

RECOVERY PLAN

for

White Irisette (*Sisyrinchium dichotomum*) Bicknell

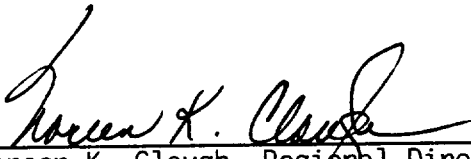
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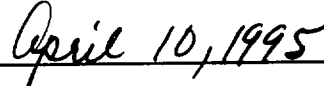
Southeast Region
U.S. Fish and Wildlife Service
Atlanta, Georgia

Approved:



Noreen K. Clough, Regional Director
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Date:



Recovery plans delineate reasonable actions that are believed to be required to recover and/or protect listed species. Plans are published by the U.S. Fish and Wildlife Service, sometimes prepared with the assistance of recovery teams, contractors, State agencies, and others. Objectives will be attained and any necessary funds made available subject to budgetary and other constraints affecting the parties involved, as well as the need to address other priorities. Recovery plans do not necessarily represent the views nor the official positions or approval of any individuals or agencies involved in the plan formulation, other than the U.S. Fish and Wildlife Service. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks.

Literature citations should read as follows:

U.S. Fish and Wildlife Service. 1995. White Irisette Recovery Plan.
U.S. Fish and Wildlife Service, Atlanta, Georgia. 22 pp.

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EXECUTIVE SUMMARY

Current Status: *Sisyrinchium dichotomum* is federally listed as an endangered species. It is currently known from seven populations (six in North Carolina and one in South Carolina).

Habitat Requirements and Limiting Factors: This rare herb is typically found in open, dry to mesic oak-hickory forests on mid-elevation mountain slopes and on open, disturbed sites, such as woodland edges and roadsides. It is threatened by residential development, road construction, herbicide use, and vegetative succession in the absence of natural disturbance.

Recovery Objective: Delisting.

Recovery Criteria: White irisette will be considered for delisting when there are at least nine geographically distinct, self-sustaining populations that are protected to such a degree that the species no longer qualifies for protection under the Endangered Species Act.

Actions Needed:

1. Survey suitable habitat for additional populations.
2. Monitor and protect existing populations.
3. Conduct research on the biology of the species.
4. Establish new populations or rehabilitate marginal populations to the point where they are self-sustaining.
5. Investigate and conduct necessary management activities at all key sites.

Total Estimated Cost of Recovery (in \$000's): Because so little is known about actions needed to recover this species, it is impossible to determine costs beyond the next few years:

Year	Need 1	Need 2	Need 3	Need 4	Need 5	Total
FY 1	20.0	4.0	49.0	5.0	5.0	83.0
FY 2	10.0	3.0	33.0	25.0	5.0	76.0
FY 3	10.0	2.0	18.0	16.0	?	46.0
TOTAL	40.0	9.0	100.0	46.0	10.0	205.0

Date of Recovery: Impossible to determine at this time.

Common associates of the species include *Quercus alba* (white oak), *Q. rubra* (red oak), *Q. velutina* (black oak), *Q. prinus* (chestnut oak), *Q. coccinea* (scarlet oak), *Liriodendron tulipifera* (tulip tree), *Carya cordiformis* (bitternut hickory), *C. tomentosa* (mockernut hickory), *C. glabra* (pignut hickory), *Acer rubrum* (red maple), *Fraxinus americana* (white ash), *Cornus florida* (flowering dogwood), *Cornus alternifolia* (alternate-leaf dogwood), *Hydrangea arborescens* (wild hydrangea), *Houstonia purpurea* (summer bluet), *Scutellaria* sp. (skullcap), *Eupatorium rugosum* (white snakeroot), *Erigeron pulchellum* (Robin's plantain), *Tradescantia subaspera* (zigzag spiderwort), *Anemone virginiana* (tall thimbleweed), *Trillium cuneatum* (little sweet Betsy), *Amphicarpa bracteata* (hog peanut), *Iris cristata* (crested dwarf iris), *Sanguinaria canadensis* (bloodroot), *Cacalia atriplicifolia* (pale Indian plantain), *Aster* spp. (aster), *Cimicifuga racemosa* (black cohosh), *Polystichum acrostichoides* (Christmas fern), and *Lilium superbum* (Turk's-cap lily). Associates on the State of North Carolina's Endangered and Threatened List are *Carex biltmoreana* (Biltmore sedge) and *Helianthus glaucophyllus* (white-leaf sunflower).

Very little specific information is available on the life history and population biology of white irisette. An individual plant is defined as a cluster of stems arising from fibrous roots. There may be 10 or more stems on one plant. Even very small plants flower (sometimes with only one stem); therefore, the percentage of flowering plants in a population is rather high. There are no data on pollinators or seed vectors. Inbreeding is suggested by distance between populations and small population sizes. Pollen stainability counts from one population showed only 63 percent fertility on average. So far, other investigations have been restricted to limited chromosome counts (Hornberger 1987). The small number of seeds produced suggests a high sterility factor, which may have implications for recovery (Cholewa, personal communication, 1994).

Threats and Population Limiting Factors

Although it is not known whether extant populations of white irisette are declining, destruction of habitat poses a major threat to the remaining populations. The continued existence of white irisette is threatened by residential development, road and trail construction and maintenance, herbicide use, off-road vehicles, and, in one population, damage by fans of race-car driving and, occasionally, race cars. Exotic weeds like Kudzu (*Pueraria lobata*), Japanese honeysuckle (*Lonicera japonica*), and an aggressive grass, *Microstegium vimineum*, are encroaching at several sites. Another potential threat is suppression of certain types of disturbance. Plants are noticeably smaller in some deeply shaded locations and have disappeared due to the regrowth of vegetation under a power line. Large native herbivores, such as bison and elk, have been extirpated from this species' range, and naturally occurring fires have been suppressed here for decades. In the absence of natural disturbances such as these, this species is now found most often where some form of artificial disturbance (such as right-of-way

maintenance) mimics the absent natural disturbances and sustains the open quality of its habitat.

Conservation Efforts

For one population, some protective measures have been initiated. Seeds from two populations have been given to the Center for Plant Conservation at the North Carolina Arboretum in Asheville, North Carolina, for propagation (N. Murdock, Service, personal communication, 1993).

PART I

INTRODUCTION

Background

White irisette (*Sisyrinchium dichotomum*) is a rare perennial herb endemic to a few scattered mountain slopes in western North Carolina and northern South Carolina. It grows on circumneutral soils of middle-elevation slopes in dry to mesic, open oak-hickory forests, most often in dappled shade. Due to its rarity and vulnerability to threats, the species was federally listed as endangered on October 28, 1991 (U.S. Fish and Wildlife Service [Service] 1991). White irisette is listed as endangered by the State of North Carolina (Weakley 1993) and by the State of South Carolina (B. Pittman, South Carolina Department of Natural Resources, personal communication, 1993).

Current and Historical Distribution

At the time the species was listed, four populations of white irisette were known to still exist in Polk and Rutherford Counties, North Carolina. During a systematic survey of Polk County, two more populations were found, one of them extending across the State line into Greenville County, South Carolina. In addition, one more population was found in Greenville County, South Carolina. White irisette is found on disturbed sites, which probably most closely simulate its natural habitat and which may have been openings created by grazing and occasional fires. Threats to its survival are residential development, road and trail construction, succession in the absence of natural disturbance, and encroachment by exotic species. Most populations have not been monitored until very recently, and data to determine the stability of the populations are insufficient.

Description, Ecology, and Life History

White irisette is 1 of 37 species of the genus *Sisyrinchium* and has the most restricted range of all species in the genus in the Southeastern United States (Hornberger 1987; A. Cholewa, University of Minnesota, personal communication, 1993). First described by E. Bicknell (1899) from material collected in Rutherford County, North Carolina, *Sisyrinchium dichotomum* is a perennial herb, 26 to 40 centimeters (cm) tall. Stems are winged, 2.0 to 3.6 millimeters (mm) wide and about one-half the height of the plant (11 to 20 cm). There are three to five nodes, with successively shorter internodes between dichotomous branches. Basal leaves are one-third to one-half the height of the plant (11 to 19 cm long and 2.2 to 3.6 mm wide). Stem leaves are as broad or broader than the stem (9 to 14 cm long and 2.8 to 5.0 mm wide) and long-attenuate, with an acuminate apex. There are one to three winged peduncles per node (4 to 7 cm long and 0.7 to 0.9 mm wide). Spathes are small and delicate and are not much

Tepals are 7.5 mm long and are white and recurved. Capsules are mostly globose (2.1 to 3.1 mm long and 2.4 to 3.2 mm wide). Seeds are black, rugulose, globose to elliptical, and 1.0 to 3.0 mm in diameter; only three to six seeds are contained in each capsule. The chromosome number is $2n = 32$. The flowering period is from late May through July (Hornberger 1987).

White irisette most closely resembles narrow-leaved blue-eyed grass (*Sisyrinchium angustifolium*). However, white irisette branches from the first node, with plant parts becoming noticeably smaller and smaller. Blue-eyed grass usually has only one node, and there is no noticeable reduction in the top of the plant. There is also a difference in the size of the capsule, with that of blue-eyed grass being about twice the size of white irisette and containing about 20 seeds (not 3 to 6). The chromosome numbers of *Sisyrinchium angustifolium* are 82, 88, 90, and 96 versus 32 for *S. dichotomum* (Hornberger 1987).

White irisette is found in open, dry to mesic, circumneutral oak-hickory forest (Schafale and Weakley 1990) communities on mid-elevation mountain slopes, with aspects ranging primarily from southeast to southwest. On most sites, plants are exposed to dappled to strong sunlight for at least part of the day. A few locations are heavily shaded. The species seems to grow best on regularly disturbed sites, such as power lines, roadsides, and woodland edges. Populations occur at altitudes ranging from 400 to 1,000 meters on gentle to very steep slopes.

The soils on which white irisette grows are generally shallow, due to the rockiness and steepness of the terrain. Soil pH is circumneutral, ranging from 6.0 (Feil 1987) to 7.5 to 8.0 (Pittman and Rayner 1992). Weathered amphibolite may be responsible for the high pH values. Some of the soil series mapped are of the Ashe-Cleveland association, Brevard loam, Cowee, Evard-Cowee complex, Fannin, Fannin fine sandy loam, Greenlee sandy loam, and Hayesville fine sandy loam.

Annual rainfall for Tryon, which is centrally located in the area of distribution, is 64.83 inches, wetter than the surrounding area. Average daily maximum temperatures are 72.8°F; average daily minimum temperatures are 47.7°F, warmer than the surrounding area. The average length of the freeze-free growing season is more than 200 days per year, more than that of any other weather station in the North Carolina mountains (information obtained from the National Climatic Data Center, Asheville, North Carolina).

The hydrology of the occupied sites is generally uniform and moderately to well-drained. Soils are intermittently saturated by rain but are subject to desiccation due to their aspect, the local steepness of slopes, and the local shallowness of soils.

PART II

RECOVERY

A. Recovery Objectives

White irisette (*Sisyrinchium dichotomum*) will be considered for delisting when there are at least nine geographically distinct, self-sustaining populations in existence that are protected to such a degree that the species no longer qualifies for protection under the Endangered Species Act (see criteria below). A self-sustaining population is a reproducing population that is large enough to maintain sufficient genetic variation to enable it to survive and respond to natural habitat changes. The number of individuals necessary and the quantity and quality of habitat needed to meet this criterion will be determined as one of the recovery tasks.

This recovery objective is considered an interim goal because of the lack of data on the biology and management requirements of the species. As new information is acquired, the estimate of self-sustaining populations required for the species' survival may be readjusted. The recovery objective for white irisette will be reassessed at least annually in light of any new information that becomes available.

The first step toward recovery will be the protection and management of all extant populations to ensure their continued survival. Little is known about the life history and habitat requirements of this species. Therefore, it will be necessary to conduct detailed demographic studies and ecological research for the purpose of gaining the understanding needed to develop appropriate protection and management strategies. The ultimate effects of various kinds of habitat disruption must be determined and, if necessary, prevented. The active management required to ensure continued survival and vigor must be defined and carried out. Therefore, white irisette shall be considered for removal from the Federal list when the following criteria are met:

1. It has been documented that at least nine self-sustaining populations exist and that necessary management actions have been undertaken by the landowners or cooperating agencies to ensure their continued survival.
2. All of the above populations and their habitat are protected from present and foreseeable human-related and natural threats that may interfere with the survival of any of the populations.

B. Narrative Outline

1. Protect existing populations and essential habitat. Only seven populations of white irisette are currently known to exist, all within two counties in North Carolina and one county of South Carolina. Until more is known about the species' biology, genetic diversity, and specific habitat requirements and about the measures necessary to protect the integrity of occupied sites, all existing populations should be protected. The long-term survival of nine populations is believed to be essential to the recovery of the species as a whole.
 - 1.1 Develop interim research and management plans in conjunction with landowners. Little is known about the specific management practices necessary to ensure the long-term survival of this species. Some form of disturbance appears to be necessary for maintaining its habitat. Appropriate management procedures will be developed through research and will be implemented in cooperation with the landowners. Some of the sites are along roadsides managed by the North Carolina Department of Transportation or on rights-of-way managed by power companies. Mowing at inappropriate times (between the onset of flowering and seed dispersal) should not be allowed, while assuring that the yearly clearing of competing vegetation takes place. Management procedures in wooded areas will have to be developed as the basic understanding of white irisette's species biology increases. Where trampling or other forms of habitat degradation pose an imminent threat to the species, immediate protection measures should be initiated. Pre- and post-management demographic studies should provide important insights into management needs.
 - 1.2 Search for additional populations. Although several new populations of the species have been found during a recent survey, a thorough, systematic effort to locate additional populations is still needed (very small populations, consisting of only a few plants, are easily missed in less intensive efforts). Searches should be preceded by an examination of geologic and topographic maps and aerial photographs in order to determine potential habitat and to develop a priority list of sites to search. A master data base should be maintained, containing maps of areas that have been searched with negative results, as well as locations of known populations, so that efforts are not duplicated.
 - 1.3 Determine habitat protection priorities. Because of the small number of existing populations and the pervasive threats to the habitat, it is essential to protect as

many populations as possible. However, efforts should be concentrated first on the sites where current landowners are cooperative and where the largest and most vigorous populations occur.

1.4 Evaluate habitat protection alternatives and implement.

The greatest possible protection should be obtained for existing populations. Fee simple acquisition or conservation easements provide the greatest degree of protection. However, as yet it is not known how much buffer land around each population is necessary to protect the integrity of occupied sites. Protection through management agreements or short-term leases may provide adequate short-term protection but should be considered only as an intermediate step in the process of ultimately providing for permanent protection. Short-term protection strategies may be necessary if private landowners are not agreeable to, or monies are not available for, acquisition of conservation easements or fee simple titles. Conservation agreements with adjacent landowners should be developed in order to prevent inadvertent adverse alteration of the habitat.

2. Determine and implement the management necessary for long-term reproduction, establishment, maintenance, and vigor. Protection of the species' habitat is the obvious first step in ensuring its long-term survival, but this alone may not be sufficient. Habitat management may be necessary to allow the species to perpetuate its life cycle over the long term. However, because very little is known about this species, information about its genetic diversity, population biology, and ecology is necessary before effective management guidelines can be formulated and implemented.

2.1 Determine the population size and stage-class distribution for all populations. Population size and stage-class distribution data are essential for predicting what factors may be necessary for populations to become self-sustaining (Menges 1987). Such data are needed for the existing populations and for any newly discovered populations. This task should be combined with the work described under Task 1.2. This will ensure that funds are utilized in the most efficient manner.

2.2 Study abiotic and biotic factors of the species' habitat. An understanding of the habitat occupied by the species is essential to the long-term survival and recovery of white irisette. Investigations should focus on community dynamics, while including species-specific work. Monitoring studies should include populations within a wide range of habitats, both altered and

undisturbed. Permanent plots should be selected and established to determine the relationship between abiotic factors (such as soil depth and type, soil moisture content and pH, and light intensity) and biotic factors (such as reproduction, germination, and degree of competition and predation). This information is necessary to determine if active management is needed to ensure the continued vigor of existing populations and to select good sites for restoration or reintroduction.

The vectors of seed dispersal should be determined and their effectiveness under different ecological and spatial conditions should be assessed. Major pollinators need to be determined, and pollination mechanisms should be identified.

To develop genetic management strategies, genetic variability within and between populations must be determined through isozyme and allozyme analyses.

Relationships with competing species must be investigated. The effects and exact interactions between this species and potential competitors are unknown, as is the relationship between white irisette and other plant and animal species that may be essential to its survival.

- 2.3 Conduct long-term demographic studies. Long-term demographic studies should be conducted in permanent plots located within each study site established for habitat analysis. Plots should be visited annually, preferably by the same person, for at least 4 consecutive years. The locations of individual plants of all stage-classes should be mapped or photographed; data collected should include such parameters as overall plant size, number of flowers, number and size of leaves, inflorescence size, fruit number, and seed set. Larger plots, surrounding each of the smaller, more intensively measured and mapped plots, should be monitored for seedling establishment. Seedlings should be mapped and measured. Within the larger plots, overall species composition should be recorded; a cover score should be given to each species so that changes in surrounding vegetation can be determined. Any changes in the habitat within each plot (soil disturbance, soil moisture, increase or decrease in light intensity, pH, etc.) should be noted at each visit.
- 2.4 Determine the effects of past and ongoing habitat disturbance. Establishment and long-term monitoring of permanent plots may be the most effective means of assessing the effects of disturbance. The appropriate

methodology for this must be determined but will likely include measurements of many of the parameters specified in Tasks 2.2 and 2.3. Experimental habitat management that mimics different disturbance regimes is also needed. This could be done on potential (but unoccupied) habitat, using introduced plants from cultivated stock.

2.5 Define the criteria for self-sustaining populations and develop appropriate habitat management guidelines based upon the data obtained from Tasks 2.2 through 2.4.

Insufficient data exists to determine what this species requires in order for populations to be self-sustaining. Research as described in Tasks 2.2 through 2.4 should provide the information needed to protect and manage occupied habitat so that the continued survival of healthy populations is assured.

2.6 Implement appropriate management techniques as they are developed from previous tasks.

2.7 Develop techniques and reestablish populations in suitable habitat within the species' range.

Transplantation and reintroduction should only be undertaken after the genetic composition of the individual populations is known. Restoration of populations should maximize genetic variation through the use of material from several maternal sources and by using a sufficient number of propagules (at least 50 survivors) to prevent genetic drift or inbreeding depression. Techniques for the propagation and transplantation of this species should be summarized and disseminated to the appropriate organizations and individuals. Reintroduction efforts should be conducted in cooperation with knowledgeable personnel at private nurseries, botanical gardens, and the Center for Plant Conservation. Transplant sites must be closely monitored in order to determine success and to adjust methods of reestablishment.

It is crucial that the causes of recent declines be identified and alleviated before large-scale reintroduction efforts are undertaken.

3. Maintain and expand cultivated sources for the species and provide for the long-term maintenance of selected populations in cultivation. Maintaining the genotypes of small, isolated populations in cultivation should be of high priority. Seed or vegetative propagules should be collected as soon as possible from all populations that are still healthy enough to tolerate such harvest. A ready source of cultivated

material should ease the threat of taking from wild populations.

4. Enforce laws protecting the species and/or its habitat. White irisetete is not currently known to be a part of the horticultural trade, but this could become a threat in the future. The Endangered Species Act prohibits the taking of species from Federal lands without a permit and regulates trade. Section 7 of the Act provides additional protection to the habitat from impacts related to federally funded or authorized projects. In addition, for listed plants, the 1988 amendments to the Act prohibit: (1) their malicious damage or destruction on Federal lands and (2) their removal, cutting, digging up, or damaging or destroying in knowing violation of any State law or regulation, including State criminal trespass law.

White irisetete is listed as endangered in North Carolina, where State law prohibits the taking of the species without a permit and the landowner's written permission and regulates trade in the species (North Carolina State Statute 19-B, 202.12-202.19). The State of South Carolina lists the species but has not assigned a status. However, South Carolina does not offer legal protection to State-listed plants (Pittman, personal communication, 1993).

These statutes focus on regulating, not preventing, trade in endangered and threatened species and on reducing the threat to wild populations from illicit collectors. It is currently not known whether white irisetete is difficult to raise from seed. However, the possibility of establishing propagation programs and dispersing cultivated stock to botanical gardens and nurseries should be investigated. This could ease the threat of taking from wild populations.

5. Develop materials to inform the public about the status of the species and the recovery plan objectives. Public support for the conservation of white irisetete could play an important part in encouraging landowner assistance and conservation efforts. This is especially true for the populations that occur in areas being adversely affected by residential development. Information materials should not identify the plant's locations so as not to increase the threat of taking. Information materials should indicate that cultivation is being carried out by the Center for Plant Conservation, so local gardeners need not think they could help by collecting the already limited amount of seed.
 - 5.1 Prepare and distribute news releases and informational brochures. News releases concerning the status and significance of the species and recovery efforts should be prepared and distributed to major newspapers and

radio stations within the range of the species, as well as to smaller newspapers in the vicinity of the species' habitat.

5.2 Prepare articles for popular and scientific publications. The need to protect the species in its native habitat and the need for cooperation among local, State, and Federal organizations and individuals should be stressed. Scientific publications should emphasize the additional research that is needed and should solicit research assistance from colleges and universities that have conducted studies on this or closely related species.

6. Annually assess the success of recovery efforts for the species. Review of new information, evaluation of ongoing actions, and redirection, if necessary, are essential for assuring that full recovery is achieved as quickly and efficiently as possible.

C. Literature Cited

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- Weakley, A. S. 1993. Natural Heritage Program List of the Rare Plant Species of North Carolina. North Carolina Department of Environment, Health, and Natural Resources. P. 32.

PART III

IMPLEMENTATION SCHEDULE

Priorities in column one of the following Implementation Schedule are assigned as follows:

1. Priority 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.
2. Priority 2 - An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.
3. Priority 3 - All other actions necessary to meet the recovery objective.

Key to Acronyms Used in This Implementation Schedule

- CPC - Center for Plant Conservation
FWS - U.S. Fish and Wildlife Service
R4 - Region 4 (Southeast Region), U.S. Fish and Wildlife Service
SCA - State conservation agencies - State plant conservation agencies of participating States. In North Carolina, these are the Plant Conservation Program (North Carolina Department of Agriculture) and the Natural Heritage Program (North Carolina Department of Environment, Health, and Natural Resources); in South Carolina, the South Carolina Department of Natural Resources.
TE - Endangered Species Division, U.S. Fish and Wildlife Service

WHITE IRISSETTE IMPLEMENTATION SCHEDULE

Priority	Task Number	Task Description	Task Duration	Responsible Agency		Cost Estimates (\$000's)			Comments
				FWS	Other	FY1	FY2	FY3	
1	1.1	Develop interim research and management plans in conjunction with landowners.	2 years	R4/TE	SCA	5.0	5.0	---	
1	1.3	Determine habitat protection priorities.	1 year	R4/TE	SCA	1.0	---	---	
1	1.4	Evaluate habitat protection alternatives and implement.	2 years	R4/TE	SCA	10.0	15.0	15.0	
1	2.2	Study abiotic and biotic features of the species' habitat.	5 years	R4/TE	SCA	10.0	8.0	8.0	
1	4	Enforce laws protecting the species and/or its habitat.	Ongoing	R4/TE	SCA	2.0	2.0	2.0	
2	2.1	Determine population size and stage-class distribution for all populations.	2 years	R4/TE	SCA	15.0	15.0	---	
2	2.3	Conduct long-term demographic studies.	5 years	R4/TE	SCA	16.0	6.0	6.0	
2	2.4	Determine the effects of past and ongoing habitat disturbance.	3 years	R4/TE	SCA	8.0	4.0	4.0	
2	2.5	Define criteria for self-sustaining populations and develop appropriate habitat management guidelines based upon the data obtained from Tasks 2.2 through 2.4.	1 year	R4/TE	SCA	---	---	5.0	
2	2.6	Implement appropriate management techniques as they are developed from previous tasks.	Unknown	R4/TE	SCA	?	?	?	
3	1.2	Search for additional populations.	3 years	R4/TE	SCA	20.0	10.0	10.0	

WHITE IRISSETTE IMPLEMENTATION SCHEDULE (continued)

Priority	Task Number	Task Description	Task Duration	Responsible Agency		Cost Estimates (\$000's)			Comments
				FWS	Other	FY1	FY2	FY3	
3	2.7	Develop techniques and reestablish populations in suitable habitat within the species' range.	5 years	R4/TE	SCA	---	20.0	10.0	
3	3	Maintain and expand cultivated sources for the species and provide for long-term maintenance of selected populations in cultivation.	3-5 years	R4/TE	SCA, CPC	5.0	5.0	1.0	
3	5.1	Prepare and distribute news releases and informational brochures.	Ongoing	R4/TE	SCA, CPC	2.0	1.0	1.0	
3	5.2	Prepare articles for popular and scientific publications.	Ongoing	R4/TE	SCA, CPC	1.0	0.5	0.5	
3	6	Annually assess success of recovery efforts for the species.	Ongoing	R4/TE	SCA, CPC	0.5	0.5	0.5	

PART IV

LIST OF REVIEWERS

The following agencies, organizations, and individuals were mailed copies of this recovery plan. This does not imply that they provided comments or endorsed the contents of this plan.

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