

Draft
Recovery Action Program
for the Desert Tortoise in California



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Recovery Action Program for the Desert Tortoise in California

I. Introduction and Purpose

The Mojave population of the desert tortoise (*Gopherus agassizii*) was listed as a threatened species under the Endangered Species Act in 1990. In 1994, the Fish and Wildlife Service (FWS) designated critical habitat covering 6.4 million acres of the desert tortoise range. Approximately, 4.8 million acres or 75 percent of the critical habitat occurs in the State of California, primarily on lands administered by the Bureau of Land Management, National Park Service, and the Department of Defense. In addition to Federal protection, the desert tortoise is the California State reptile and is listed as a threatened species under the State's Endangered Species Act.

Recovery of the desert tortoise is guided by the Desert Tortoise Recovery Plan (FWS, 1994), which outlines the actions needed to recover the desert tortoise throughout its range. In California, the primary means of achieving the objectives of the Recovery Plan will be through implementation of approved agency land management plans. These plans provide for implementation of a variety of recovery actions identified in the Recovery Plan consistent with each agency's mission and statutory authority. All actions carried out through the Recovery Action Program for the Desert Tortoise in California (Program) will be consistent with the approved Desert Tortoise Recovery Plan, approved agency land management plans, and any new scientific information that has become available. Currently, the FWS is directing a comprehensive assessment and revision of the 1994 Desert Tortoise Recovery Plan. The efficacy of the actions in this Program will be reviewed and modified as appropriate following revision of the Recovery Plan.

A major purpose of the Program is to establish the framework for coordinating and integrating recovery actions among managers and scientists across jurisdictional boundaries. Because of the many political jurisdictions involved with desert tortoise recovery, effective implementation of recovery actions will require unprecedented cooperation and coordination. A cooperative/coordinated effort among land managers will:

1. Accomplish recovery goals that would be unattainable on a local scale;
2. Reduce duplication of effort and increase the efficient use of resources and expertise; and
3. Increase public support of the recovery effort by providing consistent information on the status of the tortoise and recovery implementation throughout the California desert;

Another purpose of the Program is to put into place the basic support elements necessary to recover the desert tortoise in California. The basic support elements include:

1. **Coordinated Interagency Annual Work Planning.** A process will be established for Federal and State land and resource management agencies to jointly review progress towards recovery and develop coordinated interagency work plans addressing high priority recovery actions.
2. **Science and Data Management.** A science and data management support capability will be established to ensure that the Program is based on sound science and implemented using an adaptive management approach.

3. **Desert Tortoise Monitoring.** Monitoring will be conducted to assess the status of desert tortoise populations and habitat and to evaluate the effectiveness of actions taken to recover the desert tortoise.
4. **Public Outreach and Education.** An outreach and education effort will be implemented to foster a better understanding of and support for desert tortoise recovery efforts by the public and decision makers.
5. **Stakeholder Involvement.** Several mechanisms will be used to ensure that the Program is carried out in consultation and cooperation with affected stakeholders, local communities, and the public.

The final purpose of the Program is to coordinate implementation of specific recovery actions that require interagency cooperation for effective execution. The initial focus will be on addressing the impacts of ravens, feral dogs, and disease on desert tortoise populations and developing and implementing a coordinated plan for using head starting and translocation to re-populate areas where desert tortoise have been extirpated or significantly reduced. Additional actions may be added to the Program in the future based on new information or opportunities that may arise. All actions will be implemented using an adaptive management approach whereby action will be implemented, the effectiveness of the actions evaluated, and appropriate adjustments made.

In addition to the recovery actions included in the Program, agencies will continue to implement other recovery actions included in approved land management plans in coordination with and complementary to this Program. These actions may include grazing management, route designation, law enforcement, land acquisition, construction of tortoise fencing, research, etc.

II. Program Goals

The goals of the Program are to:

1. Recover the desert tortoise while allowing for compatible/sustainable uses of the desert in accordance with all applicable Federal and State laws,
2. Implement a collaborative/science based approach to desert tortoise recovery among land and resource management agencies in the California desert,
3. Coordinate implementation of high priority desert tortoise recovery actions among State and Federal land and resource management agencies in California, and
4. Build public and stakeholder support for and involvement in desert tortoise recovery.

III. Program Management/Coordination

Desert Managers Group. The Desert Managers Group (DMG) was established in 1994 to coordinate and integrate desert conservation, visitor services, and science and data management efforts in the California deserts. Partners involved with the DMG include the State of California (Fish and Game, Parks and Recreation, and Caltrans), the Department of the Defense (Army, Navy, Air Force and Marine Corps), the Department of the Interior (Bureau of

Land Management, National Park Service, Fish and Wildlife Service, and Geological Survey), and the U.S. Forest Service.

The DMG is well suited to coordinate desert tortoise recovery efforts in California for several reasons:

1. The desert tortoise occurs over much of the DMG's area of interest (Figure 1);
2. Nearly every DMG office is involved in desert tortoise recovery, research, and/or compliance, and most of desert tortoise critical habitat in the California Desert is on public land managed by members of the DMG; and
3. One of the DMG members, the Geological Survey, has several scientists conducting research on the desert tortoise and other sensitive species.
4. A goal of the DMG, as stated in its 5 Year Plan (2003), is to recover and monitor desert tortoise population in the California deserts.

This Program is an outgrowth of the Proposed Desert Tortoise Recovery Actions that were adopted by the DMG on September 11, 2002. Many elements of this Program were developed and approved by the DMG. For example, proposed actions related to raven management, science support, and information and education were developed by DMG work groups and subsequently approved by the DMG. The DMG partners have also cooperated for the past four years to cost share tortoise monitoring efforts in the California desert.

The DMG will continue to coordinate and facilitate various aspects of this Program including developing a coordinated work plan for each of the recovery elements, annually reviewing progress and evaluating the effectiveness of recovery actions, exploring cost sharing and partnership opportunities, and providing for stakeholder and public involvement. Staff support to carry out these responsibilities will be provided by agency staff and the DOI and DOD Coordinators for the DMG. .

Implementation of this Program will be coordinated closely with the Desert Tortoise Management Oversight Group to provide a consistent approach to recovery of the desert tortoise throughout its range. The Program will also be coordinated with local implementation/advisory groups that may be established to oversee/guide implementation of desert tortoise recovery actions in specific areas (e.g., West Mojave). Separate agreements will be developed between the DMG and these groups, as needed, to ensure effective coordination of recovery effort.

Regional Executive Management Group. A Regional Executive Management Group (REMG) will be established to oversee and guide implementation of the Program. The signatories of a Memorandum of Agreement which formally commits agencies to participate in the Program (or their designated representative) will constitute the membership of the REMG. The REMG will select its own chairman and operate by consensus. Primary responsibilities of the REMG will be to provide overall policy guidance and to recommend annual budget priorities and expenditures related to the Program.

IV. Coordinated Annual Work Planning Process

The Program establishes a cooperative work planning process for State and Federal land and resource management agencies. The primary purpose of the work planning process is to facilitate a collaborative/cooperative approach to desert tortoise recovery among land and resource management agencies in the California desert. Specific objectives of the process are to (a) coordinate implementation and funding of recovery actions; (b) provide accountability for performance and expenditures related to desert tortoise recovery; and (c) provide for annual reporting of desert tortoise recovery actions. A Desert Tortoise Science Work Group will be established (see Section VI.1) to ensure that recovery actions are based on sound science using an adaptive management approach.

All agencies will participate in and support the following annual work planning process. The general schedule for the process is indicated in parentheses below:

1. Each agency will submit an annual report of all of its accomplishments, activities, and expenditures related to recovery of the desert tortoise. The annual reports will also include an accounting of proposed budget requests related to desert tortoise recovery, monitoring and research (Nov).
2. The Desert Tortoise Science Work Group will review the agency accomplishment reports and other relevant reports, and provide recommendations on the Program and the annual work plan to the DMG (Dec).
3. The DMG will review the recommendations of the Science Work Group and develop/update a coordinated annual work plan (CAWP) for the elements/actions included in Section VI and Section VII of the Program (Jan). New elements may be added to the Program as appropriate.
4. Each agency will identify for the DMG its capability to provide resources (funding, staff, etc.) to carry out the CAWP. The DMG will provide the CAWP, a report on funding shortfalls that may exist, and other recommendations to the Regional Executive Management Group (REMG) (Jan).
5. The REMG will review and approve the CAWP and budget (Feb). The REMG members will be responsible for ensuring the budget needs for the Program are incorporated into their respective agency's budget process, as appropriate and feasible (ongoing).
6. Participating agencies will align their desert tortoise recovery efforts with the priorities identified in the CAWP and carry out their responsibilities identified in the CAWP to the best of their ability (ongoing).

V. Non-DMG Agency, Tribal, Stakeholder, and Public Involvement

Representatives of local government, non-DMG agencies, tribal and public/stakeholders will be invited to attend and provide input at regular and/or special DMG meetings and DMG Work Group meeting. The DMG will develop specific protocols that allow for local government, non-DMG agencies, tribes, and public/stakeholders to participate while allowing the DMG and DMG work groups to complete their work in a timely and efficient manner. Public/stakeholder involvement will be consistent with the requirements of the Federal Advisory Committee Act.

In addition, appropriate National Environmental Policy Act (NEPA) and/or California Environmental Quality Act (CEQA) compliance will be completed prior to implementation of specific recovery actions (e.g., raven management). NEPA and CEQA provide opportunities for public input prior to agencies making a decision to implement actions.

The DMG will make a good faith effort to address recommendations and concerns identified through these processes.

VI. Program Support Elements

VI.1 Science Coordination and Support

Background: Desert tortoise research, recovery, and monitoring activities will require scientific support for many years. Many uncertainties exist with respect to (a) the factors that are impacting desert tortoise populations, (b) the actions that will contribute most towards recovery of the desert tortoise, and (c) the effectiveness of recovery actions. These uncertainties will be addressed through an adaptive management program that answers specific questions in a scientifically defensible manner.

Goals:

1. Ensure recovery actions are based on the best available scientific information and implemented using an adaptive management approach.
2. Provide more effective and coordinated research, recovery and monitoring activities
3. Link research activities and results with land management actions/decisions
4. Assess the short and long term benefits/effectiveness of recovery actions.

Proposed Course of Action:

The DMG will establish a Desert Tortoise Science Work Group. The responsibilities of the work group will be to:

1. Advise the DMG and agencies on the scientific aspects of desert tortoise recovery efforts,
2. Review desert tortoise study plans, recovery action work plans, proposals and annual and final reports to ensure they are scientifically sound and supportable.
3. Develop, review and/or approve scientific standards/guidance for the conduct of desert tortoise research, monitoring, and adaptive management;
4. Identify high priority research needs;
5. Coordinate scientific endeavors related to desert tortoise recovery;
6. Synthesize documents/information that frame recent advances in science and ecosystem knowledge in a format that is useful to the DMG; and
7. Coordinate with other groups (MOG, Clark County HCP, etc) as needed to effectively carry out its mission/responsibilities.

Work Group Membership: The work group will include (a) 3 to 5 knowledgeable scientists with different disciplines related to desert tortoise conservation (e.g., desert tortoise ecology, physiology/disease, behavior, genetics, statistics/ population modeling, etc.) and (b) agency management biologists. The work group may also include a general ecologist working outside the desert tortoise arena—their job will be to keep the work group from being too myopic while focusing on new data, methods and opinions related to desert tortoise. All members of the DMG will be invited to submit nominees for the work group and membership will be approved by the DMG.

Non DMG agencies/groups will be invited to nominate scientists to attend meetings, observe and offer input/suggestions. Qualification requirements will be established for member and nonmember participation.

Staff Support: Staff support will be critical to the efficient and effective operation of the Work Group. Staff (e.g., post doctorate student) will be hired/assigned to provide technical support to the Work Group to include:

1. plan and coordinate meeting and prepare meeting summaries
2. compile and disseminate information and meeting review materials
3. draft documents, summarize data and conduct meta analyses for use by the work group;
and
4. coordinate external peer reviews and summarize review comments for the work group

VI.2 Data Management

Background: Management actions related to the desert tortoise must be based upon the best scientific information available. To meet this standard, all data relevant to the desert tortoise must be readily available to land managers and their staffs. Currently, data are managed separately by individual researchers or by individuals within agencies. No consistent protocol for data documentation, data quality, or data sharing exists. As a result it is difficult to determine what desert tortoise data exist, the quality of existing data, who has the data, and in what form the data exist. Development of a desert tortoise data repository will address these issues, allow agencies to see what data exists and where the data gaps are, and allow land managers to manage using the best scientific data available.

Goal: Manage scientific data for the desert tortoise in a standardized format and make it available/accessible to land managers and the scientific community.

Proposed Course of Action:

1. FWS will establish an in house repository for all desert tortoise data via a “no cost” MOU with a sister federal agency (USGS, BLM, NPS, DOD). If a “no cost” MOU is not feasible, FWS will contract data management with an appropriate Federal/State agency, educational institution, non-profit organization, or a reputable business firm.
2. The DMG will establish an ad hoc data management work group that will work in consultation with the desert tortoise Science Work Group and other entities responsible for desert tortoise data management to:
 - a. Develop protocols for the structure and maintenance of the data repository. Protocols will allow for sharing or pooling of data from other desert tortoise recovery efforts outside California (e.g., the Clark County HCP, Washington County HCP).
 - b. Establish protocols for accessing data in the repository similar to those used to manage cultural resource data (e.g., the requestor must: have appropriate qualifications background and a legitimate/approved need for the data requested, sign a “will not publish agreement” for unpublished data unless a release is provided by the original data collector, have an approved request through FWS for access to the data requested, etc.).
3. As a condition of any new or renewed ESA and/or CESA research permits, FWS and CDFG will require all agencies/institutions/researchers to abide by established protocols and submit to the desert tortoise data repository:
 - a. A copy of their field data annually, including (paper data sheets or digital field forms depending on method used). Submission of data will include a brief report outlining the protocols used for data collection and an assessment of the quality of the data.
 - b. Annual and final project reports and all final project data products.

VI.3 Desert Tortoise Monitoring

Background: Monitoring is one of the cornerstones of sound, modern adaptive management. Currently two separate efforts are being employed to monitor the status and trends of desert tortoise populations and habitat. A series of long-term Permanent Study Plots (PSPs) were established in the 1970s in various locations throughout the desert. Since that time, information related to desert tortoise mortality, habitat condition, disease, and numbers have been collected periodically at the PSP's. This information provides the basis for most of the current estimates of population status and trends. Beginning in 2001, Line Distance Sampling (LDS) was implemented to provide statistically supportable population density estimates that will be used to assess progress towards meeting recovery goals established for each Recovery Unit. The Desert Tortoise Recovery Plan (1994) recommends both population trend monitoring (i.e., LDS) and maintenance of long term study plots. An analysis and interpretation of PSP and LDS data and results will be completed by the Desert Tortoise Recovery Plan Assessment Committee in 2004.

In addition to population monitoring, effectiveness monitoring is needed to evaluate whether recovery actions are effective, and if/how actions should be modified, scaled back or discontinued.

Goal: Monitor the size and viability of desert tortoise populations and their habitats and evaluate the effectiveness of management actions taken to recover desert tortoise.

Proposed Course of Action:

1. Line distance sampling will be implemented on BLM, NPS, DOD and state lands to assess the density of desert tortoise in the 5 recovery units in the California Deserts.
2. LDS protocols will be tested and refined to reduce the variance in the data and provide more reliable density estimates.
3. Sample the 15 PSP's in California once every 4 years (not all plots would be sampled in the same year).
4. An annual report of PSP and LDS results will be produced by December of each year.
5. PSP and LDS data will be collected and maintained in a manner that facilitates a regional multi-state assessment of the status of desert tortoise populations.
6. FWS will identify opportunities to integrate LDS and PSP efforts to a) produce the best data in the most cost effective manner possible and (b) provide a method by which managers can prioritize funding for PSPs and LDS.
7. In FY 2003, several DMG agencies funded a study aimed at compiling existing information related to the effectiveness of past actions taken to recover the desert tortoise in California. The primary focus of this effort will be on cattle and sheep grazing, off-

highway vehicles management and desert tortoise barrier fencing. This initial study effort will be completed in FY 04 and considered in the development of the FY 05 work plan.

8. Studies and/or monitoring will be conducted to evaluate the effectiveness of recovery actions. The scope of the studies will be commensurate with the scope of the actions being taken and their social/environmental impact. Emphasis will be placed on designing effectiveness evaluation studies that will yield reliable results in a reasonable time frame.

VI.4 Information and Education

Background: Declines in desert tortoise populations are attributed to a number of factors, many of which are directly related to the growth of human population in the desert. People commonly collect tortoises as pets. In addition to the direct impacts of collecting tortoises, pet tortoises may serve as vectors for diseases when they are released back into the wild. Predation by common ravens and free roaming/feral dogs on desert tortoise has increased in the desert due to increase human populations. This predation has been identified as a serious threat to tortoise populations. Illegal or unauthorized off road use in the desert, often associated with residential development, is widely regarded as a serious impact to tortoises and tortoise habitat in many areas. In many localities, residents and recreation user groups regard tortoises as an impediment to human use and development in the desert.

Public appreciation and support for desert tortoise is fundamental to a successful recovery effort. There is presently no coordinated or comprehensive effort to communicate information about the desert tortoise to the public. There is also no comprehensive effort to provide objective, consistent information to stakeholders, decision makers and local communities about the factors responsible for tortoise declines and current activities to recover the desert tortoise.

Goal: Develop and implement a public education outreach program about the desert tortoise to build support for, and involvement in, its recovery.

Priority Messages

1. Desert tortoises are an important and valuable part of the Mojave Desert ecosystem and are worth saving.
2. Individuals can help conserve and protect desert tortoise by:
 - a. Disposing of trash properly
 - b. Staying on open roads and trails
 - c. Keeping hands off – do not pick tortoises up unless they are in harms way
 - d. Not releasing pet tortoises into the wild
3. Agencies are working collaboratively to recovery the desert tortoise. Recovery efforts are based on sound science while accommodating human uses in the desert.

Priority markets:

1. Coachella Valley
2. Morongo Basin
3. Barstow/Lenwood
4. Needles/Bullhead/Laughlin
5. Lancaster/Palmdale
6. Victorville/Hesperia/Apple Valley/Helendale
7. El Centro/Imperial Valley
8. Ridgecrest
9. Riverside/San Bernardino/Moreno Valley

Priority Audiences

1. Residents
2. Desert recreation users
3. School children
4. Officials – decision makers, stakeholders
5. Tortoise pet owners
6. General public

Proposed Course of Action: The following course of action will be implemented over a three year period.

1. **Mojave Max Campaign:** The desert tortoise outreach and education program will be built around Mojave Max, a popular cartoon desert tortoise that provides people with information about the desert tortoise and desert conservation in Southern Nevada. Currently Mojave Max is the spoketortoise for the Clark County Desert Conservation Program (the CCDCP). Mojave Max is also a real desert tortoise that lives in a special habitat at the Red Rock National Conservation Area in Clark County, Nevada. The DMG will enter into an agreement with the CCDCP for use of the Mojave Max image and trademark in California. The agreement will address use of the Mojave Max image in the following specific applications:
 - a. Radio and television public service announcements
 - b. Brochures targeted at desert tortoise pet owners
 - c. Curriculum-based education programs for use in California schools (K-12)
 - d. A proposed desert tortoise documentary for broadcast on public television via KCET-TV Los Angeles PBS, or through the Corporation of Public Broadcasting.
 - e. Expansion of the Mojave Max annual emergence media event into the southern California media market
 - f. Use of Mojave Max mascot at fairs and community events in conjunction with DMG-sponsored educational programming
 - g. Articles to appear in agency-sponsored publications such as newsletters, newspapers, and other free literature distributed to desert recreation users and the general public.
 - h. Use of Max image on agency-sponsored or agency-affiliated web sites such as www.californiadesert.gov, www.dmg.gov, www.nps.gov, or www.joshuatree.org (a non-profit partner).
 - i. Use of Max in a limited program of product development designed to raise tortoise awareness and generate funds for additional education and outreach ventures.
 - j. Establishment of a resident California Mojave Max/Maxine around which to focus California desert tortoise education and outreach initiatives.

2. **Desert Tortoise Media Campaign:** A multi-faceted campaign will be implemented to get key messages related to desert tortoise in the media. Elements of the media campaign will include:
- a. **Radio Public Service Announcements (PSA)—The Mojave Minute:** A minimum of 12 PSAs per year will be produced for broad distribution to radio stations throughout the desert. PSAs are inexpensive to produce and afford the opportunity to reach a large audience. The PSAs will address a variety of topics related to desert tortoise, general desert appreciation, recreation opportunities and agency/DMG efforts to recover the desert tortoise. Opportunities to produce the PSAs in partnership with the Clark County media center will be pursued.
 - b. **Desert Tortoise Media Kit.** A desert tortoise media kit will be designed, developed and disseminated. The kit will include information such as:
 - desert tortoise life history, population status, and recovery efforts,
 - answers to commonly asked questions about the desert tortoise,
 - a digital photo disk of desert tortoise images, maps, etc.,
 - contact information,
 - Mojave Max literature.
 - c. **Desert Tortoise News Releases.** In cooperation with the Joshua Tree National Park Association, 6-12 news releases will be produced and disseminated per year on newsworthy events and information.
 - d. **Desert Tortoise Television PSA/Programs.** Television PSA and programs related to the desert tortoise will be produced and disseminated. A prospectus will be developed that outlines TV suitable events or subject matter. Partnerships with Clark County will be explored. Huell Howser (PBS) has indicated an interest in filming an episode of California Gold related to the desert tortoise. An appropriate celebrity such as Jeff Corwin or Steve Erwin will be approached to act as the media spokesperson for the desert tortoise.
 - e. **Desert Tortoise Summit:** In concert with the release of the new desert tortoise Recovery Plan, the DMG, the MOG and others will host a desert tortoise summit to:
 - Create awareness of the status of the desert tortoise population, factors that are contributing to its decline, and efforts and accomplishments related to recovery of the desert tortoise.
 - Promote a dialogue and collaborative approach to resolving ESA (especially desert tortoise) issues among government, stakeholders, and business
 - Build support for implementation of an effective and timely desert tortoise recovery effort
 - f. **Media Field Day.** An annual media field day will be held in conjunction with appropriate desert tortoise field activities (e.g., Line Distance Sampling) at several locations/media markets in the desert (Moreno and Coachella Valley, Victorville, Lancaster, etc). The purpose would be to establish a working relationship with the

media and promote positive stories about the desert tortoise and desert tortoise recovery efforts.

3. **Desert Tortoise Webpage:** Develop an expanded desert tortoise web page targeted at the public, stakeholders, educators hosted on www.californiadesert.gov or set up as a new/separate site e.g., www.deserttortoise.gov. The site will be a repository for all information developed through the Outreach and Education Program. The site will serve as a clearinghouse for desert tortoise online information and will include prominent links to other agency sites- USFWS, NPS, BLM, CA F&G, private sites, etc. Existing resources at University of Redlands or MDEP will be used to design, develop and host the site. The initial step will be to develop a plan for the site and a no cost agreement with MDEP/UR to develop, host and maintain the site.
4. **Implement desert tortoise curriculum in desert schools.** Incorporate a Mojave Max-based desert tortoise curriculum in desert schools (target 50,000 K-8 students over a three-year period). The curriculum will be designed to comply with State educational standards. Develop traveling trunks with educational materials (short term) and explore the development of computer based learning modules (long term). Conduct teacher workshops to show teachers how to use the traveling trunks. Aggressively publicize the curriculum to teachers through direct mailings and California Science Teacher Association Conference. Pilot an educational program at the Desert Discovery Center (Barstow) in FY 04.
5. **Desert Tortoise Newsletter.** Produce 2-4 desert tortoise Newsletters annually to provide objective and timely information on desert tortoise recovery activities and progress. The newsletter would be targeted at decision makers, stakeholders, opinion makers, and community groups. The newsletter will be composed of news releases and other off-the-shelf material and include interesting/objective articles related to desert tortoise recovery actions, life history, population status, threats, agency profile, researcher/ conservationist profiles, desert tortoise events, etc. A high quality printed newsletter will be distributed via mail and an electronic (pdf) version would be available via the DMG desert tortoise web site.
6. **Desert Tortoise Pet Owner Brochure.** Develop a brochure about tortoise diseases and about responsible tortoise ownership targeted at pet owners for distribution through veterinarian offices, pet stores, animal shelters, and through tortoise rescue groups and tortoise clubs. Sites where the public can take sick, unwanted or rescued tortoises and points of contact need to be identified prior to developing the brochure.
7. **Desert Tortoise Power Point Presentation Tool Kit.** Develop a set of power point slides for use by managers and other interested parties in making presentations about desert tortoise.
8. **Desert Tortoise Sale Items.** In cooperation with non-profit cooperating associations or other private sector partners identify and develop low-cost, high impact sales items related to the desert tortoise, i.e., bumper stickers, patches, decals, t-shirts. Emphasis will be on

developing tight, well-crafted messages to inform the public about the desert tortoise while also allowing for the generation of revenue to fund future tortoise outreach initiatives.

9. **Desert Tortoise Exhibits.** Assist the Palm Springs Desert Museum and other regional museums in acquiring and developing quality museum exhibits on the desert tortoise for display at appropriate venues throughout southern California and other areas within the tortoise's greater range. Such assistance may include materials development, use of Mojave Max image, and grant development and support. Encourage the creation and establishment of desert tortoise exhibits by such well-known regional attractions as the San Diego Zoo, the Los Angeles County Natural History Museum, the Living Desert Preserve in Palm Desert, and the Arizona Sonoran Desert Museum in Tucson.
10. **Desert Tortoise Public Attitude and Outreach Effectiveness Study.** Carry out a university-conducted sociological study designed to generate baseline data on public attitudes, perceptions, and values about the desert tortoise, about tortoise recovery efforts, and about broader California desert conservation and appreciation. This survey would be used to help design effective public outreach messages and strategies. A follow-up survey would be conducted in 5-7 years to evaluate the effectiveness of outreach and education efforts.

VII. Recovery Actions

VII.1. Raven Management

Background: Populations of common ravens have increased by more than 1000 percent over a recent 25-year period. These increases are presumably the result of increases in food (e.g., landfills, garbage, litter, grains, feedlots, roadkills) and water subsidies provided by humans. Artificial nesting sites (e.g., transmission towers, utility poles, billboards) may also be contributing to increases in raven populations in some areas.

This population increase has become a concern because ravens prey on hatchling and juvenile desert tortoises. This predation has resulted in reduced survival rates of young tortoises. The reduction in survival of young tortoises may be lowering recruitment into the breeding population and thus inhibit stabilization/increase in declining populations of the species. With inadequate recruitment, population declines will continue.

Goal: Manage/control ravens to minimize their impacts on desert tortoise populations.

Proposed Course of Action:

The following raven management actions will be implemented in "Tortoise Management Areas" in the California deserts including designated Desert Wildlife Management Areas (DWMAs), critical habitat, and National Park Service units. The initial step in implementing these actions will be to complete appropriate NEPA compliance and secure the necessary permits required by the Migratory Bird Treaty Act.

1. Reduce or Eliminate Human Subsidies

- a. Encourage waste management agencies to reduce raven access to organic wastes at landfills.
- b. Develop an education program to encourage agencies and individuals to reduce the availability to ravens of organic wastes outside of landfills. These educational efforts should include, but not be limited to, business and agriculture.
- c. Reduce the availability of carcasses of road-killed animals along highways in tortoise habitat by fencing along roads and highways specified in the Desert Tortoise Recovery Plan and in agency land use plans. In addition to fencing, agencies will be encouraged to remove all animal carcasses along paved highways in desert tortoise critical habitat.
- d. Remove raven nests during the non-nesting season within 2 miles tortoise management areas. Work with utility companies to remove raven nests from their facilities in these areas.
- e. Avoid constructing new nesting structures and reduce the number of existing nesting structures in areas where natural or anthropogenic substrates are lacking.

2. **Implement Lethal Actions:** Eliminate by lethal means those ravens that show evidence of preying on tortoises (i.e., tortoise shells found beneath or within 1 mile of a nest or perch). Removal will be by methods that consider humaneness, human health and safety, cost, and effectiveness. Methods might include shooting, trapping, and poisoning. Removals will be conducted by authorized government agents only. Young ravens and eggs found in nests of removed adults will be euthanized humanely if they can be captured safely.
3. **Implement Adaptive Management**
 - a. Form a Raven Management Team to coordinate implementation, evaluate monitoring reports, assess progress of the actions, and recommend changes in the program. The Raven Management Team will report to the Desert Tortoise Science Work Group. The Desert Managers Group will set overall policy for the program.
 - b. Assess effects of raven management actions on raven populations.
 - c. Assess effects of raven management actions on tortoise populations.

VII.2. Free Roaming Dog Management

Background: With the increase in land development and urbanization occurring as a result of population growth in the desert, predation of desert tortoises by feral and free roaming dogs has increased. Feral and free roaming dogs are already a significant issue in some desert areas. To prevent feral and free roaming dogs from becoming a significant issue desert wide a Feral and Free Roaming Dog Management Plan is necessary.

Goal: Reduce/eliminate predation of desert tortoises by feral and free roaming dogs.

Proposed Course of Action: In conjunction with land use management plans, the CDFG will work with FWS, BLM, DOD, county animal control agencies, and other applicable local entities, to develop a Feral Dog Management Implementation Plan. This plan will articulate control/management measures, a method for assessing the effectiveness of control/management measures, and provide an agreed upon implementation time line. The Plan will be implemented following appropriate NEPA, ESA, and CESA compliance.

VII.3. Head Starting and Translocation

Background: The desert tortoise has been extirpated from some areas of the Mojave Desert and the continued downward trends suggest that without active management intervention desert tortoise could be extirpated from additional areas in the foreseeable future. Desert tortoises reach sexual maturity at 15-20 years of age and healthy populations increase at 0.5 per cent annually. This low reproductive potential suggests that it will take decades or even centuries for a population to recover naturally. Headstarting (hatching and raising young tortoises in predator free environments and subsequently releasing them into the wild) and translocation of adult animals that are being displaced from certain areas (e.g., Fort Irwin expansion area) represents potentially useful management tools to repopulate areas where desert tortoises have been extirpated or significantly reduced.

Goal: Re-populate areas where desert tortoise have been extirpated or significantly reduced using genetically acceptable desert tortoises.

Proposed Course of Action:

The initial step will be to develop a Headstarting and Translocations Implementation Plan. The Plan will be implemented following appropriate NEPA, ESA, and CESA compliance. Elements of the Plan will include:

1. Identification of areas suitable for headstarting/translocation i.e., areas where
 - a. desert tortoise have been extirpated or numbers significantly reduced,
 - b. potential impacts to tortoises such as grazing, predation, and mining/human activities have been significantly minimized or eliminated,
 - c. risk to existing wild populations is minimized
2. Actions to ensure maintenance of existing genetic diversity found in wild populations.
3. Actions to minimize the risk of disease in the reintroduction area.
4. Facilities needed to raise and properly care for captive tortoises.
5. A reintroduction plan (numbers and sizes/ages of animals to released, season of release, etc)
6. Clearly defined criteria for success (e.g., minimum survival rates and/or density goals for adult male and female tortoises)
7. Management measures (e.g., fencing, predator control, etc) that need to be implemented to maximize the likelihood of success, and
8. A monitoring program to evaluate program success.

VII.4. Disease Management and Remediation

Background: Disease is one of several factors causing declines in tortoise populations in California. Disease in general is a normal and natural phenomenon within wild populations. Disease can weaken individuals, reduce reproductive output, and cause mortality. Several diseases have been identified as possibly affecting the stability of some desert tortoise populations: upper respiratory tract disease (URTD), and cutaneous dyskeratosis or shell disease, and herpesvirus. URTD has been found in several populations that have experienced high mortality rate, especially in the West Mojave Recovery Unit. Many factors have been hypothesized as contributing to disease outbreaks including: drought, release of captive tortoises, increased exposure to heavy metals and other toxins, and habitat degradation caused by grazing, nonnative plant infestations, and off highway vehicle use.

Goal: Minimize the impacts of disease on desert tortoise populations.

Proposed Course of Action

The following remedial management actions were identified in a November 2002, Disease Workshop held in Zzyzx, CA. The purpose of the actions is to help control the spread of disease and allow for collection of information that will lead to a better understanding of diseases that affect desert tortoise. A more comprehensive strategy for addressing disease may result from the assessment and review of the Desert Tortoise Recovery Plan. The efficacy and scope of these actions will be reviewed following revision of the Recovery Plan.

1. Land management agencies and regulatory agencies will use or recommend the use of high Potassium Excretion Potential (PEP) plant species in re-vegetation projects in DWMA/critical habitat. Certain plants (mostly if not all annuals) contain a higher PEP index which are believed to be beneficial to desert tortoise.
2. A public education program will be implemented to curtail the release of captive desert tortoise into the wild (see Section VI.4).
3. An Emergency Response Team and Funds will be established to (a) salvage tortoises (b) determine disease type(s) and (c) isolate healthy or infected populations when outbreaks of diseases are first detected.
4. BLM and NPS will increase or focus law enforcement efforts to reduce poaching and release of captive desert tortoise in the Desert Tortoise Natural Area, Joshua Tree National Park and around desert towns in close proximity to DWMA's.
5. Biologists who routinely handle desert tortoise will be trained to conduct full health assessments (Berry and Christopher, 2001). The training will include drawing blood and conducting nasal lavages for cultures.
6. More ill and dying tortoises will be salvaged for determination of causes and contributors to death. FWS and the State will issue necessary salvage permits for this work.

7. FWS and CDFG will review and revise (as appropriate) existing protocols for handling tortoises to incorporate new and better methods to reduce stress.
8. All research permits issued by FWS and CDFG will require collecting data on health, disease, and mortality. In addition, incidental take permits will require permit holders to pay for necropsies for tortoises killed during and related to the project.

Figure 1. Desert Tortoise Critical habitat in the California Desert

