habitat values with regard to nesting and dispersal.

The action area is within the Northwest Tucson and Tortolita Fan SMAs identified in the draft Recovery Plan. The Recovery Team recommends that areas within SMAs be conserved in a manner that promotes the successful breeding and dispersal of pygmy-owls. The specifics of how that is to be accomplished should rely upon the best available scientific data. Currently, the best information regarding the amount of development occurring in successfully breeding pygmy-owl home ranges comes from data being gathered by the AGFD. In home ranges (estimated to be 280 acres in size) where successful nests have been located, disturbance ranged

from 16% to 54% with a mean of 33%. There are limitations to the data on which these numbers are based such as the small sample size, the limited number of years over which these data have been gathered, and the absence of data qualifying the disturbance types. It is clear that we do not yet have adequate information to fully understand the effects of development on pygmy-owls. However, the AGFD analysis represents the best information upon which we can currently base our analysis. The level of habitat disturbance proposed for the northern portion of the Cascada project falls below the mean level of disturbance found within pygmy-owl nesting territories in northwest Tucson. While development disturbance will be greater south of Lambert Lane, the existing values of this area are primarily for pygmy-owl dispersal which will largely be maintained through preservation of the major washes.

In addition to maintaining an adequate amount of pygmy-owl nesting habitat, it is important that projects maintain conserved habitat in a configuration that allows habitat connectivity for dispersal and movement within a home range. The number of breeding pairs of pygmy-owls in northwest Tucson, as well as total numbers of pygmy-owls in this area, has declined since 1996, when intensive pygmy-owl surveys and monitoring were initiated. Renewed breeding and an increase in the number of breeding pairs within this subpopulation are necessary for pygmy-owls to persist. Second, pygmy-owl offspring produced in northwest Tucson have been documented dispersing into adjacent pygmy-owl groups. On a landscape scale, pygmy-owls produced in northwest Tucson are needed to provide support to adjacent pygmy-owl groups and subpopulations to bolster population numbers and provide genetic interchange as discussed in greater detail in the STATUS OF THE SPECIES section of this BO.

Pygmy-owls are capable flyers, but rarely make flights greater than 40 meters (120 feet) (AGFD 2003). Typical flight patterns are more likely to be from one tree to another nearby tree, avoiding long flights in open areas, presumably to avoid exposure to predation (AGFD 2003). However, increased opening size (i.e., gaps between trees or large shrubs), coupled with increased threats (e.g., moderate to high traffic volumes and other human disturbances) are thought to restrict pygmy-owl movement. Recent dispersal data (AGFD 2004) indicate that a pygmy-owl dispersed over open areas, such as creosote flats, that were previously thought to act as impediments to dispersers. Wide roadways and associated clear zones cause large gaps between tree canopies on either side of roadways and may result in lower flight patterns over roads. This low flight level may result in pygmy-owls flying directly into the pathway of oncoming cars and trucks. Observations of a pygmy-owl flying across wide roadways by consultants to the Tohono O'odham Nation indicate that they can adjust their flight pattern in response to roads – flying high and straight without the characteristic swoop (Westland Resources 2002). Measures can be implemented in roadway design to minimize these threats and allow successful movement across roadways. Among other measures, decreasing the canopy openings between trees on either side of roads and increasing the density of trees along roadways to provide greater shelter and cover from predators and human activities can be utilized to minimize adverse effects to pygmy-owls attempting to cross roads.

The Cascada Specific Plan indicates that roadways within this development will utilize design features that should minimize the effects of the roadways on pygmy-owl dispersal. Interior streets will not exceed 36 feet of cleared roadway and will incorporate trees in the landscaping adjacent to the roadways. The major collector streets will utilize vegetated medians and vegetated shoulders to reduce potential flight distances.

The Cascada project will result in impacts to potential pygmy-owl dispersal habitat. Approximately 742.9 acres of potential dispersal habitat will be removed. In an effort to reduce impacts to the potential for pygmy-owls to move through the project site and vicinity, and to partially offset adverse effects of the removal of breeding and dispersal habitat on the project site, conserved open space and habitat restoration areas have been incorporated into the project description.

Of particular value to maintaining pygmy-owl dispersal values on site will be the proposed conservation and enhancement of seven wash corridors and the multi-use area along Interstate 10. The conserved open space and the enhanced conservation lands combined will provide approximately 98.8 acres of dispersal habitat, primarily along wash corridors extending between and through development. The value of this open space for dispersal will be somewhat reduced when compared to natural, undisturbed open space. High-intensity human activities will occur in proximity to these dispersal corridors. The level of human activity occurring south of the Lambert Lane alignment will exceed levels typically found in areas utilized by dispersing pygmy-owls and it is anticipated that such activities may reduce, but not preclude, use of the corridor for dispersal. Because of the on-site impacts to dispersal habitat in this area, pygmy-owls with an opportunity for dispersal through the site will effectively be funneled into the narrow open space corridors through the middle of this project. The potential concentration of pygmy-owl activity presents several concerns. Lighting, noise, and other human activities from proposed commercial and residential development will affect its suitability for dispersal. Residents of Cascada will utilize the open space corridors for purposes such as walking and playing. Concentrating potential pygmy-owl use into a narrow corridor has the potential to increase predation. This is particularly true given the expected increase in domestic pets, particularly cats, associated with residential development (see discussion under ENVIRONMENTAL BASELINE). Urban-adapted predators such as great horned owls, Cooper's hawks, and screech owls can adapt to post-construction site conditions and the potential risk of predation to pygmy-owls may increase due to concentrated pygmy-owl habitat within the project. Measures will be incorporated into the management of the corridor areas to minimize these effects. Primarily, the enhancement of tree cover within these areas will provide cover and buffer many of the anticipated impacts of adjacent development.

If pygmy-owls use the open space within and adjacent to the Cascada project, there are a number of potential indirect effects on pygmy-owls that could result from the development of this project. For example, mortality risks associated with pest control, pollution, collisions with cars and glass windows, and cat predation are often underestimated, although likely increasing in occurrence due to human population growth (Banks 1979, Klem 1979, Churcher and Lawton

1987). Even where human-related deaths are uncommon, they may still substantially affect populations of rare birds (Cartron *et al.* 2000a).

Because of the proximity of pygmy-owl sites to residential areas in northwest Tucson, these interactions may be a significant cause of pygmy-owl mortality there (Cartron *et al.* 2000b). It is expected that with this residential development, the number of cats will increase (see discussion under ENVIRONMENTAL BASELINE), resulting in increased possibility of predation of pygmy-owls and a reduction in the abundance of pygmy-owl prey species (e.g., lizards, birds) in this area, adversely affecting potential for the proposed open space to support dispersing and nesting pygmy-owls when compared to its existing condition and configuration.

The Applicant will specifically establish CC&Rs related to domestic cats. This CC&R will preclude domestic cat owners from allowing their domestic cats to become feral or roam the property without supervision. We anticipate that this will minimize the risk of pygmy-owl mortality from house cats, though it will not eliminate it.

Roads present a mortality hazard to foraging and dispersing pygmy-owls. Roads can disrupt the tree-to-tree flight pattern of the pygmy-owl; a road's width may discourage a pygmy-owl from crossing, or pygmy-owls that do cross may be struck by passing automobiles. While retaining roads in a narrow state or incorporating vegetated medians into a wider road improve connectivity, the risk of vehicle mortality can never be eliminated. The project can reasonably be expected to add to the number of vehicle trips per day that currently occur in the action area (see discussion in ENVIRONMENTAL BASELINE). This increase in vehicle trips (or a greater frequency of use) can therefore reasonably be expected to increase the probability that a pygmy-owl will be struck. Given the pygmy-owl's rarity and patchy distribution, and the fact that Tangerine Road, Camino de Mañana, Thornydale Road, and other major roadways affected by this project traverse documented pygmy-owl dispersal routes, any vehicle-strike mortality could have serious adverse consequences for the long-term persistence of pygmy-owls in northwest Tucson because there are only two known individuals at this time. As discussed above, the Applicant has indicated within the Cascada Specific Plan that roadways would incorporate design features that will minimize effects to pygmy-owl dispersal.

The increased incidence of environmental contaminants is an indirect effect of the proposed action. The use of pesticides, in particular, could affect pygmy-owls indirectly by reducing prey species (e.g., insects, reptiles, birds) within their home ranges and directly if not used in a controlled and targeted manner. The application of pesticides will be prohibited in the conserved open space, helping to reduce, but not eliminate, effects in these areas.

The effects that non-directional and high-intensity lighting has on pygmy-owls are unknown. In residential areas, lighting is expected to increase; however, it is not quantified in the BA. Of particular concern is high-intensity lighting in close proximity to pygmy-owl nests, activity centers, and movement corridors. Increased exposure to predation of adult pygmy-owls and fledglings may occur from great horned owls and other predators where bright lights are used

near pygmy-owl sites. The BA indicates that artificial lighting such as light poles or other permanent lighting fixtures are prohibited in the natural open space. However, adjacent lighting from the commercial and residential areas may still contribute to lighting effects.

The proposed action could also cause short-term noise disturbance associated with construction and long-term noise disturbance and increased human activity. In the event a pygmy-owl is present on-site, it is possible that such noise disturbance would affect the pygmy-owl directly by altering behavior, and indirectly through potential increases in predation, effects on prey species, etc. However, these effects have not been quantified during research on pygmy-owls. The Applicant will implement the development constraints discussed in this document and the BA related to activities in proximity to pygmy-owls on and adjacent to the project. This should reduce the effects on pygmy-owls from noise and disturbance related to construction activities associated with this project.

Vegetation disturbance and activities that cause noise disturbances will be limited within the conserved open space per the conservation measures set forth in the project description and this opinion (e.g., ORV, jeep tours, organized events, pesticides, bright lights, and other activities will be prohibited). Because these activities are restricted within conserved open space corridors, effects to pygmy-owls will be reduced.

### **Interrelated and Interdependent Actions**

Interrelated activities are part of the proposed action that depend on the action for their justification, and interdependent activities have no independent utility apart from the action. The proposed Cascada project will make incremental contributions to increased traffic and the need for future road improvements. These future actions are interrelated effects of the proposed action. The effects of these interrelated activities have already been considered in our analysis under Effects of the Proposed Action. We are unaware of any other interrelated or interdependent actions associated with this project.

## Critical Habitat

The project area falls within the 73,958-acre Unit 3 of the proposed critical habitat for the pygmy-owl (U.S. Fish and Wildlife Service 2002). All of the primary constituent elements defined in the proposed rule designating critical habitat are found within the project boundaries, however, the entire project area does not contain the primary constituent elements. Constituent elements containing components essential for nesting, rearing of young, roosting, sheltering, and dispersal will be removed in a portion of this area. These elements include Sonoran desertscrub and xeroriparian vegetation containing saguaro cactus and large-diameter trees, including ironwood, palo verde, mesquite, etc. Some or all of these primary constituent elements will be eliminated on approximately 742.9 acres within the project boundaries. This equals approximately 1.0% of the gross acreage within CHU-3. However, the actual percentage of critical habitat removed is somewhat higher since only a portion of the unit contains primary constituent elements and is, therefore, considered critical habitat (USFWS 2002).

Regardless of the quantity of habitat to be altered, the location of this project and the associated habitat impacts are consequential because they occur within an area that may potentially be used by resident pygmy-owls and affect dispersal pathways into and through this area. CHU 2 lies adjacent to this project and was proposed primarily as a habitat linkage. If the Cascada project precludes habitat connectivity to CHU2, the loss of function for CHU2 could occur. The Applicant has included project design elements that should maintain habitat connectivity to CHU 2.

Effects to Features That Were the Basis for Determining the Habitat to be Critical - The primary constituent elements of proposed pygmy-owl critical habitat (USFWS 2002) will be affected by the Cascada project. The following is a discussion of the specific effects:

- Primary Constituent Element 2 (existence of or potential for nesting cavities) - Potential pygmy-owl nest substrates, including large trees greater than six inches trunk diameter and saguaros, will be removed from approximately 282.9 acres of the project site containing potential pygmy-owl nesting habitat. While some of these potential nest sites will be preserved on-site or replaced, there will still be an overall reduction in potential nest sites. However, approximately 459.1 acres of conservation lands will be managed for the benefit of pygmy-owls and will maintain available nest sites.
- Primary Constituent Element 3 (vegetation structural diversity) - The vegetation within the northern and eastern portions of the project boundaries is characterized by relatively high structural diversity. Natural vegetation will be completely removed from approximately 742.9 acres of the project site supporting potential pygmy-owl habitat. Natural open space and restored habitat will be retained on 459.1 acres of the project. However, some of the multi-layered vegetation within these areas will be confined to linear corridors rather than throughout the entire project site, as is currently the condition. This primary constituent element contributes to the potential for a site to provide for the

natural history needs of the pygmy-owl related to breeding and, to a lesser extent, dispersal. Known pygmy-owl breeding home ranges include between 46% and 84% natural open space in an assumed 280-acre circular home range. Approximately 49.6% of the project site that supports potential pygmy-owl nesting habitat will remain as open space. However, 75.9% of the northern portion of this project will be maintained as undisturbed open space.

- Primary Constituent Element 4 (presence of canopy cover) - Because the Applicant will maintain the major washes within the project boundaries as natural open space, many of the large trees providing canopy cover will remain on-site. However, many large trees are also located outside of the proposed open space corridors and will be removed on approximately 742.9 acres of the project site. This primary constituent element relates to a site providing adequate cover for pygmy-owl movements, primarily dispersal, but also movement within an established home range for foraging and predator avoidance. Because this project will remove important canopy and mid-story vegetation on 742.9 acres, the ability of this site to support pygmy-owl movements is reduced, but should still allow for dispersal to occur across the project site.
- Primary Constituent Element 5 (configuration and human activity) - Retaining the function of proposed pygmy-owl critical habitat is not attributed solely to the quantity of habitat remaining on a site. The configuration of that habitat must also be considered. Connectivity must be maintained in order to preserve function. The presence of high levels of human activities adjacent to open space can also affect the potential for conserved open space to function as pygmy-owl habitat. The Cascada project, which is in an urbanizing portion of CHU-3, will further restrict natural open space to delineated corridors bounded by high-density residential and commercial development in the southern portion of the project. These corridors do provide the potential for connectivity through the site; however, the functionality of the proposed corridor may be impacted by the proximity of high levels of human activities. Residents of Cascada will utilize the open space corridor for passive recreation. Although the site is currently used by some individuals for various recreational pursuits, increasing the number of people in this area by 3,506 residential units and commercial uses can reasonably be expected to elevate the use above current levels. The Applicant has included measures to maintain the value of these habitat linkages.

## Summary

Based on the current status of the pygmy-owl in Arizona, its conservation will likely require not only protection of all known sites, but also the conservation of other areas not currently known to have nesting pygmy-owls. This can be measured at two spatial scales. At a large scale, connectivity is necessary among large blocks of suitable habitat that are either currently known to have nesting pygmy-owls or are capable of supporting pygmy-owls. At a finer scale, the protection of habitat within the vicinity of known pygmy-owl sites for establishment of new sites

and movement between them is also essential. Task 2.0 of the draft pygmy-owl recovery plan states, "Protect all currently known (since 1993) [pygmy-owls] in Arizona and the habitat they occupy. Identify and maintain an interconnected system of habitat extending from the northern portion of the historical range, south to areas potentially occupied by [pygmy-owl] populations in Mexico (USFWS 2003)". The Northwest Tucson and Tortolita Fan SMAs historically accounted for a substantial proportion of the documented pygmy-owls and nests in Arizona. They also contain habitats not currently known to have nesting pygmy-owls that are likely important for the expansion of the population. Measures to be implemented as a part of this project are intended to maintain the ability of territorial and dispersing pygmy-owls to reside and move within CHU 2 and CHU 3.

### **Cumulative Effects**

Cumulative effects include the effects of future State, tribal, local, or private non-Federal 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. As defined in the Environmental Baseline section, above, the action area for this project is defined using effects from the project itself, roads, and domestic pets. The action area thus overlaps or adjoins areas subject to ongoing residential and commercial development pressures. State, local, and private actions are expected to continue with various levels of development in the immediate vicinity of the project site and elsewhere in the action area. Activities occurring within jurisdictional waters of the U.S. require a section 404 permit under the CWA from the ACOE and, as a result, would be subject to future section 7 consultation and are not considered under cumulative effects. In the past, some project proponents have chosen to avoid jurisdictional waters by bridging over or jack-and-boring under them. This precludes the need for a 404 permit, thus removing the project's Federal nexus.

Some projects may address effects on pygmy-owls through another process (e.g. Habitat Conservation Planning under section 10 of the ESA) and could be excluded from this cumulative effects analysis, but such participation is voluntary. Aside from HCPs already in development, it is impossible to predict which parcels may choose to pursue an HCP.

The action area has been subject to significant development activities, and development will likely continue at some level. There have been a number of recent lower-density developments proposed, such as Butterfly Mountain and Saguaro Canyon Ranch. In addition, some development projects have chosen to cluster development at higher densities, leaving larger blocks of undisturbed desert and wash vegetation (Dove Mountain and Sky Ranch). If implemented for future projects, both of these approaches would reduce the level of cumulative effects on pygmy-owls. Some areas have been down-planned (recent plans recommend lower-density development than previous plans), but build out at these lower densities is dependent on a number of factors including market, existing zoning, and intentions of the landowner. Much of

the private land in the area is zoned for low-density residential uses that would have reduced effects on the pygmy-owl. However, past development has often occurred on parcels with low-density zoning that was rezoned to a higher density. Based on projects with which we are familiar, this trend is likely to continue, but probably to a reduced extent.

The Environmental Baseline describes an action area that is already largely developed and fragmented. So while development trends, zoning, and planning are beginning to provide a scenario where cumulative effects may be reduced, any cumulative effects, particularly in the area north of the project site, may still have a considerable effect on the conservation of the pygmy-owl. Many small, undeveloped parcels used primarily for single-family dwellings will not require a Federal permit or other Federal nexus and will continue to be built without section 7 consultation. This is particularly important in the action area due to the large number of undeveloped small parcels zoned as SR and low-density residential areas that, if developed, will further reduce the amount of suitable habitat, increase fragmentation, and degrade habitat conditions.

As stated in the Environmental Baseline section, the project area, action area, and surrounding region have supported one of the highest documented concentrations of pygmy-owls in Arizona. We are aware of a number of potential residential and commercial developments, schools, churches, etc. in the action area that may further reduce and fragment pygmy-owl habitat in this area. Some of these projects may not be reasonably certain to occur based on our section 7 guidelines, but the development history of this area, submitted plats and development plans, and apparent trends indicate that there is a likelihood that they will.

Our analyses of trends in growth (see ENVIRONMENTAL BASELINE) frame the possible extent of cumulative effects but do not necessarily define those actions that are reasonably certain to occur. There exist, however, certain incremental actions and approvals in the planning and zoning process that do contribute certainty to our analysis of cumulative effects. These actions include existing zoning, land use designations within jurisdictional comprehensive plans, transportation plans, population projections, designation of impact fee areas, rezoning requests, development plans, plat submittals, and grading and building permit applications and approvals. It may be reasonably assumed that these actions, when considered in the context of recent trends, give us a clear picture of the potential for cumulative effects that are reasonably certain to occur.

Within CHU 3, land ownership falls into two primary categories, private lands and State Trust lands. Much of the private land has already been developed and the remaining undeveloped private lands can be expected to be developed. The State Land Department has identified Trust lands along Tangerine Road, Thornydale Road, and Camino de Manana as suitable for commercial and medium density residential development (includes uses as intense as apartments) (ASLD 2000), indicating that State Trust Lands are likely to contribute to impacts to pygmy-owls and their habitat within the action area. However, there is also the potential for these lands to contribute to the conservation of important pygmy-owl habitats.

Private lands within the action area have jurisdictional approvals or designations that indicate continued development is reasonably certain to occur. We have searched the land use and zoning designation for Marana and Pima County for the action area. In light of documented trends and based on the existing zoning, submitted development plans or subdivision plats, transportation plans and development impact fee areas, we have determined that projects affecting pygmy-owls and pygmy-owl habitat, without a Federal nexus, are reasonably certain to occur at the following areas: Cortaro Road/Thornysdale Road intersection (the Safeway Property, Polanco), Tangerine Road/Thornysdale Road intersection (Tangerine Crossing), Hardy Road/Thornysdale Road intersection (Backus parcel), Heritage Highlands development area, Tangerine Road/Camino de Oeste area (Foothills Specific Plan), Camino de Manana/Linda Vista area (Tangerine Hills and Hartman Hills Specific Plans), and single-lot residential development throughout the action area. Proposed development would consist of commercial projects, residential subdivisions, and single-family residences.

These cumulative effects will result in additional habitat fragmentation because most occur adjacent to roadways and will increase the linear extent of unsuitable habitat within the action area. The areas of CHU-3 where we anticipate cumulative effects to occur support known breeding home ranges for the pygmy-owl, as well as dispersal habitat and pathways. As a consequence, the total area of available pygmy-owl breeding habitat, habitat connectivity, and the opportunity for pygmy-owl movements throughout CHU-3 will be reduced. In the vicinity of Cascada, much of this future development will occur on State Trust lands. At this point, it is difficult to say to what extent these cumulative effects will be compounded by the development of this project. Given the Applicant's commitment to maintain open space and habitat connectivity, cumulative effects do not cause the effects of this project to rise to the level of jeopardy or adverse modification of proposed critical habitat.

## **Conclusion**

This BO does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.2. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

After reviewing the current status of the pygmy-owl, the environmental baseline for the action area, the effects of the proposed residential development, and cumulative effects, it is our biological opinion that, while the proposed action will impact pygmy-owls in northwest Tucson, it is not likely to jeopardize the continued existence of the pygmy-owl. This project also occurs within proposed critical habitat for the pygmy-owl. It is our conference opinion that the proposed development is not likely to destroy or adversely modify proposed critical habitat. The proposed action will not eliminate the function of CHU 2 or CHU 3, and both CHU 2 and CHU 3 will retain the ability for the primary constituent elements to remain functionally established. These conclusions are based on the site-specific information and analysis of this consultation. Each future consultation must use the site-specific information available at that time and reflect

the status of the pygmy-owl at that time. In making our determination, we considered the following:

- The status of the pygmy-owl in Arizona is tenuous. The number of adult pygmy-owls documented in Arizona has never exceeded 50 since regular survey and monitoring work began in 1993. In both 2002 and 2003, the number of known pygmy-owl nests in the State, outside the Tohono O'odham Nation, was three and four, respectively, down from the highest number, 13, documented in 2001. Numbers have not increased in 2004 and 2005. Although sample size is low, and the monitoring period is relatively short, there appears to be a declining trend in population that has somewhat corresponded with recent drought conditions. Observations by researchers in Mexico may indicate a similar population decline just south of the U.S./Mexico border (A. Flesch, pers. comm). However, in and around the action area, drought should not have such a marked effect due to artificial water sources, enhanced vegetation, and increased prey availability. Nonetheless, numbers of known pygmy-owls within CHU-3 have declined from a high of 12 in 2000 to only 2 in 2005, indicating that other factors are likely contributing to the decline. Specifically, both remaining pygmy-owls in CHU-3 are males. It is imperative that habitat connectivity is maintained and enhanced, or that population augmentation be implemented, in order to increase the number of breeding pairs and reproductive output.
- Portions of CHU-3, including the action area, have been subject to rapid growth and urbanization. Existing natural habitats have been lost and fragmented. Growth in the Town of Marana, the primary jurisdiction within the action area, exceeded 400% during the past decade. Oro Valley, also containing some portions of CHU-3, had 310% growth during that same time period. Not all of this growth occurred in areas affecting the pygmy-owl, but much of it did. While some recent development projects have utilized lower housing densities or clustered development, many of the residential subdivisions being developed are high density (4-6 houses/acre). Many of the roads in CHU 2 and CHU 3 are slated for expansion or improvement, and at least one new highway interchange is being planned. Currently, only small, isolated parcels of natural open space remain within much of the action area in contrast to the larger expanses of open space in northern portions of CHU 3. Pygmy-owl dispersal pathways in northwest Tucson appear to be limited to remaining open space and low-density subdivisions where the majority of known pygmy-owl nest sites are located. Some sites within the action area have been designated for pygmy-owl conservation as a result of completed section 7 consultations.
- With the EPA transfer of the section 402 CWA NPDES program to the State of Arizona, the number of projects with a Federal nexus has been reduced within the action area. Single-family residence construction typically does not have a Federal nexus. Cumulative effects considered in our analysis include residential subdivisions, single-family residences, and commercial projects where zoning, development plans, subdivision plats, or impact fee assessment make them reasonably certain to occur, but no

Federal nexus is anticipated. Areas where these cumulative effects are anticipated to occur include areas where pygmy-owl breeding home ranges and dispersal pathways have been documented. Some of these effects are reduced due to the recent trend to plan and construct lower density housing. On August 22, 2005, the 9<sup>th</sup> Circuit vacated EPA's decision to approve the AZPDES program. If the 9<sup>th</sup> Circuit's decision stands, it will result in the return of the entire CWA 402 program to the jurisdiction of the EPA and, once again, expand the Federal role in private development activities.

- The Applicant has included a number of conservation measures in an attempt to reduce the effects of the proposed action on pygmy-owls by 1) providing contingencies to minimize effects on any pygmy-owls that may be detected on the project site prior to and/or after commencement of construction; 2) minimizing the indirect effects of this development (pet predation, pesticides, lighting, inappropriate activities within the conserved open space, etc.) on pygmy-owls; 3) leaving 76.4% of the project site north of Lambert Road as open space; 4) maintaining habitat connectivity by leaving the washes in a natural state; and 5) revegetating areas within the proposed corridors to further enhance their suitability for pygmy-owls.

Our conclusions are based on the record of this consultation including the BA, the Specific Plan, correspondence and meetings with the project proponents, the information outlined in this BO, and the following:

1. This project will occur in an area that has been regularly occupied by pygmy-owls, and that has already experienced considerable habitat loss and fragmentation. Habitat disturbance resulting from this project will occur on approximately 742.9 acres. Approximately 38% of this disturbance will occur within areas of the project that support potential pygmy-owl nesting habitat. The project will conserve 459.1 acres of enhanced and natural open space as an open space corridor traversing the property. These protected lands will be managed to protect suitable habitat for the pygmy-owl and contribute to its conservation.
2. The open space corridors will be narrower than the current configuration, and the indirect effects of the project will likely reduce functional connectivity in comparison to existing conditions. However, we simply do not know the degree to which this reduced function will affect pygmy-owl dispersal. However, while function may be reduced, it will not be eliminated.
3. This project will result in effects to the pygmy-owl. However, in this particular case, the significance of these effects related to conservation of the species is decreased by the current pygmy-owl population status. Due to the currently low numbers of known dispersing juvenile pygmy-owls statewide, it is also unlikely that additional dispersing pygmy-owls will establish territories or nest sites on or adjacent to this project in the near future. The construction of the Cascada project will not change this condition and will

maintain habitat values that could allow for future occupancy by pygmy-owls. Therefore, we do not anticipate that this project will affect the long-term conservation of the species within CHU 2 and CHU 3 and, therefore, this project will not jeopardize the continued existence of the species and will not destroy or adversely modify proposed critical habitat.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral patterns that include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

### **Amount or Extent of Take Anticipated**

No incidental take of pygmy-owls is reasonably certain to result from the proposed action because the Applicant has addressed direct and indirect effects to the pygmy-owl through ongoing surveys, the implementation of contingencies should a pygmy-owl be detected on or adjacent to the project area, limiting levels of habitat disturbance, and maintaining habitat linkages through the project.

### **Reporting Requirements/Disposition of Dead or Injured Listed Animals**

Should a dead or injured threatened or endangered animal be found, initial notification must be made to our Division of Law Enforcement, 2450 West Broadway Road, #113, Mesa, Arizona (480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species

will be submitted as soon as possible to the nearest FWS or AGFD office, educational, or research institutions (e.g., University of Arizona in Tucson) holding appropriate state and Federal permits.

Arrangements regarding proper disposition of potential museum specimens will be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any treated listed animal survive, we should be contacted regarding the final disposition of the animal.

## **CONSERVATION RECOMMENDATIONS**

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the pygmy-owl. In furtherance of the purposes of the Act, we recommend implementing the following discretionary actions:

- The ACOE should conduct or fund studies using both monitoring and telemetry, to determine pygmy-owl habitat use patterns and relationships between owls and the human interface in northwest Tucson. Surveys involving simulated or recorded calls of pygmy-owls require an appropriate permit from us. AGFD should also be contacted in regard to state permitting requirements.
- The ACOE should continue to actively participate in regional planning efforts, such as Pima County's Sonoran Desert Conservation Plan (SDCP) and the Town of Marana's HCP, and other conservation efforts for the pygmy-owl.
- The ACOE should assist in the implementation of recovery tasks identified in the pygmy-owl Recovery Plan when approved by us.
- The ACOE should monitor the effectiveness of conservation measures associated with issuance of authorized permits.

## **REINITIATION-CLOSING STATEMENT**

This concludes formal consultation with the ACOE on the proposed Cascada project in Pima County, Arizona. 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 maintained (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. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We have assigned log number 02-21-05-F-0607 to this consultation. Please refer to that number in future correspondence regarding this consultation. Any questions or comments should be directed to Scott Richardson at (520) 670-6150 (x 242) or Sherry Barrett at (x 223).

Sincerely,

/s/ Steven L. Spangle  
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)  
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ  
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ  
Habitat Branch Chief, Arizona Game and Fish Department, Phoenix, AZ  
Army Corps of Engineers, Phoenix, AZ (Attn: Marjorie Blaine)  
Town of Marana, Marana, AZ (Attn: Mike Reuwsaat)  
Pima County Development Services, Tucson, AZ (Attn: Sherry Ruther)  
Red Point Development, Tucson, AZ (Attn: Jack Richter)  
Westland Resources, Tucson, AZ (Attn: Brian Lindenlaub)

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