

PART II

RECOVERY

Recovery Criteria

Delisting can be considered when all of the following conditions have been met:

- 1) At least two viable Oregon silverspot butterfly populations exist in protected habitat in each of the following areas: Coastal Mountains, Cascade Head, and Central Coast in Oregon; and Del Norte County in California; and at least one viable Oregon silverspot butterfly population exists in protected habitat in each of the following areas: Long Beach Peninsula, Washington and Clatsop Plains, Oregon. This includes development of comprehensive management plans.
- 2) Habitats are managed long-term to maintain native, early successional grassland communities. Habitat management maintains and enhances early blue violet abundance, provides a minimum of five native nectar species dispersed abundantly throughout the habitat and flowering throughout the entire flight period, and reduces the abundance of invasive non-native plant species.
- 3) Managed habitat at each population site supports a minimum viable population of 200 to 500 butterflies for at least 10 years.

Narrative Outline of Recovery Activities

- 1 Protect and enhance existing habitat in each of six habitat conservation areas (Long Beach Peninsula, Clatsop Plains, Coastal Mountains, Cascade Head, Central Coast, and Del Norte).**

Each habitat conservation area includes or has historically supported one or more populations of the Oregon silverspot butterfly. The areas vary in habitat area, population size, and degree of protection (See Conservation and Management). Four of the areas appear to have potential habitat for management of two populations. The majority of lands in the Coastal

Mountains, Cascade Head, and Central Coast habitat conservation areas are owned by the Siuslaw National Forest or The Nature Conservancy and have been managed for the Oregon silverspot butterfly for a number of years. The Clatsop Plains population occurs on land belonging to the Military Department of the State of Oregon, and on private and County lands. The Long Beach Peninsula populations were known to occur primarily on private and Washington Department of Fish and Wildlife lands. The Del Norte population occurs on private and California Department of Fish and Game lands.

1.1 Design and protect habitat areas for the Long Beach Peninsula population of the Oregon silverspot butterfly.

The majority of the Long Beach habitat is in private ownership. By 1992, Washington Department of Fish and Wildlife had acquired 8 hectares (20 acres), which it is managing for the Oregon silverspot butterfly. Identify additional lands important to the Long Beach population, based on current and potential habitat needs as identified through research and site specific observations. Protect additional habitat through fee acquisitions from willing sellers, conservation easements, Habitat Conservation Plans, and management agreements.

1.1.1 Map habitat areas.

Mapping of habitat is complete on State lands only. Habitat consists of breeding, nectaring, and shelter habitats and adjoining dispersal corridors that are known to have been used by the Oregon silverspot butterfly over the past several years. Access permission should be sought to conduct ground surveys of habitat. Potential habitat should be mapped on aerial photographs and 7.5 minute U.S. Geological Survey topographic maps, including landowner information.

1.1.2 Determine willingness of land owners identified in task 1.1.1 to participate in recovery of the Oregon silverspot butterfly.

The Washington Department of Fish and Wildlife is the State agency with jurisdiction over terrestrial invertebrates in Washington. The U.S. Fish and Wildlife Service and/or the Washington Department of Fish and Wildlife will notify landowners and query them as to their plans for the property and

their interest in participating in the recovery of the Oregon silverspot butterfly. Secure funding from section 6, Endangered Species Landowner Incentive Fund, National Resources Conservation Service Wildlife Habitat Incentives, Safe Harbor funding, Federal Highway Administration funding, and others. Include all willing landowners with property that has potential to provide conservation benefits to Oregon silverspot butterflies. Provide regulatory assurances through the Safe Harbor Program as necessary. Encourage development of Habitat Conservation Plans.

1.1.3 Select Oregon silverspot butterfly habitat within the Long Beach Peninsula habitat conservation area that must be protected to achieve recovery.

Evaluate currently-occupied and potential habitat areas in the light of research on how much habitat is needed to support a viable population, and how such habitat must be distributed (see task 2, below). Develop a management plan for this population center, based on habitat needs and willingness of landowners to participate in recovery efforts. This plan will provide the basis for selecting habitat areas. Habitat Conservation Plans and Safe Harbor Agreements may be appropriate for accomplishing this task on non-Federal lands. Secure funding through available sources to accomplish habitat protection and restoration. Sources include: Endangered Species Land Acquisition Fund, Partners for Fish and Wildlife, section 6, Federal Highway Administration funds, Safe Harbor Agreement funding, and others.

The Washington Department of Fish and Wildlife will take the lead on habitat protection on the Long Beach Peninsula.

1.1.4 Protect habitats identified in task 1.1.3.

This task is complete for State land, but mechanisms for protecting sufficient habitat on non-State lands need to be determined. Habitat protection mechanisms may include acquisition of fee title from willing sellers, conservation easements, and/or management agreements over key properties by Federal or State governments or appropriate nonprofit

conservation organizations. The appropriate protection mechanism will depend on interests of the landowners and availability of funding. In general, breeding habitat should be acquired in fee. Nectaring habitat and flight corridors may be protected through easements and management agreements.

Management agreements should state each entity's commitment and role in the recovery of the Oregon silverspot butterfly. Signatories to agreements should include all interested land owners, land managing agencies or organizations, Washington Department of Fish and Wildlife and the Service.

1.1.5 Develop management plan for habitats protected in task 1.1.4.

Develop a site-specific management plan to address habitat management needs, and threats to the habitat or population. The plan should include management goals, strategies for achieving those goals, funding sources, and a timeline. The management plan should be coupled with a monitoring plan. The management plan should incorporate adaptive management to detect significant changes in threats, management, research, or status of the species occurs. It should be updated and revised every 3 years.

1.1.6 Implement management plans.

Management actions have been initiated on lands already acquired by the Washington Department of Fish and Wildlife. Coordinate implementation of additional management both within and among habitat conservation areas through the Oregon Silverspot Working Group.

1.2 Develop a habitat conservation area design and protect habitat for the Clatsop Plains population of Oregon silverspot butterfly.

Primary habitat on the Clatsop Plains has been divided into three more-or-less connected areas: Del Rey Beach, Sunset Lake-Caleb Lake, and Camp Rilea. This task is completed for Camp Rilea, managed by the Oregon State Military Department, Oregon National Guard. The Del Rey Beach and Sunset Lake-Caleb Lake areas are privately owned. Identify lands important to the Clatsop Plains population, based on

current and potential Oregon silverspot habitat, and identify habitat needs through research and site specific observations. Camp Rilea has already initiated management to benefit the Oregon silverspot butterfly. Habitat on private lands should be protected through fee acquisitions from willing sellers, conservation easements, Habitat Conservation Plans, Safe Harbor Agreements, and management agreements. Funding should be sought from sources including: Federal Highway Administration funding, Oregon Department of Transportation Funds, section 6, Endangered Species Land Acquisition funding, and Habitat Conservation Plan Land Acquisition funds. Division of State Lands should be the lead agency in requesting section 6 funds for land acquisition.

1.2.1 Map habitat areas.

This task is considered completed, however, updates should be made every 5 years, as needed. Currently occupied and potential habitat on the Clatsop Plains was surveyed and mapped in 1985, 1988, 1992, and 1993 (Hammond and McCorkle 1985b; Hammond 1988b; Pickering and Macdonald 1994). The information has been mapped on U.S. Geological Survey topographic maps and in a geographic information system database. A few areas still need to be surveyed. However, some areas have not been accessible due to lack of permission to survey from the private landowners.

1.2.2 Determine willingness of land owners identified in task 1.2.1 to participate in recovery of Oregon silverspot butterfly.

This task is approximately 5 percent complete on private lands through conservation agreements with individual landowners. Additional opportunities for recovery on private land should be investigated on a willing landowner basis. Landowners should be informed of the opportunities which exist under Safe Harbor Agreements and Habitat Conservation Plans. Funding should be sought to assist with recovery implementation on private lands. Funding sources include, but are not limited to: Endangered Species Landowner Incentive Program, Partners for Fish and Wildlife, Natural Resource Conservation Service's (NRCS) Wildlife Habitat Improvement Project funds, Safe Harbor Agreement funding, section 6, Oregon State Weed Board

Noxious Weed Control grants, Federal Highway Administration funding. Division of State Lands should be the lead in seeking funding from section 6 and other sources.

1.2.3 Select Oregon silverspot butterfly habitat within the habitat conservation area that must be protected to achieve recovery.

Based on available information on the distribution of habitat and butterfly use patterns, three areas deserve special consideration: Del Rey Beach, Sunset Lake-Caleb Lake, and Camp Rilea. Additional areas which meet, or have potential to meet, the habitat requirements of Oregon silverspot butterflies will be considered.

1.2.4 Protect habitats identified in task 1.2.3.

Habitats at Del Rey Beach and Sunset Lake-Caleb Lake may be protected by acquisition of fee title from willing sellers, conservation easements, Habitat Conservation Plans, or Safe Harbor agreements. Potential land managers for acquired lands include Federal agencies, State agencies, Clatsop County, or private conservation groups. Funding should be sought from sources listed in task 1.2 and others.

Camp Rilea is publicly owned by the State of Oregon, Army National Guard. Habitat is currently protected by implementation of a habitat management plan for Camp Rilea. The plan should be updated and expanded to include a variety of management techniques that will enhance native nectar source diversity and abundance in addition to early blue violets. An Integrated Natural Resource Management Plan for Camp Rilea, completed in 2001, also emphasizes restoration and management of native grassland communities.

Clatsop County has developed the Clatsop Plains Community Plan. The plan's Fish and Wildlife Policy 2 and Policy 4 encourage private and public protection of habitat of all species which are endangered, threatened, or vulnerable. An opportunity exists to support these policies through the provision of clear zoning guidance and private land incentives to protect and restore Oregon silverspot butterfly habitat. The U.S. Fish and

Wildlife Service and Clatsop County should collaborate to develop appropriate vegetation management guidelines and make them available to landowners who are interested in maintaining native coastal grassland. Information on Federal, State, and local programs which could provide financial and technical assistance to landowners should also be included. Clatsop County owns several parcels of land which have Oregon silverspot butterfly habitat. Protection and vegetation management of these parcels would be consistent with the county's Community Plan. In addition, Clatsop County could consider development of a large-scale Habitat Conservation Plan for Oregon silverspot butterflies which would provide Endangered Species Act coverage (through issuance of Incidental Take permits) to individual landowners while providing a conservation benefit to the species. A completed Habitat Conservation Plan could expedite review and issuance of building permits while reducing landowner liability by providing Endangered Species Act compliance.

1.2.5 Develop management plans for habitats protected in 1.2.4.

In addition to the habitat management plan for Camp Rilea, develop management plans for the two other habitat areas to encourage willing protection of property. Plans should be reviewed and updated every 5 years, or as new information arises.

1.2.6 Implement management plans.

Coordinate implementation within and among the habitat conservation areas. Develop funding source to support locally-based restoration crews to oversee management and monitoring of lands enrolled in Safe Harbor Agreements, Habitat Conservation Plans, Conservation Agreements, or other species recovery initiatives.

1.3 Design, protect, and manage habitat areas for the Coastal Mountains populations of Oregon silverspot butterfly.

The Coastal Mountains habitat conservation area currently includes a large population at Mt. Hebo, Tillamook County, Oregon. Both the Hebo site and the one at Fairview Mountain are owned and managed by the Siuslaw National Forest for the Oregon silverspot butterfly.

Continue efforts to expand habitat and establish additional populations, where possible. Habitat on private lands should be protected through fee acquisitions from willing sellers, conservation easements, Habitat Conservation Plans, and management agreements. Funding should be sought from sources including: Federal Highway Administration funding, Oregon Department of Transportation Funds, section 6, Endangered Species Land Acquisition funding, and Habitat Conservation Plan Land Acquisition funds. Division of State Lands should take the lead on requesting section 6 funds for recovery of this species.

1.3.1 Map Oregon silverspot butterfly habitat at Coastal Mountains sites.

This task is considered completed, although information should be updated every 5 years, as needed. Currently-occupied and potential habitat on Mt. Hebo and Fairview Mountain have been mapped several times from 1980 to 1993. Information on habitat characteristics has been mapped on U.S. Geological Survey topographic maps and in a geographic information system database. Survey, evaluate, map, and determine ownership of additional sites.

1.3.2 Determine willingness of landowners identified in task 1.3.1 to participate in recovery of Oregon silverspot butterfly.

Lands supporting existing populations within the Coastal Mountain habitat conservation area are administered by the Siuslaw National Forest, which has designated them for management of the Oregon silverspot butterfly. The Siuslaw National Forest has been participating in recovery activities since 1980 at Mt. Hebo and in the later 1980's and early 1990's at Fairview Mountain. Ownership information for any additional sites identified in task 1.3.1 will be compiled. We will determine landowner interest in participating in the recovery of the Oregon silverspot butterfly. Landowners should be informed of the opportunities which exist under Safe Harbor Agreements and Habitat Conservation Plans. Funding should be sought to assist with recovery implementation on private lands. Funding sources include, but are not limited to: Endangered Species Landowner Incentive Program, Partners for Fish and Wildlife, Natural

Resource Conservation Service's (NRCS) Wildlife Habitat Improvement Project funds, Safe Harbor Agreement funding, section 6, Oregon State Weed Board Noxious Weed Control grants, Federal Highway Administration funding. Division of State Lands should be the lead in seeking section 6 and other funding to assist with recovery efforts.

1.3.3 Select Oregon silverspot butterfly habitat within the habitat conservation area that must be protected to achieve recovery.

This task is completed, but should be revised in light of new information. Hammond (1989) determined the habitat areas needed for recovery at Mt. Hebo and Fairview Mountain. If Fairview Mountain proves too small to support a viable population, another introduction site should be identified. If additional site(s) are identified, management plans will be developed and implemented based on habitat needs and willingness of landowners to participate in recovery efforts.

1.3.4 Protect Coastal Mountain habitats identified in task 1.3.3.

This task is completed for all federally-owned habitat. The Forest Service manages all presently-identified Oregon silverspot butterfly habitat in the Coastal Mountains to promote recovery. If additional habitats are identified, they might be secured through acquisition of fee title from willing sellers, conservation easements, Habitat Conservation Plans, Safe Harbor agreements, or arrangement of management agreements for key properties by the Federal or State governments or appropriate nonprofit conservation organizations. Funding should be sought from sources including: Federal Highway Administration funding, Oregon Department of Transportation Funds, section 6, Endangered Species Land Acquisition funding, and Habitat Conservation Plan Land Acquisition funds.

1.3.5 Update management plans for habitats protected in task 1.3.4.

Management plans have been developed for Mt. Hebo and Fairview Mountain. These plans should be updated as new information arises (approximately every 5 years). Planning for

Fairview depends, of course, on the site's proving suitable for maintaining a population.

1.3.6 Implement Coastal Mountain management plans.

Management plans for Mt. Hebo and Fairview Mountain were implemented beginning in 1990, although not all tasks have been completed due to lack of funds. Coordinate implementation of management actions within and among sites.

1.3.7 Survey additional coastal mountain grasslands.

Survey additional coastal mountain grasslands (*e.g.*, Saddle Mountain in Clatsop County, Grass Mountain and Prairie Peak in Benton County) for Oregon silverspot butterflies. If additional populations are discovered, take steps to protect them.

1.4 Design, protect, and manage habitats for the populations in Cascade Head habitat conservation area (in Tillamook and Lincoln Counties, Oregon).

The primary habitat in this habitat conservation area is owned by The Nature Conservancy and the Siuslaw National Forest. Secondary habitat to the east is in private ownership, the bulk of it controlled by the Cascade Head Ranch Homeowners Association. A management plan will be developed to include Cascade Head, Roads End, and Cascade Head Ranch. Additional lands should be protected through fee acquisitions from willing sellers, conservation easements, management agreements, Habitat Conservation Plans, or Safe Harbor Agreements. Funding should be sought from sources including: Federal Highway Administration funding, Oregon Department of Transportation Funds, section 6, Endangered Species Land Acquisition funding, and Habitat Conservation Plan Land Acquisition funds. Division of State Lands should be the lead in seeking funding from section 6.

1.4.1 Map Oregon silverspot butterfly habitat.

This task is completed, although the database should be converted to a more accessible and widely used format (*i.e.*, ArcView) and future updates should be completed every 5 years, as necessary. Current and potential habitat in the Cascade Head habitat conservation area was surveyed and mapped in 1986, and in 1992 to 1993. Information on habitat characteristics was

mapped in 1992 and 1993 (nectar resources, violet abundance, habitat type, land use, slope, aspect, and invasive species). These data have been compiled in a geographic information system database.

1.4.2 Determine willingness of land owners identified in task 1.4.1 to participate in recovery of the Oregon silverspot butterfly.

The Nature Conservancy's Cascade Head Preserve, adjacent Siuslaw National Forest lands, and Roads End are managed for the Oregon silverspot butterfly, as well as other rare species and vegetation communities. Ownership information will be compiled for additional habitat areas. Landowners will be contacted by the Service and queried as to their interest in participating in the recovery of the Oregon silverspot butterfly. Funding should be sought from sources identified in task 1.4 and other sources, as identified. Landowners should be informed of opportunities to assist with Oregon silverspot habitat recovery. Division of State Lands should seek section 6 and other funding to assist with recovery efforts.

1.4.3 Select Oregon silverspot butterfly habitat within the habitat conservation area that must be protected to achieve recovery.

A management plan for the Cascade Head habitat conservation area will be developed based on habitat needs and voluntary participation of landowners in recovery efforts.

1.4.4 Protect habitats identified in task 1.4.3.

The majority of existing or potential Oregon silverspot butterfly habitat in the Cascade Head habitat conservation area has been protected by The Nature Conservancy. Some additional habitat occurs on adjacent Forest Service lands. Additional habitat may be identified in task 1.4.3 as necessary to protect sufficient habitat for the Oregon silverspot butterfly within the habitat conservation area. If so, the additional key properties should be secured through acquisition in fee title from willing sellers, conservation easements, or management agreements by Federal or State governments or appropriate nonprofit conservation organizations. Division of State Lands should be the lead in seeking funding from section 6.

1.4.5 Develop management plans for habitats protected in 1.4.4.

A management plan has been developed for Cascade Head and for the Roads End portion of the habitat conservation area.

Management plans should be reviewed and updated as needed to address changing habitat management needs and threats and to include new information as it becomes available.

1.4.6 Implement management plans.

The Roads End management plan was implemented in 1990, but has been temporarily halted pending further information.

Resume implementation based on schedules in the management plans. Coordinate implementation within and among habitat conservation areas.

1.5 Design a habitat conservation area for the Central Coast population of Oregon silverspot butterfly and protect and manage its habitats.

The Central Coast population presently includes the Rock Creek-Big Creek and Bray Point sites in Lane County, Oregon. Significant portions of the Central Coast population have already been protected and are being managed by the Siuslaw National Forest, which is attempting to acquire additional habitat on private land at Rock Creek-Big Creek and the historic population site at Squaw Creek. In addition to these acquisitions, management agreements, conservation easements, Safe Harbor Agreements, and Habitat Conservation Plans may also be important in securing and managing lands in the Central Coast habitat conservation area. Funding should be sought from sources which include: Federal Highway Administration funding, Oregon Department of Transportation Funds, section 6, Endangered Species Land Acquisition funding, and Habitat Conservation Plan Land Acquisition funds. Division of State Lands should be the lead in seeking funding from section 6.

1.5.1 Map Central Coast Oregon silverspot butterfly habitat.

This task is considered completed, although the database should be converted to a more accessible and widely used format (*i.e.*, ArcView) and updates every 5 years may be necessary. The Siuslaw National Forest has periodically mapped currently occupied and potential habitat since 1980, and has conducted

annual monitoring since 1984. Initial mapping was done on U.S. Geological Survey topographic maps. Information on habitat characteristics mapped in 1992 and 1993 (nectar resources, violet abundance, habitat type, land use, slope, aspect, and invasive species) has been entered into a geographic information system database. Ownership information on additional private lands should be compiled for currently occupied and potential habitat areas.

1.5.2 Determine willingness of landowners identified in task 1.5.1 to participate in recovery of the Oregon silverspot butterfly.

Efforts to complete this task are underway. The Siuslaw National Forest has participated in recovery efforts since 1980. In 2001 we initiated work with Audubon Society, The Nature Conservancy, and local landowners to restore habitat on private and State park land under funding by the Endangered Species Landowner Incentive Program and from Natural Resource Conservation Service's Wildlife Habitat Improvement Project funds. Landowners will receive regulatory protection under the Safe Harbor Agreement program. This effort has potential to expand to include any willing non-Federal landowners in the Central Coast habitat conservation area. Continued efforts should be made to additional funding through all available sources, including: section 6, Partners for Fish and Wildlife, Safe Harbor Agreements, Oregon State Weed Board Noxious Weed Control grants, and Federal Highway Administration funding.

Oregon Department of Transportation and the Federal Highway Administration should provide mitigation funding toward intensive habitat restoration, expansion, and long-term management. Highway 101, a Scenic Byway, bisects the Oregon silverspot butterfly habitat. Funding for native meadow restoration would mitigate for road mortality of butterflies as well as to increase the aesthetic value of the Scenic Byway.

1.5.3 Select Oregon silverspot butterfly habitat within the Central Coast habitat conservation area that must be protected to achieve recovery.

Develop a management plan for the Central Coast habitat conservation area that is based on habitat needs and willingness of landowners to participate in recovery efforts. Secure funding through available sources including: Endangered Species Land Acquisition fund, section 6, Federal Highway Administration funds, Partners for Fish and Wildlife, NRCS Wildlife Habitat Improvement Projects, and Safe Harbor Agreement funding. The Division of State Lands should take the lead in requesting section 6 funds for Oregon silverspot butterfly recovery.

1.5.4 Protect habitats identified in task 1.5.3.

Most of the presently identified Oregon silverspot butterfly habitat on the Central Coast habitat management area (Rock Creek-Big Creek and Bray Point) is managed by the Siuslaw National Forest to promote recovery of the Oregon silverspot butterfly. If task 1.5.3 identifies additional habitat as necessary to protect the Oregon silverspot butterfly within the habitat conservation area, the additional habitat may be secured through acquisition in fee title from willing sellers, conservation easements, or management agreements over key properties by Federal or State governments or appropriate nonprofit conservation organizations. However, the emphasis should be on managing existing habitat or potential habitat that is already protected. Development of Safe Harbor Agreements and Habitat Conservation Plans should be encouraged.

1.5.5 Update management plans for habitats protected in task 1.5.4.

Management plans have been developed for Siuslaw National Forest lands at Rock Creek-Big Creek and at Bray Point. Periodic review and revision of the plans are needed every 3 years.

1.5.6 Implement Central Coast management plans.

Implementation of the management plan for Rock Creek-Big Creek began in 1990, although due to lack of funds, not all tasks have been completed. Activities were not initiated at Bray Point until several years later.

Coordinate further implementation of the plan within and among habitat conservation areas.

1.6 Design, protect, and manage habitats for Oregon silverspot butterfly populations in Del Norte County, California.

Relatively little is known about the Del Norte County populations. Population size and total habitat extent at Point St. George-Lake Earl has not been determined. Early blue violet habitat is known to exist from Lake Earl to Point St. George.

Determine whether inventories for the Oregon silverspot butterfly need to be expanded. Identify lands important to the Del Norte population, based on current habitat, potential habitat, and habitat needs as identified through research and site specific observations. Arrange protection for important areas through fee acquisitions from willing sellers, conservation easements, and management agreements. Work with willing private landowners to implement recovery on private lands using Safe Harbor Agreements and Habitat Conservation Plans where applicable. The U.S. Army Corps of Engineers and Federal Emergency Management Agency should provide funding for Oregon silverspot butterfly habitat restoration and management projects as part of water level management for Lake Earl.

1.6.1 Map Oregon silverspot butterfly habitat in the Del Norte area.

This task should require 1 year to complete. Portions of the Del Norte population were surveyed in 1991, 1992, and 1998. Additional habitat surveys are needed throughout coastal Del Norte County. The survey information on habitat quality will be mapped on U.S. Geological Survey topographic maps and transferred to a geographic information system database. Compile ownership information for currently occupied and potential habitat areas to facilitate landowner contact.

1.6.2 Determine willingness of land owners identified in task 1.6.1 to participate in recovery of the Oregon silverspot butterfly.

We will notify landowners and query them as to their interest in participating in the recovery of the Oregon silverspot butterfly. Secure funding from section 6, Endangered Species Landowner

Incentive Fund, NRCS Wildlife Habitat Incentives, Partners for Fish and Wildlife, Safe Harbor funding, Federal Highway Administration funding, and others. Include all willing landowners with property that has potential to provide conservation benefits to Oregon silverspot butterflies. Provide regulatory assurances through the Safe Harbor Program as necessary. Encourage development of Habitat Conservation Plans. The Federal Emergency Management Agency the Army Corps of Engineers should manage Lake Earl water levels to optimize habitat conditions for the Oregon silverspot butterfly and provide funding for habitat restoration and management.

1.6.3 Select Oregon silverspot butterfly habitat in the Del Norte habitat conservation area that must be protected to achieve recovery.

Develop a management plan for the Del Norte population center to address habitat needs and landowners' willingness to participate in recovery efforts. Evaluate the currently occupied and potential habitat areas with respect to research needs and distribution patterns necessary to support a viable population.

1.6.4 Protect habitats identified in task 1.6.3.

Protect sufficient habitat within the habitat conservation area. Protecting habitats identified in task 1.6.3. may be accomplished by Federal or State governments or appropriate nonprofit conservation organizations. Methods may include acquisition in fee title from willing sellers, conservation easements, and/or arranging management agreements for key properties. Because the area has a large number of private landowners, habitat might also be protected by developing and implementing a Habitat Conservation Plan.

1.6.5 Develop management plans for habitats protected in task 1.6.4.

Develop a management plan to address habitat management needs and threats to the habitat or population. The plan's elements will include management goals, strategies for achieving those goals, funding sources, and a timeline (schedule). Couple the management plan with a monitoring plan. (See task 3).

1.6.6 Implement Del Norte management plans. Implement plans based on their schedules. Coordinate implementation of management actions both within and among the habitat conservation areas.

2 Determine ecological requirements, population constraints, and management needs of the Oregon silverspot butterfly.

2.1 Refine understanding of habitat requirements of the Oregon silverspot butterfly for conservation planning purposes.

2.1.1 Clarify the extent and condition of habitat areas necessary to provide for breeding, nectaring, and shelter by the Oregon silverspot butterfly.

This task is approximately 60 percent complete. Studies starting in the 1980's have investigated both habitat conditions and butterfly response to habitats. Future needs include: Identification of habitat areas that support high, medium, and low densities of adult butterflies and determination of environmental correlates of butterfly distribution and abundance, taking into consideration slope, aspect, soil types, distance from the coast, vegetation composition and structure, and historical management. Propose at least one reserve configuration to meet ovipositing, nectaring, and sheltering habitat needs of a viable population. Alternative configurations may be feasible.

2.1.2 Ascertain the distribution and habitat requirements of the early blue violet and nectar source plants.

This task is approximately 60 percent complete, based on studies of the central coast and Cascade Head populations as well as research done by the Washington Department of Fish and Wildlife in Long Beach Peninsula. Determine the environmental correlates of habitat suitability for early blue violet, including slope, aspect, soil types, soil moisture, distance from coast, vegetational community, successional stage, and historical management. Map the actual distribution and density of early blue violet within suitable habitat. Also map nectar source plants.

2.1.3 Identify dispersal patterns (distances, directions, habitat needs) of the Oregon silverspot butterfly needed to facilitate migration between patches.

Determine the length, width, and structural characteristics of potential routes likely to be used by the majority of dispersing individuals. For strong populations, it is appropriate to use mark-recapture studies to identify dispersal routes between habitat areas. If population numbers are low, direct observation should be utilized. Determine role and effect of prevailing winds in butterfly dispersal.

This task is 40 percent complete, based on studies of butterfly movement between Bray Point and Rock Creek and by studies of nectaring and ovipositing use of habitat by populations at Bray Point, Rock Creek, Mount Hebo, and Cascade Head. Isolation and fragmentation of existing silverspot butterfly populations may reduce the ability to further determine natural dispersal patterns of this species.

2.2 Refine the understanding of factors that affect population dynamics and persistence of the Oregon silverspot butterfly for purposes of reserve management.

The Oregon silverspot butterfly requires low-growing early successional coastal meadow habitat with adequate juxtaposition and abundance of early blue violet, blooming nectar sources, and wind protection.

2.2.1 Determine management methods for:

2.2.1.1 Controlling exotic grasses.

Non-native grasses such as bent grass, European beachgrass, heath grass, orchard grass, velvet grass, reed canary grass, and tall fescue commonly invade meadows, crowding out low-growing early blue violet and nectar plants needed by the butterfly. Vegetation management techniques used effectively to control brush species at Rock Creek have proven non-effective or even beneficial for non-native grass species. Grasses have

become a major threat to Oregon silverspot butterfly habitat and currently limit recovery.

Develop and implement effective control techniques for non-native grasses. Effects of control methods on early blue violets and native nectar sources should be determined. More intensive methods should be developed for areas with advanced encroachment of grasses or where violet and nectar sources have been completely suppressed.

2.2.1.2 Increasing or maintaining early blue violet density.

Mowing and burning have been used successfully for almost 10 years at some sites to reduce competing grasses and herbs, and to improve conditions for early blue violets. Additionally, early blue violet seeds have been broadcast to expand violet populations.

Gather more information on these and other techniques to help reestablish early blue violet populations on large remnant areas capable of supporting populations or on sites within the dispersal distance of occupied habitats.

2.2.1.3 Establishing or maintaining nectar plant abundance and density.

Nectar species are somewhat limited at several of the Oregon silverspot butterfly's population centers. Additionally, management techniques such as mowing and grazing which encourage early blue violets can have negative impacts on nectar species.

This task is approximately 60 percent complete. Information exists on which species should be provided and on affects of management on those species. Techniques to enhance nectar species in meadows and in portions of the forest fringe should be completed.

2.2.1.4 Controlling trees.

At most of the sites, tree species such as Sitka spruce, shore pine, Douglas-fir, and red alder are invading meadows. Existing stands of trees are simply removed by cutting or mowing, but this can be an expensive procedure. These techniques should be refined as additional information becomes available.

2.2.1.5 Controlling brush.

This task is approximately 75 percent complete. Brush species such as salal, bracken fern, trailing blackberry, serviceberry, Scotch broom, and thimbleberry commonly invade meadows and crowd out the low-growing early blue violet and nectar plants needed by the butterfly. Brush has been removed successfully for almost 10 years using hand slash-and-burn and mowing. Nevertheless, these and other techniques will be studied further and refined to ultimately allow control of resilient species like bracken fern that seem to actually benefit from occasional control treatments.

2.2.1.6 Monitor and control exotic forbs.

False dandelion has some limited use as a nectar source for Oregon silverspot butterflies, however, it appears to increase under management regimes that use intensive mowing and can compete with early blue violet.

Continue to monitor exotic forbs, including false dandelion. This task is approximately 40 percent complete based on research by Hays and Johnson (1998, 2000) and by Pickering *et al.* (2001). However, more effective control techniques should be developed and implemented.

2.2.2 Determine effects of selected management methods on habitat needs of non-target species.

Coastal and subalpine meadows used by the Oregon silverspot butterfly are sensitive and relatively rare environments. They are the habitat of other rare, threatened, endangered, and candidate

species such as the insular saepiolus blue butterfly (*Plebejus saepiolus insulanus*), hairy-stemmed checker-mallow (*Sidalcea hirtipes*), silver phacelia (*Phacelia argentia*), and showy fawn lily (*Erythronium elegans*). It is important to determine the habitat requirements of these species, and to assess the effects of management for the Oregon silverspot butterfly on them.

2.3 Determine optimum methods of re-introducing butterflies into restored or unoccupied habitat.

Oregon silverspot butterflies at Clatsop Plains and the Central Coast exhibit considerable movement. These populations have a greater propensity to colonize restored habitat within 8 kilometers (5 miles) of occupied habitat by dispersion than other, more sedentary populations. As a result, artificial introduction techniques may be necessary only for unoccupied sites that are more than 8 kilometers (5 miles) from occupied habitat or a shorter distance from habitat occupied by the more sedentary populations.

Additionally, artificial introduction techniques may be needed at some habitat conservation areas that are exhibiting population declines and/or contain very low Oregon silverspot butterfly populations that may eventually lead to extirpation. The Long Beach population is likely extirpated; and the population at Clatsop Plains is extremely low. Several methods may need to be employed to maintain genetic diversity and maintain viable populations under these circumstances, including captive breeding and return of individuals to their respective habitat conservation area, captive breeding and transfer of individuals to a different habitat conservation area, or collection of adults to translocate them into a different habitat conservation area. We will ensure that introductions are done according to all applicable Federal laws and policies.

2.3.1 Determine methods for the captive culture and rearing of the Oregon silverspot butterfly.

This task is approximately 80 percent complete. Successful techniques for the culture and rearing of the Oregon silverspot butterfly have been described in detail by Hammond and McCorkle (1991) and have been modified and implemented by

Andersen *et al.* (2001). Refinements of the technique will be attempted in 2001 and 2002.

2.3.2 Determine methods for the release of reared Oregon silverspot butterfly caterpillars into restored or unoccupied habitat.

This task is complete. Reared Oregon silverspot butterfly caterpillars have been successfully released at Cascade Head (Pickering 2001) using methods modified from Hammond and McCorkle (1991).

2.4 Determine methods of reducing impacts of impingement of butterflies by vehicles along Highway 101.

Oregon silverspot butterflies risk collision with vehicles when traveling along or crossing roads to access or search for habitat. Risk of mortality from collision is anticipated to increase as speeds, number of vehicles, area for impact, and amount of time spent by Oregon silverspot butterflies in the road corridor increase. Highway 101 is close to known Oregon silverspot butterfly populations within the Clatsop Plains and Central Coast habitat conservation areas. Much of the road cut for Highway 101, especially in the central coast, was built at a lower grade than the surrounding habitat. This creates a wind shelter in the road right-of-way that may encourage Oregon silverspot butterflies to take refuge along the road during windy days, thus increasing the probability of collision with vehicles.

Federal Highway Administration funding for Highway 101, maintained and operated by the Oregon Department of Transportation, is used for planning and construction of Highway 101. The Oregon Department of Transportation entered into a Memorandum of Agreement with us in 1997 in which they agreed to collect 4 years of data on Oregon silverspot butterfly mortality from vehicle collision, and on silverspot butterfly use of the highway corridor for wind-protection or during movements between nectaring, ovipositing, and sheltering habitats. The research should provide insights into how to better manage habitats to avoid highway impacts to Oregon silverspot butterflies.

2.4.1 Determine the amount of mortality caused to Oregon silverspot butterflies at:

2.4.1.1 Clatsop Plains.

Assess the amount of road mortality to determine effects of vehicle collision on the Clatsop Plains population.

2.4.1.2 Central Coast.

This task is approximately 80 percent complete by the Oregon Department of Transportation. A final report should be available in 2002. Assess the amount of road mortality to determine effects of vehicle collision on the Central Coast population.

2.4.2 Determine the best methods for reducing or compensating for the number of road kills

Reducing the butterfly mortality by changing speed limits, road detours, or building diversions has not been practical. However, mitigation to compensate for road killed Oregon silverspot butterflies should be pursued. The focus of mitigation efforts should be on developing large habitat restoration areas offset from the highway corridor, securing funding for management of additional habitat within and adjacent to existing habitat conservation areas, restoring and maintaining habitat corridors between existing habitat patches to provide butterfly dispersal corridors that minimize highway crossing, and providing wind protected nectaring and ovipositing areas away of the road cut for Highway 101. Potential funding sources for these projects include Federal Highway Administration discretionary funding programs such as Scenic Byways Funding and the Transportation Equity Act (TEA 21) as well as funds provided as a part of periodic highway improvement or bridge replacement projects to offset potential impacts to habitat.

3 Monitor the butterfly's status and its habitat.

The purpose of monitoring is to track the butterfly's status and progress toward its recovery objectives. Because the Oregon silverspot butterfly inhabits early successional grasslands that can rapidly be invaded by shrubs and trees, both population (distribution and abundance) monitoring and tracking of habitat management actions is necessary. Select parameters for each, determine methods and techniques, and develop and implement a plan.

3.1 Determine appropriate parameters to determine population trends.

Use the following criteria to select parameters for monitoring a population: 1) the parameter should reflect real changes in the population and habitat, 2) collecting the data should have minimal effects on butterfly populations, and 3) it should be cost effective.

3.2 Determine appropriate parameters to determine habitat trends.

Select habitat parameters that meet the following criteria: 1) the parameter should reflect real changes in the habitat that affect the Oregon silverspot populations, 2) collecting the data should have minimal effects on butterfly populations and habitat, and 3) it should be cost effective.

3.3 Develop monitoring guidelines and techniques for tracking population status.

Select population monitoring guidelines and techniques that meet the following criteria: 1) have an acceptable level of accuracy, 2) be repeatable over time and among observers, and 3) have a low impact on the butterfly and its habitat.

Specify in the monitoring guidelines the methods to be used, frequency and timing of monitoring activity, equipment needs, and skills and experience needed by observers collecting data.

3.4 Develop monitoring guidelines and techniques for tracking habitat status and habitat management activities.

Specify in the monitoring guidelines the methods to be used, frequency and timing of monitoring activity, equipment needs, and skills and experience needed by observers collecting data.

To evaluate habitat status and accurately implement monitoring activities, maintain data on location, extent, and timing of management actions. Fully describe each management action (*e.g.*, weather conditions during a prescribed burn and the type of burn, equipment used in mowing and mowing height). (See task 3.3.)

3.5 Develop monitoring plans for each of the population centers.

Base site-specific monitoring plans on guidelines and techniques developed in task 3.4.

Each plan will describe specific monitoring methods for the site, how and when each method will be implemented, where data will be stored, and what personnel will be involved. Review and update plans every 5 years or as new information and/or modifications are made to the plan. Coordinate monitoring between sites to maximize its usefulness.

Develop or update monitoring plans for the following butterfly population centers:

3.5.1 Long Beach habitat conservation area.

3.5.2 Clatsop Plains habitat conservation area.

3.5.3 Coastal Mountains habitat conservation area.

Incorporate any new areas selected under task 1.3.3 into existing monitoring plans.

3.5.4 Cascade Head habitat conservation area

Incorporate any new areas selected under task 1.5.3 into existing monitoring plans.

3.5.5 Central Coast habitat conservation area

Incorporate any new areas selected under task 1.3.3 into existing monitoring plans.

3.5.6 Del Norte habitat conservation area.

3.6 Implement a monitoring plan for each of the population centers.

Monitoring data will make it possible to evaluate the effectiveness of management activities and to track recovery and population trends of the Oregon silverspot butterfly. Provide copies of monitoring reports to the U.S. Fish and Wildlife Service and appropriate State agencies with jurisdiction over, or interest in, invertebrates.

Gather data according to methods outlined in the monitoring plan. Note any deviations from the plan. Review data annually and summarize them in a report. Summarize monitoring efforts annually and provide the summary to Federal and State resource agencies so

they can further review and assess the status of populations and habitat. Identify any new threats to the butterfly.

3.6.1 Long Beach habitat conservation area.

3.6.2 Clatsop Plains habitat conservation area.

3.6.3 Coastal Mountains habitat conservation area.

3.6.4 Cascade Head habitat conservation area.

3.6.5 Central Coast habitat conservation area.

3.6.6 Del Norte habitat conservation area.

3.7 Implement augmentation/reintroduction, if appropriate, based upon population trends, habitat availability, and life history factors.

For the past several years, the Long Beach and Clatsop Plains habitat conservation areas have had low Oregon silverspot butterfly populations and little habitat management or protection. Populations at Cascade Head have exhibited a declining trend from 1990 to 1998. Bray Point populations also have generally exhibited a declining trend. The Del Norte population size is relatively low and may not be sustainable unless it becomes larger. Factors leading to decline are not yet fully understood. Augmentation may be necessary to prevent extirpation of populations while attempts to understand and reverse declining trends are being undertaken. Plans should also be made to reintroduce butterflies to sites of extirpated populations, if habitat conditions appear suitable.

While it is not entirely clear why the Oregon silverspot populations have declined in recent years, one probable factor is a decline in habitat quantity and quality.

Augment the populations and conduct reintroductions while studies are being conducted to further elucidate the factors for the decline, so these factors can be taken into account as augmentation or reintroduction continues.

4 Reduce take.

The Oregon silverspot butterfly is highly prized by butterfly collectors. Take of Oregon silverspot butterflies may also occur as a result of development, changes in land use, and road mortality. Road mortality is addressed in task 3.4.

Monitor collecting of, and commerce in this species. Land-use changes or land development activities that may take Oregon silverspot butterflies may be monitored through local planning processes and indirectly through the subtasks of task 3.

The U.S. Fish and Wildlife Service and other law enforcement agencies are responsible for investigating suspected violations of the take prohibition. Because this is part of their regular responsibilities and funding should be provided accordingly, enforcement activities are not part of the recovery plan.

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Part III

IMPLEMENTATION SCHEDULE

The table that follows is a summary of scheduled actions and estimated costs for this recovery program. It is a guide to meet the objectives of the Oregon silverspot butterfly revised recovery plan detailed in Part II, Narrative Outline of Recovery Tasks. This table indicates the priority in scheduling tasks, estimated costs for performing these tasks, identified agencies responsible for performing each task, and a time table to accomplish objectives. Initiation of these actions is subject to availability of funds.

Priorities in column one of the following implementation schedule are assigned as follows:

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

Codes used in the implementation schedule:

- Continual — Task will be implemented on an annual or periodic basis once it is begun.
- Ongoing — Task is currently being implemented and will continue until actions are no longer necessary for recovery.
- * — Lead Agency.
- TBD — Costs to be determined.
- Total Cost — Projected cost from task start to task completion.