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Use Code: 425

FS-2700-5 (10/09)  
OMB No. 0596-0082

**U.S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE**

**TERM SPECIAL USE PERMIT**

**AUTHORITY: Arizona-Idaho Conservation Act, P.L. 100-696 (AICA),  
and the Term Permit Act of March 4, 1915, 16 U.S.C. 497.**

Arizona Board of Regents, on behalf of the University of Arizona, Attn: Senior Vice President for Research, University of Arizona, Building 66, Room 601, Post Office Box 210066, Tucson, AZ 85721.

Arizona Board of Regents, on behalf of the University of Arizona (the holder) is authorized to use and occupy National Forest System lands on the Coronado National Forest, subject to the terms and conditions of this term special use permit (the permit).

This permit covers 8.6 acres in Sections 27, 28 & 29, Township 8 South, Range 24 East, Gila and Salt River Meridian (the permit area), as shown on the maps attached as Appendices A, B1, B2, & B3. This permit is issued for the purpose of Scientific and Astrophysical Research.

Permitted facilities include the Large Binocular Telescope, the Submillimeter Telescope, and the Vatican Advanced Technology Telescope, (see Appendix B1) and necessary support facilities (see Appendix B2), which collectively include but are not limited to:

- Three telescope facilities
- Monopole with microwave dish and concrete base
- Propane building (containing 3 propane tanks totaling 6,500 gallons)
- Pump house (containing potable water pumps and a fire hydrant)
- Utility building (containing two generators, a switchgear, 150 kva transformer, sump, day tank water system pressure drum, a fire pump, two chillers, an LBT boiler, and a water distribution system)
- A 1,500 kva transformer, a 300 kva transformer, a PMH-9 transfer switch and a fused disconnect switch
- 10,000 Gal. double-walled diesel storage tank with spill containment system
- 50,000 gal. water tank
- Electric power switching stations
- First aid station/police building
- 3 Fire hydrants with sheds
- Underground utility lines and vaults
- Sprinkler system
- Septic holding tanks
- Guardrails
- Drainage grates
- 2 mile access road to the site
- The 25 kV electrical transmission system to the permit area located within the Power Corridor designated under the Arizona Wilderness Act (P.L. 98-406)

The Management Plan (Appendix C), dated the date hereof, Special Conditions and Clauses (Appendix D), the Arizona Idaho Conservation Act (AICA) and Reasonable and Prudent Alternative Number 3 (RPA3) (Appendix E), the Emergency Response Contingency Plan (Appendix F), and the Environmental Site Report (Appendix G) are attached to and hereby made a part of this permit. The terms of the AICA (including RPA 3 of the U.S. Fish and Wildlife Service Biological Opinion, dated July 14, 1983 are hereby incorporated into this

permit by reference. In the case of any conflict between the Management Plan, this permit and its appendices, and the AICA, the AICA shall control.

Within the Management Plan, its Appendix D describes the MGIO management structure for decision-making for MGIO policy, funding, and operations; however, the permit holder remains responsible for compliance with all terms and condition of this permit and the Management Plan.

## **TERMS AND CONDITIONS**

### **I. GENERAL TERMS**

A. **AUTHORITY**. This permit is issued pursuant to the Arizona-Idaho Conservation Act, P.L. 100-696 (AICA), the Term Permit Act of March 4, 1915, 16 U.S.C. 497, and 36 CFR Part 251, Subpart B, as amended, and is subject to their provisions.

B. **AUTHORIZED OFFICER**. The authorized officer is the Forest Supervisor or a subordinate officer with delegated authority.

C. **TERM**. This permit shall expire at midnight on January 29, 2035, twenty years from the date of issuance. Expiration of this permit shall not require notice, a decision document, or any environmental analysis or other documentation.

D. **RENEWAL**. This permit does not provide for renewal. Prior to expiration of this permit, the holder may apply for a new permit that would renew the use and occupancy authorized by this permit. Applications for a new permit must be submitted at least one year prior to expiration of this permit. Renewal of the use and occupancy authorized by this permit shall be at the sole discretion of the authorized officer consistent with the AICA. At a minimum, before renewing the use and occupancy authorized by this permit, the authorized officer shall require that (1) the use and occupancy to be authorized by the new permit is consistent with the AICA and the standards and guidelines in the applicable land management plan; (2) the type of use and occupancy to be authorized by the new permit is the same as the type of use and occupancy authorized by the AICA and this permit; and (3) the holder is in compliance with all the terms of this permit. The authorized officer may prescribe new terms and conditions when a new permit is issued.

### **E. AMENDMENT**

1. This permit may be amended in whole or in part by the Forest Service when, at the discretion of the authorized officer, such action is deemed necessary or desirable to incorporate new terms that may be required by law, regulation, the applicable land management plan, or projects and activities implementing a land management plan pursuant to 36 CFR Part 215.

2. At the sole discretion of the authorized officer, this permit may be amended to remove authorization to use any National Forest System lands not needed for the use and occupancy authorized by this permit.

3. The holder may apply for an amendment to this permit to cover new or changed uses or areas. In approving or denying an amendment, the authorized officer shall consider, in addition to the requirements in applicable laws and regulations, the findings or recommendations of other affected agencies and whether the new or changed use or area can be accommodated by an amendment to this permit, or whether a new permit should be issued.

F. **COMPLIANCE WITH LAWS, REGULATIONS, AND OTHER LEGAL REQUIREMENTS**. In exercising the privileges granted by this permit, the holder shall comply with all present and future federal laws and regulations and all present and future state, county, and municipal laws, regulations, and other legal requirements that apply to the permit area, to the extent they do not conflict with federal law, regulation, or policy. The Forest Service assumes no responsibility for enforcing laws, regulations, and other legal

requirements that fall under the jurisdiction of other governmental entities.

G. NON-EXCLUSIVE USE. The use and occupancy authorized by this permit are not exclusive. The Forest Service reserves the right of access to the permit area, including a continuing right of physical entry to the permit area for inspection, monitoring, or any other purpose consistent with any right or obligation of the United States under any law or regulation. The Forest Service reserves the right to allow others to use the permit area in any way that is not inconsistent with the holder's rights and privileges under this permit, after consultation with all parties involved. Except for any restrictions that the holder and the authorized officer agree are necessary to protect the installation and operation of authorized temporary improvements, the lands and waters covered by this permit shall remain open to the public for all lawful purposes.

H. ASSIGNABILITY. This permit is not assignable or transferable.

I. TRANSFER OF TITLE TO THE IMPROVEMENTS

1. Notification of Transfer. The holder shall notify the authorized officer when a transfer of title to all or part of the improvements is contemplated.

2. Transfer of Title. Except as approved in writing by the authorized officer, any transfer of title to the improvements covered by this permit shall result in termination of the permit. If required by the authorized officer, the party who acquires title to the improvements must submit an application for a permit. The Forest Service is not obligated to issue a new permit to the party who acquires title to the improvements. The authorized officer shall determine that the applicant meets requirements under applicable federal regulations.

J. CHANGE IN CONTROL OF THE BUSINESS ENTITY

1. Notification of Change in Control. The holder shall notify the authorized officer when a change in control of the business entity that holds this permit is contemplated.

a. In the case of a corporation, control is an interest, beneficial or otherwise, of sufficient outstanding voting securities or capital of the business so as to permit the exercise of managerial authority over the actions and operations of the corporation or election of a majority of the board of directors of the corporation.

b. In the case of a partnership, limited partnership, joint venture, or individual entrepreneurship, control is a beneficial ownership of or interest in the entity or its capital so as to permit the exercise of managerial authority over the actions and operations of the entity.

c. In other circumstances, control is any arrangement under which a third party has the ability to exercise management authority over the actions or operations of the business.

2. Effect of Change in Control. Any change in control of the business entity as defined in clause J.1 shall result in termination of this permit. The party acquiring control must submit an application for a special use permit. The Forest Service is not obligated to issue a new permit to the party who acquires control. The authorized officer shall determine whether the applicant meets the requirements established by applicable federal regulations.

II. IMPROVEMENTS

A. LIMITATIONS ON USE. Nothing in this permit gives or implies permission to build or maintain any structure or facility or to conduct any activity unless specifically authorized by this permit. Any use not specifically authorized by this permit must be proposed in accordance with 36 CFR 251.54. Approval of such a proposal through issuance of a new permit or permit amendment is at the sole discretion of the

authorized officer.

B. PLANS. All plans for development, layout, construction, reconstruction, or alteration of improvements in the permit area, as well as revisions to those plans, must be prepared by a licensed engineer, architect, landscape architect, or other qualified professional acceptable to the authorized officer. These plans and plan revisions must have written approval from the authorized officer before they are implemented. The authorized officer may require the holder to furnish as-built plans, maps, or surveys upon completion of the work.

### III. OPERATIONS

A. MANAGEMENT PLAN. The holder shall review its management plan, which is required under the AICA, at least every five years and advise the authorized officer of any changes. The plan shall be prepared and revised in consultation with the authorized officer or the authorized officer's designated representative and shall cover all operations authorized by this permit. Such plan shall outline steps the holder will take to protect public health and safety and the environment and shall include sufficient detail and standards to enable the Forest Service to monitor the holder's operations for compliance with the terms and conditions of this permit. The plan shall be submitted by the holder and approved by the authorized officer or the authorized officer's designated representative prior to commencement of operations and shall be attached to this permit as an appendix. The authorized officer may require an annual meeting with the holder to discuss the terms and conditions of the permit or plan, annual use reports, or other concerns either party may have.

B. PERIOD OF USE. The use and occupancy authorized by this permit shall be in normal operation at least 100 days each year or season. Failure of the holder to exercise this minimum use may result in revocation of this permit under clause VII.A.

C. RESPONSIBILITY FOR DAY-TO-DAY ACTIVITIES. As a general rule, the holder shall conduct the day-to-day activities authorized by this permit. A limited amount of activities may be conducted by a party other than the holder, but only with prior written approval of the authorized officer. The holder shall continue to be responsible for compliance with all the terms of this permit.

D. LEASING. Subject to clause III.C., the holder may lease authorized concessions and improvements owned by the holder that are located within the permit area with the prior written approval of the authorized officer. The Forest Service reserves the right to disapprove these leases. The holder shall remain responsible for compliance of the leased concessions and improvements with all the terms and conditions of this permit.

E. CONDITION OF OPERATIONS. The holder shall maintain the authorized improvements and permit area to standards of repair, orderliness, neatness, sanitation, and safety acceptable to the authorized officer and consistent with other provisions of this permit. Standards are subject to periodic change by the authorized officer. The holder shall comply with inspection requirements deemed appropriate by the authorized officer.

F. INSPECTION BY THE FOREST SERVICE. The Forest Service shall monitor the holder's operations and reserves the right to inspect the permitted facilities and improvements at any time for compliance with the terms of this permit. The obligations of the holder under this permit are not contingent upon any duty of the Forest Service to inspect the premises. A failure by the Forest Service or other governmental officials to inspect is not a defense to noncompliance with any of the terms and conditions of this permit.

G. REMOVAL AND PLANTING OF VEGETATION. This permit does not authorize the cutting of timber or other vegetation. Trees or shrubbery may be removed or destroyed only after the authorized officer or the authorized officer's designated representative has approved in writing and marked or otherwise identified what may be removed or destroyed. Timber cut or destroyed shall be paid for at current stumpage rates for similar timber in the National Forest. The Forest Service reserves the right to dispose of the merchantable timber to those other than the holder at no stumpage cost to the holder. Unmerchantable

material shall be disposed of as directed by the authorized officer. Trees, shrubs, and other plants may be planted within the permit area with prior written approval of the authorized officer.

H. SIGNS. Signs posted on National Forest System lands must have prior written approval of the authorized officer.

I. REFUSE DISPOSAL. The holder shall comply with all applicable federal, state, and local requirements related to the disposal of refuse resulting from the use and occupancy authorized by this permit.

J. SANITATION. The operation and maintenance of all sanitation, food service, and water-supply methods, systems, and facilities shall comply with applicable standards set by state and local health departments.

K. DRINKING WATER SYSTEM. The holder, as the water supplier and owner or operator of the drinking water system for the facilities authorized by this permit, is responsible for compliance with all applicable federal, state, and local drinking water laws and regulations governing operation and maintenance of a public drinking water system, including but not limited to developing, operating, and maintaining the system and conducting drinking water testing and taking appropriate corrective and follow-up actions in accordance with federal, state, and any other applicable requirements. For purposes of this permit, public water systems are defined in accordance with the Safe Drinking Water Act, as amended (42 U.S.C. 300f et seq.), and the National Primary Drinking Water Regulations, 40 CFR Part 141, or state regulations, if more stringent. The holder shall retain all drinking water system records as required by applicable laws and regulations. The holder agrees to make the records available to the Forest Service and to any other regulatory agency authorized to review Forest Service activities.

L. NONDISCRIMINATION

1. The holder and its employees shall not discriminate against any person on the basis of race, color, sex (in educational and training programs), national origin, age, or disability or by curtailing or refusing to furnish accommodations, facilities, services, or use privileges offered to the public generally. In addition, the holder and its employees shall comply with the provisions of Title VI of the Civil Rights Act of 1964 as amended, Section 504 of the Rehabilitation Act of 1973, as amended, Title IX of the Education Amendments of 1972, as amended, and the Age Discrimination Act of 1975, as amended.
2. The holder shall include and require compliance with the above nondiscrimination provisions in any third-party agreement made with respect to the operations authorized under this permit.
3. The Forest Service shall furnish signs setting forth this policy of nondiscrimination. These signs shall be conspicuously displayed at the public entrance to the premises and at other exterior or interior locations, as directed by the Forest Service.
4. The Forest Service shall have the right to enforce the foregoing nondiscrimination provisions by suit for specific performance or by any other available remedy under the laws of the United States or the State in which the violation occurs.

M. EQUAL ACCESS TO FEDERAL PROGRAMS. In addition to the above nondiscrimination policy, the holder agrees to insure that its programs and activities that are open to the general public are on an equal basis and without regard to any non-merit factor.

N. HOLDER'S REPRESENTATIVE. The holder or the holder's designated representative shall be within the permit area at all times when the facilities are open to the public. The holder shall notify the authorized officer in writing who the holder's representative will be.

O. HOLDER'S AND USERS' CONDUCT. Disorderly or otherwise objectionable conduct by the holder or those occupying the permit area with the holder's permission shall be cause for revocation or suspension

of this permit.

#### **IV. RIGHTS AND LIABILITIES**

A. LEGAL EFFECT OF THE PERMIT. This permit, which is revocable and terminable, is not a contract or a lease, but rather a federal license. The benefits and requirements conferred by this authorization are reviewable solely under the procedures set forth in 36 CFR Part 251, Subpart C, and 5 U.S.C. 704. This permit does not constitute a contract for purposes of the Contract Disputes Act, 41 U.S.C. 601. The permit is not real property, does not convey any interest in real property, and may not be used as collateral for a loan.

B. VALID OUTSTANDING RIGHTS. This permit is subject to all valid outstanding rights. Valid outstanding rights include those derived under mining and mineral leasing laws of the United States. The United States is not liable to the holder for the exercise of any such right.

C. ABSENCE OF THIRD-PARTY BENEFICIARY RIGHTS. The parties to this permit do not intend to confer any rights on any third party as a beneficiary under this permit.

#### **D. WATER RIGHTS AND WATER FACILITIES**

1. Water Rights. This permit does not confer any water rights on the holder. The term "water rights" includes all authorizations, such as certificates, reservations, decrees, or permits, for water use issued under state, local, or other law. Any necessary water rights must be acquired by the holder in accordance with state law and the terms of this permit. After this permit is issued, all water rights obtained by the holder for facilities that divert or pump water from sources located on National Forest System lands for use on National Forest System lands, whether authorized or unauthorized, are for the benefit of the United States and shall be acquired in the name of the United States. Any expenses for acquiring water rights shall be the responsibility of the holder and not the responsibility of the United States.

2. Water Facilities. No ditch, reservoir, well, spring, seepage, or other facility to pump, divert, store, or convey water (hereinafter "water facilities") for which the point of diversion, storage, or withdrawal is on National Forest System lands may be initiated, developed, certified, or adjudicated by the holder without prior written approval from the authorized officer. The authorization of any water facilities in the permit area is granted to allow use of water only in connection with the recreation residence, resort, marina, or other use authorized by this permit. If the use of any water facilities in connection with this recreation residence, resort, marina, or other use ceases, the authorization to use any associated water facilities also ceases. The United States reserves the right to place any conditions on installation, operation, maintenance, and removal of water facilities that are necessary to protect public property, public safety, and natural resources on National Forest System lands in compliance with applicable law. Any change in the beneficial use of or location of use from a water facility without prior written approval from the authorized officer shall result in termination of the authorization of that facility.

E. SERVICES NOT PROVIDED. This permit is for the occupancy of land for the purposes stated in this permit and does not provide for the furnishing of road maintenance, water, fire protection, or any other such service by a government agency, utility, association, or individual.

F. RISK OF LOSS. The holder assumes all risk of loss to the authorized improvements. Loss to the authorized improvements may result from but is not limited to theft, vandalism, fire and any fire-fighting activities (including prescribed burns), avalanches, rising waters, winds, falling limbs or trees, and acts of God. If authorized improvements in the permit area are destroyed or substantially damaged, the authorized officer shall conduct an analysis to determine whether the improvements can be safely occupied in the future.

**G. DAMAGE TO UNITED STATES PROPERTY.** The holder has an affirmative duty to protect from damage the land, property, and other interests of the United States. Damage includes but is not limited to fire suppression costs, and all costs and damages associated with or resulting from the release or threatened release of a hazardous material occurring during or as a result of activities of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees on, or related to, the lands, property, and other interests covered by this permit. For purposes of clauses IV.G and section V, "hazardous material" shall mean (a) any hazardous substance under section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601(14); (b) any pollutant or contaminant under section 101(33) of CERCLA, 42 U.S.C. § 9601(33); (c) any petroleum product or its derivative, including fuel oil, and waste oils; and (d) any hazardous substance, extremely hazardous substance, toxic substance, hazardous waste, ignitable, reactive or corrosive materials, pollutant, contaminant, element, compound, mixture, solution or substance that may pose a present or potential hazard to human health or the environment under any applicable environmental laws.

1. The holder shall avoid damaging or contaminating the environment, including but not limited to the soil, vegetation (such as trees, shrubs, and grass), surface water, and groundwater, during the holder's use and occupancy of the permit area. If the environment or any government property covered by this permit becomes damaged during the holder's use and occupancy of the permit area, the holder shall immediately repair the damage or replace the damaged items to the satisfaction of the authorized officer and at no expense to the United States.
2. The holder shall be liable for all injury, loss, or damage, including fire suppression or other costs associated with rehabilitation or restoration of natural resources, associated with the holder's use and occupancy of the permit area. Compensation shall include but is not limited to the value of resources damaged or destroyed, the costs of restoration, cleanup, or other mitigation, fire suppression or other types of abatement costs, and all associated administrative, legal (including attorney's fees), and other costs.
3. The holder shall be liable for damage caused by use of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees to all roads and trails of the United States that are open to public use to the same extent as provided under clause IV.G.1, except that liability shall not include reasonable and ordinary wear and tear.

**H. HEALTH, SAFETY, AND ENVIRONMENTAL PROTECTION.** The holder shall take all measures necessary to protect the environment, natural resources, and the health and safety of all persons affected by the use and occupancy authorized by this permit. The holder shall promptly abate as completely as possible and in compliance with all applicable laws and regulations any physical or mechanical procedure, activity, event, or condition existing or occurring before, during, or after the term of this permit and arising out of or relating to any activity, event, or condition existing or occurring during the term of this permit that causes or threatens to cause a hazard to the health or safety of the public or the holder's employees or agents or harm to the environment (including areas of vegetation or timber, fish, or other wildlife populations, their habitats, or any other natural resources). The holder shall immediately notify the authorized officer of all serious accidents that occur in connection with these activities, events, or conditions. The holder has sole responsibility to protect the health and safety of all persons affected by the use and occupancy authorized by this permit. The Forest Service has no duty under the terms of this permit to inspect the permit area or operations of the holder for hazardous conditions or compliance with health and safety standards.

**I. INDEMNIFICATION OF THE UNITED STATES.** The holder shall indemnify, defend, and hold harmless the United States for any costs, damages, claims, liabilities, and judgments arising from past, present, and future acts or omissions of the holder in connection with the use and occupancy authorized by this permit. This indemnification provision includes but is not limited to acts and omissions of the holder or the holder's heirs, assigns, agents, employees, contractors, or lessees in connection with the use and occupancy authorized by this permit which result in (1) violations of any laws and regulations which are now or which may in the future become applicable, including but not limited to the environmental laws listed in clause V.A of this permit; (2) judgments, claims, demands, penalties, or fees assessed against the United States;

(3) costs, expenses, and damages incurred by the United States; or (4) the release or threatened release of any solid waste, hazardous waste, hazardous materials, pollutant, contaminant, oil in any form, or petroleum product into the environment. The authorized officer may prescribe terms that allow the holder to replace, repair, restore, or otherwise undertake necessary curative activities to mitigate damages in addition or as an alternative to monetary indemnification.

J. BONDING. The authorized officer may require the holder to furnish a surety bond or other security for any of the obligations imposed by the terms and conditions of this permit or any applicable law, regulation, or order.

## V. RESOURCE PROTECTION

A. COMPLIANCE WITH ENVIRONMENTAL LAWS. The holder shall in connection with the use and occupancy authorized by this permit comply with all applicable federal, state, and local environmental laws and regulations, including but not limited to those established pursuant to the Resource Conservation and Recovery Act, as amended, 42 U.S.C. 6901 et seq., the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq., the Oil Pollution Act, as amended, 33 U.S.C. 2701 et seq., the Clean Air Act, as amended, 42 U.S.C. 7401 et seq., the CERCLA, as amended, 42 U.S.C. 9601 et seq., the Toxic Substances Control Act, as amended, 15 U.S.C. 2601 et seq., the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, 7 U.S.C. 136 et seq., and the Safe Drinking Water Act, as amended, 42 U.S.C. 300f et seq.

B. WATER POLLUTION. No waste or by-product shall be discharged into water if it contains any substance in concentrations which will result in harm to fish and wildlife, or to human water supplies. Storage facilities for materials capable of causing water pollution, if accidentally discharged, shall be located so as to prevent any spillage into waters or channels leading into water that would result in harm to fish and wildlife or to human water supplies.

C. ESTHETICS. The holder shall protect the scenic esthetic values of the permit area and the adjacent land to the greatest extent possible during construction, operation, and maintenance of the authorized improvements.

D. VANDALISM. The holder shall take reasonable measures to prevent and discourage vandalism or disorderly conduct and when necessary shall contact the appropriate law enforcement officer to address these problems.

E. HERBICIDE AND PESTICIDE USE. Herbicides and pesticides may not be used outside of buildings to control undesirable woody and herbaceous vegetation, aquatic plants, insects, rodents, or fish without the prior written approval of the authorized officer. A request for approval of planned uses of pesticides shall be submitted annually by the holder on the due date established by the authorized officer. The report shall cover a 12-month period of planned use beginning 3 months after the reporting date. Information essential for review shall be provided in the form specified. Exceptions to this schedule may be allowed, subject to emergency request and approval, only when unexpected outbreaks of pests require control measures which were not anticipated at the time an annual report was submitted. Only those materials registered by the U.S. Environmental Protection Agency for the specific purpose planned shall be authorized for use on National Forest System lands. Label instructions and all applicable laws and regulations shall be strictly followed in the application of pesticides and disposal of excess materials and containers.

F. ARCHAEOLOGICAL AND PALEONTOLOGICAL DISCOVERIES. The holder shall immediately notify the authorized officer of all antiquities or other objects of historic or scientific interest, including but not limited to historic or prehistoric ruins, fossils, or artifacts discovered in connection with the use and occupancy authorized by this permit. The holder shall leave these discoveries intact and in place until directed otherwise by the authorized officer. Protective and mitigative measures specified by the authorized officer shall be the responsibility of the holder.



G. NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION (NAGPRA). In accordance with 25 U.S.C. 3002 (d) and 43 CFR 10.4, if the holder inadvertently discovers human remains, funerary objects, sacred objects, or objects of cultural patrimony on National Forest System lands, the holder shall immediately cease work in the area of the discovery and shall make a reasonable effort to protect and secure the items. The holder shall immediately notify the authorized officer by telephone of the discovery and shall follow up with written confirmation of the discovery. The activity that resulted in the inadvertent discovery may not resume until 30 days after the authorized officer certifies receipt of the written confirmation, if resumption of the activity is otherwise lawful, or at any time if a binding written agreement has been executed between the Forest Service and the affiliated Indian tribes that adopts a recovery plan for the human remains and objects.

H. PROTECTION OF HABITAT OF THREATENED, ENDANGERED, AND SENSITIVE SPECIES. The location of sites within the permit area needing special measures for protection of plants or animals listed as threatened or endangered under the Endangered Species Act (ESA) of 1973, 16 U.S.C. 531 et seq., as amended, or as sensitive by the Regional Forester under Forest Service Manual (FSM) 2670, pursuant to consultation conducted under section 7 of the ESA, may be identified on the ground or shown on a separate map. The map shall be attached to this permit as an appendix. The holder shall take any protective and mitigative measures specified by the authorized officer. If protective and mitigative measures prove inadequate, if other sites within the permit area containing threatened, endangered, or sensitive species are discovered, or if new species are listed as threatened or endangered under the ESA or as sensitive by the Regional Forester under the FSM, the authorized officer may specify additional protective and mitigative measures. Discovery of these areas by the holder or the Forest Service shall be promptly reported to the other party.

I. CONSENT TO STORE HAZARDOUS MATERIALS. The holder shall not store any hazardous materials at the site without prior written approval from the authorized officer. This approval shall not be unreasonably withheld. If the authorized officer provides approval, this permit shall include (or in the case of approval provided after this permit is issued, shall be amended to include) specific terms addressing the storage of hazardous materials, including the specific type of materials to be stored, the volume, the type of storage, and a spill plan. Such terms shall be proposed by the holder and are subject to approval by the authorized officer.

1. If the holder receives consent to store hazardous material, the holder shall identify to the Forest Service any hazardous material to be stored at the site. Such identification information shall be consistent with column (1) of the table of hazardous materials and special provisions enumerated at 49 CFR 172.101 whenever the hazardous material appears in that table. For hazard communication purposes, the holder shall maintain Material Safety Data Sheets for any stored hazardous chemicals, consistent with 29 CFR 1910.1200(c) and (g). In addition, all hazardous materials stored by the holder shall be used, labeled, stored, transported, and disposed of in accordance with all applicable federal, state, and local laws and regulations.

2. If hazardous materials are used or stored at the site, the authorized officer may require the holder to deliver and maintain a surety bond in accordance with clause IV.J.

3. The holder shall not release any hazardous material as defined in clause IV.G onto land or into rivers, streams, impoundments, or natural or man-made channels leading to them. All prudent and safe attempts must be made to contain any release of these materials. The authorized officer may specify conditions that must be met, including conditions more stringent than those imposed by federal, state, and local regulations, to prevent releases and protect natural resources.

J. CLEANUP AND REMEDIATION

1. The holder shall immediately notify all appropriate response authorities, including the National

Response Center and the Forest Service authorized officer or the authorized officer's designated representative, of any oil discharge or of the release of a hazardous material in the permit area in an amount greater than or equal to its reportable quantity, in accordance with 33 CFR Part 153, Subpart B, and 40 CFR Part 302. For the purposes of this requirement, "oil" is defined by section 311(a)(1) of the Clean Water Act, 33 U.S.C. 1321(a)(1). The holder shall immediately notify the authorized officer or the authorized officer's designated representative of any release or threatened release of any hazardous material in or near the permit area which may be harmful to public health or welfare or which may adversely affect natural resources on federal lands.

2. Except with respect to any federally permitted release as that term is defined under section 101(10) of CERCLA, 42 U.S.C. 9601(10), the holder shall clean up or otherwise remediate any release, threat of release, or discharge of hazardous materials that occurs either in the permit area or in connection with the holder's activities in the permit area, regardless of whether those activities are authorized under this permit. The holder shall perform cleanup or remediation immediately upon discovery of the release, threat of release, or discharge of hazardous materials. The holder shall perform the cleanup or remediation to the satisfaction of the authorized officer and at no expense to the United States. Upon revocation or termination of this permit, the holder shall deliver the permit area to the Forest Service free and clear of contamination.

K. CERTIFICATION UPON REVOCATION OR TERMINATION. If the holder uses or stores hazardous materials at the site, upon revocation or termination of this permit the holder shall provide the Forest Service with a report certified by a professional or professionals acceptable to the Forest Service that the permit area is uncontaminated by the presence of hazardous materials and that there has not been a release or discharge of hazardous materials upon the permit area, into surface water at or near the permit area, or into groundwater below the permit area during the term of the permit. If a release or discharge has occurred, the professional or professionals shall document and certify that the release or discharge has been fully remediated and that the permit area is in compliance with all applicable federal, state, and local laws and regulations.

L. ENVIRONMENTAL SITE REPORT. An environmental site report prepared by the holder within 6 months of issuance of this permit shall document the known history of the permit area with regard to the storage, release, or disposal of hazardous materials and is attached to and made a part of this permit as Appendix G. Upon revocation or termination of this permit, the holder shall prepare another environmental site report, which shall document the environmental condition of the permit area at that time and describe any storage, release, or disposal of hazardous materials during the holder's use and occupancy of the permit area. Both environmental site reports prepared by the holder shall be subject to written approval by the authorized officer. A comparison of the two reports shall assist the authorized officer in determining whether any environmental cleanup or restoration is required. Any cleanup or restoration shall be completed promptly by the holder in accordance with all applicable federal, state, and local laws and regulations.

M. WATER WELLS AND ASSOCIATED PIPELINES

1. Other Jurisdictional Requirements. Clause IV.D governs water rights and water facilities. The holder shall obtain all required state and local water permits, licenses, registrations, certificates, or rights and shall provide a copy of them to the authorized officer. For new wells, this information shall be provided prior to disturbing National Forest System lands for the purpose of water use or development.

2. Well Construction or Development. For new or reconstruction of existing wells, the holder shall prepare a well construction and development plan and submit it to the authorized officer for approval. The well development and construction plan must have prior written approval from the authorized officer before well construction or development is initiated. The holder shall follow applicable federal, state, and local standards for design, construction, and development of new wells or reconstruction of existing wells. If such standards do not exist, the holder shall follow applicable standards issued by the American Society for Testing and Materials (ASTM), American Water Works Association (AWWA),

or National Ground Water Association (NGWA). The construction and development plan must identify all potential sources for any proposed water injection during well construction or development. Only non-chlorinated, potable water may be injected during construction or development of wells to be used for monitoring or water withdrawal. Copies of all documentation for drilling, constructing, or developing wells, including all drilling, boring, and well construction logs, shall be provided to the authorized officer within 60 days of completion of work.

3. **Water Conservation Plan.** The holder shall prepare and submit for written approval by the authorized officer a water conservation plan utilizing appropriate strategies to limit the amount of water removed from National Forest System lands.

4. **Well Decommissioning.** The holder shall properly decommission and abandon all wells that are no longer needed or maintained in accordance with applicable federal, state, and local standards for water well abandonment. If such standards do not exist, the holder shall follow applicable standards issued by the ASTM, AWWA, or NGWA. At least 30 days prior to initiation of well decommissioning, the holder shall submit a well decommissioning plan to the authorized officer. The well decommissioning plan shall have written approval from the authorized officer before well decommissioning is initiated. All documentation of well decommissioning shall be provided to the authorized officer within 60 days of completion of the work.

## **VI. LAND USE FEE AND ACCOUNTING ISSUES**

A. **LAND USE FEE.** The holder shall pay an annual land use fee of \$960.38 for the remainder of the year following the date of permit issuance, and thereafter annually on January 1, in the amount of \$960.38.

B. **MODIFICATION OF THE LAND USE FEE.** The land use fee may be revised whenever necessary to reflect the market value of the authorized use or when the fee system used to calculate the land use fee is modified or replaced.

### **C. FEE PAYMENT ISSUES**

1. **Crediting of Payments.** Payments shall be credited on the date received by the deposit facility, except that if a payment is received on a non-workday, the payment shall not be credited until the next workday.

2. **Disputed Fees.** Fees are due and payable by the due date. Disputed fees must be paid in full. Adjustments will be made if dictated by an administrative appeal decision, a court decision, or settlement terms.

#### **3. Late Payments**

(a) **Interest.** Pursuant to 31 U.S.C. 3717 et seq., interest shall be charged on any fee amount not paid within 30 days from the date it became due. The rate of interest assessed shall be the higher of the Prompt Payment Act rate or the rate of the current value of funds to the Treasury (i.e., the Treasury tax and loan account rate), as prescribed and published annually or quarterly by the Secretary of the Treasury in the Federal Register and the Treasury Fiscal Requirements Manual Bulletins. Interest on the principal shall accrue from the date the fee amount is due.

(b) **Administrative Costs.** If the account becomes delinquent, administrative costs to cover processing and handling the delinquency shall be assessed.

(c) **Penalties.** A penalty of 6% per annum shall be assessed on the total amount that is more than 90 days delinquent and shall accrue from the same date on which interest charges begin to accrue.

4. Administrative Offset and Credit Reporting. Delinquent fees and other charges associated with the permit shall be subject to all rights and remedies afforded the United States pursuant to 31 U.S.C. 3711 et seq. and common law. Delinquencies are subject to any or all of the following:

- (a) Administrative offset of payments due the holder from the Forest Service.
- (b) If in excess of 60 days, referral to the Department of the Treasury for appropriate collection action as provided by 31 U.S.C. 3711(g)(1).
- (c) Offset by the Secretary of the Treasury of any amount due the holder, as provided by 31 U.S.C. 3720 et seq.
- (d) Disclosure to consumer or commercial credit reporting agencies.

D. NONPAYMENT. Failure of the holder to make timely payments, pay interest charges, or any other charges when due shall be grounds for revocation of this permit.

## **VII. REVOCATION, SUSPENSION, AND TERMINATION**

A. REVOCATION AND SUSPENSION. The authorized officer may revoke or suspend this permit in whole or in part:

- 1. For noncompliance with federal, state, or local law.
- 2. For noncompliance with the terms and conditions of this permit.
- 3. For abandonment or other failure of the holder to exercise the privileges granted.
- 4. With the consent of the holder.
- 5. For specific and compelling reasons in the public interest.

Prior to revocation or suspension, other than immediate suspension under clause VII.C, the authorized officer shall give the holder written notice of the grounds for revocation or suspension. In the case of revocation or suspension based on clause VII.A.1, 2, or 3, the authorized officer shall give the holder a reasonable period, not to exceed 90 days, to cure any noncompliance.

### **B. REVOCATION FOR SPECIFIC AND COMPELLING REASONS IN THE PUBLIC INTEREST.**

1. If during the term of this permit the authorized officer determines that specific and compelling reasons in the public interest require revocation of this permit, this permit shall be revoked after 90 days written notice to the holder, provided that the authorized officer may prescribe a shorter notice period if justified by the public interest. The Forest Service shall then have the right to purchase the holder's authorized improvements, remove the holder's authorized improvements, or to require the holder to relocate or remove them. The Forest Service shall be obligated to pay the lesser of (1) the cost of relocation and damages resulting from their relocation that are caused by the Forest Service or (2) the value of the authorized improvements as determined by the Forest Service through an appraisal of their replacement cost, less an allowance for physical depreciation. If that amount is fixed by mutual agreement between the authorized officer and the holder, that amount shall be accepted by the holder in full satisfaction of all claims against the United States under this clause. If mutual agreement is not reached, the authorized officer shall determine the amount to be paid, which shall become part of the revocation decision. A payment made pursuant to this clause is subject to the availability of appropriations. Nothing in this permit implies that Congress will appropriate funds to cover a deficiency in appropriations.

2. If revocation in the public interest occurs after the holder has received notification that a new permit will not be issued following expiration of this permit, the amount of damages shall be adjusted as of the date of revocation by multiplying the replacement cost by a fraction which has as the numerator the number of full months remaining in the term of the permit as of the date of revocation

(measured from the date of the revocation notice) and as the denominator the total number of months in the original term of this permit.

C. IMMEDIATE SUSPENSION. The authorized officer may immediately suspend this permit in whole or in part when necessary to protect public health or safety or the environment. The suspension decision shall be in writing. The holder may request an on-site review with the authorized officer's supervisor of the adverse conditions prompting the suspension. The authorized officer's supervisor shall grant this request within 48 hours. Following the on-site review, the authorized officer's supervisor shall promptly affirm, modify, or cancel the suspension.

D. APPEALS AND REMEDIES. Written decisions made by the authorized officer relating to administration of this permit are subject to administrative appeal pursuant to 36 CFR Part 251, Subpart C, as amended. Revocation or suspension of this permit shall not give rise to any claim for damages by the holder against the Forest Service, other than as provided in clause VII.B.

E. TERMINATION. This permit shall terminate when by its terms a fixed or agreed upon condition, event, or time occurs without any action by the authorized officer. Examples include but are not limited to expiration of the permit by its terms on a specified date and termination upon change of control of the business entity. Termination of this permit is not subject to administrative appeal and shall not give rise to any claim for damages by the holder against the Forest Service.

F. RIGHTS AND RESPONSIBILITIES UPON REVOCATION OR TERMINATION WITHOUT RENEWAL. Except as provided in clause VII.B., upon revocation of this permit or termination of this permit without renewal of the authorized use, the authorized officer has the discretion to require the holder to sell or remove all structures and improvements, except those owned by the United States, within a reasonable period prescribed by the authorized officer and to restore the site to the satisfaction of the authorized officer. If the holder fails to sell or remove all structures or improvements within the prescribed period, they shall become the property of the United States and may be sold, destroyed, or otherwise disposed of without any liability to the United States. However, the holder shall remain liable for all costs associated with their removal, including costs of sale and impoundment, cleanup, and restoration of the site.

G. CONTINUATION OF OBLIGATIONS AND LIABILITIES BEYOND EXPIRATION OR REVOCATION. Notwithstanding the termination or revocation of this permit, its terms and conditions shall remain in effect and shall be binding on the holder and the holder's personal representative, successors, and assignees until all the holder's obligations and liabilities accruing before or as a result of termination or revocation of this permit have been satisfied.

## VIII. MISCELLANEOUS PROVISIONS

A. MEMBERS OF CONGRESS. No member of or delegate to Congress or Resident Commissioner shall benefit from this permit either directly or indirectly, except to the extent the authorized use provides a general benefit to a corporation.

B. REGULATING SERVICES AND RATES. The authorized officer shall have the authority to regulate the adequacy and type of services provided the public under this permit and to require that these services conform to satisfactory standards. The holder may be required to furnish a schedule of prices for sales and services authorized by the permit. These prices may be regulated by the authorized officer, provided that the holder shall not be required to charge prices significantly different from those charged by comparable or competing enterprises.

C. ADVERTISING. The holder, either orally or in advertisements, signs, circulars, brochures, letterheads, and like materials, shall not misrepresent in any way the accommodations provided, the status of the permit, or the ownership of the permit area or adjacent lands. The fact that the authorized facilities and services are located on the Coronado National Forest shall be explicitly stated in all the holder's public brochures and print advertising regarding the operations authorized by this permit.

D. CURRENT ADDRESSES. The holder and the authorized officer shall keep each other informed of current mailing addresses, including those necessary for billing and payment of land use fees.

E. SUPERSEDED PERMIT. This permit supersedes a special use permit designated Steward Observatory, SAF2035, dated 04/07/1989.

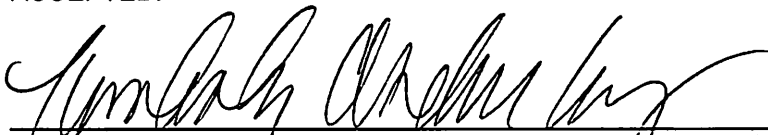
F. SUPERIOR CLAUSES. If there is a conflict between any of the preceding printed clauses and any of the following clauses, the preceding printed clauses shall control.

G. CULTURAL RESOURCES PROTECTION. The holder, contractor, or lessee shall be responsible for the protection from damage of all identified cultural resources within the area which may be affected by their actions. In addition, the holder, contractor, or lessee shall be liable for all damage or injury to the identified cultural resources caused by their actions. The holder, contractor, or lessee shall immediately notify the agency Authorized Officer if any damage occurs to any cultural resource and immediately halt work in the area in which damage has occurred until approval to proceed has been granted by the Authorized Officer after consultation with the Forest Archeologist. All provisions of the Region 3 Cultural Resources Damage Assessment Handbook are incorporated by reference herein.

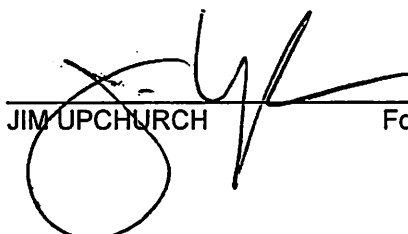
**THIS PERMIT IS ACCEPTED SUBJECT TO ALL OF ITS TERMS AND CONDITIONS.**

BEFORE ANY PERMIT IS ISSUED TO AN ENTITY, DOCUMENTATION MUST BE PROVIDED TO THE AUTHORIZED OFFICER OF THE AUTHORITY OF THE SIGNATORY FOR THE ENTITY TO BIND IT TO THE TERMS AND CONDITIONS OF THE PERMIT.

ACCEPTED:

 Jan 29, 2015  
Kimberly Espy Senior Vice President for Research, University of Arizona Date

APPROVED:

 1/30/2015  
JIM UPCHURCH Forest Supervisor, Coronado National Forest Date

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond, to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0596-0082. The time required to complete this information collection is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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**APPENDICES A & B**

**MAPS OF THE PERMIT AREA**

**APPENDIX C**

**MANAGEMENT PLAN**

**APPENDIX D**

**SPECIAL CONDITIONS AND CLAUSES**

**APPENDIX E**

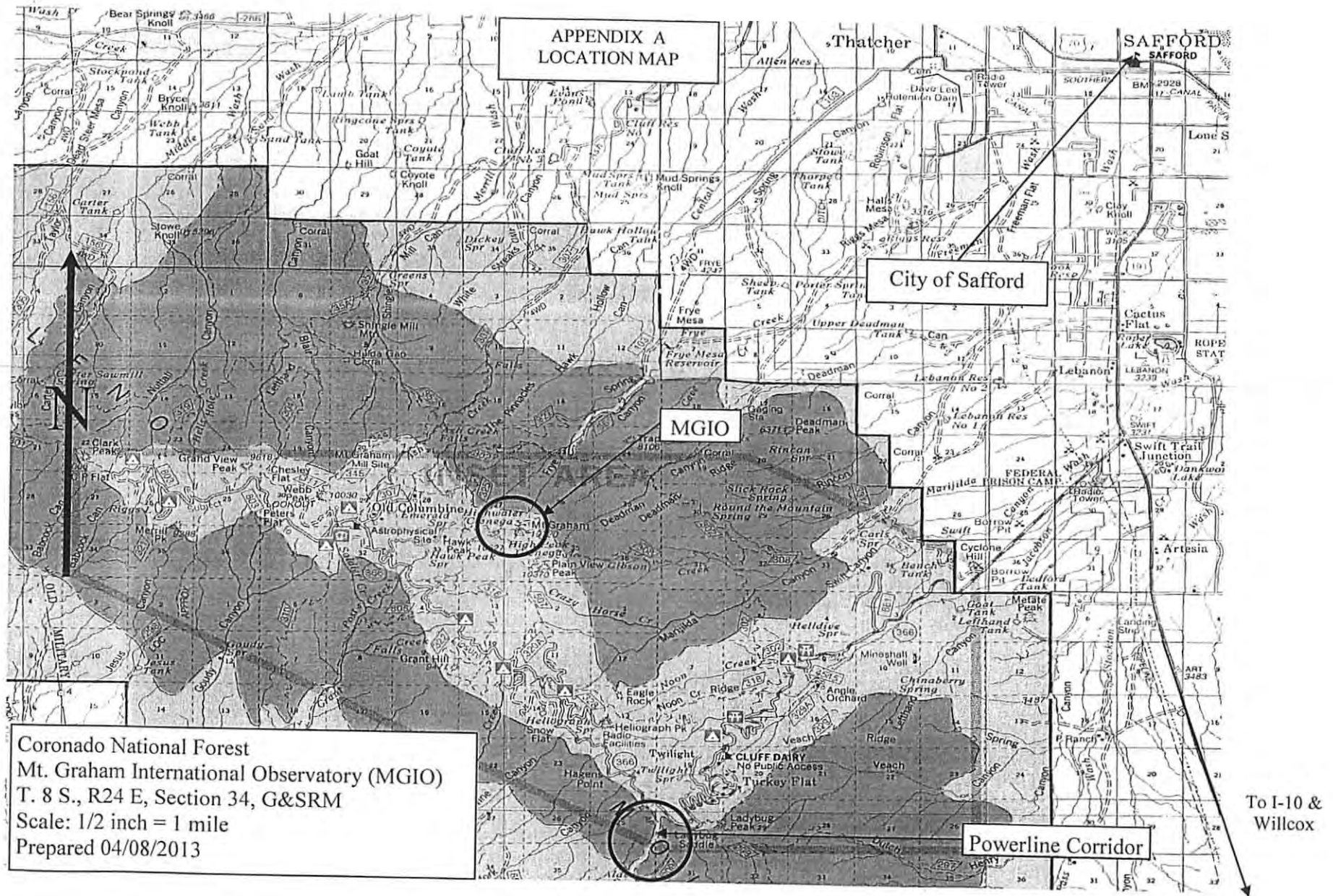
**AICA AND RPA3**

**APPENDIX F**

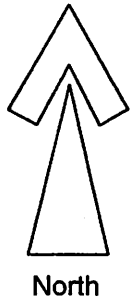
**EMERGENCY RESPONSE CONTINGENCY PLAN**

**APPENDIX G**

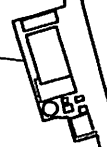
**ENVIRONMENTAL SITE REPORT**







Utilities  
Area  
See Appendix B2



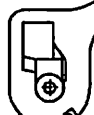
1st Aid / Police Building

Submillimeter  
Telescope

Large  
Binocular  
Telescope

Septic Holding Tanks

Vatican  
Advanced  
Technology  
Telescope



Monopole w/  
Microwave  
Dish

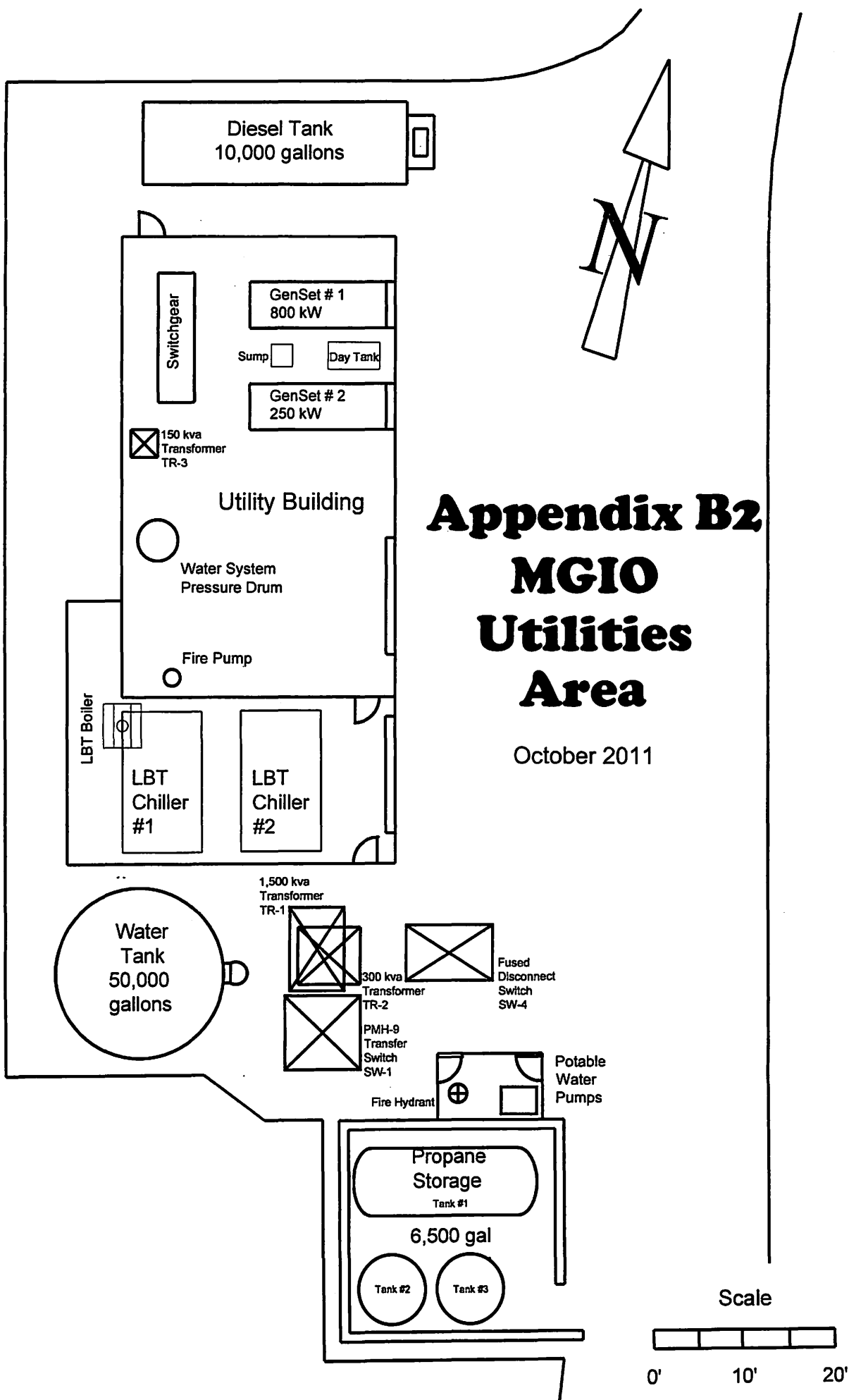
Access Road

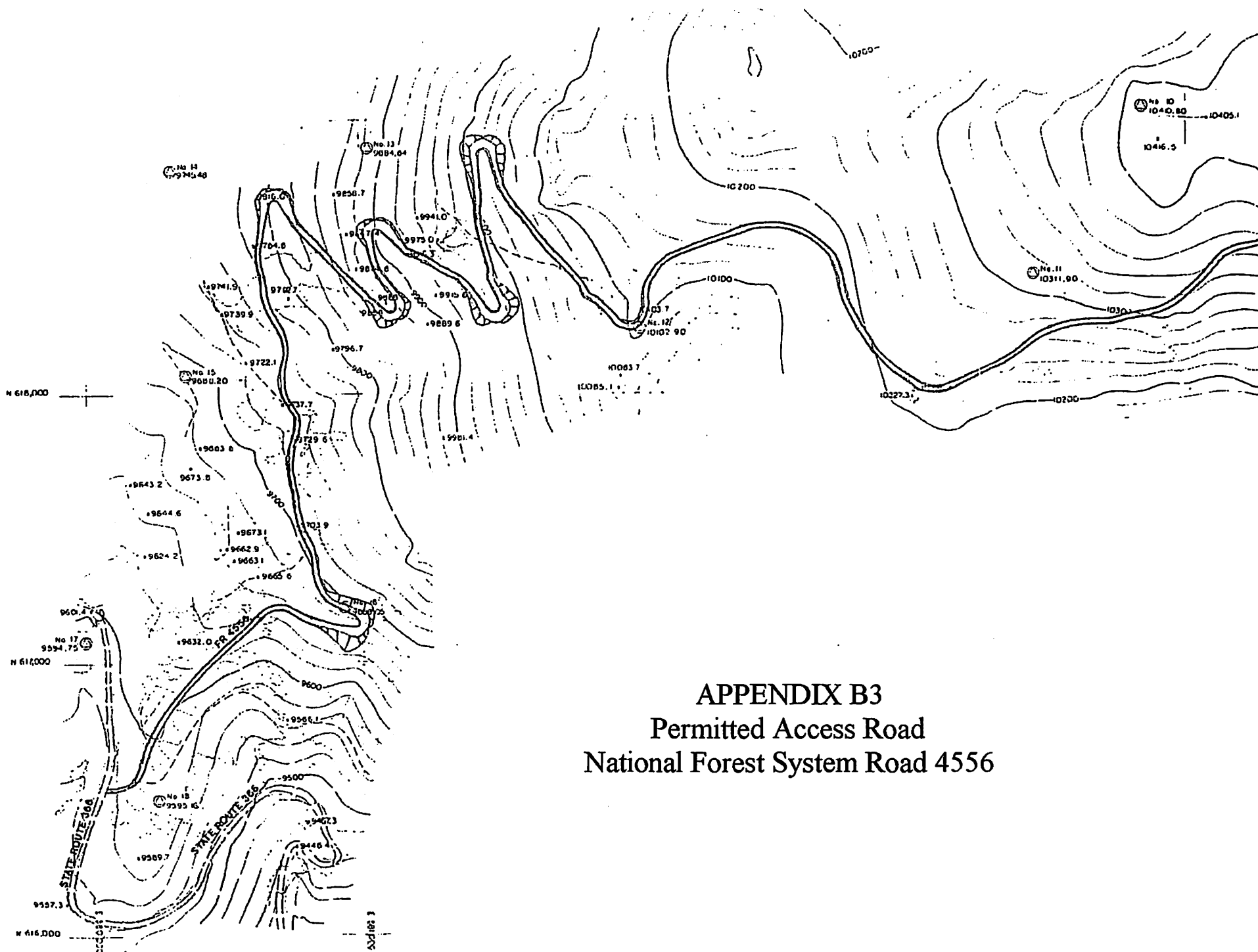
Forest Road NFSR-4556

## Mount Graham International Observatory

### Appendix B1 Site Plan

0 30 60 120  
Scale (feet)





# APPENDIX B3 Permitted Access Road National Forest System Road 4556

APPENDIX C

Mount Graham International Observatory  
Management Plan

January 30, 2015

Mt. Graham International Observatory  
Management Plan

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## 1. Introduction

### 1.1 Purpose

The purpose of this Management Plan is to outline the procedures and guidelines for the operation and maintenance of the Mt. Graham International Observatory (MGIO), a three-telescope observatory complex located in the Pinaleno Mountains of Arizona, which are part of the Coronado National Forest. The purpose of these procedures and guidelines are to ensure compliance with Public Law 100-696, the special-use permit issued by the U.S. Forest Service, and Reasonable and Prudent Alternative Three (RPA3) of the 1988 Biological Opinion (BO) issued by the U.S. Fish and Wildlife Service (USFWS).

Subsequent to the original Management Plan, the entire Coronado National Forest area of the Pinaleno Mountains was determined eligible for listing in the National Register of Historic Places (NRHP) by the Coronado National Forest. The Arizona State Historic Preservation Officer and the Keeper of the National Register concurred with the determination. No specific historic period sites, prehistoric sites, or shrines, however, are located within the boundaries of the 8.6-acre permit area. Out of respect for Western Apache beliefs regarding Mt. Graham (*Dził Nchaa Si'an* in the Western Apache language), the Forest Service and the University have revised this Management Plan to also address concerns expressed by Western Apache tribal governments (the San Carlos Apache, White Mountain Apache, and Yavapai Apache tribes) in consultation with the Coronado National Forest. The measures in this Plan are in addition to other mitigating

measures contained in other documents such as the appendices to the MGIO Special Use Permit.

The District Ranger is responsible for administration of the permit.

## 1.2 Background

On November 18, 1988, Public Law 100-696 was signed into law. This Act is known as the "Arizona-Idaho Conservation Act of 1988" (hereinafter referred to as "the Act").

Part of this law related to the MGIO. Title VI, Section 601.(a), directs the Secretary of Agriculture to issue a

"Special Use Authorization, subject to the terms and conditions of Reasonable and Prudent Alternative Three of the United States Fish and Wildlife Service Biological Opinion, dated July 14, 1988 (hereby incorporated by reference), to the State of Arizona Board of Regents on behalf of the University of Arizona for the establishment of the Mount Graham International Observatory Research Site which shall, subject to any subsequent biological opinions issued by the U.S. Fish and Wildlife Service under the Endangered Species Act and the provisions of this Title, include provision for seven telescopes and necessary support facilities, for the purpose of scientific and astronomical research."

The Act provided for the construction of the following facilities, subject to the terms and conditions of RPA3:

- Three telescopes to be located on Emerald Peak;



- Necessary support facilities; and
- An access road to the site.

Congress amended the Act in 1989 to provide for the present day configuration of the telescopes. The current three-telescope configuration is depicted in Figures 1 and 2. The Act, Section 603.(a), further provides that “the Secretary shall, subject to the requirements of the Endangered Species Act and other applicable law, authorize the construction of four additional telescopes on Emerald Peak.” Any expansion of MGIO outside of the Observatory Site and the Access Road (each defined herein) is outside the scope of the current Forest Service special use authorization and this Management Plan. According to the Act, if the University proposes to build the other telescopes contemplated by the Act, certain environmental, wildlife and cultural reviews will be required under applicable law.

Throughout this document, the term “Observatory Site” or “Permit Area” shall indicate the 8.6 acres under the special-use permit for the Observatory Site, inclusive of the Access Road. The term “Refugium” refers to the area of limited access, as designated by the Forest Service in 1988, to protect the Mt. Graham red squirrel (MGRS).

#### 1.2.1 Astronomical Importance of Mt. Graham (*Dził Nchaa Si'an*)

Southern Arizona is recognized world-wide as uniquely favorable for astronomical research, largely as a consequence of the excellent climatic conditions for ground-based observations. The University's programs in Astronomy, Optical Sciences, and

1 Planetary Sciences have played a major role in bringing recognition to the  
2 University as an international leader in optics and astronomy.

3 In 1980, the University identified a national need for a darker and higher-altitude  
4 site for astronomical observations if the United States (and Arizona) were to  
5 maintain excellence in the era of new technology telescopes. Mt. Graham (*Dził Nchaa*  
6 *Si'an*), in the Pinaleno Mountains of southeastern Arizona, was identified by the  
7 University as the best available site with remarkable and rare properties for  
8 astronomical research.

9 The specific astronomical advantages of the MGIO location on Mt. Graham (*Dził*  
10 *Nchaa Si'an*) include its dark sky, dryness, ability to produce sharp images, and  
11 relative freedom from cloud and radio frequency interference. These features make  
12 it a premier location for observations at optical, infrared, and submillimeter  
13 wavelengths; the combination is rare world-wide. Some specific areas of current  
14 scientific interest that benefit from the MGIO telescopes are:

- 15 1) Studies of the early universe
- 16 2) Formation of stars and planets
- 17 3) Chemical evolution of the universe
- 18 4) Relationship of the sun and the stars
- 19 5) Search for other planetary systems

1 MGIO's large ground-based telescopes, operating at optical, infrared, and  
2 submillimeter wavelengths, provide the tools necessary to explore these and other  
3 areas.

#### 4 1.2.2 The Significance of Mt. Graham (*Dził Nchaa Si'an*) to the Western Apache

5 As the permit holder for the MGIO, the University recognizes that Mt. Graham (*Dził*  
6 *Nchaa Si'an*) has outstanding religious, cultural, and historical significance to  
7 Western Apache people, and embodies Apache lifeways. The mountain is also  
8 important to other tribes, including the Hopi Tribe, the Pueblo of Zuni, the  
9 Chiricahua Apache, and the Four Southern Tribes (the Salt River-Pima Maricopa  
10 Indian Community, the Gila River Indian Community, the Ak-Chin Indian  
11 Community, and the Tohono O'odham Nation). The University also understands  
12 that the presence and operation of MGIO is very offensive to and incompatible with  
13 the cultural and spiritual beliefs of many Western Apache. This Management Plan  
14 attempts to address some of the concerns expressed to the Forest Service during the  
15 consultation with Western Apache governments on the permit renewal process. Not  
16 all concerns can be completely mitigated and still preserve essential functions of  
17 MGIO that serves the international astronomical community. In addition, the  
18 University and Forest Service understand that the Western Apache do not believe  
19 that most, if any, of their concerns regarding MGIO can be mitigated. Nevertheless,  
20 the new provisions in the Management Plan present the good faith efforts of the  
21 Forest Service and the University to address as many of them as feasible.

1 The following states the principles on which specific mitigation measures  
2 concerning Western Apaches' concerns are based:

- 3 • The UA acknowledges and recognizes Mount Graham (*Dził Nchaa Si'an*) as a  
4 Western Apache traditional cultural property and commits to preservation of an  
5 environment that is supportive of the traditional spiritual and religious values of  
6 the Apache peoples.
- 7 • The University supports full access of Western Apache peoples to Mt. Graham  
8 (*Dził Nchaa Si'an*).
- 9 • The University does not seek in its permit application to increase the current  
10 number of telescopes beyond the three existing facilities or expand the surface  
11 area of the MGIO Observatory Site.
- 12 • The University seeks ongoing collaboration and consultation with Western  
13 Apache tribal governments, cultural practitioners, and elders regarding the  
14 MGIO. Updating or amending the management plan will be done in consultation  
15 with the Tribes.
- 16 • The University will collaborate with Western Apache tribes and organizations to  
17 increase awareness and knowledge among MGIO and University personnel on  
18 the cultural and historical significance of Mt. Graham (*Dził Nchaa Si'an*) and the  
19 importance of passing traditional knowledge to the next generation. Upon any  
20 formal request of a Western Apache tribal government, the University will also

1 aid such government in making this information available to visitors to the  
2 mountain.

- 3 • Upon request, the University will provide archival resources to assist the tribes  
4 in seeking to list Mt. Graham (*Dził Nchaa Si'an*) as part of a Forest Service multi-  
5 property designation of Western Apache sites on Arizona Federal public lands.
- 6 • The University will cooperate with the Forest Service in the development of  
7 tribal consultation and participation in any revision of the Forest Plan for Mt.  
8 Graham (*Dził Nchaa Si'an*).
- 9 • The University expects that operations at MGIO will cease when the site is no  
10 longer useful for astronomical observations. During its useful lifetime changes  
11 can occur to the configuration of the telescopes and instrumentation that do not  
12 cause an adverse visual effect outside of the observatory buildings themselves or  
13 require an amendment to the special use permit. At the end of MGIO's useful life,  
14 the University will remove all buildings and structures and will restore the site  
15 to pre-MGIO conditions to the extent possible.
- 16 • The University commits to minimize the visual impact of the MGIO observatory  
17 whenever and wherever possible in a manner that is consistent with the  
18 scientific purposes of MGIO. The University has been testing, and will continue  
19 to seek and test materials and other measures to mitigate visual impacts on the  
20 Western Apache reservations. The University will continue to explore  
21 opportunities for mitigation as technological advances occur.

### 1.2.3 Biological Importance of Mt. Graham (*Dził Nchaa Si'an*)

The Pinaleno Mountains are recognized as a biologically and biogeographically unique "sky island." In addition to the usual montane life zones of the region, these mountains are high enough to support spruce-fir habitat with large meadows, and several large cienegas. While the quality of many of these areas recently has been compromised by intensive wildfire and drought, their geographical location, between the mountains of northern Mexico to the south and the central Arizona high country to the north, has left them with an unusually diverse blending of boreal and austral species. An example of this richness is the endangered Mt. Graham red squirrel. This native subspecies is found only on Mt. Graham (*Dził Nchaa Si'an*).

Responding to the biological situation on Mt. Graham (*Dził Nchaa Si'an*), the University has and will continue to provide resources, personnel, and funding to monitor the MGRS. This activity has been ongoing since 1989. Biologists, under the supervision of a University faculty member, conduct research to further understand the situation regarding the MGRS and the Mt. Graham (*Dził Nchaa Si'an*) ecosystem.

### 1.2.4 Document Structure

When a feature, incidental take measure, incidental take term and condition, or conservation recommendation of RPA3 has direct bearing on a particular management aspect, the feature, etc., will be listed verbatim and addressed. For the document's specific compliance with RPA3, refer to section 4, "Compliance with Reasonable and Prudent Alternative Three of the Biological Opinion." This structure results in some redundancy between section 4 and the rest of the document, but

assures clarity and compliance. In this revised Management Plan, the features of RPA3 that pertained only to the construction of the MGIO have been omitted, as they have now been completed and are no longer relevant to the current situation. Additional elements have been added to this Management Plan to address, and to the degree possible, mitigate the concerns expressed by Western Apache governments.

## 2. Observatory Site Operations

### 2.1 Observatory Site

#### 2.1.1 Observatory Site Perimeter

The current rope perimeter shall be maintained around the Observatory Site with the exception of the Observatory Site Access Road ("Access Road.") The purpose of the perimeter is to delineate the boundary of the Observatory Site. The perimeter shall not be compromised unless authorized by the District Ranger.

The University shall require all personnel working inside the Observatory Site or on the Access Road to sign a briefing document and acknowledgement (Appendix C) concerning the rope perimeter and other measures to protect the MGRS.

#### 2.1.2 Parking and Storage

A parking and storage area in the existing clearing at the gate near the junction of Swift Trail and the Access Road shall be maintained for equipment such as snowplows, shuttles, and authorized vehicles as well as for short-term storage of maintenance materials such as the aggregate base course that is used to repair the

1 road. This parking area shall be no larger than 1 acre. Any changes to the use or  
2 footprint of the parking and storage area must have approval from the District  
3 Ranger. No trees shall be removed and the area will be rehabilitated by the  
4 University under the direction of the District Ranger upon ultimate  
5 decommissioning of the MGIO.

## 6 7 2.2 Transportation

### 8 2.2.1 Observatory Site Access

9 The Observatory Site shall be accessed via U.S. route 191, State Route 366 (SR 366,  
10 also known as Swift Trail), and the Access Road.

#### 11 *Requirement for Compliance with RPA3 Feature 15*

12 The Forest Service will ensure that Forest Road 669 (FR-669) remains gated and  
13 closed except as authorized by the District Ranger.

#### 14 *Requirement for Compliance with RPA3 Conservation Recommendation 2*

15 The University and the District Ranger shall annually review the Access Road  
16 conditions and effects to determine if additional erosion control is warranted. If  
17 hard surfacing is proposed, the Tribes will be consulted to determine whether it  
18 would have an adverse effect. The District Ranger has the authority to direct that  
19 such actions take place and all costs associated with these actions will be the  
20 responsibility of the University.



2.2.2 Public Access

*Requirement for Compliance with RPA3 Feature 16*

Between approximately November 15 and April 15 of each year, Swift Trail (SR 366), beginning at its intersection with FR 507 to its terminus, shall be closed to all motorized vehicles except those authorized by the District Ranger.

*Requirement for Compliance with RPA3 Feature 17*

All access roads leading off Swift Trail above FR 507 (including but not limited to the roads to Grant Hill and Webb Peak) and the access road from Swift Trail to Heliograph Peak shall be closed year-round to all motorized vehicles except those authorized by the District Ranger.

The University shall maintain all gates required by the Forest Service to control access to the areas identified in RPA3 Features 15, 16, and 17. Closure authority and access authorization for all gates remain with the District Ranger.

2.2.3 Snow Removal

Snow blowing and removal on SR 366 and access roads to and within the Observatory Site are the responsibility of the University and/or other State agencies.

*Requirement for Compliance with RPA3 Conservation Recommendation 1*

1 The University shall conduct snow blowing and snow removal on the Access Road in  
2 a manner that will not result in additional snow being placed on middens or damage  
3 to other forest resources.

#### 4 2.2.4 Observers and Maintenance Personnel

5 All vehicles accessing MGIO shall remain within the Observatory Site or Access Road  
6 right-of-way unless otherwise authorized by the District Ranger. (See also RPA  
7 Feature 2, section 4 and RPA Feature 3, section 3.)

#### 8 2.2.5 Emergency Transport

9 An emergency vehicle will be stationed at the Observatory Site. A first-aid room and  
10 supplies shall be located on site.

### 11 2.3 Supply and Utilities

#### 12 2.3.1 Water

13 At this time potable water is transported from Safford via tanker truck to the  
14 Observatory Site. Appropriate storage and distribution shall be provided on-site.  
15 The Forest and University may explore local sources of water to avoid inefficient  
16 hauling procedures and associated impacts in consultation with Western Apache  
17 tribes and in accordance with national and state regulations.

### 2.3.2 Fuel

Propane, gasoline, and diesel fuel shall be stored in approved storage vessels in the Utilities Area on the Observatory Site. The equipment shall be maintained and operated in accordance with all State and County codes.

### 2.3.3 Electric Power

Standby generation of electrical power for the Observatory Site is provided by generators in the utilities building. Commercial three-phase electrical power is brought to the Observatory Site by an underground power cable from the Bonita, Arizona area.

## 2.4 Waste Disposal

### 2.4.1 Solid Waste

Solid waste shall be contained inside buildings. Solid waste shall be transported periodically, as necessary, to a sanitary landfill located off the Forest and shall be in accordance with all Federal, State and County laws.

### 2.4.2 Chemical Waste Management Plan

Chemical waste disposal shall be in accordance with all Federal, State and County laws. Septic systems shall not be used for chemical waste disposal. Separate chemical containment areas, at the point of use, shall be maintained for collection of any chemical wastes. Chemical waste materials shall be transported off-site using EPA-approved containers. Chemical waste management is addressed in the MGIO

Emergency Response Contingency Plan. The Plan, updated every two years, shall be approved by the Forest Service and the University's Risk Management Department.

#### 2.4.3 Toxic Waste Management Plan/Spill Contingency Plan

Toxic waste management and spill contingency plans are addressed in the MGIO Emergency Response Contingency Plan.

#### 2.4.4 Septic Disposal

The University shall guard the purity of streams and living waters. All waste or byproducts shall be discharged into specified treatment or containment facilities. Grey water and sewage shall be directed to underground septic tank/leach disposal systems. Each system shall conform to State and County codes and Forest Service standards. Grey water and sewage disposal shall be in accordance with all Federal, State and County laws. All system locations require the approval of the Forest Service. Detailed groundwater analysis shall be required whenever a disposal system is upslope and within 100 meters of a cienega. Substances toxic to the microbial organisms in the septic system shall not be discharged into the septic system and will be handled in the same manner as chemical waste.

### 2.5 Communications

#### 2.5.1 Radio

A radio repeater shall be operated from Heliograph Peak. This communications channel shall assist emergency and routine operations requirements.

1 During observations all radio base or repeater stations transmitting from the  
2 Observatory Site shall be switched off if that transmitter is found to produce radio  
3 frequency interference.

#### 4 2.5.2 Telephone/Data

5 Observatory communications (data and telephone) are provided via a microwave  
6 link from the Observatory Site to Bonita, Arizona. A commercial telecommunications  
7 company provides telecommunications services from the Observatory Site to the  
8 University of Arizona – Tucson campus.

### 9 2.6 Monitoring Activities

#### 10 2.6.1 Astronomical and Meteorological Monitoring

11  
12 Astronomical and meteorological monitoring is required to optimize telescope  
13 operation and to forecast meteorological conditions for the immediate future that  
14 would impact telescope operation. Monitoring performed for evaluation of current  
15 observing conditions and for the forecast of immediate future observing conditions  
16 by instruments attached or inside the telescope structures is permitted without  
17 further Forest Service approval.

#### 18 19 2.6.2 Ecological and Geological Monitoring

20 Only nonintrusive monitoring in the Biological Research Area (see Figure 2) shall  
21 be allowed. Nonintrusive monitoring shall use portable equipment that has no

1 permanent foundations and is typically staked to the ground or is physically  
2 attached to existing structures. This monitoring is typically associated with required  
3 studies of MGRS activity or to detect geological changes such as erosion.  
4

## 5 2.7 Personnel Policies

### 6 2.7.1 Cultural Education

7

8 All MGIO and Observatory employees will be informed of the importance of Mt.  
9 Graham (*Dził Nchaa Si'an*) to Western Apache people and encouraged to be  
10 respectful of these views when visiting, living, residing, or working on the mountain.  
11 While the Forest Service and University may themselves accommodate Western  
12 Apache religious and cultural beliefs and practices, as a federal government agency  
13 and a State university they are constrained by the Establishment Clause of the  
14 United States Constitution from taking any action that prefers one set of religious  
15 beliefs over another set of beliefs. Therefore, it is especially important for the White  
16 Mountain and San Carlos Apache Tribes to collaborate with the Forest Service and  
17 the University in this effort so that the training can teach appropriate respect, in a  
18 culturally sensitive manner, within the parameters of the law. Specifically,  
19 assistance from the tribes would be helpful in designing and developing appropriate  
20 educational materials and lesson plans, and by designating Tribal representatives to  
21 teach and explain the importance of Mt. Graham (*Dził Nchaa Si'an*) and how to  
22 respect the mountain. If the tribes do not wish to participate in developing a

1 training program, the University will work with appropriate Forest Service  
2 personnel to develop such training based on the Forest Service and University's  
3 current understanding of these issues. All employees will sign a statement  
4 acknowledging that they have participated in the training and understand the issues  
5 presented to them. Until such training has been developed, all employees, observers  
6 and visitors to the MGIO will be required to sign the statement in Appendix B (as it  
7 may be amended from time to time with tribal input).  
8

#### 9 2.7.2 Ecological Education

10  
11 All MGIO personnel, project personnel, and service contractors working in the  
12 Observatory Site shall be provided a briefing document (Appendix C) concerning the  
13 MGRS and shall sign an acknowledgment that they have read the briefing document  
14 and agree to observe the requirements of the special use authorization and this  
15 Management Plan in relation to the MGRS. The University is ultimately responsible  
16 for the compliance of its employees and contractors.  
17

### 18 2.8 Fire Control/Response

#### 19 2.8.1 Fire Control Plan

20

21 A fire control plan shall be part of the MGIO Emergency Response Contingency Plan  
22 and shall set forth in detail the plan for prevention, control, and extinguishing of

1 fires in the Observatory Site. Such plans shall be jointly reviewed with the Forest  
2 Service and revised at intervals of not more than every two (2) years.

### 3 4 2.8.2 Fire Prevention

5  
6 The University shall do everything reasonable within its power and shall require its  
7 employees, contractors, and employees of contractors to do everything reasonable  
8 within their capabilities, both independently and upon request of the Forest Service,  
9 to prevent fires on the Observatory Site. The Coronado National Forest annually  
10 prepares a Fire Management Plan that guides the operations of fire managers so as  
11 to fit the goals and objectives of its Land and Resource Management Plan ['Forest  
12 Plan', 2001, under revision 2010].

### 13 14 2.8.3 Damage and Fire

15  
16 The University agrees to take all necessary precautions to avoid damage to property  
17 and resources of the United States and will, independently and upon request of the  
18 Forest Service, aid in fire prevention efforts on or near lands occupied under this  
19 plan.

## 20 2.9 Security and Emergency Aid

### 21 2.9.1 Security Policy

22



1 Observatory Site security shall be the responsibility of the University. A security  
2 plan shall be coordinated with the District Ranger. The security plan will contain  
3 elements dedicated to maintaining the proper respect for Native American cultural  
4 uses of Mt. Graham (*Dził Nchaa Si'an*) and the respectful treatment of those  
5 participating in such use.  
6

#### 7 2.9.2 Agency Interaction

8

9 The University shall maintain working relationships with the Graham County  
10 Sheriff's Department, the Forest Service, and other law enforcement agencies as  
11 appropriate.  
12

### 13 2.10 Signs and Advertising

#### 14 2.10.1 Signs

15 No signs or advertising devices shall be erected in the special use permit area  
16 covered by this plan or elsewhere in the Forest without prior approval by the Forest  
17 District Ranger as to location, design, size, color, and message. Erected signs shall be  
18 maintained or renewed as necessary to neat and presentable standards by the  
19 University as determined by the District Ranger.

### 20 3 Access

21

1 The University and all associated parties involved in the operation and maintenance of  
2 the Observatory Site shall strictly adhere to the Refugium closure. No Refugium access  
3 is allowed without authorization by the District Ranger. The University supports access  
4 to all areas for traditional cultural practitioners for traditional uses such as collection of  
5 medicinal and ceremonial plants and spring water, and prayer, subject to fire closures  
6 and human safety.

7  
8 *Requirement for Compliance with RPA3 Feature 3*

9  
10 All persons entering the Observatory Site will remain on the Access Road or the  
11 Observatory Site. The remainder of the Refugium area is closed to all access except  
12 persons authorized by the District Ranger.

13  
14 MGIO will ensure that all observatory personnel and official visitors comply with this  
15 closure. Enforcement of the closure for non-observatory visitors (including  
16 recreationists) lies solely with the Forest Service. The Forest Service will cooperate  
17 with and inform the University and its security personnel at MGIO of any changes in  
18 policy regarding Refugium access.

19  
20 3.1 Winter Access

21  
22 *Requirement for Compliance with RPA3 Feature 16*

Between approximately November 15 and April 15 each year, Swift Trail (SR 366), beginning at its intersection with FR 507 to its terminus, shall be closed to all motorized vehicles except those officially authorized.

### 3.2 The Observatory Site

The Forest Service and the Observatory have limited restrictions pertaining to hunting, campfires, headlights, and radio transmissions; they are identified below:

#### 3.2.1 Hunting

All State laws and Forest Service regulations regarding hunting apply. Firearms shall not be discharged within one quarter mile of any inhabited structure. No hunting is permitted on the Access Road, the Parking and Storage area, the Observatory Site, or in the Refugium.

#### 3.2.2 Campfires/Night Lights

To preserve the dark skies, open campfires are not permitted within one quarter mile of the Observatory Site; otherwise, standard Forest Service regulations shall apply in all other areas. After dark, for approaching traffic all vehicle headlights

1 shall be turned off within a quarter mile of the Observatory Site.

### 3 3.2.3 Radio Transmissions

4  
5 All radio transmissions, except for authorized or emergency use, are prohibited  
6 inside the Observatory Site boundary.

### 8 3.2.4 Pets

9  
10 Observers and Observatory personnel are not allowed to bring pets in the area.  
11 No pets other than service animals used to aid the handicapped are allowed  
12 inside Observatory buildings. The Forest Service requires all such service  
13 animals within the Observatory Site and on the Access Road to be on a short  
14 leash.

## 16 3.3 Radio Frequency Interference

17  
18 Radio frequency interference is a serious problem for all sensitive electronic  
19 equipment whether installed in optical, infrared, or radio telescopes. The  
20 restrictions itemized in the following three paragraphs are required to protect the  
21 effectiveness of the extremely sensitive detectors installed in the telescopes.

22 The University shall review all applications for new transmitters within the

1 Pinaleño Mountains or for changes in transmitter power, frequency, and antenna  
2 gain pattern. The University and Forest Service shall seek to ensure that the radio  
3 frequency field strength at Emerald Peak does not exceed the maximum existing  
4 field strength present within the broad radio spectrum in August 1985.

5  
6 The "maximum existing field strength as of August 1985" is defined as the lower of  
7 either the maximum field strength measured at High Peak in 1985 by the University  
8 and the National Radio Astronomy Observatory at any frequency from 100 kHz to  
9 10GHz, or the maximum measured field strength of any signal with a frequency  
10 within a factor of two of that of the transmitter in question. These field strengths are  
11 published in the Site Development Plan for the Mt. Graham International  
12 Observatory dated May 1, 1986.

13  
14 Transmitters to be located within the Observatory Site for the use of the University,  
15 the Forest Service, or other federal or state government agencies shall not be subject  
16 to the field strength requirement stated in the preceding paragraph. However,  
17 consistent with the provisions of 36 CFR 251.54(e)(1), the Forest Service will  
18 consult with the University before approving such a use in an effort to avoid any  
19 adverse effect or conflict from any such use, and any such approval will be granted  
20 subject to the requirement that the Forest Service be permitted in its discretion,  
21 upon request by the University, to turn off the transmitter if interference is  
22 suspected and if public safety is not an overriding concern.

### 3.4 Public Information

As part of operating the MGIO, the University shall undertake educational measures, in cooperation with other public agencies as appropriate, to improve public awareness of astronomy, ecology, and wildlife management. The University will also consult with Western Apache nations on the appropriate manner for transmitting information on the significance of the mountain in Apache culture.

#### 3.4.1 Facility Tours

The University shall cooperate with any agency or entity that is authorized by the Forest Service to provide tours of the MGIO for the purpose of education and description of MGIO activities on a not-for-profit basis. Any fees charged for a tour of the MGIO by any such agency or entity should only cover actual and administrative costs involved in providing and conducting the tour with no profit. The purpose of the tours shall be to educate the public about the astrophysical research being undertaken at the Observatory Site as well as the ecology, wildlife, and natural history of the area. Information on Native American culture and history will not be provided unless the material is developed collaboratively with and agreed to by the tribes it describes.

### 3.4.2 Information Station

The University shall maintain an information station at the Mt. Graham International Observatory Base Camp, located on SR 366. Notice boards information, brochures, and pamphlets shall be available to explain Observatory activities, ecological concerns, and other information as deemed necessary. If requested by the tribal governments, the University will provide an appropriate information display on the significance of Mt. Graham (*Dził Nchaa Si'an*) to the Western Apache and other cultures, to be developed jointly with official tribal representatives.

### 4 Compliance with RPA3 of the Biological Opinion

MGIO was constructed and operates under the conditions specified in Reasonable and Prudent Alternative Three of the biological Opinion. RPA3 contains 20 features that require implementation in order to “reduce human impacts and habitat loss over the long term” plus the required reasonable and prudent measures and associated terms and conditions that must be implemented to reduce “incidental take” of the MGRS. RPA3 concludes with Conservation Recommendations which are additional suggestions for further species protection.

## 4.1 Features

Features are marked with a number that corresponds to the number in RPA3. Features that pertain only to the construction phase or pertain solely to the Forest Service or other agencies are not generally included in the Plan because the construction phase has been completed and this Plan addresses only MGIO operations, not agency functions unrelated to MGIO. Following each enumerated feature is a description of the element of this Management Plan that addresses compliance with the features.

Elements that address a feature that contains both operational and construction aspects are generally limited to the operational aspects. In some cases the method used to comply with the earlier construction requirement may be described.

### *RPA3 Feature 2:*

Only authorized vehicles are permitted at the Observatory Site and the number of vehicles shall be limited.

### *RPA3 Feature 3:*

All visitors to MGIO (recreationists, astrophysical workers) will remain on the Access Road or within the Observatory Site. The remainder of the Refugium is closed to all access except authorized personnel. The closure is in effect for recreationists as well as observatory personnel. Only the District Ranger may authorize entry into the Refugium.



1 The University will ensure that University employees, MGIO visitors and astrophysical  
2 workers will adhere to the closures. Forest Service will enforce the Refugium closure  
3 for all others, as well as ensure the University complies with this feature.  
4

5 *RPA3 Feature 4:*  
6

7 Management Plan requirement:

8 This document is intended to serve as the management plan described in RPA3 Feature  
9 4, which reads:  
10

11 "A management plan to govern the construction and operation of the astrophysical  
12 complex and the associated road systems in ways least likely to adversely affect the  
13 squirrel would be developed. This plan should set down standards and guidelines for  
14 human activities on the site and adjacent areas. Some examples of the type of human  
15 activities to consider for inclusion in the plan include use of the restricted use areas, use  
16 of paths and trails, storage of materials on-site, and trash disposal."  
17

18 Construction was completed in accordance with this feature. As discussed above, out  
19 of respect for the cultural and religious beliefs of the Western Apache, the Management  
20 Plan has been revised to include measures to address their concerns.  
21

22 *RPA3 Feature 5:*

MGIO shall continue to comply and cooperate with all Forest Service-developed inspection methods and monitoring.

*RPA3 Feature 7:*

The Access Road was located and constructed to avoid degrading existing midden habitat. The Access Road was constructed with the required minimum buffer of 220-250 feet between the road and any midden.

*RPA3 Feature 9:*

The additional facilities of the power line and the microwave tower produced forest Service-approved amendments to the Management Plan. Any additional facilities approved under the special use authorization shall also require a new management plan or additional amendments to this Management Plan.

*RPA3 Feature 10:*

MGIO employs Forest Service-approved methods to minimize windthrow or blowdown. These methods are subject to the periodic review and approval of the District Ranger.

*RPA3 Feature 11:*

1  
2 The University has carried out required studies to define the life history and ecology of  
3 the red squirrel and the spruce-fir and mixed conifer forests in compliance with this  
4 feature.

5  
6 *RPA3 Feature 12:*

7  
8 The University shall continue its financial and other support of the MGRS monitoring  
9 plan for monitoring of red squirrels adjacent to astrophysical development and the  
10 associated road systems. This will be required for the life of the astrophysical complex  
11 and will be considered in any changes to the management plan.

12  
13 *RPA3 Feature 14:*

14  
15 FR 507 above milepost 1.8 and FR 669 to the first interferometer site were obliterated  
16 by the University and prepared as seed beds for natural regeneration. This activity was  
17 conducted under the direction of the District Ranger. FR 507 from the junction with FR  
18 669 to the top of High Peak was obliterated by the University and prepared as a seed  
19 bed for natural regeneration by September 30, 1989 under the direction of the District  
20 Ranger. In 2004, this road was re-opened for fire suppression activities and remains  
21 available for rehabilitation after the fire.

1     *RPA3 Feature 15:*

2  
3     FR 669 shall remain gated closed to all but officially authorized vehicles.  
4

5     *RPA3 Feature 17:*

6  
7     The access roads leading off Swift Trail above FR 507 (including but not limited to the  
8     roads to Grant Hill and Webb Peak) and the access road from Swift Trail to Heliograph  
9     Peak have been closed. Closure authority and access authorization for all gates remains  
10    with the Forest Service.  
11

12    *RPA3 Feature 18:*

13  
14    The Forest Service has closed the Refugium by posting a closure order at appropriate  
15    places specified by the Forest Service. This closure is enforced by Forest Service patrol  
16    of the Refugium. As of November 2009, the closure order is posted:  
17

18    at all trailheads with trails that lead into the Refugium;  
19    on all trails where they enter the Refugium;  
20    at the junction of FR 507 and Swift Trail;  
21    on FR 507 at the Refugium boundary;  
22    at the junction of the Observatory Site Access Road (FR-4556) and Swift Trail;  
23    at the gate on FR 669 at the Observatory boundary;

1 in all campgrounds and picnic grounds in the Pinaleno Mountains; and  
2 in the Safford District office at the information desk.

3  
4 *RPA3 Feature 20:*  
5

6 The Forest Service has revised the Management Plan from time to time to address new  
7 information and conditions. The Forest Service will continue to evaluate management  
8 practices and strategies to determine if further future modifications are warranted. If  
9 such modifications are warranted, MGIO shall work with the Forest Service to modify  
10 this Management Plan.  
11  
12

13 4.2 Incidental Take  
14

15 RPA3 provides five reasonable and prudent measures relative to MGIO operations for  
16 reducing incidental take. The sixth measure is a direction to the Forest Service. The  
17 measures are identical to RP3 features 2, 15, 16, and 17. See the elements of this Plan  
18 addressing these features for compliance with the five measures.  
19

20 4.2.1 Terms and Conditions  
21

22 RPA3 lists two terms and conditions for complying with the above measures. Below

1 is the plan for complying with such terms and conditions.

2  
3 *RPA3 Term and Condition 1*  
4

5 The University and its associated parties shall report all squirrels wounded or  
6 harmed to the first available Forest Service Official. The Forest Service shall, in turn,  
7 report all dead or wounded squirrels to the USFWS. Locations of killed squirrels will  
8 be immediately reported to Forest Officials for collection and preservation.

9 Procedures will be developed by the Forest Service for all employees to report  
10 wounded and harmed squirrels and for handling the collection and preservation of  
11 killed squirrels. Information regarding this term and condition will be included,  
12 where appropriate, in information and education activities.  
13

14 *RPA3 Term and Condition 2*  
15

16 The University will satisfy this requirement for MGRS monitoring by compliance  
17 with Feature 12 above.  
18  
19

20 4.3 Conservation Recommendations  
21

22 Compliance with Conservation Recommendation number 1 is addressed in section  
23 2.2.3.

1  
2 Compliance with Conservation Recommendation number 2 is addressed in section  
3 2.2.1.

1

2 **Appendix A – General Principles**

3 The following general principles will guide the University and the Forest Service in  
4 administering the Observatory Site:

5 (1) The above Management Plan will be implemented in an efficient manner that is  
6 consistent with the Act and the Biological Opinion.

7 (2) The MGIO and Observatory Site will be operated and managed in a cost-efficient and  
8 environmentally sound manner.

9 (3) The Observatory Site will be maintained in a manner that is respectful of the  
10 cultural traditions of the Western Apache tribes.

11 (4) The Observatory Site is also intended to support long-term MGRS and astrophysical  
12 studies which will continue for the term of the permit.

13 (5) The Observatory Site shall be administered by the University in accord with the  
14 Management Plan. This Plan may be reviewed once per calendar year by the  
15 University and Forest Service and may be altered by mutual agreement of the  
16 University and the Forest Service, in consultation with the Apache Tribes. The  
17 Forest Service shall monitor activity at the Observatory Site.

18 (6) The Forest Service and the University shall establish working relations at the  
19 appropriate District, Forest, and Regional levels to ensure successful



1 implementation and maintenance of the Observatory Site. It is expected that  
2 most items can be handled at the District Ranger-MGIO Director level.

3 (7) All development and operation costs associated directly with the Observatory Site,  
4 including ecological monitoring and corrective measures within the Observatory  
5 Site, shall be the responsibility of the University. All other costs remain the  
6 responsibility of the Forest Service or other cognizant agencies or parties.  
7 (Specific variances may be made by mutual agreement.)

8 (8) The University and the Forest Service will work cooperatively with the USFWS and  
9 other appropriate parties to increase the survival probability of the MGRS.

10 (9) The Forest Service and University will follow the Biological Opinion, but work to  
11 avoid all unnecessary limitations on public access.

12 (10) The Forest Service and University will work cooperatively, where appropriate, in  
13 carrying out biological research required by the various features of RPA3.

**Appendix B –Western Apache Cultural Sensitivity**

I have been informed that Mt. Graham (*Dził Nchaa Si'an*) is a traditional cultural property for Western Apache people and that the mountain is important to their culture, traditions, and spiritual beliefs. In respect for such beliefs, I agree:

- To cause no unnecessary, excessive noise and auditory disturbance while on the Access Road or within the Observatory Site;
- To refrain from littering or other unnecessary physical disturbance of the mountain;
- To not approach or disturb any traditional gatherings or individuals not known to me as they may be engaged in private cultural ceremonies or practices (unless approached by such individuals, and then I promise to be respectful and cordial in any such encounter);
- To refrain from gathering any animal, vegetation or mineral substances from the Observatory Site, including the Access Road, unless specifically authorized to do so in conduct of my official duties.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**Appendix C – Mt. Graham Red Squirrel Briefing Document**

The endangered Mt. Graham red squirrel is protected by the Federal Endangered Species Act of 1973, as amended. It is illegal to “take” (this means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) individuals of this species. This includes touching and feeding. If anyone working on the Mt. Graham International Observatory project “takes” (as defined above) a Mt. Graham red squirrel they will be subject to prosecution under the Endangered Species Act.

Report all dead or wounded squirrels to the first available Forest Service official. The Forest Service will report all dead or wounded squirrels to the USFWS. Locations of dead squirrels will be immediately reported to the Forest Service so the dead squirrel can be collected and preserved for study.

There is some concern that squirrels could become dependent on human food, which in turn may reduce survival. Dispose of your trash in appropriate containers provided for that purpose.

There are Mt. Graham red squirrels near many Pinaleno Mountain roads. The squirrels do cross roads, so drive slowly and carefully to avoid hitting any Mt. Graham red squirrels.

**MGIO SITE & VEHICLE PERMIT REQUIREMENTS**

I have read and understand the following Site/Vehicle Permit requirements and the Mt. Graham Red Squirrel briefing document and understand their rules and conditions, which are set forth by the US Forest Service:

- I will remain inside the clearing limits of the MGIO facilities (delineated by a yellow perimeter rope).
- I will not go beyond the clearing limits (boundaries) of the two-mile, one-way observatory access road.
- I will not use this permit for any purposes other than those stated on my permit.

If these conditions are not met, I understand I will be in violation of the terms of the Special Use Permit issued to the University of Arizona. If I am an employee of MGIO or the University, I understand that breach of these conditions may result in disciplinary action.

Date: \_\_\_\_\_ Printed Name: \_\_\_\_\_ Signature: \_\_\_\_\_

## **Appendix D – University Management Structure**

This section is included to provide insight into the internal management structure the University will utilize to manage the Observatory Site. However, the Arizona Board of Regents, as permittee, is responsible for compliance with all permit requirements.

### **D.1 University Administration**

The administrative structure for the Mt. Graham International Observatory (hereinafter “the MGIO”) within the University, is shown below. The senior responsible official is the Senior Vice President for Research, acting on behalf of the Provost and the President.

The MGIO Director is appointed by the Director of Steward Observatory, with approval of the Senior Vice President for Research. The Director reports to the Senior Vice President for Research and is responsible for all University activities at the Observatory Site.

The University Biologist is appointed by the Senior Vice President for Research in consultation with the heads of the Department of Ecology and Evolutionary Biology and the School of Renewable Natural Resources. The University Biologist is responsible for administering and conducting certain activities dictated by the Biological Opinion with the concurrence of and in collaboration with the Forest Service.

The Observatory Site Manager, appointed by the MGIO Director, normally resides in the Safford area. The Manager, who reports to the MGIO Director, is responsible for the day-to-day operations at the Observatory Site.

### **D.2 Interface with Federal and State Agencies**

Any legally binding arrangements must be made with the Arizona Board of Regents, through the Office of the President. In normal circumstances, however, the MGIO Director or designee provides the principal contact point for federal and state agencies on all issues. (Formal agreements shall be negotiated initially with the MGIO Director, for transmission to and approval by the Senior Vice President for Research.) On biological matters, frequent interaction takes place between the University Biologist and his/her counterparts in the agencies.

### **D.3 Interface with Scientific Users**

#### **D.3.1 The MGIO Council**

Scientific users of the Observatory Site are both users of and investors in the research facility. Appropriate participation in the decision-making process is therefore required.

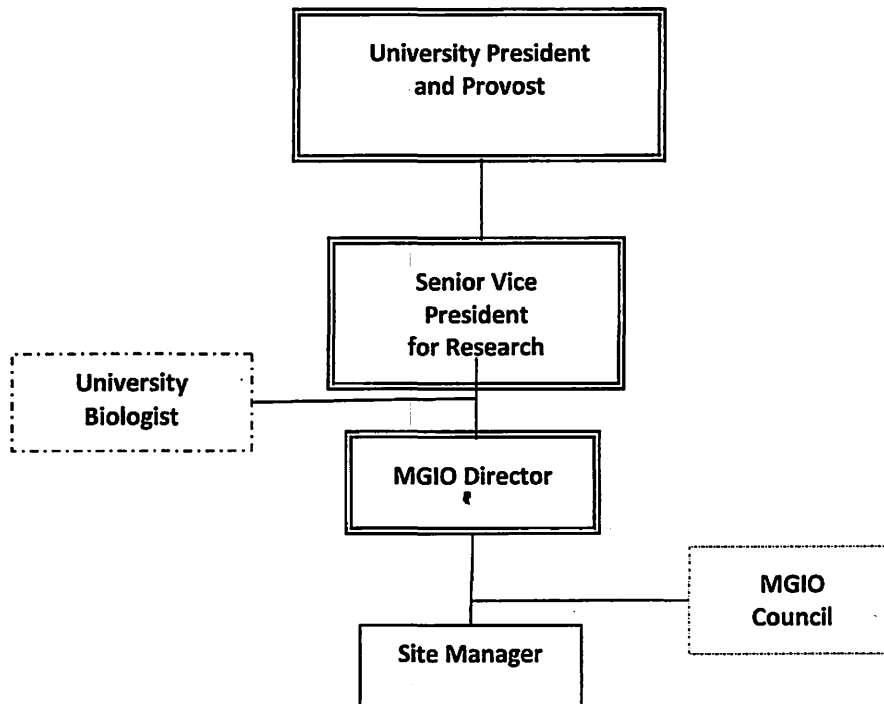
The MGIO Council is a senate of representatives of those scientific facilities that comprise MGIO.

The Chairman of the MGIO Council is the MGIO Director. The membership of the Council includes the directors and deputy directors of the Large Binocular Telescope (LBT), the

1 Sub-millimeter Telescope facility (SMT), the Vatican Advanced Technology Telescope  
2 facility (VATT), a representative from the biological sciences, and the MGIO Site Manager.

3 The purpose of the Council is to set and approve MGIO policy, funding, and operations,  
4 including the annual program plan and budget. The MGIO Council functions as a board of  
5 directors, but because the Special Use Permit is in the name of the Arizona Board of  
6 Regents, all decisions must remain advisory. The MGIO Director and the University  
7 administration are responsible for reconciling council directives with their responsibilities  
8 as representatives of the Arizona Board of Regents as permittee. Routine matters do not  
9 reach the Council, but are dealt with by interaction between the Observatory Site Manager  
10 and the individual facility directors.

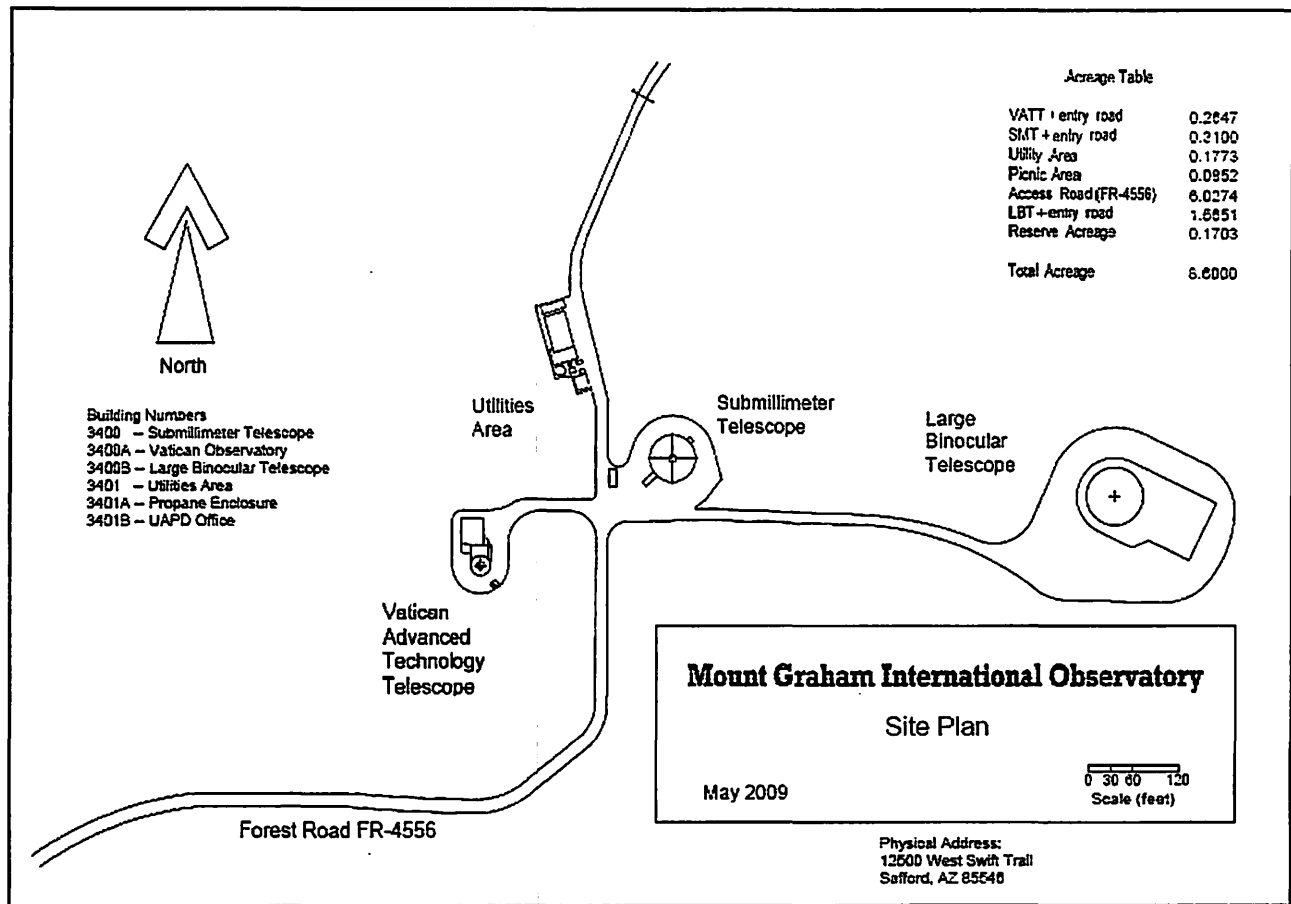
11 The Council meets at least once per year to discuss and approve an MGIO budget.  
12 Additional meetings can be called by the Director, or by request of at least one-third of the  
13 members of the Council. Council votes are on a basis of one representative, one vote, with  
14 the chairperson also voting.



University of Arizona Mt. Graham International Observatory  
Administrative Management Structure

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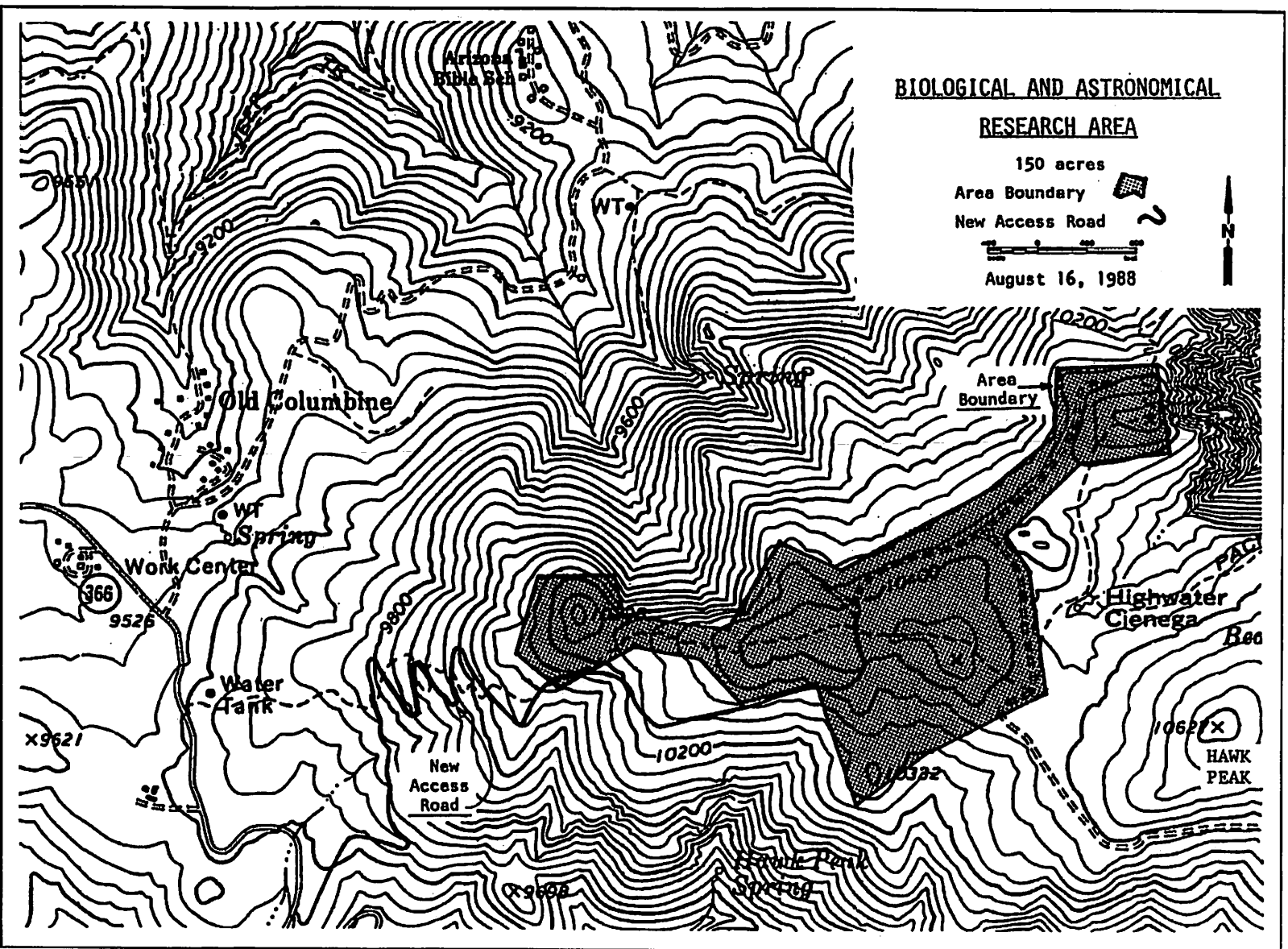
1



2

3 Figure 1. Three-telescope configuration.

4



1  
2 Figure 2. Biological and Astronomical Research Area  
3



## APPENDIX D

### SPECIAL CONDITIONS AND CLAUSES

1. Non-Exclusive Use. The MGIO permit area contains unique, fragile and valuable scientific equipment utilized for complex international scientific research. Allowing unsupervised public access to the permit area is inconsistent with the intended purposes of the MGIO and the Congressional authorization of the MGIO under the AICA. This provision constitutes the agreement of the Forest Service and the MGIO under Section I.G of the permit regarding Exclusive Use of the permit area.

The Forest Service and MGIO hereby agree that the permit area as described in the permit may be demarcated by MGIO by stakes and ropes, and MGIO may restrict access to the permit area to provide protection for the operation of the authorized improvements and instrumentation located at the MGIO. The MGIO may not exclude the Forest Service personnel, nor persons specifically authorized by the Forest Service to enter the permit area. The Forest Service will provide to the MGIO Liaison a list of all non-Forest personnel that the Forest Service has authorized to access the permit area.

In addition, the MGIO will prohibit all observatory personnel, contractors and visitors from entering the Forest outside of the permit area enclosure in order to prevent entry into the Refugium, which was designated by the Forest Service in accordance with RPA3 to protect the endangered Mt. Graham Red Squirrel. Further requirements regarding access and use of the permit area are included in the Management Plan.

2. Transfer of Title/Ownership of Improvements. The Forest Service acknowledges and restates its earlier approval of the ownership structure for certain scientific facilities in the permit area. The Forest Service acknowledges that the Vatican Advanced Technology Telescope ("VATT") is owned by the Vatican Observatory Foundation, an Arizona non-profit corporation; the SMT is owned by Steward Observatory, University of Arizona; and the LBT is owned by the Large Binocular Telescope Corporation, an Arizona non-profit corporation. Notwithstanding the above-ownership structure, the permit holder remains responsible for ensuring compliance with the terms of the permit by all observatory personnel and scientific users of and visitors to the facilities in the permit area.

Notwithstanding the provisions of Section I.I of the permit, the permit holder may, with the consent of the authorized officer and subject to reasonable prior conditions which shall not be unreasonably withheld, transfer title to one or more improvements to a subsidiary, department, affiliate, or research partner, including any of the entities that currently own one or more facilities, without the necessity of such transferee obtaining a new permit.

3. Period of Use/Occupancy. The Forest Service and the permit holder agree that failure of permit holder representatives to physically occupy the permit area in the case of evacuation for wildfire, weather events, or for other reasons beyond the control of the permit holder, shall not be considered a breach of Section III.B of the permit.

4. Responsibility for Day-to-Day Activities. The Forest Service acknowledges and approves the conduct of astrophysical research at the MGIO by scientists affiliated with research institutions other than the permit holder. Such scientists utilize MGIO facilities under the general supervision of the permit holder. This provision constitutes the prior written approval of such third-party activities pursuant to Section III.C of the permit. The permit holder, however, shall continue to be responsible for compliance with all of the terms of this permit and the Management Plan, and responsible for ensuring that all third parties present in the permit area also comply with such provisions. Any such use will be consistent with the scope, level and intensity of use contemplated in the permit.

5. Removal and Planting of Vegetation. From time to time the Forest Service has authorized the removal of hazard trees to prevent damage to the facilities in the permit area. Such authorizations have been, and will continue to be, authorized on a case-by-case basis as authorizations separate and apart from this permit. The permit holder shall not remove any hazard trees within or in the vicinity of the permit area without prior written authorization from the Authorized Officer.

6. Signs. All signs currently existing as of the date hereof have received prior approval of the Authorized Officer. This provision constitutes the continued written approval of the Authorized Officer pursuant to Section III.H of the permit.

7. Consent to Store Hazardous Materials. The MGIO Emergency Response Contingency Plan ("Contingency Plan") was submitted by MGIO in accordance with the permit requirements for a Chemical Waste Management Plan, Spill Control and Countermeasures Plan (SPCC Plan), and a Fire Response Plan. The Contingency Plan satisfies the requirements of Section V.I of the permit, and this provision constitutes the Authorized Officer's approval of the Contingency Plan and the storage of certain hazardous materials in the permit area as described, and in compliance with, the Contingency Plan.

9. Use of Access Road. All maintenance or reconstruction of the MGIO access road shall be in accordance with RPA3 and plans, specifications, and written stipulations previously approved by the Forest Service. The United States may use the access road without cost for all purposes, including those deemed necessary or desirable in connection with the protection and administration of the lands or resources of the United States; provided that the road will only be used by the United States for commercial hauling purposes after payment by the United States of its pro rata share of maintenance costs associated with such commercial uses.

## APPENDIX E

Westlaw.

PL 100-696, 1988 S 2840

PL 100-696, November 18, 1988, 102 Stat 4571

(Publication page references are not available for this document.)

Page 1

### UNITED STATES PUBLIC LAWS 100th Congress - Second Session Convening January 25, 1988

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**DATA SUPPLIED BY THE U.S. DEPARTMENT OF JUSTICE. (SEE SCOPE)**  
Additions and Deletions are not identified in this document.

PL 100-696 (S 2840)  
November 18, 1988

An Act to provide for the designation and conservation of certain lands in the States of Arizona and Idaho, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act be cited as the "Arizona-Idaho Conservation Act of 1988".

#### TITLE I -- SAN PEDRO RIPARIAN NATIONAL CONSERVATION AREA ESTABLISHMENT OF SAN PEDRO RIPARIAN NATIONAL CONSERVATION AREA

SEC. 101. (a) ESTABLISHMENT. -- "16 USC 460xx" In order to protect the riparian area and the aquatic, wildlife, archeological, paleontological, scientific, cultural, educational, and recreational resources of the public lands surrounding the San Pedro River in Cochise County, Arizona, there is hereby established in the San Pedro Riparian National Conservation Area (hereafter in this title referred to as the "conservation area").

(b) AREA INCLUDED. -- The conservation area shall consist of public lands as generally depicted on a map entitled "San Pedro Riparian National Conservation Area -- Proposed" numbered AZ-040-OZ, dated January 1988, and consisting of approximately 56,431 acres.

(c) MAP. -- As soon as is practicable after enactment of this title, a map and legal description of the conservation area shall be filed by the Secretary of the Interior (hereafter in this title referred to as the "Secretary") with the Committee on Interior and Insular Affairs of the House of Representatives and the Committee on Energy and Natural Resources of the United States Senate. Each such map shall have the same force and effect as if included in this title. Such map shall be on file and available for public inspection in the Office of the Director of the Bureau of Land Management, Department of the Interior, and in the Bureau of Land Management offices of the State Director for Arizona, and the district office responsible for the management of the conservation area.

#### MANAGEMENT OF CONSERVATION AREA

SBC. 102. (a) GENERAL AUTHORITIES. -- "16 USC 460xx-1" The Secretary shall manage the conservation area in a manner that conserves, protects, and enhances the riparian area and the aquatic, wildlife, archeological, paleontological, scientific, cultural, educational, and recreational resources of the conservation area. Such management shall be guided by this title and, where not inconsistent with this title, by the provisions of the Federal Land Policy

The effective date of the revocation shall be the date of patent to the State of Arizona.

(b) PATENTS. -- The following stipulations shall be included in all patents issued by the Secretary of the Interior for the lands described in subsection (a)(2):

(1) Excepting and reserving to the Salt River Project, a right-of-way for electric transmission and distribution lines and access purposes which shall comprise that portion of the east 300 feet of section 24, lying west of a line extending northerly from a point on the south section line of section 24, being 51 feet west of the southeast corner of section 24 to a point on the north section line of section 24, being 129 feet west of the northeast corner of section 24, as generally depicted on the Salt River Project drawing number C-675-439.88, dated June 1988;

(2) The United States and the Salt River Project shall not be liable whatsoever for damages to any lands conveyed herein, which may be caused by flooding in conjunction with any of the United States' or Salt River Project's existing or future facilities or protective works;

(3) The patentee, successors or assigns of the lands conveyed herein shall be held liable to the United States or the Salt River Project for damages caused by the holder's activities which alter drainage and adversely affect adjacent lands, project facilities or protective works of the United States or the Salt River Project; and

(4) Reserving to the United States a right-of-way for road purposes, as described in Bureau of Land Management A.R. 020234.

#### ADJUSTMENT OF CORONADO NATIONAL FOREST BOUNDARY

SEC. 508. (a) MODIFICATION OF PROCLAMATION 1121. -- Proclamation 1121, dated April 17, 1911, which established the Coronado National Forest boundary as it related to Township 21 South, Range 18 East, G& SRM, is hereby modified to delete sections 27 and 28, which are not under the jurisdiction of the Forest Service, from inclusion within the National Forest System.

(b) MODIFICATION OF PROCLAMATION DATED JULY 19, 1907. -- The proclamation dated July 19, 1907, which established the Coronado National Forest boundary as it is related to Township 15 South, Range 17 East, Gila and Salt River Meridian, is hereby modified to delete sections 9, 10, 15 and 22, which are not under the jurisdiction of the Forest Service, from inclusion within the National Forest System.

#### AUTHORIZATION

SEC. 509. (a) GENERAL APPROPRIATION. -- There are hereby authorized to be appropriated such sums as are necessary to carry out the provisions of this title.

(b) PERSONNEL. -- There are hereby authorized to be appropriated such sums as are necessary to provide for at least 5 and more, if necessary, full-time equivalent employees of the Bureau of Land Management to perform resource management and law enforcement activities as part of the administration of the Bureau of Land Management lands in Black Canyon Corridor.

SEC. 510. The Director of the United States Fish and Wildlife Service shall approve or disapprove applications for rights-of-way access across the Kofa National Wildlife Refuge as expeditiously as possible.

#### TITLE VI -- MOUNT GRAHAM INTERNATIONAL OBSERVATORY

---

#### ESTABLISHMENT OF THE MOUNT GRAHAM INTERNATIONAL OBSERVATORY SITE

SEC. 601. (a) The Secretary of Agriculture (hereinafter in this title referred to as the "Secretary") shall issue a Special Use Authorization, subject to the terms and conditions of Reasonable and Prudent Alternative Three of the United States Fish and Wildlife Service Biological Opinion, dated July 14, 1988 (hereinafter referred to as "the Biological Opinion"), to the State of Arizona Board of Regents on behalf of the University of Arizona for the establishment of the Mount Graham International Observatory Research Site (hereinafter referred to as the "Site"), which shall, subject to any subsequent biological opinions issued by the United States Fish and Wildlife Service under the Endangered Species Act, and the provisions of this title, include provision for seven telescopes and necessary support facilities for the purposes of scientific and astronomical research.

(b) The Site referred to in subsection (a) shall include not more than 24 acres within the 150-acre area of the Coronado National Forest, Arizona, as generally depicted on a map entitled, "Mount Graham International Observatory Site", dated July 28, 1988. Copies of the map shall be available for public inspection in the Office of the Chief, Forest Service, United States Department of Agriculture, Washington, District of Columbia, and the Forest Service office located in Tucson, Arizona.

#### CONSTRUCTION AUTHORIZATION

SEC. 602. (a) Subject to the terms and conditions of Reasonable and Prudent Alternative Three of the Biological Opinion, the requirements of section 7 of the Endangered Species Act shall be deemed satisfied as to the issuance of a Special Use Authorization for the first three telescopes and the Secretary shall immediately approve the construction of the following items:

- (1) three telescopes to be located on Emerald Peak;
- (2) necessary support facilities; and
- (3) an access road to the Site.

(b) Until the road described in subsection (a)(3) above is constructed, the Secretary shall allow the University of Arizona to use forest roads FR 507 and FR 669 to the extent permitted in the Biological Opinion.

#### ADDITIONAL TELESCOPE CONSTRUCTION AUTHORIZATION

SEC. 603. (a) The Secretary shall, subject to the requirements of the Endangered Species Act and other applicable law, authorize the construction of four additional telescopes on Emerald Peak.

(b) Consultation under section 7(a)(2) of the Endangered Species Act with respect to construction of the four additional telescopes referred to in subsection (a) shall consider, among other things, all biological data obtained from monitoring the impact of construction of the first three telescopes upon the Mount Graham red squirrel. Authorization by the Secretary for the construction of four additional telescopes shall be consistent with requirements deemed necessary to avoid jeopardizing the continued existence of any species listed under and pursuant to the Endangered Species Act.

#### MANAGEMENT PLAN

SEC. 604. (a) The University of Arizona, with the concurrence of the Secretary, shall develop and implement a management plan, consistent with the requirements of the Endangered Species Act and with the terms and conditions of Reasonable and Prudent Alternative Three of the Biological Opinion, for the Site.

(b) Such management plan shall include provisions for the construction, operation and maintenance of the Site, access to the Site, and related support facilities.

(c) The management plan shall be included in any Special Use Authorization issued by the Secretary to the University of Arizona.

#### EXISTING SPECIAL USE AUTHORIZATIONS

SEC. 605. (a) Those Special Use Authorizations now in effect for the Columbine Summer Home Tract area and the Arizona Bible School Organization Camp shall continue, subject to the terms and conditions of the authorizations, for the duration of the term specified in each authorization. Prior to the termination, nonrenewal or modification of those Special Use Authorizations for the areas noted above, the Secretary shall, with the assistance of the United States Fish and Wildlife Service, conduct a biological study to determine the effects of such special use authorizations upon the Mount Graham red squirrel and other threatened or endangered species. In making this determination, the Secretary shall consider the small amount of land under special use authorizations. The biological study shall also involve the participation of representatives from the community of Safford, Arizona, all of the affected parties, and any other appropriate interests. In addition to the biological study, the Secretary shall initiate consultation with the United States Fish and Wildlife Service pursuant to section 7(a)(2) of the Endangered Species Act regarding the termination, nonrenewal, extension or modification of the special use authorizations.

(b) Pursuant to title 2300 of the Forest Service Manual, special use terminations, nonrenewals, or modifications shall not take effect until ten years from the last date of the tenure of existing special use authorizations described in subsection (a). Unless the biological study or the biological opinion issued by the United States Fish and Wildlife Service after consultation under the Endangered Species Act concluded that an earlier date was necessary to avoid jeopardizing the continued existence of the Mount Graham red squirrel or any other threatened or endangered species, such actual terminations, nonrenewals, or modifications shall not take effect before completion of a biological study by the United States Fish and Wildlife Service to begin in the year 2000. This additional study shall be subject to the same requirements and involve the same participants as described in subsection (a).

(c) If, after completion of these studies, termination, modification or nonrenewal of special use authorizations described in subsection (a) are prescribed, the United States Forest Service shall, with the cooperation and approval of the holders of these special use authorizations, develop a relocation plan for such individuals and entities.

(d) Nothing in this section is intended to preclude the termination of special use authorizations for breach by the permittee of terms and conditions of the authorizations.

#### FINANCIAL RESPONSIBILITIES

SEC. 606. In implementing this title, all costs directly associated with construction and site preparation for telescopes, support facilities, a new access road, the biological monitoring program for the Mount Graham red squirrel as contained in the terms and conditions of Reasonable and Prudent Alternative Three of the Biological Opinion, and the retention of an onsite biologist, shall be funded by the University of Arizona.

#### ENVIRONMENTAL IMPACT STATEMENTS

SEC. 607. With reference to the construction of the first three telescopes, related facilities, and the access road within the boundaries of the Site described in section 601, the requirements of section 102(2)(c) of the National Environmental Policy Act of 1969 shall be deemed to have been satisfied. The Environmental Impact Statement for the Site, currently in process, shall continue and shall use the information developed to date and any additional appro-

priate information in analyzing the impacts of the four additional telescopes authorized under section 603 of this title.

TITLE VII -- MISSISSIPPI NATIONAL RIVER AND RECREATION AREA  
Subtitle A -- Mississippi National River and Recreation Area  
FINDINGS AND PURPOSES

SEC. 701. (a) FINDINGS. -- "16 USC 460zz" The Congress finds that:

- (1) The Mississippi River Corridor within the Saint Paul-Minneapolis Metropolitan Area represents a nationally significant historical, recreational, scenic, cultural, natural, economic, and scientific resource.
- (2) There is a national interest in the preservation, protection and enhancement of these resources for the benefit of the people of the United States.
- (3) State and local planning efforts along the River Corridor provide a unique foundation for coordinating Federal, State, and local planning and management processes.
- (4) Existing Federal agency programs lack sufficient coordination and financial participation with State and local planning and regulatory authorities to provide for adequate and comprehensive resource management and economic development consistent with the protection of the Mississippi River Corridor's nationally significant resources, and the public use and enjoyment of the area.
- (5) The preservation, enhancement, enjoyment, and utilization of the nationally significant resources of the Mississippi River Corridor can be accomplished by a cooperative Federal, State, and local comprehensive planning and management effort.

(b) PURPOSES. -- The purposes of this subtitle are:

- (1) To protect, preserve and enhance the significant values of the waters and land of the Mississippi River Corridor within the Saint Paul-Minneapolis Metropolitan Area.
- (2) To encourage adequate coordination of all governmental programs affecting the land and water resources of the Mississippi River Corridor.
- (3) To provide a management framework to assist the State of Minnesota and its units of local government in the development and implementation of integrated resource management programs for the Mississippi River Corridor in order to assure orderly public and private development in the area consistent with the findings of this subtitle.

ESTABLISHMENT OF NATIONAL RIVER AND RECREATION AREA

SEC. 702. (a) ESTABLISHMENT. -- "16 USC 460zz-1" There is hereby established the Mississippi National River and Recreation Area (hereinafter in this title referred to as the "Area")<sup>1</sup> which shall consist of the State designated Mississippi Critical Area encompassing that portion of the Mississippi River and adjacent lands generally within the Saint Paul-Minneapolis Metropolitan Area, as depicted on the map entitled Mississippi National River and Recreation Area numbered MI-NRA/80,000 and dated April 1987. The map shall be on file and available for public inspection in the offices of the Department of the Interior in Washington, District of Columbia, and in the offices of the Metropolitan Council of the Twin Cities Area in Saint Paul, Minnesota.



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
POST OFFICE BOX 1306  
ALBUQUERQUE, N.M. 87103



In Reply Refer To:  
Region 2, FWE/HC

2-21-86-F-75

July 14, 1988

Mr. Sotero Muniz  
Regional Forester  
U.S. Forest Service  
517 Gold Avenue, S.W., Room 642B  
Albuquerque, New Mexico 87102

Dear Mr. Muniz:

This responds to Mr. David F. Jolly, Deputy Regional Forester's February 10, 1988, request for formal consultation pursuant to Section 7 of the Endangered Species Act (Act) of 1973, as amended, on the Coronado National Forest Plan and the Mt. Graham Astrophysical Area Plan. These plans involve the Pinaleno Mountains on the Coronado National Forest, Graham County, Arizona. The species of concern is the endangered Mt. Graham red squirrel (Tamiasciurus hudsonicus grahamensis).

This biological opinion (opinion) is not a land use allocation analysis. The decision about the best use of the upper elevations of the Pinaleno Mountains involves issues beyond the Act and is ultimately your decision. In accordance with the Act, this opinion deals solely with the effect of the above proposed plans on endangered species.

A table of contents has been included (next page) because of the complexity and length of the supporting text.



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## CONSULTATION HISTORY

*This section briefly describes past activities relative to this formal Section 7 consultation.*

An opinion on the Coronado National Forest Plan was issued by the Fish and Wildlife Service (Service) on December 6, 1985. That opinion dealt with Forest Service planning for the Pinaleno Mountains outside of a 3,500-acre area centered on the highest elevations of the mountains. This 3,500-acre area, referred to as the Mt. Graham Astrophysical Area, was under consideration for the placement of an astrophysical observatory (Figure 1). (Figures 1, 2 and 5 in this opinion, the only numbered figures included, are from USDA-FS 1988. Some information was added to Figure 5). The Forest Service decided to separate the planning for the Astrophysical Area from the Coronado National Forest Plan and address its management in conjunction with the astrophysical development proposal from the University of Arizona-Steward Observatory (University of Arizona).

The December 6, 1985, biological opinion predated the proposed and final rules for listing the Mt. Graham red squirrel (red squirrel) as endangered. An evaluation of the management policies, goals and objectives contained in the Forest Plan for their effect on the red squirrel was not made at that time.

This formal consultation will address all Forest Service management activities in the Pinaleno Mountains (Pinalenos), including management policies, goals, and objectives in both the Coronado National Forest Plan (Forest Plan) and Mt. Graham Astrophysical Area Plan (Astrophysical Area Plan).

A list of species was provided to the Forest Service for the Mt. Graham Astrophysical Area on April 1, 1986. Two listed species, the Arizona trout (Salmo apache) and peregrine falcon (Falco peregrinus), and three candidate category 2 species, the Pinaleno monkey grasshopper (Eumorsea pinaleno), southern spotted owl (Strix occidentalis lucida) and the red squirrel, were on that list.

A proposal to list the Mt. Graham red squirrel as endangered with critical habitat was published in the Federal Register on May 21, 1986. We provided the Forest Service with this information informally in May. Our letter of September 22, 1986, updated the original species list.

On January 12, 1987, the Forest Service provided the Service with their assessment of impacts to the Arizona trout and peregrine falcon as a result of actions in the Astrophysical Area. The Service concurred with a finding of no effect to the peregrine falcon. However, owing to a lack of information on the potential for spill of toxic wastes generated by the astrophysical facility and the lack of a commitment to develop a management and spill contingency plan for these substances, we did not concur with the finding of no effect for the Arizona trout. The Forest Service was notified of our conclusions in a letter dated February 10, 1987. The Forest Service responded to our concerns in a letter dated March 10, 1987, and as a result, we were able to concur with the finding of no effect to the Arizona trout in our letter dated March 30, 1987. This concurrence is contingent upon the development and implementation of a toxic waste management and spill contingency plan should an astrophysical facility be permitted in the Pinalenos.

The Forest Service requested an informal conference with the Fish and Wildlife Service on July 29, 1986, in regard to the proposed endangered red squirrel and proposed astrophysical facility. An August 26, 1986, meeting examined alternative development plans for the astrophysical facility to be included in the draft environmental impact statement, which was released October 7, 1986 (USDA-FS 1986B). Further discussions of the alternatives, potential conflicts with the red squirrel, and ways to analyze or minimize the conflicts were held December 8-9, 1986. The Forest Service prepared a draft biological assessment on their preferred alternative, which was reviewed by Arizona Game and Fish Department (AGFD), University of Arizona, and the Service at a March 25, 1987, meeting. The red squirrel was listed as endangered on June 3, 1987. Critical habitat remained proposed (Fig. 2). The revised biological assessment was transmitted to the Service along with a request for formal Section 7 consultation. The formal consultation period began on June 23, 1987.

The Service established a consultation team with representatives from the AGFD and the Forest Service. The astrophysical area applicant, University of Arizona, was involved in the consultation through the Forest Service. The team met on July 9, 1987, to prepare for a meeting with species and project experts that was held July 14-15, 1987. A representative of the Coalition to Preserve Mt. Graham also attended the meeting. The team met again on July 16, 1987. A meeting to discuss possible reasonable and prudent alternatives was held on July 29, 1987. The team met to consider the draft biological opinion on August 3-4, 1987.

Consultation on the Forest Service preferred alternative was halted on September 17, 1987, prior to the issuance of a final biological opinion. The Forest Service stated that consultation would be reinitiated on a proposed facility that the University of Arizona claimed would meet their minimum astrophysical development needs. The Forest Service further indicated that an expanded biological assessment would be prepared.

The Forest Service held a meeting on December 15, 1987 to discuss the basis for analysis that would be used in the expanded biological assessment (assessment). The assessment (USDA-FS 1988) was completed and transmitted to the Service on February 10, 1988 along with the request for reinitiation of formal Section 7 consultation. The 90-day consultation period began on February 17, 1988.

The consultation team was re-established with personnel from AGFD, the Forest Service, and the Service. A meeting with project and species experts was held March 15-16, 1988. Representatives from University of Arizona and the Coalition to Preserve Mt. Graham were in attendance. A meeting with species experts and the team was arranged on March 28, 1988, prior to the spring red squirrel midden census. The team met to discuss the draft biological opinion on April 8, 1988. The formal consultation period was extended first to June 15, 1988, then to July 15, 1988, to accommodate the evaluation of further information.

Officials from the Service, the Forest Service, and the University of Arizona met on June 3, 1988, to review the reasonable and prudent alternatives then under consideration. The Service and Forest Service heard the views of the Gila Valley Economic Development Foundation also on June 3, 1988. Service, Forest Service, University of Arizona, and Arizona Game and Fish Department officials, and a representative of the Coalition for the Preservation of Mt. Graham met on June 15,

1988, to further discuss reasonable and prudent alternatives under consideration. On June 28, 1988, representatives of the Service, Forest Service, University of Arizona, Arizona Game and Fish Department, Coalition for the Preservation of Mt. Graham, and several law firms met to share any new information that may have become available.

This biological opinion is based on information contained in the Forest Service assessment, Coronado National Forest Plan, Mt. Graham Astrophysical Area Plan, status report for the red squirrel, the draft environmental impact statement, technical information from the University of Arizona, conversations and meetings with experts, published literature, and other sources of information.

### BIOLOGICAL OPINION

It is my biological opinion that the implementation of the Coronado National Forest Plan as revised by letter dated June 22, 1988, is not likely to jeopardize the continued existence of the endangered Mt. Graham red squirrel because this plan does not significantly increase the existing jeopardy status of this red squirrel.

It is my biological opinion that the implementation of the Mt. Graham Astrophysical Area Plan that includes the establishment of the seven telescope Mt. Graham Observatory on Emerald and High Peaks is likely to jeopardize the continued existence of the endangered Mt. Graham red squirrel because this plan significantly increases the existing jeopardy status of this squirrel.

### BACKGROUND INFORMATION: PROJECT DESCRIPTION

*This section briefly describes the actions under this consultation.*

Both the Forest Plan and Astrophysical Area Plan contain a series of management objectives that will form the basis for further planning to achieve the Forest Service's goal to provide for multiple use and sustained yield of goods and services from the Forest in a way that maximizes net public benefits in an environmentally sound manner. The objectives will be implemented through groups of management practices and activities called prescriptions. Each prescription has a set of standards and guidelines that set performance criteria for each activity. A more detailed explanation of forest planning can be found in the Forest Plan and the final Environmental Impact Statement for the Plan.

The proposed Astrophysical Area was evaluated under the same series of management objectives as contained in the Forest Plan. Once a final decision is made for the Astrophysical Area, the Astrophysical Area Plan will be incorporated into the Forest Plan as a supplement. The supplemented Forest Plan will be reviewed and evaluated on a 10-15 year cycle with revisions or amendments occurring as needed. The Forest Plan is reviewed periodically within the planning cycle which began in 1985.

### Forest Plan

The Forest Plan contains a list of wildlife management prescriptions that are applicable to all forest areas and activities. Grazing, mineral development, timber harvest, recreation, and other objectives are all subject to the standards and

guidelines contained in the Forest Plan for wildlife. A number of these prescriptions specifically mention threatened and endangered species and state the Forest Service objectives for these species. A summary of these standards and guidelines is given below:

1. Maintain or improve occupied habitat of commonly hunted species, listed threatened or endangered species and management indicator species through mitigation of Forest activities with the cooperation of Arizona Game and Fish Department and the Fish and Wildlife Service.
2. With cooperation of Federal and Arizona wildlife agencies, develop overall direction for listed threatened and endangered species. Delist federally and state listed threatened and endangered species in accordance with species recovery plans. Reoccupy historic habitat Forest-wide with other identified species.
3. Reintroduce extirpated native species into historical habitats in accordance with cooperative interagency plans.
4. Consult with Arizona Game and Fish Department and the Fish and Wildlife Service during the environmental analysis process on projects significantly affecting wildlife and threatened and endangered plant habitats.
5. Determine presence of federally and state listed threatened and endangered plant and animal species in project areas through site inventory and consultation with existing data bases as part of environmental analysis completion. Recommendations for habitat needs will be made on a project by project basis.
6. In cooperation with Arizona Game and Fish Department and the Fish and Wildlife Service, develop a general activity plan for state and federally listed threatened and endangered species. This directional plan would guide habitat management on the Forest by:
  - a. Determining critical habitat for threatened and endangered species and prescribing measures to prevent the destruction or adverse modifications of such habitat.
  - b. Recommending appropriate conservation measures including the designation of special areas to meet the protection and management needs of such species.
  - c. Setting priorities for completion of recovery plans in memoranda of understanding by species.
  - d. Establishing a time frame for item c above.

Habitat requirements, research needs and transplant goals with completion dates would be outlined for each species within the recovery plan.

7. Develop management plans for designated endangered species critical habitat on a site by site basis as species recovery plans are completed.
8. Within occupied habitat of threatened and endangered species, specific recommendations regarding mineral entry and oil and gas exploration will be made on a site by site basis to protect such species.
9. Tolerance levels for threatened and endangered species to recreation will be established on a project site by site basis.
10. In areas of threatened and endangered species habitat, fuelwood harvest standards and guidelines will be modified as necessary on a site by site basis.
11. Tolerance levels for threatened and endangered species for new construction and maintenance of roads will be established on a project by project basis.
12. Transplant listed threatened and endangered and other identified species into suitable habitat following guidelines of species recovery plans and memoranda of understanding.
13. Consider structural improvements and maintenance for threatened and endangered species' habitats as technology develops.
14. Timber management priorities are to enhance wildlife and recreation resources.
15. Utilize prescribed fire in wilderness to enhance wilderness values, including restoration and maintenance of threatened species habitat.

The Forest Plan contains other prescriptions which pertain to wildlife values that would also concern threatened and endangered species management. For information on those prescriptions, please refer to the Forest Plan (USDA-FS 1986A). On June 22, 1988, the Forest Service submitted to the Service an amendment to the Forest Plan to be considered under the consultation. The amendment contained the following management directives:

1. The proposed Snow-Flat Treasure Park Campground would be deferred until the next planning period which will allow time for development of the recovery plan and additional research on this species. Riggs Ridge Campground development would be allowed this planning period although actual construction would likely not occur for at least several years, also allowing time for more species research and recovery planning.
2. Vehicle access onto Forest Roads 507 and 669 would be closed at mile post 1.8. This closure is "below the wall" near the bottom of the proposed critical habitat.
3. Measures for pet (dog) control within the "Refugium" will be developed and will involve total prohibition or leash restrictions.

4. Dispersed recreation would be allowed in management area 2A. If research and/or monitoring indicates that conflicts are present or have the potential to develop, then steps will be taken to modify the dispersed recreation guidelines to minimize or avoid these conflicts. Closure alone of Forest Road (FR) 507 and 669 to vehicle access is predicted to reduce recreational visitor use to one-third of current levels.
5. Compliance with regulations, monitoring of use, and education of the Forest users would take place through the use of a recreation technician or other personnel working in the area.

Within the area covered by the Forest Plan, consumptive uses such as grazing, mineral development, oil and gas exploration, timber and fuelwood harvest and recreation uses, will be subject to both their own prescriptions as well as the wildlife prescriptions discussed previously. There have been changes made to the Forest Plan for these uses in the Pinalenos to protect the red squirrel. No fuelwood gathering will be permitted within suitable habitat for the red squirrel to preserve the downed log component of the habitat. There is no timber harvest within red squirrel habitat. Grazing is not and has not been permitted in red squirrel suitable habitat. There will also be no expansion of the two organizational camps located within the red squirrel habitat.

Total recreation use in the Pinaleno Mountains is estimated in the vicinity of 220,000 visitor use days per year (USDA-FS 1986B). This is approximately half of the projected capacity of 470,000 visitor use days per year. Access for 96 percent of the visitors is along Swift Trail (SR 366) where most developed public and private recreation sites are located (figure 1). Estimates place recreation growth at 2 to 5 percent per year. At a rate of 5 percent, recreation use would be in the vicinity of 432,000 visitor use days in the year 2000.

The increased visitor use includes both a campground and dispersed recreation component. There are 47 established dispersed campsites above 7,000 feet elevation in the Pinalenos accessible via Swift Trail. The High Peak area is a popular destination for dispersed campers, hikers, and picnickers. Present use is estimated to be 6,000 Recreation Visitor Days (RVD's), increasing to 7,300 RVD's by the year 2000 without any road closures. With the restrictions on vehicle access to FR 507 and 669, RVD's are expected to drop to 1,900 and only increase to 2,400 by the year 2000 (USDA-FS 1986B). Combined recreational and camping use of established campsites would retard or prevent reforestation of heavily used areas due to trampling, parking, and camp area maintenance. Much of the impact would be in existing recreational use areas and would not involve new habitat losses. In addition, there is no irretrievable commitment in these areas that would prevent their restoration as squirrel habitat if data show such a need.

The Forest Plan contains a large area that would be recommended for Congressional designation wilderness. Cyclical review of the Forest Plan would not affect management of designated wilderness.



### Astrophysical Area Plan

The Astrophysical Area Plan contains the same specific standards and guidelines as the Forest Plan with some additions designed to emphasize management for the red squirrel. These additions are summarized below:

1. Designate a 470-acre Research Natural Area for the purpose of maintaining the acreage in a natural climax vegetative state.
2. Designate an additional 743 acres as wilderness.
3. Assess needs for and design of studies for both red and tassel-eared (Sciurus aberti) squirrels in the management area.
4. Reforest, either by encouraging natural regeneration or by artificial means, existing fuelbreaks and clearcuts to increase habitat for closed canopy old growth forest-dependent species, including the red squirrel.
5. Monitor red squirrel populations and habitats annually through intensive inventory and analysis.
6. Any timber harvest activities with appropriate stand examinations will be done only to benefit specific wildlife or recreation values after consultation with appropriate parties (Fish and Wildlife Service, Forest biologist and Arizona Game and Fish Department).
7. Recommend withdrawal from mineral entry and mineral leasing on all 3500 acres to protect essential habitat for Federal and State listed threatened and endangered species, recreational opportunities and recreational/astrophysical site investments.

Grazing, commercial timber harvest and fuelwood harvest would be prohibited within the Astrophysical Area and some recreation uses would be curtailed. Daytime motorized access would be allowed on FR 507 and FR 669; however, nighttime access would not be allowed above "the wall" on FR 507 (approximately 3.6 miles above the junction with State Route 366). Public motorized access would be prohibited on FR 507 and FR 669 from approximately November 15 to April 15 due to snow conditions. A gate would be located at the base of FR 507 to enforce the closure. Other roads would be closed and reforested.

Camping and hiking would be allowed in the Astrophysical Area except for certain restrictions in the Astrophysical Use Area to protect the instruments. The High Peak Cienega trailhead would be relocated to below "the wall" to line up with a new parking area at that location.

Approximately 24 acres would be allocated under a special use authorization for the proposed Mt. Graham Astrophysical Observatory (Observatory) by University of Arizona (Fig. 1). A restricted public use area would protect the Observatory from human activities, such as campfires, gunfire and radio transmissions, that could affect the proper operation of the telescopes. Otherwise, all prescriptions described for the Astrophysical Area apply.

The proposed Observatory includes three major components: the access roads (FR 507 and 669), Emerald Peak facilities, and the High Peak facilities. The development plan provides for seven telescopes, logistics buildings, support facilities, a buried powerline, sewage leach fields, utility boxes, as well as public parking and picnic areas.

Some widening and realignment of FR 507 and 669 would be required to provide year round access to the Observatory. Unlike the existing conditions, these roads would be kept cleared of snow but with restricted access during the winter. Some new roads would be constructed at Emerald Peak to serve the telescopes.

Four of the seven telescopes, the 11.3 optical/infrared (IR) binocular, two 8M optical/IR and the submillimeter interferometer array would be located on Emerald Peak. The remaining three, an 8M optical/IR, a 5M, and 10M submillimeter telescopes, would be sited on High Peak.

The site development plan also contains measures to minimize tree cutting and clearing, and reduce windthrow and other physical degradation of existing red squirrel habitat. These measures will be addressed more fully under Impacts of the Action.

#### BACKGROUND INFORMATION - MT. GRAHAM RED SQUIRREL

*This section briefly examines the biology of the red squirrel.*

The Forest Service expanded biological assessment (USDA-FS 1988) provides detailed information on what is known about the Mt. Graham red squirrel, including its habitat, current population, and predicted vulnerability to extinction. Refer to that document for information not contained in this summary. Much more information needs to be gathered on this squirrel.

#### Taxonomy

The Mt. Graham red squirrel was first described in 1894 from three specimens taken on August 17-19, 1894, in the Pinaleno Mountains by W.W. Price and B.C. Condit. The collection records show the three were taken from the fir forest on the summit of Mt. Graham. The species was officially described by J.A. Allen in 1894 in the Bulletin of the American Museum of Natural History (Arizona Game and Fish Department 1985). The subspecies was recognized on the basis of difference in color and later differences in size and various morphometric characteristics. There may also be differences in behavioral characteristics that separate the Mt. Graham subspecies from other red squirrels.

#### Habitat Requirements

The Mt. Graham red squirrel is found in conifer forest, especially old growth spruce-fir, Douglas fir and mixed conifer types in the upper elevations of the Pinalenos. Engelmann spruce (*Picea engelmannii*), corkbark fir (*Abies lasiocarpa*) and Douglas-fir (*Pseudotsuga menziesii*) seeds are the primary food of the red squirrel, though Engelmann spruce is the most important source of food. The cones containing these seeds are cached by the red squirrel in storage areas or middens. Other foods include mushrooms and rusts, bones and carrion, spruce and

fir cambium, pollen and spruce/fir buds, and perhaps berries and seeds of broad-leaf trees and shrubs. Each of these foods has a seasonal importance. The stored cache of closed conifer cones in each squirrel's midden provides food through the winter.

C. Halvorson (1988A) judges the existing excellent rated Mt. Graham red squirrel habitat as not being well provisioned with either red squirrel food or shelter components as compared with what are considered excellent coniferous red squirrel habitats in the northern Rocky Mountains. There may be differences in the most critical habitat components between these two areas due to ecological and climatic conditions within the habitat that result in differences in red squirrel population densities or responses to habitat or climatic changes.

Closed conifer cones provide most of the food base in the Pinalenos. Unlike other red squirrel habitats, there is a marked paucity of grasses, herbaceous material, and berry producing shrubs that contribute significantly to the food base of other populations. The Mt. Graham red squirrel has only buds, cambium, and mushrooms as supplementary foods and none are available enough to sustain the red squirrel on a long term basis.

Middens may be constructed inside a standing hollow tree, in association with downed logs, or at the base of a large live tree. Middens are usually located near good cone crop producing trees within the territory of a squirrel. It is not known how long it takes to establish a midden that can hold enough cones to sustain a squirrel through a winter.

The microclimate necessary to support a midden is critical to the continued existence of the squirrel. Areas that are dark, cool and moist aid in keeping the cones from drying, opening and losing the seeds to other seed eaters and decay organisms. In the Pinalenos, the red squirrel and the spruce-fir forest upon which it depends reach the southern most extension of their range. At the latitude of the Pinalenos, solar radiation is as much as 46 percent higher than at the northern end of the red squirrel's range. This increase in solar radiation results in a drier and warmer microclimate for middens. Compounding this situation is the low water vapor found in the desert air. Red squirrels in the Pinalenos must be more selective about midden sites than the northern subspecies because of the dryness-solar radiation condition at this latitude. Sites that possess the necessary microclimate are not abundant. Younger age stands of trees or areas that have been opened up by logging, windthrow or other causes do not provide good midden sites as they tend to be warmer and drier. Data from areas outside the Pinalenos for different red squirrel subspecies indicate substantial differences in red squirrels per unit area in logged versus unlogged areas. There are significant decreases in midden densities in logged areas when compared to unlogged areas. Opening the canopy enables wind and sunlight to degrade midden habitat. Loss of midden habitat renders areas largely unsuitable for squirrels despite the continued presence of cone producing trees.

In addition to good cone producing trees and midden sites, red squirrels generally require trees for nesting. Nests are typically near middens. Young of the year squirrels may not be able to establish a midden their first year; thus, overwintering areas may be especially critical for juvenile survival. Such areas may be in

lower elevation habitats now occupied by the tassel-eared squirrel and may no longer be fully available to juvenile red squirrels.

### Population Size

Using data on tree stand type and quality, survey transects, vegetation plots and other data, the forest habitats in the Pinaleno Mountains were evaluated for their current relative quality as squirrel habitat. A total of 22,436 acres were evaluated. Of this acreage, 11,733 acres were considered to contain habitat ranging from excellent to very poor and 10,703 acres were judged to have no potential for squirrels. A breakdown by habitat quality is given below:

<u>Habitat Quality</u>	<u>Acres</u>	<u>% of Total</u>	<u>% of Suitable</u>
Excellent	472	2.10	4.02
Good	1,564	6.97	13.33
Fair	1,182	5.27	10.07
Poor	2,747	12.24	23.41
Very Poor	5,768	25.71	49.16
Not Suitable	<u>10,703</u>	<u>47.71</u>	<u>-0-</u>
TOTAL	22,436	100.00	99.99

Areas within the suitable habitat were intensively surveyed for red squirrel middens in May 1986 and October 1987. Using numbers of observed active middens and acreages of habitat quality, an estimate of total population was made for spring of 1986 ( $328 \pm 55$ ), the fall of 1987 ( $246 \pm 40$ ) and spring of 1988 (215). Active middens per habitat quality and density figures are given below:

<u>Habitat Quality</u>	<u>Acres</u>	<u>1986 Active Middens</u>	<u>Density Active Middens Per Acre</u>	<u>1987 Active Middens</u>	<u>Density Active Middens Per Acre</u>
Excellent	472	71	.15	53	.11
Good	1,564	128	.08	96	.06
Fair	1,182	46	.04	35	.03
Poor	2,747	41	.02	30	.01
Very Poor	5,768	<u>42</u>	.01	<u>32</u>	.005
TOTAL		328		246	

Converting active midden counts to the actual population of red squirrels is not entirely accurate. Although assumptions were made concerning midden activity areas (containing one or more middens) in calculating the potential population, we do not know enough about activity areas in the Pinalenos to be confident of the assumptions. The actual number of midden activity areas may be higher or lower than hypothesized for a particular year. The number and density of active midden activity areas were also used to determine density for acres of red squirrel habitat not included in the surveys. If areas surveyed had higher or lower densities than areas not surveyed, extrapolated density figures would be in error, leading to errors in the population estimates. Further complicating matters is the fact that habitat acreages of equal quality were clumped together to create the estimate, thus approximating a contiguous habitat instead of a fragmented one as exists in the Pinalenos. Given these factors, the population estimates may be somewhat optimistic, but are the best available.

The figures given reflect only that portion of the population that possesses a midden activity area. Juveniles may not be accounted for depending on when the survey was made and transient adults would not be included in any survey. Mortality may be significantly higher for these non-midden related animals, decreasing their contribution to recruitment.

The population estimates we have represent three points on a curve of the red squirrel population cycle. Two are at approximately the same time of year (May 1986, March 1988) and one is not (October 1987). We do not have any data that show whether the red squirrel is near a high, low, or mid-point of its population cycle and what the changes from 1986 to 1988 tell us. We do know that the estimated population size has declined 33 percent in 2 years (328 to 215) and we cannot be sure we have reached the low point on the population curve in 1988.

The Forest Service attempted to estimate potential carrying capacity for red squirrels in the Pinalenos. The Habitat Capability Model (HCM) was used to develop one of the carrying capacity estimates. Using values for food and cover characteristics of different age and stand quality of spruce-fir and mixed conifer types and a pre-set red squirrel density figure, the HCM generated a predicted maximum of 502 carrying capacity units. This number was based on a density in excellent habitat in the best population years of 0.23 red squirrels/acre. This number may be somewhat over estimated due to the consolidation of small habitat areas. In non-peak years the population will not approach carrying capacity.

Another carrying capacity estimate may be made using the total number of active and inactive middens as an index. A red squirrel activity area contains a primary midden and any number of secondary or satellite middens that may or may not be actively used in a particular year. In a peak population year, all potential activity areas will be occupied. Some secondary middens may be used by juvenile squirrels if the adult tolerates them. Distances in an activity area between middens will vary due to habitat quality, local features, and red squirrel energy costs to maintain the area. Therefore the number of potential activity areas is some factor less than the total number of middens found except in peak years where it may equal or exceed the number of middens found (C. Halvorson 1988B). Using the two survey periods, a total of 444 active and inactive middens is estimated.

With the estimated maximums of 502 and 444, remembering that these numbers represent an optimistic level of carrying capacity, we can grossly estimate the population cycle of the red squirrel. Rodent populations undergo periodic population fluctuations (Elton 1939). If we assume a mean population of 222 to 251 based on estimated maximums, we see that the 1988 population of 215 is approximately one-half of a potential maximum.

Red squirrel populations, like all rodent populations, undergo very wide population fluctuation. Records from other populations indicate a 60-80 percent loss in population in one year is possible (Wolff and Zasada 1975). Other data indicate that populations may vary as much as four times around their balance point (C. Halvorson 1988B). Given the red squirrel population levels and maximum potentials, the low point of the population may drop below 100 animals.

Density surveys in 1986 of red squirrels in the Pinalenos averaged 15 squirrels per 100 acres in excellent habitat. This figure is unusually low in comparison to other densities for the species in North America. Densities of other red squirrel subspecies of 35 to 277 per 100 acres in Alberta, Canada (Rusch and Reeder 1978) and 51 to 101 per 100 acres elsewhere in Arizona have been reported. Only a logged area in Arizona, at 16 middens per 100 acres, approached the maximum densities seen in the Pinalenos (Vahle 1978).

There is considerable evidence that the red squirrel was once more widespread in the Pinalenos. Surveys in 1914 reported capturing red squirrels at between 6,685 and 9,906 feet elevation and were reported as being common above 8,417 feet elevation in spruce-fir forests (Hoffmeister 1986). By the 1950's red squirrels were not observed in historic locations and researchers in the 1960's failed to find any at all (Minckley 1968). The species was again recorded in 1971 and surveys completed for the species status report in 1984 found 31 individuals (Spicer et al. 1985). Further surveys in 1985 and 1986 located 177 red squirrel middens. The population estimates contained in the assessment were based on the 1986 and 1987 midden survey data.

### Current Status

The Mt. Graham red squirrel was listed as endangered on June 3, 1987. In the final rule that determined the subspecies to be endangered, modifications to or loss of habitat and interactions with the tassel-eared squirrel were listed as the primary factors in determining the species' status.

The loss of habitat to the red squirrel parallels the logging of the Pinalenos from 1880 to 1973. Logging began in the lower elevation ponderosa pine and oak areas and may have resulted in physical changes to these areas that made them less usable by red squirrels. Logging operations reached the mixed conifer types in the 1946-1958 period and the spruce-fir types on the summits in 1963. It was in the period of the 1950's and 1960's that researchers noted the disappearance of the red squirrel (Minckley 1968).

In addition to timber harvest, roads destroyed forest habitat directly and also indirectly through opening edges and windthrow that opened forest canopies, drying soils and middens. The 1956 Nuttall Fire burned 29,000 acres of shrub and forest

habitats, further removing red squirrel habitat. Construction of campgrounds for the increasing number of recreationists also removed some potential habitat areas.

In the 1940's, the Arizona Game and Fish Department introduced the tassel-eared squirrel to the Pinalenos. This species has expanded into the ponderosa pine and mixed conifer forests and may be competing with the red squirrel in those areas. The tassel-eared squirrel has also been reported in the spruce-fir habitat. Much of the present tassel-eared squirrel habitat would not support middens but may have been important over-wintering sites for red squirrel young of the year.

Another factor in the current status of the red squirrel is the impact of human presence. The red squirrel elsewhere in its range has adapted to the presence of people and their facilities within suitable habitat. We do not have information, however, as to the reductions in habitat use that result from human disturbance. In areas with abundant habitat and large red squirrel populations, impacts from human presence may not be readily apparent. The effect of people on Mt. Graham red squirrels is unclear.

The past logging, road construction, campgrounds, forest fires, and perhaps introduction of the tassel-eared squirrel in the Pinalenos have resulted in fragmentation and reduction of red squirrel habitat. Maps of known midden sites indicate that most of the middens are concentrated above 9000 feet near the summits of the Pinalenos (figure 5). These areas are the most essential to the survival of the red squirrel as a subspecies, both in the long and short term, of all habitats on the mountain. Of the 11,733 acres of suitable habitat remaining, only 2,036 acres are good to excellent habitat. This small area represents 17 percent of all suitable habitat and currently supports 60 percent of the remaining red squirrels. This habitat is essential for the survival of this species.

During the consultation, efforts were made to estimate the past population or carrying capacity for red squirrels in the Pinalenos. The Forest Service, using HCM, had projected a carrying capacity of 725 units at 200 years in the future. The increase over present carrying capacity (502) was due to growth and development over a 200-year period of red squirrel habitats in the mixed conifer forest. Only four units were gained in the spruce-fir areas that contain most of the currently rated excellent or good habitats, indicating low potential for further increase in these habitats.

The 725 units can also be projected back in time to approximate the condition of the mountain prior to significant human impacts (pre-1880). Because the 725 figure does not include areas that would remain as habitat already disturbed by humans (i.e., State Route 366, campgrounds, etc.), it is actually a low estimate of historic carrying capacity. It also assigns no value to lower elevation habitats disturbed by logging, fires and other incidents and currently occupied by the tassel-eared squirrel. These habitats may have provided some value to red squirrels in the past. Taking into account these factors and information concerning persistence in size of small populations, a speculative estimate of 1000 units in the 1880's was made. This estimate, even though speculative, can serve as an indication of trend. If the present maximum carrying capacity, 502, is compared to the possible past carrying capacity, a loss of 50 percent of 1880's capacity is estimated. The spring 1988 optimistic population estimate of 215 is only about 20 percent of the speculative 1880's potential maximum of 1000.

### Refugium

An examination of maps with plots of known middens shows a definite concentration of middens in the Emerald-Hawk-High Peaks area. In the assessment, the 882 acres above 10,200 feet contain 136 middens (figure 5). If the boundary is adjusted to conform to the proposed critical habitat area around High Peak (Mt. Graham on maps), an additional 10-15 middens are added. This represents approximately 27 to 30% of the present carrying capacity of 502. Because this area contains the longest contiguous stand of good to excellent habitat and the densest concentration of red squirrel middens, we consider it to be the core or refugium of the population. For the sake of convenience, the critical habitat boundary proposed in the Federal Register Vol. 51, No. 98, May 21, 1986, for the Hawk Peak-Mt. Graham area will be used to define the refugium.

This area, in all likelihood, provides the best existing habitat components for the survival of this species, more so than any other area in the Pinaleno Mountains. Refugia are extremely important because they provide for the core population of the species and are most able to survive a catastrophe (e.g., prolonged drought, major fire or disease outbreak). This population is also the main source of individuals to re-colonize other areas hit by catastrophes. The refugium must be of sufficient size and quality to ensure enough individuals of the population survive the catastrophe to maintain the integrity of the species. There are other clusters of middens found in areas of good to excellent habitat, but none are large enough to serve as refugia for the red squirrel. Over time, as the forest regenerates, we would expect that the area around Webb Peak and Ash Creek drainage would become more important red squirrel habitat and connect with the Emerald Peak portion of the refugium.

### Vulnerability to Extinction

The Mt. Graham red squirrel is, for several reasons, extremely vulnerable to extinction. As an isolated subspecies with only one population, it is inherently vulnerable, especially to environmental catastrophes that effect significant portions of the habitat (Halvorson 1988A and Soule 1988). The red squirrel has survived such natural catastrophes over its 10,000 year isolation. The effects of human activities since the 1880's, however, have severely compromised the ability of the red squirrel to survive subsequent similar events in the near future.

The red squirrel has both a low population and a low population density. There is also a limit on current carrying capacity that effectively prevents expansion of the population to substantially safer levels. There has been considerable effort in recent years to define a "safe" population level that would ensure the survival of a species over a set period of time. Estimates of 500 individuals have been proposed in the literature; however, this figure varies with the type of animal or plant involved, the time period, genetic heterozygosity in the population, and other factors.

Two estimates of threshold level population size have been developed for the red squirrel in the Pinalenos. Dr. C.C. Smith (USDA-FS 1987) estimated that 150 individuals in the spring would be the lower limit able to sustain the population. C. Halvorson (1988A) suggested that a median spring population of 300 adults and



yearlings would be a safe minimum with numbers as low as 200 to 250 acceptable on a short term. If the population in both estimates is on the verge of increasing through recruitment during the summer.

The estimated spring red squirrel population based on midden counts was 326 in 1986 and 215 in 1988. We do not know if these estimates represent the low range of a vigorous population or the high of a non-vigorous population. We are inclined to believe the population reflects the latter. This is the belief, in part, because of the 246 midden count of October 1987, which was recorded when the population should have been close to its seasonal maximum. Low populations are also critical when normal population level fluctuations occur. The low population and carrying capacity increase the natural vulnerability of the red squirrel to catastrophe.

Both the red squirrel and the spruce-fir habitat upon which it depends are at the extreme southern edge of their range and are subject to stress of temperature, isolation, and dryness that strongly influence their survival. The extremely low density of red squirrels in the Pinalenos may be an indication of the population's response to a habitat under stress. As stated previously, the Mt. Graham red squirrel is dependent upon cone crops for the major portion of its food source.

Dependence on cone crops alone is hazardous. Conifers do not produce large cone crops every year and there is the additional variance involved in seed viability. The tree species the red squirrel depends on are at the southern limit of their range and may, therefore, produce fewer good cone crops and have lower seed viabilities than in other portions of their range. Douglas fir produces good crops every 2 to 11 years. Engelmann spruce every two to five years and corkbark fir is intermediate between them in other areas of their range. We do not know how often conifers in the Pinalenos produce good cone crops; however, an estimate of two good, two bad and six intermediate cone years per 10 year cycle has been made. We have no data on seed viability, a factor as important as cone numbers, because it is viable seeds that provide food for the red squirrel. Red squirrel numbers are more likely to fluctuate sharply in response to cone crops than if there was a substantial natural alternative food base. The lower elevation oak and pine habitats that may have provided an additional food resource for red squirrels in the past may no longer be fully exploitable by red squirrels due to possible competition with the introduced tassel-eared squirrel.

In the event of extensive and consecutive cone crop failures, no significant alternative food source exists for the Mt. Graham red squirrel and high mortality may result. Because the habitat is so constrained, environmental conditions that eliminate the cone crop are likely to affect all or most of the available habitat, and thereby all or most of the red squirrel population.

The vulnerability of the red squirrel is increased because of the limited knowledge of its life history, as well as limited information on the quality of its environment. We have insufficient data on the reaction of this squirrel to recreation and land uses, and on breeding habits, fecundity, and survival. We have extremely limited data on location of this squirrel in relation to its population cycle. We do not understand red squirrel activity areas or dispersal patterns, cone crop production cycles, or seed viability. The limited information base requires a cautious approach before proceeding with additional habitat disrupting activities. This approach ensures that those actions would not further jeopardize the continued

existence of the red squirrel. Development related losses to the red squirrel, that would be imposed on natural population cycles, could cause the squirrel to fall below minimum populations necessary for survival in the event of a catastrophe. Even in a non-catastrophic situation, a small additional squirrel loss, as a result of human activities, could be sufficient to reduce the red squirrel population levels below the extinction threshold during low points in the population cycle.

The influence of the tassel-eared squirrel on the red squirrel is also a significant question. The nature and extent of their interaction must be identified prior to any program to control tassel-eared squirrels. The habitat quality of the area where red squirrels and tassel-eared squirrels overlap should also be evaluated. The unknowns surrounding these interactions add a potential additional threat to the continued existence of the red squirrel.

The long term survival and recovery of the red squirrel depends upon increasing the quality and quantity of habitat, and concurrently eliminating or reducing man-caused mortality and interference with red squirrel reproduction. Elimination of the fragmentation within existing habitat and restoration of other contiguous potential habitat areas will be especially important. This will increase the amount of contiguous habitats and reduce wind and solar effects in adjoining habitats. It can be achieved by reforesting existing timber harvest areas, fuelbreaks, and roads and blowdowns, but may take nearly 200 years. Restoration of degraded areas within the good to excellent habitats, especially in the refugium and areas adjacent to it, would help to maintain this essential area. Restoration of areas that are potentially good to excellent habitat are also very important. The Forest Service has predicted, using HCM, that few new squirrel equivalents are attainable at the higher elevations. More units would be attained at lower elevations where the mixed conifer forest occurs. However, maximum benefits are 200 years away. The Forest Service has estimated it will take that long to develop the old growth habitat needed by the red squirrel. The larger and better the core or refugium area, the higher the probability of survival of the species until habitat recovery can occur. It will take decades, at least, to eliminate or substantially reduce further increases to the red squirrel's vulnerability to extinction caused by past human activities.

#### IMPACTS OF THE ACTION: FOREST PLAN

*This section describes the impacts of the Forest Plan on the red squirrel.*

##### Land Management Prescriptions

Overall, implementation of the land management prescriptions and associated standards and guidelines contained in the Forest Plan and Astrophysical Project Plan are an improvement over the status quo for the red squirrel. The emphasis on management to maintain and enhance habitat is of special importance in this determination. The commitments to reforest the fuelbreaks and degraded areas will be vital to the long term survival of the red squirrel. Controls and prohibitions on timber and fuelwood harvest, expansion of existing human use facilities, and recreation use preserve existing red squirrel habitat and protect individual red squirrels from excessive disturbance. The prescriptions concerning the commitments to develop and implement recovery plans, monitoring, and other protective features are also necessary to secure the future of the squirrel.

As standards and guidelines contained in the wildlife protection prescription are adhered to and guided by red squirrel needs, adverse effects to the red squirrel from consumptive uses such as commercial timber harvest and fuelwood cutting will be minimized or eliminated. Areas are present in the Pinalenos where these activities may take place without affecting the red squirrel. In addition, proper reforestation will require timber stand management to enhance old growth development, prevent disease outbreaks, and suppress the likelihood of fire.

### Recreation

Increases in recreation use of the Pinalenos would adversely affect the red squirrel in several ways. Direct mortality is the most obvious adverse effect. With the increase in traffic on both FR 507 and FR 669 and the Swift Trail, road kills of red squirrels will likely increase. In 1987, one kill was documented on Swift Trail and another two or three were reported but not confirmed. Road kill deaths may be highest during juvenile dispersal; however, any animal whose midden activity area is near a road is at risk. Other forms of direct mortality may include poaching, accidental shooting and capture by pets.

Equally important is the loss of habitat and habitat components due to recreational activities. Fuelwood gathering for campfires, mushroom and berry picking that removes scarce supplemental food resources, trampling of tree seedlings at campsites and other areas, all have some effect on red squirrels. The construction of a new campground at Riggs Ridge would remove 23.3 acres of currently rated very poor habitat. Over the long term, this habitat would continue to rate as 23.3 acres of very poor habitat because it is too low in elevation to support either mixed conifer or spruce fir.

The third type of impact to red squirrels from recreationists is the least understood. Red squirrels are not notoriously shy animals. In many places throughout their range, they are found in close proximity to human developments and adapt to human presence quite readily. However, there are indications that the type of human activity involved may affect the degree of red squirrel adaptation, and that the Mt. Graham red squirrel may be more vulnerable to human use impacts than other red squirrels.

Recreationists are an uncontrolled impact. They are not concentrated in one place and can thereby reach any area of red squirrel habitat, although those midden activity areas nearest developed or established campsites, roads, or trails, would be most affected. Red squirrels are attractive small mammals that have a high level of acceptability with the public. If one is seen, people would attempt to get closer for a better look and perhaps take pictures. The red squirrel remains within its midden area and does not flee very far away if it feels threatened. Presence of people on the midden interrupts normal activities to some extent (some red squirrels in the Pinalenos are less shy than others) but may also lead to attempts to abuse the animal (throwing items in an attempt to hit it or attempt to capture it), lure it with unnatural foods (pecans, crackers, etc.) or vandalism of the midden. Because the Mt. Graham red squirrel seems less wary than other subspecies, it is more vulnerable to these types of physical abuse, or of capture by dogs (C. Halvorson 1988C). The approachability of the red squirrel in the Pinalenos has been noted by both Forest Service and Service personnel.

We do not infer that recreationists are intentionally disruptive. What may seem to be undamaging wildlife observation may be affecting the red squirrel in subtle ways. Watching intruders instead of gathering and storing cones has an effect on winter survival and if intruders enter into the immediate midden area, storage activities are disrupted. The red squirrel may also be less aware of other potential dangers (i.e., predators such as goshawks) if engaged in observing humans in the vicinity of the midden. Data from other areas (C. Halvorson 1988D) indicate that portions of an activity area or part of a midden may be abandoned if human presence becomes too intrusive. An animal disturbed by capture or harassment on the midden may not utilize the area where the action occurred. Red squirrels avoid areas of dense camping and would likely abandon a midden activity area that contained a well used camp site within 25 feet of the main storage area (C. Halvorson 1988D). Red squirrels with young in the nest are the most sensitive to nearby uses or intrusions into the midden activity area.

Preliminary information suggests that intermittent exposure to an impact is more deleterious than a continuous exposure (C. Halvorson 1988D). Red squirrels apparently adapt better to a continuous human presence than one that appears at irregular intervals and irregular levels. The constant exposure allows the animal to study the intrusion over time and adapt to its presence. This assumes that the intrusion is of a low enough level that red squirrels do not immediately leave the area and not return. A low level intermittent intrusion would be less disruptive than either a larger intermittent or a larger continuous intrusion. For example, an occasional hiker passing through a midden activity area without stopping is far less intrusive than a well used picnic or camping area in the same area or a permanently manned station. The station would likely have a zone of abandonment around it, the extent of which would be related to the difficulty the red squirrel has in adjusting to its presence.

In sum, recreationists are involved in direct mortality through road kills and harassment deaths from dogs, rocks, or poaching, and in habitat losses for recreational facilities. In addition, through harassment impacts that we do not clearly understand, recreationists also adversely affect the ability of the red squirrel to behave normally. Recreation impacts are mostly intermittent, with levels of use varying seasonally and weekly, as well as by location. It is our conclusion that the effects of recreation on the red squirrel may be significant and that increases in use levels within the best habitat for the red squirrel is not without some risk. More study is needed to define the problem.

The number of recreationists in the Pinalenos is going to increase during the planning cycle. Commitments by the Forest Service to curtail recreation use within the refugium would protect that area from the effects of increasing recreational use and enable monitoring to determine the extent of this concern. Allowing for recreation to continue as presumably envisioned within the remainder of the Pinalenos will provide us with the opportunity to study human/red squirrel interactions to determine proper management.

With the two-thirds decrease in recreation use within the refugium and the commitment to evaluate and correct any problems regarding the concerns raised in this document regarding recreation, the projected increases in recreation do not significantly increase the level of jeopardy to the red squirrel.

### Special Management Area

The establishment of the proposed Research Natural Area and Wilderness in the Pinalenos would protect those areas from future development. This protection benefits the red squirrel by protecting the integrity of its habitat. It should be noted that management restrictions inherent in such designations may limit some types of silvicultural actions that could benefit the red squirrel within the boundaries of these areas. The degree of this limitation cannot be established at this time. Depending upon the administrative design of the Research Natural Area, recreation impacts within it could be controlled.

### IMPACTS OF THE ACTION: ASTROPHYSICAL AREA PLAN

*This section describes the impacts of the Astrophysical Area Plan on the red squirrel.*

#### Astrophysical Use Area

The establishment of the restricted use area would, of itself, have very limited effects on the red squirrel. The protective Forest Service prescriptions would apply to this area and the restrictions to public use inherent in this area may provide a slight benefit to the species. This benefit would be countered by the increased disturbance and intrusion at the Observatory development areas.

The following discussion of effects resulting from the Observatory comes in part from the expanded biological assessment.

#### Physical Habitat Impacts

The Mt. Graham Observatory would be located on Emerald and High Peaks. Immediate fire suppression and mineral withdrawal would likely protect red squirrel habitats in the vicinity of the project.

A site plan for the Mt. Graham Observatory was included in the biological assessment. This assessment also contained measures that would be followed to reduce the acres disturbed by construction and operation of the facility. The measures to reduce impacts on the spruce-fir forest included restrictions on forest clearing with trimming and topping preferred over clear-cutting. Raising of telescope pedestals is also planned to minimize trimming. Clearings will be designed to minimize windthrow. Revegetation of degraded areas is also included.

The Observatory would require clearing of .90 acres of trees on High Peak, 2.34 acres on Emerald Peak and 1.3 acres for road widening along FR 507 and 669 plus new spur roads. An additional 18.82 acres previously cleared of trees (cleared but in some locations beginning to naturally revegetate) would be used for buildings and roads to serve the new Observatory. A total of 23.36 acres would be committed to the Observatory for astrophysical development and the associated road system (Appendix Table 1).

The High Peak habitat is currently degraded, open canopy spruce-fir as a result of past management actions (road construction and logging). No red squirrel middens are in the area where the telescopes would be sited; however, two squirrel middens

are located within approximately 350 feet of the perimeter road. The probable food gathering territories of these two squirrels would be directly impacted by the line of sight tree cutting for the 5M and 10M submillimeter telescopes. In addition, the proximity of these two middens to each other requires that significant portions of each foraging territory may include the area on top of High Peak where the three telescopes and related facilities would be constructed. The construction of the facility would remove significant amounts of this habitat. Unless there is sufficient alternate foraging habitat available, these two middens may no longer be viable for red squirrels. In a worst case scenario, the two middens could be lost.

Emerald Peak contains a large fuelbreak and an area of windthrow, but excellent closed canopy habitat is found there. Eight middens are located in the triangle formed by the existing road and new spur roads. Another midden is located adjacent to the large 11.3M binocular scope site. The other eight middens are already affected by wind and solar degradation because of the existing roads; however, due to road widening and extension, these effects are likely to become more acute and may significantly affect the viability of some or all of these middens. Data are insufficient to determine if these eight middens would be abandoned because of project activities. The other (ninth midden) would probably be lost due to the construction of the 11.3M binocular scope facility in close proximity to this midden.

In addition to the 4.54 acres directly cleared at Emerald and High Peaks and along the roads, the new clearing would result in additional degraded edge and windthrow totaling 4.0 to 7.6 acres in the short term. Three squirrel middens are located in the fragment of habitat between FR 507 and 669 on the north that may be adversely affected by improvements to the roads, increases in traffic and subsequent increases in wind and solar degradation. Data are insufficient to determine the degree of effect to these three middens.

Over the life of the project, the Forest Service intends to reforest, either naturally or with human assistance, the fuelbreaks and road edges along FR 507 and 669. Without the Observatory, the roads could be closed and removed so that revegetation could occur over the entire area. The need to maintain the roads to serve the Observatory prevents the regeneration in the road bed and results in a zone of degradation in the new forest growing in the cleared areas because the road provides the edge effect for wind and sunlight. The assessment states that 64.7 to 105.3 acres will not become midden habitat owing to the siting of the Observatory. An additional 23.36 acres is permanently lost due to roads and buildings for the Observatory.

#### Human Use Impacts

Three types of human use would occur with the construction and operation of the proposed Observatory. Only one, recreation, currently exists in the Emerald-High Peak area. The additional two are construction and a "physical workers".

Public use would include camping, hiking, picnicking, nature study, and visitation of the Observatory. From 1.1 to 1.5 acres of land is estimated to be removed from active reforestation due to trampling, 1 acre for the 8 campsites along FR 507 and 0.1 to 0.5 acres due to illegal parking along FR 507. These figures were

developed during consultation and do not appear in the assessment. These 2.2 to 3.0 acres would be located largely within the degraded edge along FR 507 and FR 669 so they do not add acres to the physical habitat lost. However, the 1 acre for campsites described in the assessment would not be allowed to reforest at all, thus adding 1 acre to the Observatory commitments, a new total of 24.36 for the proposal (Appendix Table 1).

Recreation impacts would be of the same types as previously discussed under the Forest Plan with one exception. The construction of the Observatory will draw another type of recreationist, the "astro-tourist." This individual's primary experience would be touring the telescopes and they may or may not be interested in the natural resources of the Pinalenos. The University of Arizona estimates there would be 10,000 astro-tourists at project buildout in 30 years (approximately 2020). During the early years of the facility, there would be a much lower number of visitors.

Astro-tourists would arrive at the site via the Observatory shuttle bus from Safford or by private car. The Observatory shuttle could potentially transport 8,000 astro-tourists. Shuttle bus tourists would have a guided tour of the telescopes, other astro-tourists and general recreationists would be free to wander about. Some hikers may use the shuttle for transport to the mountain top, then hike down. These hikers have the same effect on red squirrels as do other hikers.

Uncontrolled astro-tourists that enter the forested areas would have some effect on red squirrels as general recreationists, i.e., harassment, trampling of seedlings, berry or mushroom picking, and midden disturbance. By the year 2000, at least two of the major telescopes, the 10M SMT and 11.3M binocular would be built and attracting visitors. These would be the largest telescopes in Arizona and may attract at least 2,000-3,000 people a year, increasing the visitor load on High Peak from 28,500 to over 30,000. By the time the Observatory is completed in 2020, the maximum sustainable visitor use days in the Pinalenos likely would have been exceeded and some management actions on people numbers would have been taken.

The construction of the facility would require heavy equipment and work crews to be on-site during the snow-free period. Estimates of 10 or 12 workers to 22 workers per day have been made by the University of Arizona and the Office of Arid Lands Studies.

Construction workers tend to stay in the area they are working in with only minor wandering. Noise, strange smells, vibrations, and intrusion of large equipment into the habitat are the major effects to red squirrels. The severity of the intrusion depends upon the distance from the midden or nest, screening afforded by trees and landforms, and the continuity of the action. Distances of 100 feet or less may be most critical, especially for females with young (Halvorson 1988D). Construction would take place during the nesting season and would occur over the 30-year period of development. Anywhere from 1900 to 4180 construction worker-use days would occur in any given year on the site (assuming 190 days of work). As different telescopes would be constructed, location of the disturbance would change. Some years may have no construction, while others may have work on more than one telescope. The more continuous the disturbance (i.e., same types of noises or actions over time), the less disruptive to the red squirrel. If construction only occurs during the week, with quiet weekends, the intermittence, and thus potential

for disruption, increases. Because construction workers are not likely to wander far, harassment of red squirrels at the midden may be lessened, even more so because recreationists would avoid construction areas.

The third type of human use would begin once the first telescope was built--the astrophysical worker. The number of daily workers would increase to an estimated 40 at completion of the project. In addition, observers and visiting scientists would be using the facilities. This group probably has the lowest impact on the red squirrel because their main focus is on their work and they would not spend the day wandering the forest. Their activities are continuous, making adaption to them easier for nearby animals. Noise may not be a significant factor, except possibly for the interferometer which will require heavy equipment to move the dishes from station to station. There may be a zone around the buildings that the red squirrels will move out of permanently as part of the adaption process, but the size or amount of abandonment cannot be calculated at this time.

Red squirrel experts do not feel that the change in season of human use from summer only to year round would be significant due to the type of activity that would occur in the winter with only astrophysical workers on site.

Astrophysical workers may utilize forest areas more than construction workers as they take "short cuts" from telescope to telescope. This may be of special importance to the eight red squirrels in the triangle of affected habitats on Emerald Peak. Human passage through that area would act as recreationist harassment and would further stress those animals. A "short cut" from High Peak to Emerald would pass by middens around Bear Wallow Cienega.

In addition to short cuts, astrophysical workers on site every day may be motivated by the scenic qualities of the spruce-fir forest to use part of their time off during the day to enjoy the aesthetic qualities of the area. University of Arizona personnel have repeatedly stated that astronomers are conservationists, as well as physical scientists, and have an appreciation for natural resources. As such, they have impacts to red squirrels more in line with recreationists.

All human uses in the astrophysical use area involve vehicles. Private vehicles would still be able to drive up to High Peak and out to Emerald Peak during daylight hours, which is very similar to the current conditions. Improvements to both FR 507 and 669 will make access even easier. In addition to this traffic, heavy construction and vehicles delivering materials would operate on FR 507 and 669 as well as Swift Trail up to the FR 507 turnoff. Observatory vehicles, including the 36 passenger shuttle bus, would run from High Peak to Emerald, as well as up and down Swift Trail. The increase in traffic both increases the potential for road kills of red squirrels, and requires a higher level of road maintenance to prevent erosion and maintain a driveable surface. Changes in downslope drainage, compaction of soil on tree roots, and deepening of road cuts may affect red squirrel habitat, including middens. One red squirrel midden was lost between May 1986 and October 1987 due to erosion from FR 669.

#### SUMMARY OF IMPACTS

The implementation of the Coronado National Forest Plan with the protective prescriptions contained in it should benefit the red squirrel, because it includes



protection and restoration of red squirrel habitat. There are some adverse effects to the red squirrel from traffic mortality and increased human use for recreation over the life of the Forest Plan. The closure of the refugium to vehicles will significantly reduce human use in this important red squirrel habitat as a counter to increasing use in other areas of the Pinalenos. The opportunity to study and monitor red squirrel/human interactions will enable the Forest Service to determine the extent and type of problems existing now and to be able to plan for them in the next Forest Plan.

The siting of the Observatory within the currently rated good to excellent habitat of what we consider the refugium is significant. A total of 8.54 to 12.14 acres of habitat will be lost in the near term due to clearing, new edge degradation and windthrow. Further, 88.06 to 128.66 acres will never provide midden habitat because of the physical placement of buildings and degraded edge effects. Of this, 59.77 to 83.10 acres are in the refugium area. At least 14 midden activity areas are in proximity to facilities or are in fragmented areas that are adjacent to or surrounded by Observatory facilities. The presence of the facility magnifies the problem of human use impacts with additional visitor use days for tourists, construction workers, and astrophysical workers resulting from the Observatory.

Although the impact from habitat loss may be estimated, the question of human impact is a complex one that is inadequately understood. Red squirrels are adaptable, but conditions of distance, type of human use, and constancy of use all determine the degree to which the red squirrel will adjust to people. The red squirrel in the Pinalenos is already a very approachable animal. Its lack of fear renders it all the more vulnerable to abuse and harassment, and to the development of unnatural habits by individual squirrels.

### CONCLUSIONS

The Mt. Graham red squirrel is presently in jeopardy. The past actions of man have removed or altered a major portion of its habitat, reducing the possible carrying capacity of its range by 50 percent or more. The introduction of the tassel-eared squirrel in the 1940's by the Arizona Game and Fish Department may also have had a significant effect on red squirrel use of non-prime habitats.

Models and other numerical representations of the acreage losses, numbers of squirrels, and squirrel habitat equivalents effects have been developed by the Forest Service in their assessment and by informed individuals during the consultation. These models examined the potential for increase in risk of extinction due to physical changes in the habitats owing to the proposed actions. In any of the models, the hypothetical increases were small. The potential impacts due to human presence were not evaluated in any of the models.

It is important to consider the data that went into those figures and the questions that at present cannot be answered concerning the red squirrel and its habitat. We do not have enough information on the red squirrel's population dynamics, genetics, habitat quality, habitat use or interactions with other species to dismiss any hypothesized increase in extinction probability as trivial because of its present status.

The commitments made in the amended Forest Plan prevent the continuing adverse impacts allowed by the plan to become a significant increase in the level of jeopardy. The same cannot be said for the Observatory, where increased habitat loss and degradation and changes to human use patterns do cause significant impacts.

It is our contention that the losses to habitat and the impact of increased human presence due to the Observatory within the habitat of the red squirrel increases the level of jeopardy that exists under current conditions.

CORONADO NATIONAL FOREST PLAN:  
INCIDENTAL TAKE

Section 9 of the Endangered Species Act, as amended, prohibits any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species without a special exemption. Under the terms of Section 7(b)(4) and Section 7(c)(2), taking that is incidental to and not intended as part of the agency action is not considered taking within the bounds of the Act provided that such taking is in compliance with the incidental take statement.

The Service anticipates five red squirrels could be taken in the form of harassment, harm, wounding, and/or killing per year as a result of the Forest Plan. At present levels, vehicle traffic takes an estimated two red squirrels per year. The projected increase in traffic going up Swift Trail through the planning cycle increases this risk. In addition, we anticipate one midden will be abandoned because of increased recreation. Reasonable and prudent measures that will reduce incidental take are:

1. The Forest Service shall take steps to reduce the risk of road kills along all roads within red squirrel habitat in the Pinalenos under their jurisdiction (e.g., speed bumps, appropriate signs, etc.).

The following terms and conditions must be complied with in order to implement the above measures:

1. All red squirrels killed, wounded, or harmed by vehicles or other human related causes shall be immediately reported to the Service's Phoenix Ecological Services Office. The handling and deposition of all carcasses will follow Service procedures.

If, during the course of the action, the amount or extent of the incidental take is exceeded, the Forest Service must reinstitute formal consultation with the Service. The Forest Service should provide an explanation of the causes of the taking.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term "conservation recommendations" has been defined as suggestions of the Service regarding discretionary

measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information.

1. Forest roads 507 and 669 be abandoned and reforested.
2. The Forest Service shall determine if the removal of existing human use areas (i.e., campgrounds, summer homes, radio sites) from red squirrel habitat would significantly benefit the species and, if so, consider their removal.
3. The Forest Service should take the lead in developing and funding long-term studies on the life history and habitat of the red squirrel. A list of specific research needs for the red squirrel would be developed jointly between the Forest Service, Arizona Game and Fish Department, and the Service.
4. Reforestation efforts should proceed as quickly as possible.

#### MT. GRAHAM ASTROPHYSICAL AREA PLAN REASONABLE AND PRUDENT ALTERNATIVES

The Section 7 regulations have defined reasonable and prudent alternatives as alternate actions identified during formal consultation that can be implemented in a manner consistent with the intended purpose of the action, that can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction, that is economically and technologically feasible, and that the Service believes would avoid the likelihood of jeopardizing the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

We have developed three reasonable and prudent alternatives to eliminate the increase in level of jeopardy due to construction and operation of the Observatory. The increase in level of jeopardy would be due to habitat losses in the short and long-term and increases in human use in the refugium.

A comparison of the acreages and numbers of middens affected by the Astrophysical Area Plan and each of the reasonable and prudent alternatives described below is shown in Appendix Table 1.

#### REASONABLE AND PRUDENT ALTERNATIVE 1

This alternative would eliminate the increase in jeopardy due to the Observatory by requiring the telescopes to be sited at other existing or potential astrophysical sites elsewhere in the world, not in the Pinalenos. Of the telescopes in the proposed action, four have been specifically identified in the biological assessment and only the 11.3M binocular telescope has requirements for a continental United States location. The consortium that is developing the telescope wants it conveniently and more cheaply located on this continent rather than in Hawaii or Chile. Possible continental sites would be in New Mexico or South Baldy Peak (Cibola National Forest) or Sacramento Peak (Lincoln National Forest). All candidate sites in the United States would be subject to Section 7 of the Endangered Species Act if any threatened or endangered wildlife or plants might be affected by the proposed action. The other three could be located at existing or potential sites anywhere in the world. Without the Observatory, the refugium could be

closed to access and FR 507 and 669 removed and reforested. No habitat would be lost and human impacts would not change from Forest Plan conditions (Appendix Table 1).

#### Features

1. No land allocation or special use permit for an astrophysical observatory in the Pinalenos would be made.
2. All commitments included under the Coronado National Forest Plan as amended would be in effect for the entire 3500 acre Astrophysical Plan Area.
3. All testing permits held by University of Arizona would be revoked immediately and all test equipment and facilities would be removed and all site damages repaired.
4. New requests for testing or special use permits would not be accepted during this planning period.

#### INCIDENTAL TAKE

Same as for the Forest Plan (see page 50).

#### CONSERVATION RECOMMENDATIONS

Same as for the Forest Plan (see page 51).

#### REASONABLE AND PRUDENT ALTERNATIVE 2

This alternative allows for the development of the Observatory in the Pinalenos. The applicant would be allowed to develop telescopes at High Peak only. This alternative commits 14.15 acres to the Observatory, of which 1.0 acre would be new clearing. An additional 1 to 2 acres (estimated) would be degraded because of the clearing in the short term. Over the long term, a total of approximately 53 to 78 acres of committed and degraded acreage would be maintained. Two middens would be affected indirectly by construction on High Peak.

A 10-year study of the red squirrel's biology and population dynamics, habitat, and microclimatic factors would be funded by the Forest Service or the applicant. Information on construction impacts and techniques would be gathered during development of High Peak and the responses of red squirrels would be monitored. Preliminary work on human/red squirrel interactions would also be accomplished. If an application to also develop telescopes on Emerald Peak is subsequently filed, information from these studies could be used in issuance of the ensuing biological opinion. No obliteration of FR 669 would be called for until a decision is made regarding the siting of facilities on Emerald Peak. However, restoration and revegetation of areas identified as not needed for a facility there would be undertaken as soon as feasible.

Any request by the Forest Service to reinstitute Section 7 consultation on the effects of additional development on the species prior to the completion of the

10-year studies would be accommodated. Analyses would be based on all information available at that time. If available information does not show that astrophysical development could be accommodated on Emerald Peak without jeopardizing the continued existence of the red squirrel, FR 669 would be permanently closed and all areas revegetated within 3 years of the decision.

The construction of telescopes on High Peak will provide the opportunity to evaluate construction methods and determine if acreage impacts due to construction as presented by the University of Arizona are accurate. The two telescopes that would be ready for construction first, the Max Planck 10M SMT and the Vatican 1.8M optical/IR were both scheduled for High Peak in the site plan. The SMT is ready to be built at any time and the Vatican mirror has been cast. The construction of the third scheduled telescope, the 11.3M binocular in 1992, may have to be postponed unless relocated to High Peak. No starting date is available for the interferometer or the remaining three optical/IR telescopes.

Impacts due to human presence are also minimized to the extent possible under this alternative. The development and operation of the Observatory will require construction and astrophysical workers to be on-site. In addition to these people, astro-tourists and other recreationists would also be utilizing the refugium in increasing numbers. The goal is to maintain human use levels at or below pre-Observatory levels and in accord with guidelines established in the Forest Plan.

Astrophysical and construction workers would be required to remain within the designated boundary of the Observatory or on FR 507. The same constraints apply to astro-tourists and general recreationists. All other areas of the refugium are closed to all but authorized entry. Walk-in access for recreationists is provided to the High Peak overlook via FR 507. The Emerald Peak portion of the refugium would be protected from most human disturbance for the 10-year study period. Further restrictions on use of motorized vehicles have been prescribed in order to reduce the frequency and intensity of human/squirrel interactions and minimize disturbance levels.

This alternative also attempts to deal with the loss of habitat due to the Observatory. Short term losses have been minimized to the extent possible by the design of the facility and the delayed decision for siting telescopes on Emerald Peak. Long term losses, both direct and indirect, are more difficult to reduce. As a replacement for some of these long term losses, restoration of a habitat area with the potential to provide good to excellent habitat, or protection of such an area from degradation was considered.

The summer homes at Columbine and the Arizona Bible Camp are along a forest road that leads into the Ash Creek drainage, an area that has considerable potential for red squirrels. Removal of the Bible Camp and summer homes would enable those acreages (2.5 and 14.5 respectively) to be incorporated into forest restoration plans for the area. The summer home area was projected to recover to good to excellent habitat, the Bible Camp to fair.

These two areas are not in the spruce-fir vegetation type considered to be the best available for the red squirrel, but are rather in the mixed conifer. Because this is the habitat type where the Forest Service predicts the greater gains in red squirrel equivalents over time (USDA-FS 1988), any augmentation to this area,

especially in the Ash Creek drainage, is worthwhile. Removal of the Bible Camp and summer homes and subsequent reforestation represents the best opportunity to regain previously lost habitat outside the refugium.

In sum, this alternative attempts to reduce human impacts and habitat loss over the short and long term by its features. The unanswered questions about the red squirrel, its biology, and the quality of its habitat, will be addressed so that an informed decision can be made on the appropriateness of siting the Observatory on Emerald Peak if such an application is filed at a later date. In the interim, the Emerald Peak portion of the refugium is protected from development and human use.

### Features

1. Steward Observatory's testing permit for Emerald Peak will be revoked immediately and all testing equipment removed.
2. All construction workers and eventual astrophysical workers will be shuttled to the High Peak site. No private cars will be allowed and only limited numbers of Observatory vehicles will be permitted at the Observatory.
3. All visitors to High Peak (recreationists, construction workers, astrophysical workers) will remain on FR 507 or in the telescope facility area itself. The remainder of the refugium area is closed to all access except by authorized personnel. The closure is in effect for recreationists as well as Observatory personnel.
4. A management plan to govern the construction and operation of the astrophysical complex and the associated road systems in ways least likely to adversely affect the squirrel would be developed. This plan should set standards and guidelines for human activities on the site and adjacent areas. Some examples of the type of human activities to consider for inclusion in the plan include use of the restricted use areas, use of paths and trails, storage of materials on-site, and trash disposal.
5. Forest Service will develop construction inspection methods and monitoring that will ensure compliance with the management plan and will provide a mechanism for immediate control of on-site activities.
6. A construction fence delineating the areas of allowed ground disturbance impact will be placed around each development site prior to the start of construction. Violation of the perimeter will not be tolerated.
7. Small trees, that would be destroyed by construction, shall be salvaged for use in reforestation.
8. If a siting decision is ever made for the telescopes not sited on High Peak, a new management plan will be developed to govern the entire Observatory.
9. Methods to minimize windthrow or blowdown will be employed.

10. Studies to define the life history and ecology of the red squirrel and the spruce-fir and mixed conifer forests will be conducted for a 10-year period. Specific studies to be done will be determined by a committee comprised of representatives from the Forest Service, Arizona Game and Fish Department, University of Arizona, and the Service with outside experts called in as appropriate. The Service, with due sensitivity for funding considerations, will have final approval authority for any study plan developed. The funding agency, while complying with requirements of the study plan, will retain fiscal approval for the study plan.
11. Adequate funding for monitoring of red squirrels adjacent to astrophysical development and the associated road systems is required for the life of the astrophysical complex and this monitoring will be considered in development of the management plan.
12. Reforestation efforts within red squirrel habitat will be initiated immediately and completed in 5 years.
13. Forest Road 669 will be gated closed to all but official vehicles. No human access to this area except for authorized personnel.
14. Between November 15 and April 15 each year, Swift Trail (FR 366), beginning at its intersection with FR 507 to its terminus, would be closed to all motorized vehicles except those officially authorized.
15. All access roads leading off Swift Trail above FR 507 (including but not limited to the roads to Grant Hill and Webb Peak) and the access road from Swift Trail to Heliograph Peak, would be closed year-round to all motorized vehicles except those officially authorized.
16. The refugium will be closed to all dispersed recreation use. All hiking trails through the area are closed. Walk-in use to High Peak only along FR 507 is allowed.
17. Permits for the 14 summer homes at Columbine and the Arizona Bible Camp will not be renewed in 1992. These areas and the access road will be actively reforested to manage for red squirrel habitat once the facilities are removed.
18. As findings are developed from the studies, modifications to the management plan and Forest Plan will be made as appropriate.

#### INCIDENTAL TAKE

The Service anticipates six red squirrels could be taken per year, in the form of harassment, harm, wound and/or kill, as a result of the Forest Plan and allowing astrophysical development on High Peak. At present levels, vehicle traffic takes an estimated two red squirrels per year. The projected increase in traffic going up Swift Trail through the planning cycle increases this risk. In addition, we anticipate two middens will be abandoned because of increased recreational use and

astrophysical development and operation. Reasonable and prudent measures that will reduce incidental take are:

1. All construction workers and eventual astrophysical workers will be shuttled to the High Peak site. No private cars will be allowed and only limited numbers of Observatory vehicles will be permitted at the Observatory.
2. Forest Road 669 will be gated closed to all but official vehicles. No human access to this area except for authorized personnel.
3. Between November 15 and April 15 each year, Swift Trail (FR 366), beginning at its intersection with FR 507 to its terminus, would be closed to all motorized vehicles except those officially authorized.
4. All access roads leading off Swift Trail above FR 507 (including but not limited to the roads to Grant Hill and Webb Peak) and the access road from Swift Trail to Heliograph Peak, would be closed year-round to all motorized vehicles except those officially authorized.
5. The refugium will be closed to all dispersed recreation use. All hiking trails through the area are closed. Walk-in use to High Peak only along FR 507 is allowed.
6. The Forest Service shall take steps to reduce the risk of road kill along all roads within red squirrel habitat in the Pinalenos under their jurisdiction (e.g., speed bumps, appropriate signs, etc.).

The following terms and conditions must be complied with in order to implement the above measures:

1. All red squirrels killed, wounded or harmed by vehicles or other human related causes shall be immediately reported to the Service's Phoenix Ecological Services Office. The handling and disposition of all carcasses will follow Service procedures.
2. Red squirrels near High Peak should be monitored for their response to construction and operation of the Observatory, and this monitoring should be reported semi-annually to the Service's Phoenix Ecological Services Office.

If during the course of the action, the amount or extent of the incidental take is exceeded, the Forest Service must reinstitute formal consultation with the Service. The Forest Service should provide an explanation of the causes of the taking.

#### CONSERVATION RECOMMENDATIONS

1. Snow blowing along FR 507 should avoid adverse impacts to middens.
2. If maintenance of FR 507 is excessive and downslope erosion or water diversion becomes an issue, consider hard surfacing those portions where erosion effects are significant.



### REASONABLE AND PRUDENT ALTERNATIVE 3

This alternative allows for the development of the Observatory in the Pinalenos. The applicant would be allowed to develop three telescopes on Emerald Peak only. A new access road approximately 2 miles in length would be constructed from Swift Trail below the Columbine Work Center to Emerald Peak. An alternate routing of an access road to Emerald Peak has been identified by the Arizona Game and Fish Department. Timing precludes a full and fair analysis of their suggested route prior to the scheduled issuance of this biological opinion. If this, or any other route, however, is found after evaluation and consultation to be more compatible with the needs of the squirrel, it will replace the route shown in Fig. 5 and be incorporated into the provision for implementation of the Emerald Peak alternative.

The three telescopes (11.8M binocular, Max Planck 10M SMT and Vatican 1.8M) and support facilities would be clustered off the west end of the existing fuelbreak on FR 669 (Fig. A). A total of 8.6 acres would be committed to the Observatory with approximately 6.28 acres of that to be new clearing. An additional 0.5 acres along the new access road would be subject to windthrow. This clearing creates an additional 16.68 to 26.62 acres of degraded habitat, with a long term total of 23.63 to 37.75 acres. Two middens could be directly or indirectly affected.

The creation of a new and shorter access road allows for the closure of FR 507 and 669, thus providing long term protection and enhancement for the eastern portion of the refugium. Under this alternative, FR 507 from 1.8 miles above Swift Trail to High Peak would be obliterated and reforested. Similarly, FR 669 would be obliterated and reforested from its junction with FR 507 to the point at which the first proposed interferometer pedestal was located on the University of Arizona's plan for Emerald Peak.

A 10-year study of the red squirrel's biology and population dynamics, habitat, and microclimatic factors would be funded by the Forest Service or the applicant. Information on construction impacts and techniques would be gathered during the development of the minimum facility and the responses of red squirrels would be monitored. Interactions between humans and red squirrels would also be studied. If an application to develop additional telescopes on Emerald Peak is subsequently filed, information from these studies could be used in issuance of the ensuing biological opinion. The remainder of FR 669 and the fuelbreak would be closed to access during this period and natural reforestation would be encouraged.

Any requests by the Forest Service to reinitiate Section 7 consultation on the effects of additional development on the species prior to the completion of the 10-year studies would be accommodated. Analyses would be based on all information available at that time. If available information does not show that expansion of facilities on Emerald Peak could be accommodated without jeopardizing the continued existence of the red squirrel, the remainder of FR 669 and the fuelbreak would be completely reforested within 3 years of the decision. In this alternative there is no potential to expand to High Peak.

The construction of a minimal facility on Emerald Peak will provide the opportunity to evaluate construction methods and determine if acreage impacts due to construction as presented by the University of Arizona are accurate.

Impacts due to human presence are also minimized to the extent possible under this alternative. The development and operation of the Observatory will require construction and astrophysical workers to be on-site. In addition to these people, astro-tourists and other recreationists would also be utilizing the refugia in increasing numbers. The goal is to maintain human use levels at or below pre-Observatory levels and in accord with guidelines established in the Forest Plan.

Astrophysical and construction workers would be required to remain within the designated boundary of the Observatory or on the new access road. The same constraints apply to astro-tourists and general recreationists. All other areas of the refugium are closed to all but authorized entry. There is no access for recreationists to High Peak under this alternative. Further restrictions on use of motorized vehicles have been prescribed in order to reduce the frequency and intensity of human/squirrel interactions and minimize disturbance levels.

This alternative attempts to deal with the long-term losses of habitat resulting from maintaining FR 507 and 669 open. Existing roads 507 and 669 would, without modification, remain available to the applicant to do site engineering, test drilling, and site preparation (of a reversible nature) only until the new access road is opened for use or no later than one year following issuance of a permit for the astrophysical facility development by the Forest Service. All construction traffic would be confined to the new access road only. By constructing a new access road, the long term improvement of the refugium can be enhanced. The new road and telescope locations are located on the western end of the refugium and thus enables better management of the area as a whole. The additional clearing of forest in this alternative will not enhance the status of the squirrel in the short term, but the immediate curtailment of human activity over a large portion of the refugium and in other locations will. This alternative results in the fewest total acres permanently unsuitable for midden habitat among the astrophysical development options in the Pinaleno Mountains (Appendix Table 1).

Because of the increased short-term risk resulting from this alternative, it becomes even more imperative that habitat restoration via reforestation be accelerated. Acreages not presently considered for restoration must be included. The summer homes at Columbine and the Arizona Bible Camp are along a forest road that leads into the Ash Creek drainage, an area that has considerable potential for red squirrels. Removal of the Bible Camp and summer homes would enable those acreages (2.5 and 14.5 respectively) to be incorporated into forest restoration plans for the area. The summer home area was projected to recover to good to excellent habitat, the Bible Camp to fair.

These two areas are not in the spruce-fir vegetation type considered to be the best available for the red squirrel, but are rather in the mixed conifer. Because this is the habitat type where the Forest Service predicts the greater gains in red squirrel equivalents over time (USDA-FS 1988), any augmentation to this area, especially in the Ash Creek drainage, is worthwhile. Removal of the Bible Camp and summer homes and subsequent reforestation represents the best opportunity to regain previously lost habitat outside the refugium.

In sum, this alternative attempts to reduce human impacts and habitat loss over the long term by its features. The unanswered questions about the red squirrel, its biology, and the quality of its habitat, will be addressed so that an informed decision can be made on the appropriateness of expanding the Observatory on Emerald Peak. The High Peak portion of the refugium is protected from development and human use, and is not an expansion site for the Observatory.

### Features

1. Steward Observatory's testing permit for High Peak will be revoked immediately and all testing equipment removed.
2. All construction workers and eventual astrophysical workers will be shuttled to the Emerald Peak site. No private cars will be allowed and only limited numbers of Observatory vehicles will be permitted at the Observatory.
3. All visitors to Emerald Peak (recreationists, construction workers, astrophysical workers) will remain on the access road or in the telescope facility area itself. The remainder of the refugium area is closed to all access except authorized personnel. The closure is in effect for recreationists as well as Observatory personnel.
4. A management plan to govern the construction and operation of the astrophysical complex and the associated road systems in ways least likely to adversely affect the squirrel would be developed. This plan should set down standards and guidelines for human activities on the site and adjacent areas. Some examples of the type of human activities to consider for inclusion in the plan include use of the restricted use areas, use of paths and trails, storage of materials on-site, and trash disposal.
5. Forest Service will develop construction inspection methods and monitoring that will ensure compliance with the management plan and will provide a mechanism for immediate control of on-site activities.
6. A construction fence delineating the areas of allowed ground disturbance impact will be placed around each development site prior to the start of construction. Violation of the perimeter will not be tolerated.
7. The new access road will be located to avoid degrading existing midden habitat. A minimum buffer of 220-250 feet is required between the road and any midden.
8. Small trees, that would be destroyed by construction, shall be salvaged for use in reforestation.
9. If additional facilities are authorized after the 10-year study period, a new management plan will be developed to govern the entire Observatory.

10. Methods to minimize windthrow or blowdown will be employed.
11. Studies to define the life history and ecology of the red squirrel and the spruce-fir and mixed conifer forests will be conducted for a 10-year period. Specific studies to be done will be determined by a committee comprised of representatives from the Forest Service, Arizona Game and Fish Department, University of Arizona, and the Service with outside experts called in as appropriate. The Service, with due sensitivity for funding considerations, will have final approval authority for any study plan developed. The funding agency, while complying with requirements of the study plan, will retain fiscal approval for the study plan.
12. Adequate funding for monitoring of red squirrels adjacent to astrophysical development and the associated road systems is required for the life of the astrophysical complex and this monitoring will be considered in development of the management plan.
13. Reforestation efforts within red squirrel habitat will be initiated immediately and completed within 5 years.
14. FR 507 from 1.8 miles above Swift Trail and FR 669 to the first interferometer site will be obliterated and reforested within 5 years of the completion of construction of the new road to Emerald Peak.
15. Forest Road 669 will be gated closed to all but official vehicles beyond the Observatory boundary.
16. Between November 15 and April 15 each year, Swift Trail (FR 366), beginning at its intersection with FR 507 to its terminus, would be closed to all motorized vehicles except those officially authorized.
17. All access roads leading off Swift Trail above FR 507 (including but not limited to the roads to Grant Hill and Webb Peak) and the access road from Swift Trail to Heliograph Peak, would be closed year-round to all motorized vehicles except those officially authorized.
18. The refugium will be closed to all dispersed recreation use. All hiking trails through the area are closed. Walk-in use to the Observatory on Emerald Peak only along the access road is allowed.
19. Permits for the 14 summer homes at Columbine and the Arizona Bible Camp will not be renewed in 1992. These areas and the access road will be actively reforested to manage for red squirrel habitat once the facilities are removed.
20. As findings are developed from the studies, modifications to the management plan and Forest Plan will be made as appropriate.

#### INCIDENTAL TAKE

The Service anticipates six red squirrels could be taken per year, in the form of harassment, harm, wound and/or kill, as a result of the Forest Plan and allowing

astrophysical development on Emerald Peak. At present levels, vehicle traffic takes an estimated two red squirrels per year. The projected increase in traffic going up Swift Trail through the planning cycle increases this risk. In addition, we anticipate two middens will be abandoned because of increased recreational use and astrophysical development and operation. Reasonable and prudent measures that will reduce incidental take are:

1. All construction workers and eventual astrophysical workers will be shuttled to the Emerald Peak site. No private cars will be allowed and only limited numbers of Observatory vehicles will be permitted at the Observatory.
2. Forest Road 569 will be gated closed to all but official vehicles beyond the Observatory boundary.
3. Between November 15 and April 15 each year, Swift Trail (FR 366), beginning at its intersection with FR 507 to its terminus, would be closed to all motorized vehicles except those officially authorized.
4. All access roads leading off Swift Trail above FR 507 (including but not limited to the roads to Grant Hill and Webb Peak) and the access road from Swift Trail to Heliograph Peak, would be closed year-round to all motorized vehicles except those officially authorized.
5. The refugium will be closed to all dispersed recreation use. All hiking trails through the area are closed. Walk-in use to the Observatory on Emerald Peak only along the access road is allowed.
6. The Forest Service shall take steps to reduce the risk of road kills along all roads within red squirrel habitat in the Pinalenos under their jurisdiction (e.g., speed bumps, appropriate signs, etc.).

The following terms and conditions must be complied with in order to implement the above measures:

1. All red squirrels killed, wounded or harmed by vehicles or other human related causes shall be immediately reported to the Service's Phoenix Ecological Services Office. The handling and disposition of all carcasses will follow Service procedures.
2. Red squirrels near Emerald Peak should be monitored for their response to construction and operation of the Observatory, and this monitoring should be reported semi-annually to the Service's Phoenix Ecological Services Office.

If during the course of the action, the amount or extent of the incidental take is exceeded, the Forest Service must reinstitute formal consultation with the Service. The Forest Service should provide an explanation of the causes of the taking.

CONSERVATION RECOMMENDATIONS

1. Snow blowing along the access road should avoid adverse impacts to middens.
2. If maintenance of the access road is excessive and downslope erosion or water diversion becomes an issue, consider hard surfacing those portions where erosion effects are significant.

We appreciate the Forest Service's level of participation in this consultation. The Forest Service's commitment to facilitate the use of the best available scientific and commercial information is acknowledged.

Because this is a jeopardy biological opinion, the Forest Service is required to notify the Fish and Wildlife Service of its final decision on the reasonable and prudent alternatives.

In order for the Fish and Wildlife Service to be kept informed of actions that either minimize or decrease adverse effects or which benefit listed endangered and threatened species or their habitat, we request you inform us if any of the conservation recommendations in this biological opinion will be implemented.

This concludes formal consultation on this action. Reinitiation of formal consultation is required if the amount or extent of incidental take is exceeded, if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, if the 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, and/or if a new species is listed or critical habitat designated that may be affected by the action.

Sincerely,



Regional Director

cc:

Director, Arizona Game and Fish Department, Phoenix, Arizona  
Director, Fish and Wildlife Service, Washington, D.C. (EHC)  
Field Supervisor, Ecological Services, Fish and Wildlife Service,  
Phoenix, Arizona

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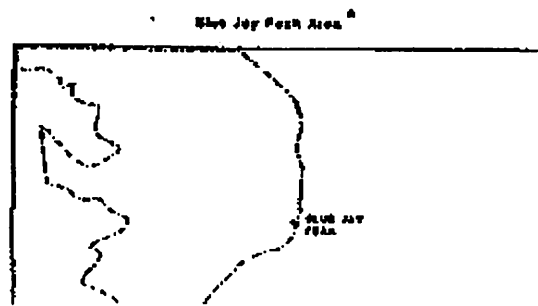
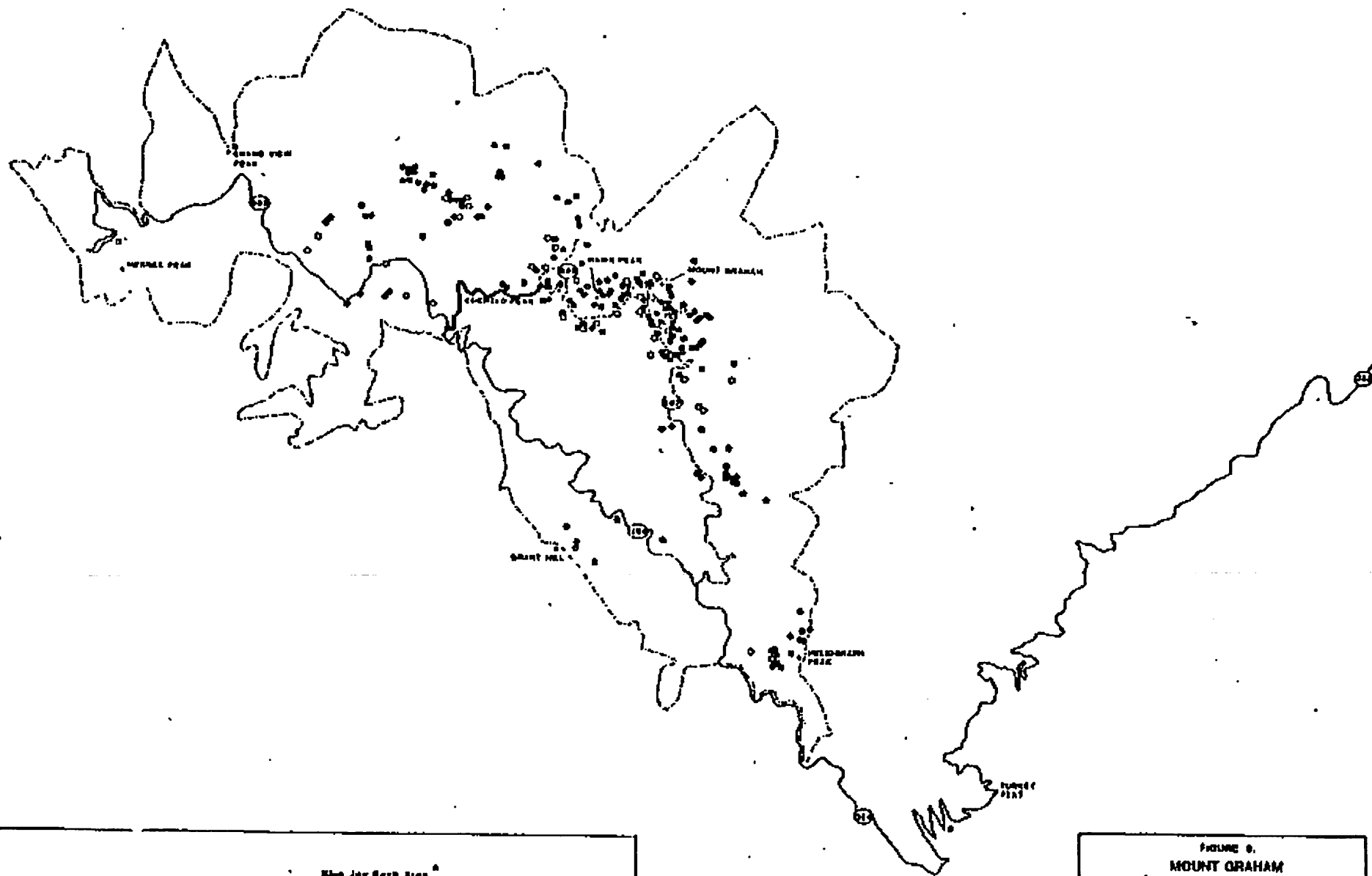
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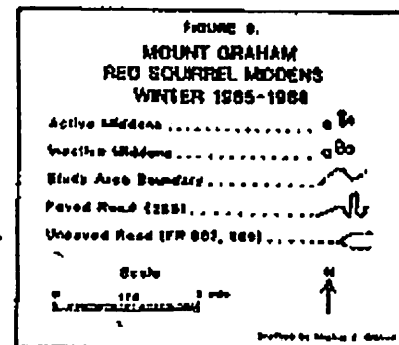
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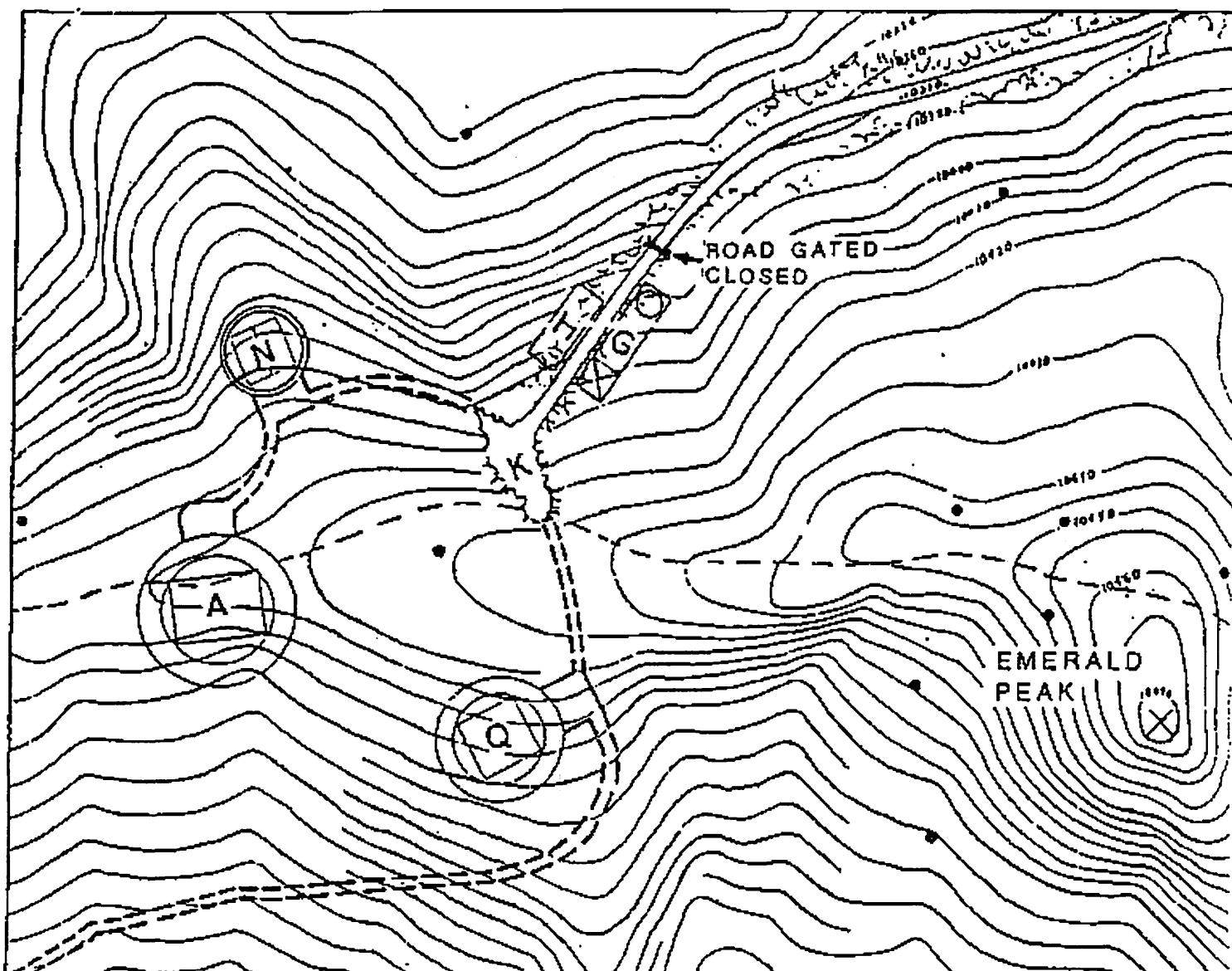






NEW ACCESS ROAD (APPROX.)





- MIDDEN
- A 11.3 METER BINOCULAR TELESCOPE
- N 10 METER SUBMM TELESCOPE
- Q 1.8 METER VATICAN TELESCOPE
- K PARKING AND TURNING AREA
- G EQUIPMENT, WATER STORAGE, HELICOPTER PAD,  
RESIDENCE, COMMUNICATIONS BUILDING
- H LOGISTICS, SHOP, RESIDENCE, UTILITIES
- ==== GENERAL LOCATION OF EMERALD PEAK TELESCOPE ACCESS ROAD

COMPARISON OF MT. GRAHAM ASTROPHYSICAL AREA PLAN (AREA PLAN)  
AND REASONABLE AND PRUDENT ALTERNATIVES (R&P) TO THE AREA PLAN<sup>1</sup>

<u>Proposal</u>	<u>Committed Acres<sup>2</sup></u>	<u>New Clearing Areas<sup>3</sup></u>	<u>New Degraded Acres<sup>4</sup></u>	<u>Long-term Degraded Acres<sup>5</sup></u>	<u>Total Acres Permanently Unsuitable for Midden Habitat</u>	<u>Number of Squirrel Middens<sup>6</sup></u>
Area Plan	24	5	4 - 8	65 - 105	88 - 129	14
R&P No. 1 (no astrophysical development in Pinaleno Mtns.)	No changes from existing surface conditions would be caused by astrophysical development					
R&P No. 2 (4 High Peak scopes w/study)	14	1	1 - 2	39 - 64	53 - 78 <sup>7</sup>	2
R&P No. 3 (3 Emerald Peak scopes w/study)	9	6	17 - 27	24 - 38	33 - 47 <sup>7</sup>	2

<sup>1</sup> All acreage figures have been rounded to the nearest whole number.

<sup>2</sup> Acres to be occupied by buildings, roads, parking areas, and other astrophysical development requirements.

<sup>3</sup> Acres of trees that will be cleared to accommodate the astrophysical development.

<sup>4</sup> The acres of degraded forest edge resulting from the new clearing required by the astrophysical development.

<sup>5</sup> The acres of degraded forest edge that will be maintained over the life of the astrophysical project.

<sup>6</sup> The number of squirrel middens in vicinity of the astrophysical project that will or may be affected by the proposal.

<sup>7</sup> These negative acreages would be offset by the restored habitat at the summer home and Bible Camp sites (17 acres).

## APPENDIX G

### MGIO Environmental Site Report 2-27-12

Operation and maintenance of MGIO requires the use of small quantities of specific chemicals and the transport and handling of petroleum products such as propane, gasoline, and diesel fuel. The chemicals are used to clean electronic parts, printed circuit boards, etc. The majority of the acid/base chemicals are used to clean and strip aluminum from telescope mirrors prior to re-aluminizing them. Small quantities of waste oil from maintenance operations involving internal combustion engines are also disposed.

An *MGIO Emergency Response Contingency Plan* (Contingency Plan) is reviewed and updated biannually and fulfills the requirements for a Chemical Waste Management Plan, Spill Control and Countermeasures Plan (SPCC Plan) and a Fire Response Plan, as required by the U.S. Forest Service. It specifies all hazardous materials stored at MGIO, identifies their chemical and physical properties and hazardous characteristics, and provides detailed plans for preventing and counteracting human exposure and for responding to and disposing of any spills. The Contingency Plan identifies emergency coordinators and procedures to determine if an imminent or actual incident threatens human health or the environment and provides a detailed plan to address the emergency. The Contingency Plan is to be implemented for fires/explosions, spills or material releases, or for medical emergencies.

A copy of the Contingency Plan is available at the University of Arizona Police Department (UAPD) and at the Department of Risk Management and Safety, along with strict operating and safety directives. Copies of this plan have also been provided to the U.S. Forest Service, Graham County Sheriff's Office, Southwest Ambulance, and the Department of Public Safety – Air Rescue Branch, Tucson.

Since MGIO was first authorized, a single incident of spillage of hazardous materials occurred. At 10:40 pm on 9/15/11, a UAPD officer detected diesel fuel emanating from the MGIO utility building. Emergency personnel were immediately called and arrived by 12:45 am to begin spill containment and cleanup, which continued through the night. The cast iron housing of the oil-water separator was found to have failed, keeping oil fuel from reaching the 275-gallon day tank. At 5:30 am on Sept. 16 the MGIO operations superintendent implemented the Contingency Plan and notified the U.S. Forest Service, the Safford District Ranger, and the Health/Safety officer for Risk Management Services. By 8 am on 9/16/11 the diesel fuel had been removed from the utility building and the utility area parking lot cleanup commenced. The Site manager also contacted the Director, Occupational/Environment Health and Safety - UA, Risk Management Services. Because the spill did not exceed reportable quantities, the National Response Center and the Arizona Department of Environmental Quality (ADEQ) were not officially notified, but UA Risk Management Services placed a courtesy call to ADEQ about the event on Monday morning, 9/19/11.

Removal of contaminated soil was authorized by the Safford District Ranger and this effort continued until completion on 9/30/11. The contaminated soil was initially stored at the MGIO Base Camp in Safford and then transferred to the Los Reales landfill in Tucson. The spill site was inspected 10/7/11 and no contaminants were detected. The area was backfilled with native soil that had been stockpiled near the USFS Columbine Workstation when the Large Binocular Telescope foundation was excavated in 1996. Backfill was completed by 10/28/11. MGIO has added a hydrocarbon sensor in the sump as a preventive measure and new PVC pipe to make sure it drains to the sump.