Appendix B-8
LAKE TAHOE RESTORATION PROJECTS
ESTIMATED DIRECT COSTS & KEY MILESTONE DATES

Project Name: **Implementation of the Conservation Strategy for the Tahoe Yellow Cress (*Rorippa subumbellata*)** Agency: USFS, LTBMU, and USFWS
Prepared by: Shana Gross Phone: 530.543.2788 EIP #: 10159
SNPLMA Project #_____

Identify estimated costs of eligible reimbursement expenses:

1. **Planning, Environmental Assessment and Research Costs** (NEPA: BA/BE and CE, Annual Report, Interagency Meetings, Contract Preparation and Administration)	$ 40,000		%
2. **Direct Labor (Payroll) to Perform the Project** (Annual interagency survey, fencing and outplanting, monitoring, data collection, analysis)	$ 65,000		%
3. **Project Equipment** (fencing, signs, TYC plants)	$ 25,000		%
4. **Travel** (including per diem where official travel status required to carry out project, such as serve as COR, experts to review reports, etc.)	$ 0		%
5. **Official Vehicle Use** (FS rental vehicle)	$ 10,000		%
6. **Cost of Contracts, Grants and/or Agreements to Perform the Project** (Contract for outplanting, maintaining, monitoring, study design, report writing, survey protocol, future recommendations; additional contract for seed study: seed bank, germination study, seed movement, metapopulation research and soil analysis; private landowner partnerships and visitor awareness)	$ 200,000		%
7. **Other Direct Costs** (contract administration)	$ 10,000		%
TOTAL*:	$ 350,000	100	%

Milestones/Deliverables:	Date:
Protective structures and 2006 TYC plant installation	June 15, 2006
2006 field monitoring, seed collection, and Interagency Annual Survey	September 30, 2006
TYC soil analyses field data collection	November 30, 2006
Reproductive Biology/Metapopulation dynamic studies- data collection	December 31,2006
Identification & protection materials available for partners	January 15, 2007
Conference presentations to private partners	August 2006
Protective structures and 2007 TYC installation	June 15, 2007
2006 Data analysis and Annual Report	June 30, 2007
TYC soil analyses final report	June 30, 2007

Conference presentations to private partners	August 2007
2007 field monitoring, seed collection, and Interagency Annual Survey	September 30, 2007
Signage & fencing options available for private partners	October 31, 2007
Reproductive Biology/Metapopulation dynamic studies- data analysis and interim report	December 31,2007
Reproductive Biology- 2007 data collection	December 31,2007
Site Management Plan Template	December 31, 2007
Visitor awareness campaign fully operational	March 30, 2007
Protective structures and 2008 TYC installation	June 15, 2008
2007 Data analysis and Annual Report	June 30, 2008
Conference presentations to private partners	August 2008
2008 field monitoring, seed collection, and Interagency Annual Survey	September 30, 2008
Reproductive Biology/Metapopulation dynamic studies- data collection	December 31,2008
Site Management Plans for 6 TYC populations	December 31, 2008
Protective structures and 2009 TYC installation	June 15, 2009
2008 Data analysis and Annual Report	June 30, 2009
Reproductive Biology/Metapopulation dynamic studies- final reports	June 30, 2009
Classroom projects to protect TYC, understand biology	August 2009
2009 field monitoring, seed collection, and Interagency Annual Survey	September 30, 2009
2009 Data analysis and annual report	June 30, 2010
Final Completion Date:	January 2011

Estimated Key Milestone Dates:

COMMENTS:

The Conservation Strategy for the Tahoe Yellow Cress calls for the continuation of the experimental program and monitoring components for at least 8 years, to allow exposure of the reintroduced populations to a full range of environmental variation. The experimental program started in 2003 and will run through 2011.

SCIENCE, RESEARCH & MONITORING
TAHOE PROJECT PROPOSAL

Project Name: Implementation of the Conservation Strategy for the Tahoe Yellow Cress (*Rorippa subumbellata*) **EIP #** 10159

Lead Agency: USFS-LTBMU/USFWS

Contact: Shana Gross/Jody Fraser
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Threshold: Vegetation
Threshold Standard: V-3 Sensitive Plants

Total Project Cost: 850,000
Round 6 Funding requested: 350,000
Is this a multi-year project? Yes

Project Description (Include a specific list of tasks and subtasks to be accomplished that will facilitate Basin agencies in writing a detailed scope of work):

This project is to implement actions identified in the Conservation Strategy (CS) for Tahoe yellow cress (TYC). The CS and associated agreement were completed, approved, and signed in January 2003 by the TYC executive committee and all participating entities. Implementation of the CS is a collaborative effort carried out by the signatories to the agreement (see Partners below) and is overseen by a technical advisory group (TAG) and the executive committee. The CS outlines goals intended to facilitate recovery of TYC, improve TYC populations, and guide management and conservation activities to secure its survival into the future and to prevent the need to list it under the federal Endangered Species Act. Successful implementation of the conservation actions identified in the CS should also allow the States of Nevada and California to downlist or delist this species under their respective endangered species acts. Successful implementation will also reduce the regulatory burden on proposed projects along the lakeshore by providing more certainty as to appropriate methods of mitigation that can be made available to project proponents whose projects may impact the species. The goals of the CS are as follows:

Goal 1: Protect occupied habitat and potentially suitable habitat that does/could support natural populations
Goal 2: Improve TYC populations
Goal 3: Promote conditions that favor a positive metapopulation dynamic
Goal 4: Conduct research that directly supports management and restoration
Goal 5: Revise and continue the monitoring program for TYC
Goal 6: Implement an interagency adaptive management framework

For each of the six goals identified above, the CS articulates a series of objectives and actions. This project proposal for Round 6 specifically addresses Goals 2 and 4. These goals are interrelated in that the ability to improve TYC populations (Goal 2) requires that restoration efforts can be successful; therefore, a study that directly supports management and restoration (Goal 4) must be conducted to determine the likelihood of achieving Goal 2.

Implementation of the proposed project is expected to occur over an 8-year period. The first 4 years will focus on testable, management-oriented hypotheses that will inform subsequent restoration activities. As the study progresses, the findings will be summarized and restoration/management prescriptions will be formulated and implemented at various sites beginning in year 3. The restoration program is expected to be fully operative in years 5 through

8. Given the elusive nature of biological success in rare plant restoration projects, expansion of either the research or restoration components may be necessary to meet the recovery criteria set forth in the CS (e.g., core populations support a minimum of 1200 stems for 6 years out of 10). Such modifications will be guided by an adaptive management process set forth in the CS (Goal 6) through which the TAG will incorporate yearly analyses and summaries of newly acquired data into management and conservation recommendations to the executive committee.

Completion of the 8-year project requires five integrated components:

1. TYC reintroduction studies
2. Reproductive biology/metapopulation studies
3. TYC Soils analyses
4. Annual surveys and adaptive management recommendations
5. Landowner and shorezone visitor restoration and conservation activities

For Science & Research Projects briefly summarize the current state of knowledge of this subject matter:

A relevant and useful body of information about TYC biology, population persistence, and associated habitat factors already exists that provides an excellent foundation to advance the science of rare plant restoration. The long-term monitoring database is one of the most comprehensive available on any rare plant and preliminary isozyme analysis has revealed pertinent details about the genetic variability of TYC populations. Consequently, there are several working hypotheses currently in place regarding TYC and critical habitat factors. For instance, the hypothesis that TYC population size is both cyclical and a function of lake level can be tested in a well-controlled, multifactorial experiment that will enable us to differentiate among alternative hypotheses. Careful design of the experimental reintroduction will also enable us to define and evaluate project success.

A pilot outplanting project was implemented during the 2003 and 2004 growing seasons. This project was designed to inform subsequent reintroduction studies for TYC and has assisted ecologists and land managers in identifying and resolving logistical issues associated with propagating, transporting, and reintroducing a rare plant to historic habitats. Subsequent demographic, physiological, habitat disturbance monitoring techniques were designed to document responses of TYC to microhabitat, genetic, hydrological, and recreational factors. The information garnered from this pilot project is critical to ensure effective design and implementation of future outplanting efforts.

A key long-term objective put forth in the CS is to restore the metapopulation dynamics of TYC. By increasing the size, and perhaps the number, of essential populations we may be able to increase the probability of colonization events and reduce the probability of irreversible extirpation events on the local and landscape levels. Extensive monitoring of experimental populations may help us determine the impacts of restoration on metapopulation dynamics and better ensure the future of this endemic Tahoe Basin plant species.

Describe the purpose and need for the project: (For Science & Research Projects describe how this project will guide future management activities**.** This description should include a quantitative estimate of the anticipated gain in management information and describe how the

research and/or monitoring project may inform the development and understanding of additional Key Management Questions (one page recommended)**:**

Tahoe yellow cress is a rare plant species endemic to the shores of Lake Tahoe in California and Nevada. It was listed as endangered by the State of California in 1982 (California Fish and Game Code 2050 *et seq.*) and is considered endangered throughout its range by the California Native Plant Society. Tahoe yellow cress is state-listed as critically endangered in Nevada (Nevada Revised Statutes 527.270 *et seq.*), and is considered threatened by the Nevada Native Plant Society (Nevada Natural Heritage Program 2001). It is classified as a candidate species for listing under the Endangered Species Act of 1973, as amended (64 FR 57533).

Survey results from 1979 to 2000 showed a decline in Tahoe yellow cress populations. Evidence suggests the decline in the number of sites occupied by TYC is primarily due to: Alterations in lake level dynamics caused by construction and operation of the Truckee River outlet dam and reservoir; destruction of actual and potentially suitable habitat by the construction of piers, jetties, and other structures; high levels of recreational activity associated with beaches and dunes; disturbance of the sand by public and private property maintenance activities; and possibly random environmental events. Because of the imminent threats facing the species, a task force was formed to develop and implement the CS for TYC. As stated previously, the CS is coupled with an agreement signed by the participating entities that demonstrates the commitment of all involved to the long-term protection of the species.

Swift and effective implementation of the CS will provide two main benefits: 1) Identification of appropriate mechanisms to enhance and recover the species and 2) development of appropriate mitigation options that ensure protection for an adequate number of sites around the lake. The availability of these options will reduce the regulatory burden and the need to enforce strict species protections lake-wide, including federally listing the species. Securing the conservation of this species into the future will facilitate economic and conservation progress throughout the basin.

A program that fosters a greater awareness and understanding of TYC biology and conservation among private landowners and lakeshore visitors is a necessary component of implementing the CS and reducing the need for federal listing. Since 25 to 50 percent of TYC sites occur on private lakefront parcels, successful reintroduction and enhancement actions will require the use of both public and private lands. This project will provide landowners with information and tools to help them protect TYC on their beaches (fencing and signage as appropriate), as well as encourage them to conduct restoration actions on their property. This project complies with Nevada and California state endangered species laws regulating take of the species and it will specifically encourage public and private beach visitors to avoid TYC plants and respect protective fencing boundaries.

The information gained from this project will enhance our knowledge base regarding the biology and habitat requirements of the species and potentially establish feasible mitigation measures for projects affecting TYC and its habitat. Data obtained from year to year, either through annual survey efforts or results of the studies included in this proposal, will be the basis for future conservation and management decisions and recommendations. As the ecological needs of the species become clear, KMQs (identified below), the goals and objectives for conservation, and legal status will be revised appropriately.

Describe the goals and objective of the project (for Science & Research Projects describe Key Management Questions being addressed (Recommended 2-3 pages):

1.Objectives: List the objectives of the proposed research being tested during the project, and briefly state why the intended research is important.
2.Approach: Outline the research design, methods, and techniques that you intend to use in meeting the objectives stated above.
3. Identify the Key Management Questions being addressed and/or how the project may inform the development and understanding of additional Key Management Questions.

Approach:
1. TYC reintroduction studies

The experimental reintroduction program would be implemented in three phases, with each phase expected to span two or more years. Overall, a total of 14,000 second-year plants and 4,000 third/fourth/fifth year plants will be outplanted at various restoration sites. The program has been designed to ascertain the habitat conditions, logistical factors, and best management practices that will optimize the chances for successful restoration. The experimental program will test management-oriented hypotheses that will aid in the development of site-specific action plans for restoration sites. Concurrent demographic and physiological monitoring will generate data that will inform the adaptive management process.

Plant installations at the different sites will consist of outplanting container-grown plants in transect configurations (perpendicular to the shore) that extend from the waterline into different microhabitat zones: low beach, high beach, dune, dune trough, or meadow habitats. Within each zone, a randomized-block design will be utilized and will possess the genetic variables of site of origin and maternal parent. Five replicate (demographic) blocks of 50 plants each will be arranged in a 5-10 m wide strip running parallel to the shore. Blocks will also contain plants obtained from different seed sources (these will test secondary hypotheses), spaced at regular intervals and mapped to retain all propagation information. A buffer will separate strips and microtopographic zones to allow access during outplanting and monitoring. An additional block of 50 plants will be installed within each zone to allow for physiological monitoring (xylem water potential) without disturbing plants in the demographic blocks. During the initial stages and into the future to support subsequent outplanting efforts, all plants will be hardened, with second-year individuals grown in plastic tubes. They will not receive supplemental water or nutrients in the greenhouse or in the field. This design would accommodate outplanting of between 600 to 1250 plants per site. Specific experimental design elements may be modified through discussions with the TAG and/or due to field conditions at individual sites.

1.1 Experimental Reintroduction Phase I (ER-I)

Year 1 of ER-I will entail design, propagation, outplanting layout, and site preparation tasks. Full implementation will take place in year 2, which will include outplanting of the first, one-year-old cohort of 4000 plants, monitoring, data analysis, and report preparation tasks. The primary hypothesis to be tested will address the hydrotopographic position in relation to lake level (and, therefore, depth to water table). Secondary hypotheses (those which cannot be precisely controlled) will center on elements of wind/wave disturbance (distance to waterline, exposure) and genetic composition of the founders (site of origin, maternal parent). A precision seedling experiment (i.e. using seeds instead of plants as founders) will provide additional life history details (e.g. field germination, seedling mortality factors, seed longevity *in situ*). The monitoring

program includes demographic and physiological monitoring, with the latter concentrating on basic water relations of plants in different hydrotopographic positions.

1.2. Experimental Reintroduction Phase II (ER-II)

ER-II will consist of installation of another cohort of 4000 founders during Spring 2007, which will be collected and propagated in year 2 (2006). This serves to spread the risk of failure of founders among years, which in principle is analogous to the risk aversion strategy used in financial investing known as “dollar-cost averaging”. This “founder-cost averaging” minimizes the chances of selecting a particularly “bad” year for expenditure of all the founding individuals. It is likely that the same hypotheses tested during the first phase will be tested in this phase, subsequent to modifications according to available information and adaptive management. The monitoring program will emphasize demographic performance, including an assessment of reproductive output of the ER-I cohort.

This phase will be initiated in year 2 (collection, propagation), fully implemented in year 3 (outplanting, monitoring, data analysis, report, meeting tasks), and concluded in year 4 (third year monitoring for cohort 1, second year for cohort 2).

1.3. Restoration – (ER-III)

Using the results of the experimental phases, restoration activities will begin at 6 to 8 sites in an effort to enlarge average minimum population sizes to meet the target of 1200 reproductive stems. Prescriptions for all management tasks (non-experimental) could be implemented as early as year 3. Outplanting of second, third, and fourth-year founders will take place in subsequent, successive years, thus ensuring a variable age-structure within the reintroduced populations and utilizing founder-cost averaging. Minimal demographic monitoring will be utilized for performance evaluations. A maximum of four restoration years are possible during the latter half of the proposed 8-year project.

This phase could be implemented in year 3 (collection, propagation, outplanting layout, and site preparation) depending on the results of ER-I and ER-II. Otherwise, it could be postponed until year four, after which outplanting, monitoring, etc. would take place.

2. Reproductive biology/metapopulation dynamic studies

The unique metapopulation dynamic of TYC requires an increased understanding of the factors that contribute to periodic colonization and extirpation events. The TAG proposes a study to elucidate TYC reproductive biology and metapopulation dynamics through testing the hypotheses that colonization of TYC is dependent on temperature, timing, water availability, and submersion, and these factors influence both seed germination and stolon longevity. Seed dormancy and seed viability will be investigated under greenhouse and field conditions to determine the persistence and germination of seed under various conditions and the longevity of stolons once germination and establishment have occurred. Experimental factors include:

1. Persistence and germination of seed
    a. Length of storage time
    b. Soil/sand mix
    c. Seasonal planting time (timing mechanism)
    d. Amount of water suitable for germination
    e. Effect of flotation time on germination

f. Light intensity
g. Temperature

2. Longevity of stolons
   h. Comparison of morphology of stolons kept under water with those never submerged
   i. Oxygen levels during submersion
   j. Effect of length of inundation

3. TYC soils analyses

Soil characteristics (e.g. nutrient status, surface armoring, texture) have been invoked to explain the patterns of TYC distribution and abundance, but there have been no scientific studies to date. Both occupied and unoccupied sites are important for the maintenance of TYC metapopulation dynamics and soil characteristics may play an important role in potential and actual habitat suitability. The TAG proposes a design for sampling physical and chemical soil characteristics that test seven hypotheses related to specific key management questions (KMQs; identified below). The experimental design will utilize a replicated block design with standardized sampling positions (in relation to TYC plants, waterline, and beach width) and standardized sampling depths (in relation to TYC root zone). Experimental factors will address physical and chemical soil characteristics:

1. Among core and high, medium, and low priority restoration sites
2. In occupied vs. unoccupied sites
3. Along gradients within an occupied site
4. In proximity to Nitrogen fixing plants
5. In relation to plant performance

4. Annual survey report and adaptive management recommendations

The CS and the associated agreement direct the TAG to prepare an annual report describing the status of TYC following each survey year. Field surveys of TYC have been conducted on an annual basis (with periodic omissions) on the shores of Lake Tahoe since 1979. The annual report serves as a repository of information for all TYC-related activities and is a key element of directing future TYC conservation and management. A template for site-specific management plans will be developed and incorporated into the annual report.

Agency participation in developing the annual report in a timely manner has been challenging and the 2003 report recommends that the TAG include data analysis and annual report development in contracted costs as a part of the experimental reintroductions and other conservation efforts. The annual report format was standardized in 2003 to contain the following major sections:

1. Executive summary
2. Field surveys including methods, results, and discussion of the annual survey
3. Conservation activities including research reports and updates on the TYC stewardship program
4. Activities by agency, which presents a detailed summary of all in-kind agency contribution of services, material, and personnel
5. Recommended conservation activities for the following year
6. Appendices including annual survey data, qualitative descriptions of known TYC sites, proposed conservation and management actions for TYC sites

5. Private landowner partnerships and visitor awareness

Successful implementation of the CS includes the development of a program in which partnerships with private landowners are forged in an effort to protect and enhance TYC on their lands. Approximately 35 percent of the occupied TYC sites in 2003 were found on private lands around the lake, and enhancement of TYC on those properties and properties supporting potential habitat is integral to recovery of the species and efforts to prevent federal listing. This program will be designed to be a cooperative effort that encourages private landowners and non-governmental entities to: 1) Manage their lakefront properties for the conservation of TYC and 2) develop site-specific management plans and conduct restoration activities such as outplanting and weed control. In addition, efforts to make beach visitors aware of TYC and to avoid trampling or destroying plants while recreating on either private or public lands will be conducted. A primary focus of these efforts will be to reduce the amount and severity of human activities that impact TYC and its habitat. Guidance will be provided to the interested public regarding the options for conservation actions and the implementation of their site-specific management plans.

The Tahoe Lakefront Owners' Association (TLOA) has volunteered to organize the "Friends of TYC", a group whose mission will be to encourage the conservation of TYC on private lands. The Friends group will work with the TAG to provide landowners information about TYC biology and available protection measures, such as signage and fencing, for plants on their lands. Plant identification and monitoring packages will be made available for partners; the TAG will participate in annual TLOA conferences to provide assistance and information to the public; and classroom projects will be developed with local schools to protect TYC and help school age kids understand the sensitivity of the species and its biology. Once outplanting and restoration studies are completed, opportunities for shorezone landowners to outplant or enhance the species on their property are expected to become available.

Objective:
The CS outlines goals intended to facilitate recovery of TYC, improve TYC populations, and guide management and conservation activities to secure its survival into the future and to prevent the need to list it under the federal Endangered Species Act. This project meets all six goals outlined in the CS in the following manner:

Goal 1: Protect occupied habitat and potentially suitable habitat that does/could support natural populations.
This project includes protective fencing of both natural and experimental populations and will provide the necessary data for determining the habitat parameters that define "potentially suitable habitat".

Goal 2: Improve the size and persistence of TYC populations at core and priority restorations sites.
Reintroduction of propagated plants and/or seeds to appropriate habitats based upon our experimental program will increase the chance of overall project success of maintaining minimum stem counts (greater than 1200 stems for core sites).

Goal 3: Promote conditions that favor a positive metapopulation dynamic.
Monitoring data from experimental and natural populations will enable us to evaluate changes in the colonization/extirpation ratio in operation around the lake over an 8-year period.

Goal 4: Conduct research that directly supports management and restoration.
The ability to manage TYC is currently limited by our understanding of the biology of the

species. Reintroduction experiments present the greatest opportunity for increasing our knowledge of TYC. An experimental design will enable us to determine the techniques, habitat conditions, and logistical factors that will optimize restoration efforts.

Goal 5: Revise and continue the monitoring program for TYC.
The project supports continued monitoring efforts and provides an assessment of the accuracy, efficiency, and utility of currently used methods.

Goal 6: Implement an adaptive management framework.

Project implementation is a cooperative effort being carried out under the auspices of the TAG with executive committee oversight. The TAG is a multi-agency and private interest task force comprised of biologists, public land managers, and representatives of private property owners and environmental groups. The experimental approach of the proposed project will generate the demographic and physiological monitoring data to inform the adaptive management process.

In order to organize existing and future research related to TYC, five key management questions (KMQs) were developed (Pavlik and O'Leary 2002). The KMQs that guide conservation and restoration research on TYC are intended to implement the conservation strategy by focusing research on the restoration of metapopulation dynamics in the context of changing lake levels and continued human disturbances. Within an adaptive management framework, the KMQs harness the power of a scientific approach while keeping the focus on generating information of immediate value to decision-making. The questions guide research to address specific, applied problems faced by land managers, agency regulators, and restoration biologists.

The study design is discussed above in the Project Description section. This design is expected to aid our understanding of the following KMQs:

KMQ 1: Can TYC populations occupy any site around the lake margin that has sandy beach habitat?
KMQ 2: Are there ecosystem factors that can affect TYC performance within an occupied site or microhabitat?
KMQ 3: Can TYC populations be created or enlarged in order to restore the self-sustaining dynamics of the species?
KMQ 4: Can any TYC genotype perform equally well at any appropriate site?
KMQ 5: Can TYC microhabitats/places be found or created that are less likely to be adversely disturbed despite high visitor use or intense shoreline activity?

Describe the anticipated project accomplishments (for Science & Research Projects provide a qualitative description of how the results of each task will reduce the uncertainty of predicting the behavior of the environmental processes being studied and may lead to solutions to environmental problems (one page recommended) to improve the agencies' abilities to protect the environment and achieve the management objectives.):

The proposed project includes five major components and the following anticipated accomplishments:

1. TYC reintroduction studies

The greenhouse propagation efforts will produce 4,500 container-grown TYC per year, with a 4-

year total of 18,000. Over a 4 to 6 year period, a total of 14,000 second year plants and 4,000 third/fourth/fifth year plants could be transferred to restoration sites. Protective fencing will be installed at all experimental sites and maintained at naturally occurring population sites. Experimental data will inform KMQs and goals and objectives, aid in the development of site-specific management plans for restoration sites and inform the overall adaptive management process.

2. Reproductive biology/metapopulation dynamic studies

Greenhouse and field data on seed germination, viability, dormancy, storage longevity, and stolon longevity will provide important information on the factors that contribute to periodic colonization and extirpation events and will increase our ability to manage and promote the unique metapopulation dynamic of TYC.

3. TYC soils analyses

The experimental design for investigating physical and chemical soil characteristics will provide data for seven hypotheses related to specific KMQs. We will be able to determine if soil characteristics differ among TYC sites, if differences can be detected in the soil between occupied and unoccupied sites, and if gradients in the soil exist within an occupied site. In addition, we will examine if soil characteristics can be correlated to plant performance or proximity to nitrogen-fixing plant species. The final report will strive to provide a more thorough definition of potential TYC habitat.

4. Annual survey report and adaptive management recommendations

The annual reports will include all data from the annual field surveys including methods, results, and a discussion. A description of the year's conservation activities will include detailed research reports of all funded projects and updates on Friends of TYC. In addition, a detailed summary of all in-kind agency contributions of services, material, and personnel will help establish future fiscal needs.

A central feature of the annual report will be a set of recommended conservation activities for the following year. The TAG will develop recommendations from results of the annual survey and current and past research data that will guide the next year's management of individual sites as necessary. These recommendations will be forwarded to the executive committee for decisions.

5. Private landowner partnerships and visitor awareness

The TAG and the Friends of TYC will gain acceptance and participation of private landowners who recognize the need to protect TYC. In addition, visitors to public beaches will be more cognizant and respectful of protecting TYC from harm when they use the public beaches. Informational signs and protective fencing will be designed specifically for private landowners interested in participating in the program. Activities that landowners may voluntarily participate in include the following: Offering land for experimental efforts, fencing or signing existing plants to protect them, assisting in monitoring and annual survey efforts, or entering into conservation agreements for their property.

Describe the "readiness" of this project to move forward (environmental documentation, etc.; for Science and Research Projects that are a continuation of previous projects, provide a

quantitative measure of the actual gain in management information (one to two paragraphs recommended):

All necessary environmental compliance documentation has been completed for the early phases of this project where outplanting activities are planned or fencing will be installed. All permits for seed collection have been obtained from the responsible regulatory entity. Finally, coordination with the participating land managers has been conducted and all parties are prepared for the implementation phases. Subsequent site-specific environmental clearances would have to be completed for the restoration phase of the project.

Based on the results of the pilot outplanting project discussed above, implementation of this project is critical to further elucidate feasible conservation and recovery activities that will ultimately ensure the long-term persistence of TYC around the lake. While the pilot project provided important information that will be incorporated into this project, the scientific approach to the long-term studies taken here will produce statistically powerful results that will translate to confident decisions by regulatory and land management agencies.

Describe potential partnerships for this project.

The following entities participated in the development of the Conservation Strategy for the Tahoe Yellow Cress and signed a Memorandum of Understanding/Conservation Agreement in 2003 demonstrating their commitment to the implementation of the strategy:

- Tahoe Regional Planning Agency
- US Forest Service - Lake Tahoe Basin Management Unit
- US Fish and Wildlife Service
- Nevada Division of State Parks
- Nevada Division of State Lands
- Nevada Division of Forestry
- Nevada Natural Heritage Program
- California Department of Fish and Game
- California Department of Parks and Recreation
- California Tahoe Conservancy
- California State Lands Commission
- League to Save Lake Tahoe
- Tahoe Lakefront Owners' Association

For Science & Research Projects describe how this project will guide future management activities:

The successful implementation of the TYC CS relies upon an adaptive management framework designed to bring new information immediately into new management direction. A set of five KMQs has been developed to organize and guide existing and future studies related to TYC. Addressing each KMQ over time will provide regulatory and land management agencies information necessary to make sound scientifically based decisions regarding TYC in the context of fluctuating lake levels and continued human disturbances. Within an adaptive management framework, the KMQs harness the power of a scientific approach while keeping the focus on generating information of immediate value. The questions guide research to address specific, applied problems faced by land managers, agency regulators, and restoration biologists.

Include an 8 ½ X 11 map depicting the project, or research/study area.

Project area will include all suitable habitats around the lake.