Volume 2

Bandon Dunes
Golf Resort

PHASE 8 FINAL
DEVELOPMENT PLAN

NOVEMBER 5, 2009
Bandon Dunes Golf Resort

PHASE 8 FINAL DEVELOPMENT PLAN

PART I: INTRODUCTION & SUMMARY MATRIX CHART
PART II: TECHNICAL DISCUSSION
PLANS & DRAWINGS
APPENDICES

NOVEMBER 5, 2009

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INTRODUCTION & SUMMARY MATRIX CHART
INTRODUCTION

ORGANIZATION OF THIS SUBMITTAL

To facilitate review, the Phase 8 Final Development Plan Review Application is organized into three parts in the same manner as the previous submittals:

• PART I—An Introduction which provides an explanation and rationale for a proposal that would blend two mutually supportive projects—a low-impact recreation use with a long-term natural resources conservation program as well as background material and the planning context for the project.

A Summary Matrix Chart follows that allows the reader to quickly gain an overview of the submittal, a reference key to the various maps, plans, other graphic materials, and appendix documents that comprise the application. The chart is organized with subheadings that reflect the requirements outlined in Section 4.10.065 of the 1996 Final Decision document.

• PART II—The Technical Discussion section presents detailed information on important planning issues affecting the two components.

• APPENDICES—Support materials are included in this section of the report.

PROPOSED PROJECT AND LOCATION MAP

Project Description

Phase 8 will involve about 27 acres of the 2140-acre Bandon Dunes Resort site. It will be located in the Natural-Resource zone just south of the Cut Creek ravine and west of the Bandon Trails golf course.

Almost three-fourths of the project area, about 20 acres, will be intensively managed to enhance and expand native plant communities, especially open-sand species such as silvery phacelia, in place of an existing landscape increasingly dominated by European beach grass, gorse, and dense stands of shore pine.

The remaining seven acres will become small islands of turf, mainly native fescue, constituting the tees, greens, and approaches of a special-purpose, low-intensity, small-scale golf course. These elements will be carefully integrated into the restored duneland setting to ensure long-term sustainability as well as compatibility between recreation and habitat restoration.

Sustainability and integration permeate the thinking behind the design concept. This approach will establish a built-in, ongoing source of funding for
Exhibit 1: Project Location Map
THE EXISTING SCENIC DUNES ENVIRONMENT

As stated in the Bandon Coastal Dunelands Conservation, Recreation and Resort Development Master Plan, August 1996, one of the primary purposes of the project has been to

"Provide for resource conservation and enhancement while providing economic and recreational development pursuant to Statewide Planning Goals. The Master Plan calls for harnessing resource protection and low-impact recreational development in a manner that makes them mutually dependent and mutually supporting. The site has been heavily impacted by the encroachment of noxious alien plant species, unregulated hunting, off-road vehicle activity, gold mining and commercial timber management. Recovery and enhancement of the natural and scenic qualities of the site will be made both necessary and economically feasible as a key to the success of a development whose main selling point is the environmental health and beauty of its unique coastal setting."

The past 16 years of planning, design, construction, operations, and management on the 2140-acre Bandon Dunes Resort site have succeeded in realizing most of these goals. However, in the dunelands areas south of Cut Creek, where resort-related activity has been minimal, encroachment by gorse, scotch broom, beach grass has continued to reduce habitat for silvery phacelia, sand verbena, and other open-sand species. Except where construction activities have involved use of heavy equipment to remove extensive areas of exotic plant species, the three main invasive plant species--gorse, Scotch broom and European beach grass--have continued to gain ground.

One of the sensitive environmental areas recognized in the 1996 Master Plan is the "Scenic Dunes" area located immediately south of Cut Creek. At that time, substantially larger areas of mixed open sand and grassland habitat characterized this area and adjacent state park land. Then as now, the plant community included silvery phacelia, thought to be the largest population in the United States. The State of Oregon lists this plant species as threatened, although it is not federally-listed as either threatened or endangered. As a result, it was deemed to be a primary candidate for protection and preservation. At that time, the recommended conservation strategy was to leave it alone, prohibiting structural improvements, intensive recreational uses, controlling foot access and prohibiting the use of off-road vehicles.

Over the years, encroachment has continued and it has become apparent that more aggressive management is needed. Invasive species encroachment has continued to change the ecology of the scenic dunes since 1993. Fortunately, a promising way forward has been suggested by experience since then. Silvery phacelia are colonizing and thriving in open sand areas opened up and maintained within the playing boundaries of the western holes of the Bandon
center of the photographs has become denser. Unless checked, the advance of shore pine trees, together with the other exotic plants, will dramatically alter the scenic quality and ecology of the existing scenic dunelands.
Bandon Dunes Golf Resort
Duneland Conservation~Recreation Project

EXISTING SITE CONDITIONS: AERIAL PHOTO 2009
2005 Site Aerial Photograph: Partial View of West End of Proposed Golf Course

2009 Site Aerial Photograph: Partial View of West End of Proposed Golf Course

Exhibit 3: Comparison of 2005 NS 2009 Aerial Photographs
MANAGEMENT PRACTICES AND STUDIES IN THE SCENIC DUNELANDS

In 2000, a hiking trail was built to allow resort guests and day visitors’ foot access from the resort center to the beach just south of where Cut Creek flows into the ocean. The presence of this trail gave resort staff maintenance access to the area so they could begin actions to protect the silvery phacelia population.

The past five years have seen some reduction of beach grass through a European beach grass eradication and abatement Program initiated by the resort. Resort staff and a citizen volunteer have accomplished the work by hand pulling the beach grass. This effort was concentrated on five primary sites, each of which was revisited several times to remove re-growth. During the summer of 2008, the resort hired two maintenance specialists to assist in the beach grass removal and abatement program.

USF&W Study

In 2006 the U.S. Fish & Wildlife (USF&W) Service office in Arcata, California contracted with Jennifer Kalt to undertake a Status Review and Field Inventory for Silvery phacelia along portions of the Oregon and California coast. Her on-site inventory of the silvery phacelia populations on resort and state parkland was accomplished in June 2007. A final report was published on April 1, 2008, and it documented the fact that there have been only 30 occurrences of silvery phacelia reported since 1916 with the majority being in southern Oregon (see Appendix C: Status Review and Field Inventory for Silvery phacelia: Phacelia argentea (Hydrastylaceae), April 1, 2008).

The study confirmed that the existing populations are small and highly fragmented. Most are declining in numbers. The study confirms that all phacelia habitats are primarily threatened by European beachgrass and notes that gorse is also a threat in southern Oregon. It reports that there is a significant population on Bandon Dunes Resort property. The USF&W study estimated the phacelia population on resort and neighboring state park land to be approximately 3000 plants. In Oregon, silvery phacelia is classified as a “Listed Threatened Species” by the Oregon Department of Agriculture. It is not federally listed.

In 2007, during her study, Ms. Kalt prepared a photographic aerial plan map showing the approximate extent of the existing silvery phacelia population as well as the approximate extent of suitable habitat on resort and adjacent state park land (See Appendix D: Sand Dune Phacelia (Phacelia argentea) at Bandon Coastal Property, Bandon, Oregon, June 29, 2007). Boundary data from this plan map was copied and superimposed over the proposed golf course routing plan. This information was used to help identify potential impacts and to help identify habitat reclamation and expansion opportunities.
The US Fish and Wildlife Report confirms that European beach grass and gorse are serious threats to silvery phacelia:

"The primary threat to populations and habitat of silvery phacelia is invasion by nonnatives. In particular, silvery phacelia is threatened by European beachgrass (Ammophila arenaria) throughout its range, and in addition by gorse (Ulex europaea) in [the] northern part of its range (particularly in sites near Bandon, Oregon)." USF&W 2008 Report, Section IV.A.

A very promising finding in the 2008 Fish and Wildlife Study is that silvery phacelia seed beneath a mat of beach grass can re-colonize an area after the beach grass has been removed:

"Fortunately, silvery phacelia appears to persist for some time beneath a canopy of European beachgrass, potentially allowing for successful recovery of populations by manual removal of European beachgrass." 2008 USF&W Report, Section IV.A.

Another of the report’s findings, equally relevant to this proposal, is the importance of sustained effort:

"Ongoing management of European beachgrass is crucial to the conservation and recovery of silvery phacelia populations throughout its range." 2008 USF&W Report, Section IV.A

The proposed preserve golf course and habitat enhancement project responds directly to these findings.

Environmental Management Thesis Project

In June 2008, Ashley Edwards, a staff intern at the Bandon Dunes Golf Resort, undertook a recreational land management study of the proposed Par 3 Golf Course as the focus for a master’s thesis in Environmental Management at Portland State University. As part of her study she assessed numbers and locations of silvery phacelia plants potentially affected by the proposed golf course. During the summer of 2008, Ms Edwards conducted an on-site inventory of the population and interviewed resort maintenance staff regarding silvery phacelia habitat maintenance and restoration activities, including invasive plant abatement measures.

The following extract from Ms. Edwards’ 2009 thesis describes the methodology she used to inventory the silvery phacelia population:
To conduct the silvery phacelia inventory, a Garmin HCx etrex Global Positioning Unit (GPS) was used. This is a midline recreational GPS unit that was used to collect positional data on silvery phacelia. A minimum of four satellites was used for the inventory, allowing for the most precise locations. The accuracy of this Garmin GPS unit is approximately nine feet, resulting in any individual plants falling in that radius to be counted as the same location. A single Silvery phacelia, completely surrounded by sand, was categorized as one individual plant. When collecting positional data, a minimum of 50 points was used to produce the most accurate latitude and longitude reading in the WGS84 datum. Each of the 50 points consists of one-second GPS data, which includes latitude and longitude location and its specific time. Using a large number of points increases precision when averaging all point locations to get the overall coordinates. Waking the active dune sheet from south to north, in a zig-zag west to east orientation, plants were inventoried as they were encountered. Portions of the dune sheet that are heavily invaded by European beachgrass received a less through search due to Silvery phacelia's inability to compete for resources with this invasive species.

After collecting point information on the Silvery phacelia population, data was saved in an Excel spreadsheet. All of the data from the spreadsheet can be imported into ArcGIS (proprietary ESRI software) as the attribute table for the Silvery phacelia locations. Each point has a number of plants associated with a set of coordinates. Due to the accuracy of the GPS being nine feet, the number of plants in any given location can determined in the GIS attribute table. Latitude and longitude coordinates were then converted from degree minute seconds into decimal degree coordinates, allowing the information to be displayed spatially in ArcGIS. Prior to this step, the Excel spreadsheet was saved as a database file (.dbf) format, which can be imported into a personal geodatabase and added to an ArcMap (.mxd) window. After pre-processing the data, it was be assigned a spatial location using the decimal degrees coordinates in the WGS84 datum. Data then had to be projected into harn international feet state plane Oregon south to overlay correctly with additional GIS data. Thesis at page 25-26.

Ms. Edwards determined that about 5000 plants were in the H. L. McKee Preserve, of which the project site is a part, and that the next largest population, about 1250 plants, is found on the Bandon Trails golf course adjacent to the project site. She found another 27 plants on the Bandon Dunes course north of Cut Creek and 420 more on the Pacific Dunes course north of the Bandon Dunes course. Thesis at page 30-31.

Inventoried plants were mapped and several plan graphics prepared to illustrate the location of the silvery phacelia population on resort and state park land. See Appendix G: Silvery Phacelia/Intern Mapping. A review of these maps indicates that the golf course will be routed along the north edge of the existing plant
population. Only a portion of the proposed golf improvements will affect the north edge of Phacelia plants.

In response to these findings, a preliminary course routing was modified to reduce expected impacts. The mapping also shows that the existing population extends south on resort and state park land, and that most of the localized population would not be affected.

LONG-TERM VIABILITY OF THE SCENIC DUNES ENVIRONMENT

A review of past studies and reports indicates current management practices may not offset the adverse impacts associated with the plant succession trend in the scenic dunes area. The resort has followed guidelines recommended by the Oregon Heritage Foundation in an attempt to abate the advance of European beach grass. Past and current hand pulling activities have been only partially successful in the scenic dunes area.

In the past limited operational funds for state park lands have restricted park officials from abating Gorse growth on Bullards Beach State Park. Recently about 50 acres of infested state park land was cleared of gorse plants. Coordination with state park officials will be a necessary component in a long-term effort to abate the spread of gorse along this portion of Oregon’s coastline.

The current Bandon Dunes Resort (BDR) zoning classifies the scenic dunes area as the NR-3 (Scenic Dunes) subzone as adopted by Coos County. It appears the management of the NR-3 subzone and adjacent state parkland will need to consider alternative approaches to adequately protect and enhance the silvery phacelia habitat from extinction and to preserve the scenic amenity and beauty associated with the scenic dunes for future generations. This is especially important considering that the resort and neighboring Bullards Beach State Park currently host what may be the largest existing population of slivery phacelia.
CONSERVATION~RECREATION PROJECT

PROPOSED DEVELOPMENT & RATIONALE

Integrated Conservation and Recreation Improvements

A unique opportunity exists to blend 12 holes of golf with a natural resources conservation program that will reclaim and expand important plant habitat and restore the native duneland plant community that has been altered by the invasion of exotic plant species.

Plant Community Protection and Restoration

Much of the project site is covered with European beach grass. Construction of the golf course would result in removal of much of this invasive species by a combination of manual and mechanical removal.

Immediately west of the project site in the Cut Creek Delta area, the dominant plant species are gorse and shore pine trees. Over the past few decades the Shore pines have spread to upland areas. A dense stand of Shore pine with some native Spruce mixed in is present on the western portion of the proposed site. About one and a half acres of existing shore pine and native spruce trees would be preserved as accent features in the golf course design.

Improvement Benefits

The sustained intervention proposed by this application will result in the permanent removal of extensive areas of existing trees, exotic plants and European beach grass. New areas of open sand will be created within and abutting the new course layout. The new restoration areas will be replanted and restored to reestablish the native plant community that thrived in the dunes before the introduction of exotic plant species.

Other benefits will include a long-term funding source for on-site, and potentially off-site, natural resource habitat restoration. A significant portion of the revenue generated by the Par 3 Golf Course will be allocated for these purposes. The integration of a low-impact golf course within a unique natural resource area will also provide an "immersive" means of educating golfers and other visitors about habitat restoration and coastal ecology. Foot trail access into the scenic dunes area south of Cut Creek will would give resort guests and day visitors similar opportunities to see and appreciate the unique ecology and stunning visual character of the central Oregon coastal environment.
In sum, the proposed preserve course will blend natural resource protection, long-term funding, and low-impact recreational development in a creative, mutually dependent and mutually supportive manner. It will also provide a sustainable source of funding for long-term reclamation, enlargement, enhancement, and maintenance of silvery phacelia habitat.

**DUNELAND RECREATION-PAR 3 GOLF COURSE**

**Course Design**

The proposed golf course has been designed to facilitate restoration of the native "dune mat" community, to expand silvery phacelia habitat, to minimize impacts on existing plants, and, finally, to provide a golfing experience rooted in the origins of golf. The Bill Coore layout minimizes impacts and maintains habitat connectivity with an archipelago-like layout of short par-three holes. Turf acreage is kept to a minimum by concentrating tees, greens, and approaches on small islands of mown fescue for the approach and landing areas, rather than continuous maintained turf fairways.

The proposed golf course has been reduced from 18 to 12 holes of play to further reduce habitat impacts. The course architect and resort owner were guided by a combination of their broad experience and their deep personal acquaintance with the resort site, together with advice gathered from resort maintenance managers, naturalists, and other experts and members of the community familiar with coastal restoration and management strategies.

The preserve course will be short. The shortest hole (number 1) will be 92 yards long, and the longest hole (number 10) will be 165 yards long. In contrast, at the Bandon Dunes Golf Resort, the typical par-3 hole runs about 130 yards, and longer holes can be over 500 yards. Overall, each of the resort's four championship courses is from 5000 to almost 7000 yards long, depending on which tees are used. Finally, each of the four championship courses occupies a footprint of over 200 acres, with a turf footprint of about 70 acres, compared with a total of less than 8 acres of turf for the entire Preserve Course.

The proposed course will offer resort guests more golfing choices. The preserve course will offer golfers of all skill levels the opportunity to play a round of golf requiring less time than an 18-hole course. The requirement to play from all holes from a tee box to a limited approach and landing area over open sand will presents a unique and novel challenge.

At the same time, the course will offer a less strenuous experience for families and guests staying at the resort, enabling all to play different courses at their own level of confidence.
Course Location and Layout

The routing plan of the Preserve Course architect, Bill Coore, starts with the first tee near the vehicular drop-off at the Bandon Trails clubhouse. Play continues to the west along the south bluff side of the Cut Creek ravine for holes 1 and 2. Hole 3 slants away from the ravine and continues toward a section corner near the common boundary line of with Bullards Beach State Park. Holes 5, 6, 7, 8 and 9 will be located on an elevated landform above and just east of the Cut Creek delta. The remaining holes 10, 11 and 12 are routed eastward along the south bluff of the ravine, returning to a natural bowl landform immediately north of Hole 1. The site is about 2300 feet long from east to west and varies from about 200 feet wide at the east end to about 800 feet wide at the west end.

Golfers will use the existing facilities and services at the Bandon Trails Clubhouse, including the parking area and the shuttle drop-off. The starting tee will be only 200 feet from the clubhouse, and the finishing green will be about 500 feet from the clubhouse. An existing irrigation water supply pipe serving the Bandon Trails course will easily meet the modest needs of the new course as well. Close proximity to existing infrastructure, staff, and dining facilities is key to minimizing impacts and providing easy access for resort guests.

The Bill Coore golf architectural team also designed the Bandon Trails Golf Course, and it has made good use of the knowledge and experience gained with Bandon Trails. Several holes on Bandon Trails were designed to incorporate existing silvery phacelia plants and habitat as natural features of the course. These holes depart from the usual design, where a grassed fairway runs continuously from the tee boxes to the green. That strategy has been extended to become a defining feature of the Preserve Course. This and other lessons learned have been used in designing and planning for the new course, where the prime focus will be to reclaim, preserve, extend, and enhance silvery phacelia habitat in particular, and to remove exotic plant species and restore native plant communities in general.

Schematic plan drawings have been prepared to illustrate the design approach envisioned by the golf course architect. The design for the 12th hole shows how the maintained turf associated with the tee area, approach/landing area and green are surrounded by an expansive open sand area that in the future will be populated by Silvery phacelia plants.

The other drawing of the 8th and 9th holes illustrates how tees, approach and landing areas, and greens can be aggregated into small islands of maintained turf that sit like islands in a sea of native plant habitat. A comparison of two existing golf holes on the Bandon Trails Golf Course with two of the proposed Preserve Course holes shows the dramatic reduction in area dedicated to golf course use.
The drawings also illustrate the dramatic character difference in the surrounding landscape setting.

Exhibit 5: Par 3 Golf Course / Illustrative Plan of Holes 8 and 9
Exhibit 6: Par 3 Golf Course / Illustrative Plan of Hole 12
Note: All plans are shown at a common scale to indicate:
- Differences in golf course hole lengths.
- Reduction of land required for Par 3 golf course holes.
- Reduction of maintained turf when comparing existing and proposed golf course holes.

Exhibit 7: Comparison of Par 3 Illustrative Plans and Bandon Trails Plans
Land Requirements

The golf course will occupy less than 20 acres of land. This is about 15% of the area (average 120 acres) required for a typical PGA 18-hole golf course and only 10% of the area of each of the four championship courses at Bandon Dunes.

The design of the Par 3 Course calls for only a small fraction of the turf development that has occurred on the four championship Bandon Dunes courses. The amount of groomed turf (less than 7 acres) proposed as part of the Preserve Course will be only about 10% of the 70 acres of turf found on a typical 18-hole golf course and less than 7% of the average 108 acres of turf on each of the resort's four championship courses.

The golf course architect estimates turf coverage requirements would be:

- Tees 1.38 acres
- Greens and bunkers 1.65 acres
- Grass turf surrounds, approach-and-landing areas 3.20 acres

Total turf coverage 6.23 acres

Only about a third of the preserve course site will be groomed turf. The remaining areas will remain as part of the larger dunal habitat setting and will be the focus of intensive conservation, restoration, reclamation, and research initiatives targeted at dunal plant habitat protection and enhancement.

Riparian Corridor Setback

All of the tee and green improvements along the edge of the Cut Creek ravine have been located beyond the regulatory setback of 50 feet that applies to this riparian corridor. A consulting civil engineer has determined the high level watermark associated with a two-year flood event in Cut Creek, which defines the top of bank as defined in the Bandon Dunes Resort Master Plan and provides the baseline for measurement of the setback. See Par 3 Golf Course/Routing, page 16, and Appendix E: Report on The Effect of a 2-Year Flood Level on the Setback for Construction for more detail.
DUNELAND CONSERVATION PROGRAM

Improvement Program Area

About three-quarters of the main project area, about 21 acres will be improved as a natural resource conservation area. Within this area there are three main objectives:

- Preservation of silvery phacelia plants.
- Restoration of a native duneland plant species community.
- Enhancement of existing duneland vegetation.

The resort has been engaged in the preservation and restoration of silvery phacelia habitat for nearly a decade. Even as the resort’s existing golf courses, utility infrastructure and buildings were being planned, built and occupied, the planning and design team, together with resort staff, have monitored the spread of European beachgrass and its impact on the silvery phacelia population. Past work by a USF&W contract specialist and a recent inventory by a resort intern have given us a greater appreciation of the total phacelia population present on the resort and state park lands.

Recent efforts by resort staff, adjacent to the proposed project site, have resulted in the removal of European beachgrass from a large area duneland area. Manual removal activities have cleared almost one (1) acre of beachgrass to allow open sand for the spread of the existing population of silvery phacelia plants.
Silvery Phacelia Test Plots

The proposed conservation program will integrate into the project several existing silvery phacelia test plots that the resort has installed in the scenic dunes. The test plots were established in the summer and fall of 2008. The plots were installed to test the survival rates of transplanted phacelia (4" diameter) plants with exposure to irrigation and plots with different exposure to predominant seasonal wind conditions. The resort is currently installing more transplant sites to test survival rates associated with spring and early summer plantings.

The resort is also investigating the field collection of seeds and beachgrass mat removal, among other methods of reclamation and propagation.

Initial Plant Impacts

In order to assess potential construction impacts on the existing silvery phacelia population, resort staff undertook a field hand count in June 2009. They determined that about 1000 plants located around holes 1, 2, 3, 10, 11 and 12 will be displaced. The team responsible for the count used the same inventory method as was used by the resort's research intern.

This would represent less than a fifth of the estimated existing population in the proposed Par 3 Golf Course area. The proposed habitat expansion and enhancement conservation improvement program integral to the project constitutes an aggressive mitigation action plan that is expected to result in habitat and plant-count increases of several times the magnitude of the expected impact.
Bandon Dunes Golf Resort
Duneland Conservation~Recreation Project

SILVERY PHACELIA: CONSTRUCTION IMPACT MAP

Exhibit 9
Page 24
Long-Term Environmental Benefits

While the existing silvery phacelia population is not in imminent danger of total loss, it will remain at risk unless aggressive, dramatic action is taken to halt the advance of invasive and incompatible exotic plant species. This proposal, with its built-in long-term commitment to intensive management for reclamation, restoration, enlargement and enhancement of dunal habitat, responds directly to this threat. Passive "conservation" will not suffice.

Approval will have the following long-term environmental benefits:

- Establishment of the preserve course will initiate and sustain an aggressive abatement and enhancement program targeting removal of exotic plant species, especially European beachgrass, and replacement of those species with native open-sand species, especially silvery phacelia.

- The project will provide an important building block for a coordinated collection of duneland restoration initiatives, with substantial funding, research, education, and implementation components.

- The project will support, inform, and inspire similar efforts elsewhere on the South Oregon Coast.

- The project will significantly advance the art and science of dunal plant habitat restoration on the Oregon coast.

- If successful, the project will be a major step forward in ensuring the survival and expansion of what may be the world’s largest population of silvery phacelia—a funded legacy for future generations of the plants and the people who care for them.

IMPLEMENTATION OF A CONSERVATION PLAN

Implementation will include consist of mitigation, abatement, preservation, restoration and enhancement activities.

Silvery Phacelia Mitigation Actions

One of the critical components of the plan will be mitigation of initial impacts to the existing silvery phacelia population by golf course construction activities. This component has several elements:

First, silvery phacelia plants disturbed or removed due to movement of equipment during construction will be replaced or re-established during and after construction.
Second, silvery phacelia plants displaced by turf will be mitigated by a combination of transplanting, propagation, and recovery and expansion of habitat affected by invasive plant species.

A June, 2009 inventory of silvery phacelia plants by resort staff determined numbers of plants likely to require removal or replacement at specific turf "islands," as follows:

- Tee #1: 10
- Tee #12: 544
- Green # 12: 86
- Green #1, Tee #2 and Green #11 complex: 150
- Green #2, Tee #11, Tee #3 and Green #10 complex: 103
- Green #3: 154

Total plants disturbed: 1,047

No plants were found in the western part of the site.

**Plant Community Subzones**

The proposed project site exhibits a high degree of biodiversity among existing plant species. To assist in formulating an implementation approach, the design team has subdivided the site into six (6) plant community subzones. Each of the subzones will require a different approach and intensity of abatement, preservation, restoration and enhancement. To gain an appreciation of the land area involved, the acreage of each subzone was determined:

- Subzone 1: Existing Duneland Vegetation and Golf Course Turf: 5.68 acres
- Subzone 2: Existing & Expanded Silvery Phacelia Population: 10.50 acres
- Subzone 3: Expanded Silvery Phacelia Population: 1.50 acres
- Subzone 4: Existing Mixed Plant Species/Biodiversity: 1.15 acres
- Subzone 5: Dense Shore Pine Forest: 1.35 acres
- Subzone 6: Native Shore Pine/ Spruce Mixed Forest: .50 acres

Total 20.68 acres
SUBZONE 1: EXISTING DUNELAND VEGETATION & GOLF COURSE TURF

This area contains a mixture of plant species including European beachgrass and turf areas associated with the Bandon Trails Golf Course. An existing putting green is in this area. The putting green will be redesigned, and a strip of vegetation will be retained to provide a transition between the proposed Par 3 course and the Bandon Trails course.

The primary objectives in this subzone are:

- Preservation of the functional layout of the Bandon Trails Golf Course and provision of visual and spatial separation between the two golf courses.

- Preservation of existing duneland plant material with minor modifications to enhance the overall landscape character.

A segment of the rerouted paved Beach Trail will run through this area, requiring minor modification of terrain along and outside the south side of the Cut Creek riparian corridor. (see Recreation: Par 3 Golf Course/Routing Plan on page 15). Native shrubs and ground covers will be installed to blend the paved walking path into the landscape setting.

SUBZONE 2: EXISTING & EXPANDED SILVERY PHACELIA POPULATION

This area contains the majority of inventoried Silvery phacelia plants. The objectives in this subzone are:

- Long-term preservation and enhancement of existing silvery phacelia plants.

- Expansion of the silvery phacelia population.

- Re-introduction of native plants typically resident in the dunes prior to the pioneer settlement era and dune stabilization activities, circa. 1910, along the Oregon coast.

Restoration will require substantial removal of European beachgrass, gorse, and other nonnative plants, as well as some coastal pine that has encroached prematurely because of nonnative plant effects on dunal forms. This will include substantial hand pulling of beachgrass in order to avoid existing silvery phacelia plants.

Construction impacts will be mitigated as described above.

Golf play on holes 1, 2, 3, 10, 11 and 12 will involve some foot traffic in limited areas. Impacts will be minimized by providing designated footpaths between
turf areas, together with rules of play restricting play in sensitive areas, based upon ongoing experience and research.

Design, management, and mitigation activities will be reinforced by educational measures enabling golfers and trail users to understand, appreciate, and respect the special setting they are walking through. One of the goals of the resort is to demonstrate that golfers can be educated to respect ecologically sensitive settings and that their activities can be managed to keep adverse impacts to a minimum.

A key premise of the Preserve Course initiative is that an excellent golfing experience can be blended with an excellent environmental education experience. Many users are expected to be young people visiting the resort with their families. Bandon Dunes sees this project as a golden opportunity to attract, educate, and retain an environmentally sensitive new generation of resort visitors.

SUBZONE 3: EXPANDED SILVERY PHACELIA POPULATION

This area currently lacks concentrations of silvery phacelia plants. Construction will involve removal of invasive beach grass, gorse, and other exotic plant materials as well as some shore pines.

The objectives in this subzone are:

- The removal of all exotic vegetation, including gorse, Scotch broom and European beachgrass.

- Installation of mixture of native plants from a list of plants in order to establish a replacement native coastal plant community (see Appendix G: Recommended Plant Species for Bandon Dunes Native Coastal Plant Community).

Selected shore pines will remain as visual features in the course design. Native shrubs, including coyote bush, ceanothus and wax myrtle, will generally be retained to provide habitat and visual diversity in the understory. Native ground covers, such as yellow verbena, knotweed, fescue and poa grasses, sand mat and lupine, will also be preserved and encouraged to spread, where feasible and consistent with silvery phacelia habitat objectives.

SUBZONE 4: EXISTING MIXED PLANT SPECIES/BIODIVERSITY

Western parts of the proposed site are characterized by a variety of landforms and mixture of plant materials.

The objectives in this subzone are:

- Preservation of the biodiversity of existing native plant material.
• Limited removal of existing shore pine trees with the preservation and enhancement of the shore pine/kinnikinnick community.

• Preservation of localized sand depressions and associated sand mat plants

SUBZONE 5: DENSE SHORE PINE FOREST

The design of the Par 3 course will incorporate several groups of existing Shore pine trees as natural features.

The objectives in this subzone are:

• Selective removal of Shore pine trees during construction of the golf course.

• Selective preservation of other native plants to maximize biodiversity.

SUBZONE 6: NATIVE SHORE PINE/SPRUCE MIXED FOREST

The golf course architect has designated four specific areas characterized by the presence of shore pine and native spruce trees to be generally retained as features of the Par 3 course.

The objectives in this subzone are:

• Preservation and enhancement of habitat.

• Construction fencing as necessary to protect habitat.

Vegetation Removal and Restoration Methods

Both mechanical and manual methods will be used to remove beachgrass and other exotic plants. Sensitive areas will be protected with construction fencing. Manual pulling of beachgrass will be used as necessary to protect silvery phacelia plants and enhance or increase their habitat. No chemical control will be used on non-turf areas.

Site work will begin in the western portion of the proposed site. Disposal of debris will be handled by a combination of onsite recycling and onsite incineration of plant debris, followed by burial of ash in place in deep holes prior to final grading and shaping activities.

Resort personnel, with the help of volunteers and possibly contract personnel, will gather seeds in the fall for seeding operations. The resort nursery as well as the site itself will be used for field-testing techniques for reseeding, transplanting, and otherwise propagating native plant species.
Monitoring operations are already in place in association with previously installed test plots. Active monitoring will continue under the supervision of senior resort staff and the resort landscape architect to ensure the short and long-term survival of the restored and enhanced native plant community.

Resort staff and the resort landscape architect have consulted with John Christy, an ecologist from the Oregon Natural Heritage Program, about the feasibility of restoring the native plant community at the proposed project site. After reviewing existing conditions in the field, this consultant advised that

"(he) saw no problems with any of the design concepts for the Par 3 Golf Course (and related conservation activities) and (he thought) the project is definitely doable".

Furthermore, he felt the silvery phacelia and other plant material indigenous to the duneland environment would establish readily and advised that

"assuming that rejuvenated sand movement will not cause major site problems, a moderate amount of long-term care will be needed to monitor vegetation and remove invasive species (that will come in as volunteer plants)."

CONSTRUCTION CONSIDERATIONS

Golf Course Construction

Construction access to the proposed site is severely limited by the narrow corridor of available land between portions of the existing Trails Golf Course and the Cut Creek ravine. In some places the distance is only 250 to 300 feet of available land.

The construction of tees, greens and turf surrounds will affect limited areas of silvery phacelia plant material. Construction fencing will be erected around the plants where possible to provide enclosures. Fencing and other site-management measures will limit the movement of heavy equipment during construction. Disturbed areas will be repaired and replacement plants will be installed during the completion of the golf course improvements and as part of the operational mitigation program.

Conservation Area Implementation

Almost 70% of the proposed project site will require some modification during construction, including clearance of nonnative plants from areas without
inventoried phacelia plants. Heavy equipment will be used with care to contour playing surfaces and create habitat enhancement opportunity areas.

A variety of techniques will be used to encourage re-colonization of reclaimed open sand areas. Experience with Bandon Trails and other research has shown that silvery phacelia seed remain viable for a long time beneath beach grass and will re-colonize open sand areas following removal of the beach grass. Other measures to be employed include transplantation, reseeding, propagation from plant cuttings, and exposure of existing seedbeds by removal of beachgrass mats. These and other methods will be mixed and matched based upon experience, new research, and availability of materials.

In addition, some open sand areas may be left relatively untouched in order to determine whether silvery phacelia and other native plants volunteer to re-colonize these areas on their own.
HIKING TRAILS

Relocation of the Existing Beach Trail

The construction of the Par 3 Golf Course and the conservation program will require partial rerouting of the existing hiking trail to the beach. The existing trail from the Inn lodging facility south of Cut Creek will continue on its current routing for the most part, but its east end will be rerouted behind and east of the proposed 1st tee. Using the existing paved sidewalk, the trail will circle around the 1st tee boxes in a westerly direction, slipping between the 1st green and 12 th tee boxes. At this point the trail will run around the north side of the 2nd tee boxes following the edge of the riparian corridor. It will then cross over the line of golf play to pass just south of the 11th tee boxes where it will connect up with the existing “soft” beach trail.

The proposed landscape setting at these locations will be open with no visual barriers to block the view of golf play. The proposed trail relocation has been routed to maximize the visibility of golfers and hikers to one another. Signage will advise golfers and hikers of potential conflicts and protocols at crossing points, consistent with current practice elsewhere on the resort. Aware of potential conflicts, golfers and hikers will wait until it is safe to tee off or hike across the line of play.

This new trail alignment will be routed to bypass established colonies of slivery phacelia plants as well as existing and new test plots. Some grading and manipulation of grade lines might be necessary to minimize any potential visual conflicts between golfers and hikers (see Recreation: Par 3 Golf Course/Routing Plan on page 15).

Potential Cut Creek Delta Trail:

Besides relocating the Beach Trail, there is an opportunity to provide a hiking trail that will give resort guests a special visual experience in the scenic dunes area. A branch loop trail could depart from a segment of the existing Beach Trail that is located on the adjacent state park land.

This trail would follow a routing alignment from south to north at a location west of the proposed golf course. Located at the bottom of a west-facing slope, the trail could be integrated along an existing tree line and/or through existing open beachgrass areas. With this routing, hikers would be hidden from the view of golfers playing on an elevated ridge slightly more than a hundred feet away from the trail. As the trail approaches the Cut Creek delta there is a natural landform that offers a spectacular scenic overlook.
A further opportunity is available as well: the trail could be continued into the existing delta area following one of the braided watercourses until it reached the open ocean beach. From there, hikers could walk along the beach, proceeding southward for a distance of about 250 feet, until intersecting with the existing Beach Trail connection that traverses the foredune.

This trail would provide resort guests and the public with panoramic views of the Pacific Ocean, headland coastline features, and views of the delta. It would further expand opportunities available to educate guests and visitors about the diversity of coastal habitat found on the resort and state parkland.

Coordination with Bullards Beach State Park officials would be needed to plan and gain approval of this proposed trail. In addition, portions of the trail in the delta might need to be built as elevated walkways to allow for use during the winter months when the delta floods.
Exhibit 11: Location for a Potential Future Beach Spur Trail
CONSERVATION FOUNDATION CONCEPT

Off-Site Conservation

The 1996 Master Plan introduced the idea of creating a conservation district that would include valuable natural resource areas outside the Bandon Dunes Golf Resort. The Cascade Head Scenic Research Area near Neskowin is one example of this approach.

This 1996 conservation concept envisioned combining the diverse set of natural resource areas within the resort with natural resource conservation areas previously established on Bullards Beach State Park. To this end, the resort and Oregon State Parks and Recreation have entered into an agreement to manage and protect designated conservation areas. The resort is in the process of establishing the H.L. McKee Preserve as a managed conservation area encompassing both resort and state park land to accomplish this goal.

On a broader scale, the conservation effort could be expanded to include a comprehensive management program embracing public and private sites along the Oregon South Coast. The presence of the Bandon Marsh Federal Wildlife Service Refuge and Ni-Les'Tun Addition together with the resort and state parkland constitute a core group of conservation lands. The addition of other private conservation efforts would complement and enhance this regional coastal approach.

Future Funding for Conservation Activities

One of the issues associated with this concept is funding for the restoration, management and long-term maintenance of coastal conservation lands, including those natural resource conservation areas in the Par 3 Course. To meet this need, the owner of the Bandon Dunes Golf Resort is considering the establishment of a private foundation to support conservation efforts on the South Oregon Coast.

Long-term management of the conservation/restoration program associated with construction of the Par 3 Course is an important issue. Identifying a dedicated funding source is a key component of the program. The resort owner has indicated a willingness to allocate a portion of the net revenue stream from guest fees associated with the Par 3 Course.

RESORT AREAS NOT INCLUDED IN SUBMITTAL

The Phase 8 Final Development Plan addresses only a small site located near the heart of the resort, constituting only about one % of the resort’s 2140 acres. Significant portions of the resort remain to be developed after 2011 as was noted in the Phase 7 Final Development Plan submittal, including private residential
SUMMARY MATRIX CHART

The Phase 8 Final Development Plan uses the same matrix chart format that was used in all of the previous Final Development Plan submittals. The alphabetical and numerical reference system reflects the Final Development Plan Contents requirements (Section 4.10.065) in the approved and amended BDR Zoning Ordinance that was included in the 2003 FINAL DECISION document.
### Zoning Reference

**Final Development Plan Review/Topic Check List**

<table>
<thead>
<tr>
<th>Zoning Reference</th>
<th>Final Development Plan Review/Topic Check List</th>
<th>Comment</th>
<th>Supplemental Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>A11</td>
<td>• Both Combined Projects</td>
<td>DRAINAGE PLAN</td>
<td>• No storm drainage would be required on the golf course: surface storm runoff would self drain into open sand, silvery Phacelia areas and new native plant communities</td>
</tr>
</tbody>
</table>

### SECTION B:

**LANDSCAPE/GOLF COURSE MANAGEMENT PLAN**

<table>
<thead>
<tr>
<th>B1</th>
<th>CLIMATIC FACTORS &amp; LANDSCAPE MANAGEMENT STRATEGIES</th>
<th>FD Plan Phase 8 would continue current policies and practices</th>
<th>Part II, Page 43</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Site Conditions</td>
<td>• Diversity of plant material in duneland and woodland settings; sandy soils, thin humus layer, permeability is high</td>
<td>NBR/SA 1993</td>
</tr>
<tr>
<td></td>
<td>• Climatic conditions</td>
<td>• Rainfall is high; summers dry and hot; strong winter winds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Landscape Design/Management Strategies</td>
<td>• Preserve Silvery Phacelia to the maximum possible</td>
<td>Part I, Page 13 and Pages 25-32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mitigate any negative impacts on Phacelia during construction</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Selected removal of pine trees and exotic vegetation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use erosion control measures wherever &amp; whenever necessary</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B2</th>
<th>HORTICULTURAL MANAGEMENT</th>
<th>FD plan 8 reduces need for extensive management of course</th>
<th>Part I, Page 20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Mowing</td>
<td>• Only 0.23 acres of turf requiring mowing</td>
<td>Part II, Page 20</td>
</tr>
<tr>
<td></td>
<td>• Tree Removal &amp; Pruning</td>
<td>• Ongoing removal of volunteer trees, European beachgrass and other exotic vegetation if regrowth appears</td>
<td>Part II, Pages 26-32</td>
</tr>
<tr>
<td></td>
<td>• Irrigation</td>
<td>• Limited irrigation facilities w/ controlled application rates</td>
<td>Part II, Page 47</td>
</tr>
<tr>
<td></td>
<td>• Use of fertilizers &amp; pesticides</td>
<td>• Minimum applications to limited turf areas only; no pesticides</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B3</th>
<th>INTEGRATED PEST MANAGEMENT</th>
<th>FD Plan Phase 8 continues current policies and practices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Pest identification/monitoring strategies</td>
<td>• Course to be monitored daily; daily reports to be reviewed by golf course superintendent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Action thresholds for pest damage</td>
<td>• Monitoring program to establish threshold impacts for potential pests and infestations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Evaluation of control options</td>
<td>• Application rates to be applied and increased in response to their level of effectiveness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Education of field personnel</td>
<td>• No pesticide use</td>
<td>Part II, Pages 26-32</td>
</tr>
<tr>
<td></td>
<td>• Evaluation of results</td>
<td>• Continue current annual program evaluation and filling of reports to Coos County and appropriate regulatory agencies</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B4</th>
<th>PESTICIDE SAFETY PROGRAM</th>
<th>FD Plan Phase 8 continues current policies and practices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Storage</td>
<td>• Not applicable</td>
<td>FPD PHASE-1</td>
</tr>
<tr>
<td></td>
<td>• Handling</td>
<td>• Not applicable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Disposal</td>
<td>• Not applicable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Record keeping</td>
<td>• Not applicable</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>B5</th>
<th>MONITORING PROGRAM</th>
<th>FD Plan Phase 8 continues current policies and practices</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Water quality base line</td>
<td>• Report staff to establish baseline for water quality in reservoir</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Testing locations</td>
<td>• Establish monitoring station on new golf course (No. 9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Frequency of testing</td>
<td>• Initial monitoring will be done on a quarterly basis; long-term monitoring to be on an annual basis</td>
<td>Part I, Page 32</td>
</tr>
<tr>
<td></td>
<td>• Analytes to be tested for</td>
<td>• Ground water to be tested for temperature, conductivity, pH, alkalinity, nitrate, phosphate and iron on each test.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reporting protocols</td>
<td>• Tests for herbicides, pesticides and organo-phosphates to be twice a year in the first year and once each year after</td>
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<td></td>
<td></td>
<td>• An agency approved format will be used for all reports</td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>B6</th>
<th>SITE NURSERY</th>
<th>FD Plan Phase 8 continues current off-site nursery operations and would add restoration test plots and additional monitoring for Silvery Phacelia preservation and native plant community restoration subzones</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Par 3 Golf Course</td>
<td>• Size and location</td>
<td>FPD PHASE-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Design and layout</td>
<td>Part II, Page 44</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Irrigation practices-water source</td>
<td>Part I, Page 32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fertilizer &amp; pesticide use</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Mitigation measures</td>
<td></td>
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<td></td>
<td></td>
<td>• Relocation of existing native plants</td>
<td></td>
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<td></td>
<td></td>
<td>• Proposed project would not affect nursery operations</td>
<td></td>
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<td></td>
<td></td>
<td>• Native plants for use in restoration program could be grown in the nursery</td>
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<td></td>
<td></td>
<td>• No change from current use</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• No change from current use in nursery</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Existing Pine trees under six feet in height could be dug up and transplanted to nursery holding beds for later reuse</td>
<td></td>
</tr>
</tbody>
</table>
### BANDON DUNES RESORT

Phase 8 Final Development Plan / 11.5.2009

<table>
<thead>
<tr>
<th>Zoning Reference</th>
<th>Final Development Plan Review/Topic Check List</th>
<th>Comment</th>
<th>Supplemental Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>B7</td>
<td>FIRE CONTROL/ MANAGEMENT PLAN&lt;br&gt;  * Responsible Public Authorities&lt;br&gt;  * On-site water source</td>
<td>PD Plan Phase 8 constitutes current policies and practices&lt;br&gt;  * Coos Forest Patrol and Bandon Rural Fire District&lt;br&gt;  * Presence of irrigation system on golf course would add to resort fire fighting capability along Cut Creek and in the vicinity of the Trails Clubhouse.</td>
<td>Part II, Pages 37-38</td>
</tr>
</tbody>
</table>

### SECTION C:

SITE AND UTILITY DESIGN, ENVIRONMENTAL IMPACTS, OVERNIGHT ACCOMMODATIONS AND PRIVATE DWELLINGS, CONSTRUCTION/PHASING & REGULATORY COMPLIANCE

<table>
<thead>
<tr>
<th>C1</th>
<th>IMPACT ON RIPARIAN VEGETATION/ COASTAL SHORELAND LAKES&lt;br&gt;  * Riparian Corridor Protection</th>
<th>Golf course layout respects 50-foot riparian setback along Cut Creek&lt;br&gt; Exotic plants such as European beachgrass, Scotch broom and gorse to be removed</th>
<th>Part I, Page 20&lt;br&gt; Part II, Page 45&lt;br&gt; Part II, Pages 44</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Both Combined Projects&lt;br&gt;  * Impact on Coastal Shoreland Lakes</td>
<td>No proposed development near coastal shoreland lakes</td>
<td>NA</td>
</tr>
</tbody>
</table>

| C2               | WETLAND MITIGATION<br>  * Quantity of wetland affected | No impact on any wetland areas in the resort | NA |

| C3               | DEVELOPMENT RESTRICTIONS-CO&RS | Not Applicable | NA |

| C4               | IMPACT ON BEACH & DUNE LAND<br>  * Conservation Improvement Program | Construction of the Par 3 Course would alter the grassed dune landscape character; protection and enhancement of the silvery phacelia habitat would preserve the largest population of this threatened plant species<br> Revenues generated from Par 3 Course fees could become a designated funding sources for conservation activities on the resort and at off-site locations.<br> Implementation of this program would provide an effective exotic plant material removal and abatement program in both the short and long-term | Part I, Pages 12<br> Part I, Pages 63 & 36<br> Part I, Pages 9-10<br> Part I, Page 25-32 |

| C5               | UTILITY SYSTEMS DESIGN<br>  * Native American Artifacts<br>  * Underground utilities<br>  * System capacity and pipe sizing | Fire rock discovered on western part of proposed site<br> Existing agreement and protocol with Coquille Tribe would be before and during construction activities.<br> New irrigation facilities would be connected to the existing Bandon Trails golf course irrigation system.<br> All improvements would be designed and constructed under the supervision of a registered engineer | Part II, Page 47 |

| C6               | QUANTITY OF PUBLIC LODGING UNITS & RECREATIONAL DWELLINGS | No public lodging facilities or private residential development is proposed in this application | Part II, Page 48 |

| C7               | CONSTRUCTION PHASING | Construction Jan-Feb 2011 to May 2011<br> Phase I: Spring 2011<br> Phase 2: Fall 2011 to 2016 | Part II, Page 48 |

<p>| C8               | PLAN COMPLIANCE/APPROVAL CRITERIA&lt;br&gt;  * Development consistent with the Exception Statement | Development is consistent with the Exception Statement because it authorizes only the uses, activities, and improvements to the site that are described in and justified by the Exception Statement&lt;br&gt; The proposed site is located within the Bandon Dunes Golf Resort and within the NR-3 subzone of the Bandon Dunes Resort (BDR) Zone and the authorized uses, activities, and improvements are limited to those authorized by the BDR Master Plan and the BDR Zoning Ordinance as amended concurrently with the approval of this application. | Part II, Page 49 |</p>
<table>
<thead>
<tr>
<th>Zoning Reference</th>
<th>Final Development Plan Review/Topic Check List</th>
<th>Comment</th>
<th>Supplemental Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Development meets standards established in Section 4.10.030 of the Coos County Zoning and Land Development Ordinance, Chapter IV-Zoning, Article 4.10 Bandon Dunes Resort Zone (BDR).</td>
<td>• Most of the standards in this section apply to the resort as a whole, which has previously been found to meet or exceed all such standards. FDP Plan-8 authorizes only a single additional small-scale, low-impact recreational use on 20 acres of the 2140-acre resort site, with no new roads, structures or other major infrastructure.</td>
<td>Part II, Page 49</td>
</tr>
<tr>
<td></td>
<td>• Proposed Uses are permitted under Section 4.10.040 and Section 4.10.050</td>
<td>• The use authorized by the Phase II Final Development Plan is located in BDR subzone NR-3, a Natural Resource Subzone, which has been concurrently amended to authorize the use.</td>
<td>Part II, Page 49-50</td>
</tr>
</tbody>
</table>

**Legend: Supplemental Reference Sources:**

- **FINAL DEC 2003**
- **FINAL DEC 1996**
- **FDP/PHASE-1**
- **NR/SA 1993**
- **NR/SA 2002**
- **Part I or II, page number**
- **Exhibit 1 through 11**

Final Decision Report including Supplemental Master Plan, Land Use Findings and Goal Exception Statement & Revised BDR Zone adopted June 2003 by the Coos County Board of Commissioners

Final Decision Report including Master Plan, Land Use Findings and Goal Exception Statement & BDR Zone adopted August 1996 by the Coos County Board of Commissioners

Phase I: Final Development Plan, Part I and Part II submitted to Coos County July 31, 1997

Natural Resource Inventory/Site Analysis, March 1995, prepared by Bandon Dunes Planning Team

Natural Resource Inventory and Site Analysis, November 2002, prepared by Bandon Dunes Planning Team

Refers to Part I or II of Phase II Final Development Plan report

Refers to plans or drawing contained in Part I
PART II:

TECHNICAL DISCUSSION
SECTION A
(4.10.065), ITEMS A

The amendments to CCZ.LDO, Article 4.10 (BDR Zone) August 18, 2003, state:

“A final development plan shall set forth, to the extent not previously addressed in the Master Plan or Exception Statement (underlining added) and only to the extent applicable to the particular phase or element of the destination resort for which final approval is sought.” This section of the report provides additional description material for proposed development in Phase 8.

To simplify matters, information included in the Summary Matrix Chart and following sections of this report only provide additional detail not otherwise covered in the 1996 and 2003 FINAL DECISION documents. The reader is referred to those documents for supporting information that may be referred to in this report.

SECTION B (4.10.065), ITEMS B
LANDSCAPE / GOLF COURSE &
LANDSCAPE MANAGEMENT PLAN

SECTION B1: CLIMATIC FACTORS & LANDSCAPE MANAGEMENT STRATAGIES

Site and Climatic Conditions

The site for the proposed low-impact golf course development and the Conservation Improvement Program has changed over the past 16 years since the Natural Resources Inventory/Site Analysis Briefing Booklet was accomplished in 1993. As was pointed out in that report, the scenic dunes area was “rapidly becoming conditionally stable and could disappear within two or three decades.” While we still have open sand in the scenic dunes area, the invasive European beachgrass continues to spread from west to east threatening the long-term survival of the slivery phacelia population on both resort and state parkland. As in the past decades, there is less open sand in the proposed project area.

The proposed site is a long, linear land parcel adjacent and parallel to Cut Creek. The eastern half of the site is characterized by open sand and grassland for two-thirds of its length. The westerly portion is covered with dense stands of Shore Pine trees, associated shrubs including Gorse and some Scotch Broom, both of which are exotic species. There is some fringe grasslands dominated by European beachgrass intermixed with the Shore pine trees along the southern edge of the woodland area (see, Existing Site Conditions: Aerial Photo 2009 in Part I of this report).
The development of the Par 3 Golf Course would remove extensive areas of Shore pine trees, associated shrubs and European beachgrass. The conservation improvement program of the overall plan proposes the replacement of exotic plant species with native plants. The golf course itself would use Red Fescue, a native grass species, on golf course turf areas exclusively.

Irrigation would be provided to establish and manage these turf areas. Provision would also be made for the use of drip irrigation at selected locations to support the native plant community restoration program.

**Landscape Management Strategies**

A fundamental change is being proposed with the conservation/restoration program. The conceptual approach will alter the present plant community by removing selected exotic plant species and replacing this vegetation with native plant species. The construction of the Par 3 Course within the modified NR-3 Scenic Dunes subzone would result in the long-term commitment of resource management funding and maintenance services.

**SECTIONS B2: HORTICULTURAL MANAGEMENT, INTEGRATED PEST B3, B4, and B5 MANAGEMENT, PESTICIDE SAFETY PROGRAM, AND MONITORING PROGRAM**

The resort continues to employ and practice previously established policies in these areas. However, the Integrated Pest Management (IPM) program used for the resort will be reviewed and modified to support the preservation, restoration and enhancement goals, objections and actions plans that underlay the proposal.

**SECTION B6: RESORT NURSERY**

Portions of the proposed site will be used as an extension of the off-site resort nursery. Test plots within the proposed site have been established and more will be established to determine what techniques are best suited for encouraging the spread of the silvery phacelia plant. Since the conservation/restoration program will need native plants associated with the Oregon Coastal Dunes such as Yellow Sand Verbena, Seashore Lupine, Woody Beach Knotweed and Beach Evening Primrose, efforts to propagate these plants from collected specimens or seed will be initiated in the future.

**SECTION B7: FIRE CONTROL & MANAGEMENT PLAN**

**Gorse and Coastal Fire Prevention**

Removal of existing vegetation will further reduce the danger of a coastal fire south of Cut Creek. The presence of irrigation facilities as is the case on all golf courses at the resort provides a means of fighting a coastal fire or delaying its spread until fire fighting equipment and manpower can be mobilized within the resort.
Fire Protection Plan Review

Fire protection for the resort continues to be the responsibility of the Coos Forest Patrol and the Bandon Rural Fire District. No new buildings are being proposed in this submittal. A fire hydrant exists immediately adjacent to the proposed first tee box, and there is adequate quantity and pressure of water available for fighting fires at the subject site.

SITE AND UTILITY DESIGN, ENVIRONMENTAL IMPACTS, OVERNIGHT ACCOMMODATIONS AND PRIVATE DWELLINGS, CONSTRUCTION PHASING & REGULATORY COMPLIANCE

SECTION C1: IMPACT ON RIPARIAN VEGETATION

The 2003 Revised Master Plan requires a 50-foot setback from the “top of bank” of riparian corridors associated with creeks or streams. This setback can be measured from the bankfull stage in the ravine as defined in Oregon Administration Rules (OAR 141-085-0510 (5) as being “two-year recurrence interval flood stage.

A flood level study on the Cut Creek watershed was undertaken in April, 2009, by TFE, Inc. to determine the flood stage of water that would occur in Cut Creek during a two-year flood condition. The results indicate the water level would raise approximately one foot in height above the normal water level in that segment of the creek parallel to the proposed golf course. This water level increase would typically widen the existing 4-6 foot average width under normal flow conditions to a width of 8 feet.

To determine the location of the “top of bank” as defined in OAR regulations the engineering consultant prepared several cross sections along the riparian corridor. Four cross sections were studied near proposed golf course tees and greens (see Appendix E: Report on The Effect of a 2-Year Flood Level on the Setback for Construction for more detail). The projected two-year flood levels were added to existing topographic conditions at the selected locations along Cut Creek in order to establish the “top of bank” location of the existing south side of the riparian corridor. In all instances, the “top of bank” would be located below the actual physical top of bank as indicated on a topographic contour map (see Par 3 Golf Course/ Routing Plan, page 15).

All improvements associated with the proposed Par 3 Golf Course would be in compliance with the setback requirement. Furthermore, the proposed course layout would preserve existing native vegetation in the riparian zone. However, in some instances, it will be necessary to remove gorse or other exotic or noxious plant material along side and within the riparian corridor. Replacement plantings will comply with the BDR zoning regulations or disturbed areas will be hydro-seeded with Red Fescue grass.
SECTION C2: WETLAND MITIGATION

No mitigation is required as there are no impacts on wetland features. The discussion regarding a potential loop trail in the delta area would necessitate coordination with State Parks and would require application for a special permit to build this type of improvement as the delta is located in a jurisdictional wetland.

SECTION C3: DEVELOPMENT RESTRICTIONS—CC&R'S

No CC&R's are required at this time to protect resort open space or to ensure compliance with other applicable standards. All proposed development is consistent with use-specific subzones, permitted uses and standards in BDR Subzones.

SECTION C4: IMPACT ON BEACH & DUNE LAND

Beach and Dune Lands

No development is being proposed for development on beach lands in the Phase 8 Final Development Plan submittal. Minor modification of existing dune landforms may occur during grading and shaping construction activities. Removal of European beachgrass from localized areas will result in improved habitat more suitable for the establishment and growth of silvery phacelia plants.

Development in Areas of Limited Development Suitability

The Par 3 Golf Course and the conservation program effort will be located in an Area of Limited Development Suitability. No structures of any kind will be built as part of the Par 3 Golf Course as golfers will use existing facilities at Bandon Trails.

SECTION C5: SITE AND UTILITY SYSTEM DESIGN/CONSTRUCTION

Site Design

The primary goals of preserving existing phacelia habitat and minimizing the impact on the existing silvery phacelia population will shape the golf course design. The planning and design process for the project recognizes that the proposed site is presently classified as a "natural resources conservation area" and zoned as the NR-3 Scenic Dunes subzone in the Coos Country zoning code. The envisioned design will blend a special, if not unique, short course layout with a natural resources conservation program that will have minimal impact on existing natural resources and associated amenity values.
Design Considerations for Native American Artifacts:

Field investigations have found evidence of "fire rock" on resort property in the western portion of the proposed golf course site. The rock was discovered lying exposed on the ground surface in at least two locations. These blackened and broken rocks are evidence of past use by Native Americans.

The fire rocks were discovered on a forested upland area that has scattered clearings of open sand and dune mat type vegetation. The rocks were lying on open sand and were quite visible. Other Native American artifacts have also been discovered on adjacent state parkland.

At present, the resort has an agreement with the local Coquille Tribe, and a protocol is in place to handle situations where artifacts are discovered on resort land before or during construction activities. Resort staff and a representative(s) from the planning and design team will meet with a Native American official to discuss how to handle this situation, if artifacts are discovered during construction.

In the past, the approach has been to encapsulate the artifacts with a soil and vegetation cover to prevent an adverse damage or loss of the artifacts. This method preserves the artifacts for perpetuity and has been approved by the local Coquille Tribe representative.

Utility Design

The only infrastructure improvements being proposed will be limited irrigation facilities in all grassed turf areas. There could also be selected locations where some form of irrigation facilities will be provided in restoration areas to assist in the establishment of replacement plant material.

Construction Aspects

The provision of sedimentation and erosion control fences along the edge of the Cut Creek ravine will be extremely important to protect the fragile edge of the ravine bank from damage. The fencing will also control the movement of blow sand and other debris from clearance, grading and shaping activities.

Another important consideration is the disposal of all organic materials resulting from site clearance. All trees and large shrubs will be chipped on site and recycled. Much of this material can be used to renew the hiking trail surfaces. Recycled chips can also be moved to the resort nursery and used as mulch.

No storm drainage facilities will be needed for the Par 3 Course. Surface runoff will be directed into adjacent restoration subzones and nearby natural resource conservation areas. All surface runoff will be retained locally as existing soil conditions, primarily sand, have high permeability characteristics.
SECTION C6: PUBLIC LODGING UNITS & RECREATIONAL DWELLINGS

No public lodging units or recreational dwellings are proposed in the Phase 8 construction.

SECTION C7: CONSTRUCTION PHASING  

- Par 3 Golf Course Construction  
  Anticipated Start—Finish  
  Jan-Feb 2011 to May 2011
- Conservation/Restoration Program  
  - Phase 1  
  - Phase 2 through 5  
  Spring 2011  
  2011-2016
C8: PLAN COMPLIANCE / APPROVAL CRITERIA (FINDINGS)

Consistency with the Exception Statement

The proposed development is consistent with the exception statement because it authorizes only the uses, activities, and improvements to the site that are described in and justified by the exception statement, as amended concurrently with this application. All findings in the 2009 Exception Statement and Findings to be adopted concurrently with this approval are hereby incorporated by this reference.

Consistency with the 1996 Master Plan and 2003 Revised Master Plan

The proposed site is located within the Bandon Dunes Golf Resort and within the NR-3 subzone of the Bandon Dunes Resort (BDR) Zone. The authorized uses, activities, and improvements are limited to those authorized by the BDR Master Plan and the BDR Zoning Ordinance as amended concurrently with the approval of this application.

Meets Standards established in Section 4.10.030

Most of the standards in this section apply to the resort as a whole, which has previously been found to meet or exceed all such standards. FDPlan-8 authorizes only a single additional small-scale, low-impact recreational use on 20 acres of the 2140-acre resort site, with no new clubhouses, lodging, roads, parking lots, or other such buildings and infrastructure.

The proposed final development plan authorizes only minor contouring and landscaping. It does not fill and removal, riparian vegetation removal, or other activities within riparian boundaries, coastal shorelands, or wetlands. No turf or grading is authorized within 50 feet of a wetland, stream, or lake. No additional beach access trails will be constructed. The proposed golf course will be consistent with applicable setback requirements, as specified in the concurrent amendment to Section 4.10.030, which allows placement of not more than two acres of turf area of a special-purpose golf course in subzone NR-3 within 50 feet of an external boundary of the BDR zone.

Proposed Uses are permitted uses under Section 4.10.040 and 4.10.050

The use authorized by the Phase 8 FDP is located in BDR subzone NR-3, a Natural Resource Subzone, which has been concurrently amended to authorized the proposed use, which is a single small special-purpose golf course designed, located, and implemented as described in CCLDO 4.10.050(A) (12), as follows:
.10.050 - USES PERMITTED UNDER APPROVED FINAL DEVELOPMENT PLAN

The following uses may be permitted in the BDR subzones identified in brackets following each listed use, pursuant to a final development plan approved under Sections 4.10.060 to 4.10.070. If a particular subzone is not noted in brackets following the listed use, the use is prohibited in that subzone, except as may be authorized by antidiscrimination laws.

A. Natural Resource Subzones

1. Open space. [NR-1 through NR-13]
2. Wildlife observation facilities. [NR-1 through NR-13]
3. Fish and wildlife research and rehabilitation facilities, habitat mitigation, restoration and enhancement. [NR-1 through NR-13]
4. Wetland and plant research and habitat mitigation, restoration and enhancement. [NR-1 through NR-13]
5. Nature interpretive centers and educational facilities. [NR-4, NR-5, NR-6, NR-8, NR-9, NR-11, NR-13]
6. Pedestrian hiking trails, nature trails, walkways, bridges and lookouts. [NR-1, NR-3 through NR-6, NR-8 through NR-13]
7. Bicycle paths and equestrian trails. [NR-3 through NR-6, NR-8, NR-11, NR-12]
8. Paved roads. [NR-6, NR-8, NR-9, NR-11]
9. Paved golf-cart paths. [NR-6]
10. Facilities necessary for public safety and utilities serving the resort. [NR-2 through NR-13]
11. Accepted agricultural and forestry practices other than commercial timber harvesting. [NR-2 through NR-12]
12. One special-purpose, small-footprint golf course as Master Plan. [NR-3].

Conclusion

All applicable approval criteria are satisfied.
Appendices

Appendix A: Bandon Trails Golf Course: Silvery Phacelia Photographs

Appendix B: Historic Landscape Patterns, Bandon Dunes Coastal Property from 1939 to 1984

Appendix C: Status Review and Field Inventory for Silvery Phacelia: Phacelia argentea (Hydrophyllaceae), April 1, 2008.

Appendix D: Sand Dune Phacelia (Phacelia argentea) at Bandon Coastal Property Bandon, Oregon, June 29, 2007

Appendix E: Report on the Effect of a 2-Year Flood Level on the Setback for Construction

Appendix F: Recommended Plant Species for Bandon Dunes Native Coastal Plant Community

Appendix G: Silvery Phacelia/Intern Mapping
APPENDIX A:

Bandon Trails Golf Course:
Silvery Phacelia Photographs
Bandon Trails Golf Course: Silvery Phacelia Photographs

November, 2009

The golf course design team of Bend Crenshaw and Bill Coore were responsible for the Par 3 Golf Course preliminary routing plan. This team also was responsible for the design and construction of the Bandon Trails Golf Course.

One of the key features of the Bandon Trails course is the incorporation of silvery phacelia plants and habitat into the course design. The knowledge and experience acquired while designing Bandon Trails was instrumental in the design and layout of the Par 3 or Preserve Course.

The following photograph of the first hole at Bandon Trails illustrates how phacelia habitat was incorporated or has blended into a duneland golf course environment. The bunker just below the green (note red flag) contains about 50 silvery phacelia plants. The other two photographs are examples illustrating how phacelia plants will colonize open sand areas among areas covered with European beachgrass.
APPENDIX B:

Historic Landscape Patterns, Bandon Dunes Coastal Property From 1939 to 1984
Photographic interpretation of aerial photographs of the Bandon Dunes site and surrounding area including Bullards Beach State Park from 1939 to 1989 dramatically illustrates the loss of open sand habitat between Cut Creek and the Coquille River.

In 1939 about 85 to 90 percent of the beach, foredune and deflation plain areas were open sand. Vegetated areas were isolated islands, probably consisting of a mixture of native grasses, European beachgrass, native ground cover and a variety of native and introduced shrub species. The marine terrace above Cut Creek had linear strips of open sand along the edge of the bluff, but was mostly covered with grasses. The land may have been used for cattle ranching, but it had decreased in comparison to activity in the late 1800's and early 1900's. The important fact is that the area was still predominantly a grassland environment. Gorse plants, if they existed, were a minority. These coastal Red Fescue meadows were natural environments. They were stable, transitional zones found between open, moving sand and more stable Shore Pine forests. During the period of European settlement, these native grasslands were replaced by European pasture grasses. In addition, there is evidence in the photograph that portions of Cut Creek, notably the edges of the watercourse near its mouth and the ocean beach, are covered with dense shrub growth.

By 1964, the open sand habitat had receded significantly. The once isolated islands of coastal vegetation had begun to link together in linear bands. The marine terrace meadow was also shrinking in size. To the west, open sand had encroached on the meadow; and to the east and along the north creek bank, stands of Shore Pine and other trees were appearing. Open sand areas were also expanding to the north.

By 1977 very little of the Red Fescue grasslands was left. Open sand surrounded the marine terrace area to the west and north. The tree stands had linked together, and there was almost continuous tree canopy cover within and along the north side of Cut Creek.

Over the past four decades, open sand habitat has been reduced to about 25 percent of the deflation plain between Cut Creek and the Coquille River. The principal culprit is European beachgrass, although Gorse is also present. The mouth of Cut Creek has also been invaded by Gorse and other wetland plant species.

The 1989 photograph shows the open sand area about the same size as it was in 1977. The linear pattern of coastal vegetation found in the 1964 photograph has begun to break up illustrating how natural force continue to affect the deflation plain and remaining open sand habitat. The dark areas just behind the ribbon foredune are stands of stunted Shore Pines. Significant areas of Gorse are in evidence south of Cut Creek.

A color aerial photograph, taken in April, 1994, when the Gorse is in bloom, clearly demonstrates the presence of Gorse on Bullards Beach State Park. The evolving landscape pattern indicates that exotic species of grass and shrubs have invaded the northerly portions of Bullards Beach State Park and are advancing unchecked in a southerly direction.
Landscape Patterns: 1939-1989
Bandon Coastal Property
APPENDIX C:

Status Review and Field Inventory for Silvery Phacelia: Phacelia argentea, (Hydrophyllacease), April 1, 2008
Status Review and Field Inventory for Silvery Phacelia:

*Phacelia argentea* (Hydrophyllaceae)

April 1, 2008

Summary: *Phacelia argentea* (silvery phacelia; sand dune phacelia) is an evergreen perennial herb in the waterleaf family (Hydrophyllaceae). It is restricted to the immediate coast from Coos County, Oregon to Del Norte County, California. Only 30 occurrences, with 26 in Oregon and 4 in California, have been documented since the species was described in 1916. Of these 30 occurrences, 7 are historic or presumed historic, and 22 are presumed extant, with only 8 occurrences known to be extant. It is presumed extirpated from the type locality at Chetco, Oregon, which was last documented in 1884. Populations are typically small and highly fragmented, and most appear to be declining. All are threatened by habitat invasion by European beachgrass, and in the northern portion of its range, it is severely threatened by gorse as well. Without ongoing management to control invasive non-native, impacts from uncontrolled ORV use, and conversion of habitat by development, the species is in danger of extinction. Recommendations include censusing of populations not visited in more than 10 years, increased funding for weed management and protection from ORV trespass in both Oregon and California state parks and state beaches, consideration for state listing in California, and research to inform recovery and conservation efforts.
Bullards Beach State Park/Bandon Dunes

Site #2
Status: Extant
Trend: Unknown
Ownership: Public and Private
Impacts: Gorse, European beachgrass, development

EO #3984 (ONIC)
Coos County, Oregon
USGS Quad: Bullards
T27S, R11W, Sec. 32;
T28S, R14W, Sec. 5, 6

<table>
<thead>
<tr>
<th>Site:</th>
<th># plants:</th>
<th>Year:</th>
<th>Observer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullards Beach State Park</td>
<td>~500</td>
<td>1984</td>
<td>Kagan &amp; Soper</td>
</tr>
<tr>
<td>(Public)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bandon Dunes Golf Resort</td>
<td>~3000</td>
<td>2007</td>
<td>Kalt &amp; Rogers</td>
</tr>
<tr>
<td>(Private)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Information: Bullards Beach State Park dunes have been heavily invaded by gorse, with few Phacelia plants observed in 2007. One site at the northern side of Bandon Dunes Golf Resort where beachgrass has been manually removed has some of the few seedlings observed in 2007.
I. Introduction

*Phacelia argentea* (silvery phacelia; sand dune phacelia) is an evergreen perennial herb in the waterleaf family (Hydrophyllaceae). It is restricted to approximately 130 miles of the immediate coast from Coos County, Oregon to Del Norte County, California. Populations are typically small and highly fragmented, and most appear to be declining (Rittenhouse 1995). It is presumed extirpated from the type locality at Chetco, since it has not been documented at the site since it was first collected there in 1884 (ORNHIC 2007).

Silvery phacelia occurs on the open sand above the high tide line, further inland on semi-stabilized and open dunes, and on coastal bluffs. Its flowers attract a variety of pollinators including bumblebees (*Bombus* spp.) and native solitary bees; a study is currently underway at Tolowa Dunes State Park to identify the major pollinators (Julian, pers. comm.). Silvery phacelia appears to require insects for pollination (Rittenhouse and Kiffe 1993), although whether it is self-compatible or requires outcrossing is unknown.

This status review provides an overview of all documented occurrences of the species across its range, most recent population estimates and trends (where multi-year data is available), threats to the species, and recommendations for conservation and recovery.

For information on associated species, life history, pollinators, soils, and monitoring protocols used on lands managed by the Bureau of Land Management, see Brian (2006).

II. Legal Status

**Federal:** Silvery phacelia is presently a Species of Concern (U.S. Fish & Wildlife Service) and a Bureau of Land Management Sensitive Species. In 1990, silvery phacelia was proposed as a Category 2 plant (Department of Interior 1990), meaning that it was a taxon for which there is some evidence of vulnerability, but for which there is not enough data to support listing proposals at the time. In 1996, the U.S. Fish & Wildlife Service (USFWS) no longer considered Category 2 plants for listing under the Endangered Species Act because sufficient information to justify issuance of a listing was lacking. USFWS also discontinued the designation of Category 2 species because of the confusion about the conservation status between Category 1 and 2 species. USFWS remains concerned about Species of Concern, but further biological research and field studies are needed to resolve the conservation status of these plants.

**State:** In Oregon, silvery phacelia is an Oregon Natural Heritage Information Center () List 1 species, meaning that it is threatened with extinction or presumed to be extinct throughout its entire range (2007). It is a Listed Threatened
species by the Oregon Department of Agriculture (2007). In 1979, silvery phacelia was listed as a Group 1b, meaning regional endemic, with the range limited to one of the regions of botanical interest (Siddall et al. 1979).

In California, silvery phacelia is a California Natural Diversity Database (CNDDB) and CNPS Inventory List 1B.1 species, meaning that it is rare, threatened, or endangered in California and elsewhere, with a threat code of .1, meaning that it is seriously endangered in California (CNDDB 2007). It is considered a sensitive species as described in the California Environmental Quality Act (14 Cal. Code Reg. §15380) and therefore is protected under state law on private and public lands covered by CEQA.

**NatureServe Element Ranking:** G2/S2: Silvery phacelia is ranked as Global Rank 2, meaning imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with either 6 to 20 occurrences, 1,000-3,000 individuals, or occupies 2,000-10,000 acres CNDDB 2007). In Oregon, it is listed as State Rank 2.2, meaning imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6 to 20 occurrences (2007).

In California, it is listed as State Rank 1.1, meaning, it is known from fewer than 6 occurrences, and is considered threatened (CNDDB 2007). It is not State Listed as threatened under the California Endangered Species Act (CESA).

III. Occurrences and Trends

According to Brian (2006), there were a total of 32 occurrences known in 1995, 28 in Oregon and 4 in California. The compilation of data on documented occurrences, including those newly documented during 2007, there were a total of 30 occurrences, with 26 in Oregon and 4 in California (see Attachment A for detailed maps, number of individuals, and years documented). The largest extant occurrence is on privately owned land at the northern edge of the range, at Bandon Dunes Golf Resort (~3000 plants), followed by Floras Lake (1,043 plants) and another newly-documented occurrence on private land at Two Mile Creek (~1,000 plants) (Table 1). One or more large occurrences may still be extant at Tolowa Dunes State Park, but population estimates at these locations are not recent enough to be considered reliable considering the extensive ORV damage that occurs there (see aerial photos in Appendix B for ORV trails and mapped phacelia plants).

Several locations which were previously considered separate occurrences were combined due their proximity and lack of documentation of unoccupied habitat separating them. The CNDDB rule is ¼ mile between separate occurrences, while the CRNHC rule is 0.5 km (approximately ¼ mile). The basis for this rule is that separate occurrences would be those that are separated by enough
distance that gene flow between the two would be unlikely. In most cases, the combining of adjacent occurrences involved one or more that has not been documented for decades. These occurrences (and the potentially occupied habitat between them) should be revisited to determine whether they should be considered one or multiple separate occurrences (see Table 1).

For the purposes of this status review, the 30-year rule as applied by ORNHIC was used to distinguish between historic and presumed extant occurrences. Although the CNNDDB definition of historic is 20 years or older (Bittman and Vrlikas, pers. comm.). Of the 30 occurrences identified, 7 are historic or presumed historic, and 22 are presumed extant, with only 8 occurrences known to be extant, using the following definitions:

- **Extant**: has been visited in the last 10 years (1997 to 2007)
- **Presumed Extant**: has not been revisited within the last 10 years (before 1997)
- **Presumed Historic**: has not been revisited in 30 years or more (before 1977)
- **Historic**: has been revisited and plants not found, or habitat has been converted

Few of these occurrences have been monitored, most have not had numbers of plants documented more than once, and many have not been revisited in many years, making it difficult to discern population trends. However, many occurrences have been declining or have been aggressively invaded by gorse and/or European beachgrass, and should be regarded as declining in the absence of more recent census data. Four occurrences on lands managed by BLM—Floras Lake, Four Mile Creek, Lost Lake, and Ophir Dunes—have been monitored regularly since 1995 (Brian 2006). Three of these occurrences have declined, with the Floras Lake occurrence being the only one that has increased, probably in response to manual removal of European beachgrass (Brain 2006; Rodenkirk pers. comm.).

Most populations observed are comprised of juvenile and adult plants, with few or no seedlings. The rare observations of silvery phacelia seedlings are typically associated with recent manual removal of European beachgrass (Brian 2006; Rogers pers. comm.). Another observation of seedling establishment was reported following an accidental fire at Tolowa Dunes State Park (Nyoka 2003). The establishment of seedlings in response to these types of disturbance may be a function of increased light penetration and water availability following by removing competition such as European beachgrass. Research should be done on the types of disturbance that can promote seedling establishment and long-term viability of phacelia populations.
Table 1. Most recent population estimates for silvery phacelia populations, Oregon and California. Occurrences are listed from north to south. See site record summaries for more detailed information (Appendix A).

<table>
<thead>
<tr>
<th>Site #</th>
<th>EO #</th>
<th>Location</th>
<th>First Documented</th>
<th>Last Documented</th>
<th># Plants</th>
<th>Status/Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14960</td>
<td>Bullards Beach</td>
<td>1975</td>
<td>1975</td>
<td>a few clumps</td>
<td>Historic/Unknown¹</td>
</tr>
<tr>
<td>2</td>
<td>3984</td>
<td>Bullards Beach/Bandon Dunes Golf Resort²</td>
<td>1984</td>
<td>2007</td>
<td>3000</td>
<td>Extant/Unknown¹</td>
</tr>
<tr>
<td>3</td>
<td>715</td>
<td>Coquille River Spit</td>
<td>1978</td>
<td>2007</td>
<td>100</td>
<td>Extant/Unknown</td>
</tr>
<tr>
<td>4</td>
<td>2708</td>
<td>Bandon State Park³</td>
<td>1978</td>
<td>2007</td>
<td>~50</td>
<td>Extant/Declining¹</td>
</tr>
<tr>
<td>5</td>
<td>18664</td>
<td>South of mouth of Coquille River</td>
<td>1919</td>
<td>?</td>
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<td>Historic/Extirpated</td>
</tr>
<tr>
<td>6</td>
<td>new</td>
<td>Two Mile Creek</td>
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<td>1000</td>
<td>Extant/Unknown</td>
</tr>
<tr>
<td>7</td>
<td>15614</td>
<td>Lost Lake</td>
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<td>43</td>
<td>Extant/ Stable⁴</td>
</tr>
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<td>7292</td>
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<td>21143</td>
<td>New River and N. shore of Floras Lake</td>
<td>1978</td>
<td>2006</td>
<td>1043</td>
<td>Extant/ Stable⁶</td>
</tr>
<tr>
<td>11</td>
<td>10950</td>
<td>Cape Blanco State Park</td>
<td>1998</td>
<td>2006</td>
<td>70-100</td>
<td>Extant/ Unknown</td>
</tr>
<tr>
<td>12</td>
<td>18663</td>
<td>2 mi. NW of Port Orford</td>
<td>1951</td>
<td>1951</td>
<td>?</td>
<td>Historic/ Unknown</td>
</tr>
<tr>
<td>13a</td>
<td>14773</td>
<td>Paradise Road, NW of Garrison Lake</td>
<td>1977</td>
<td>1977</td>
<td>?</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>14a</td>
<td>14622</td>
<td>Port Orforc--1 mi. N. of Port Orford</td>
<td>1919</td>
<td>1936</td>
<td>?</td>
<td>Historic/ Unknown</td>
</tr>
<tr>
<td>14b</td>
<td>19522</td>
<td>Port Orforc Heads State Wayside</td>
<td>1976</td>
<td>1992</td>
<td>8</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>14c</td>
<td>9510</td>
<td>Just S. of Port Orford</td>
<td>1952</td>
<td>1952</td>
<td>?</td>
<td>Historic/ Unknown</td>
</tr>
<tr>
<td>16</td>
<td>9061</td>
<td>Rocky Point</td>
<td>1993</td>
<td>1993</td>
<td>?</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>17a</td>
<td>5122</td>
<td>Humbug S.P at mouth of Brush Creek</td>
<td>1976</td>
<td>1984</td>
<td>60-70</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>17b</td>
<td>14718</td>
<td>Humbug Mtn. S.P. on trail to Brush Creek</td>
<td>1992</td>
<td>1982</td>
<td>0 in 2007</td>
<td>Historic/ Presumed Extirpated</td>
</tr>
<tr>
<td>20</td>
<td>7379</td>
<td>Ophir Dunes</td>
<td>1976</td>
<td>2006</td>
<td>52</td>
<td>Extant/ Declining</td>
</tr>
<tr>
<td>21</td>
<td>15860</td>
<td>Rest Area N. of Nesika Beach</td>
<td>1929</td>
<td>1978</td>
<td>?</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>22</td>
<td>4241</td>
<td>Gold Beach</td>
<td>1963</td>
<td>1963</td>
<td>?</td>
<td>Presumed Historic/ Unknown</td>
</tr>
<tr>
<td>23a</td>
<td>23800</td>
<td>Mouth of the Pistol River and S.</td>
<td>1925</td>
<td>2007</td>
<td>100</td>
<td>Extant/ Declining</td>
</tr>
<tr>
<td>23b</td>
<td>4750</td>
<td>S. end of Pistol River S.P.</td>
<td>1998</td>
<td>1998</td>
<td>100</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>24</td>
<td>11347</td>
<td>Chetco</td>
<td>1884</td>
<td>1884</td>
<td>?</td>
<td>Historic/ Unknown</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>12520</td>
<td>Lone Ranch: State Beach</td>
<td>1977</td>
<td>2007</td>
<td>300</td>
<td>Extant/ Unknown</td>
</tr>
<tr>
<td>26a</td>
<td>1321</td>
<td>Cal-Ore line--2 mi. N of line</td>
<td>1913</td>
<td>1978</td>
<td>?</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>26b</td>
<td>3985</td>
<td>Crissey Field</td>
<td>1985</td>
<td>2006</td>
<td>120</td>
<td>Extant/ Unknown</td>
</tr>
<tr>
<td>26c</td>
<td>-</td>
<td>Oregon Border</td>
<td>1987</td>
<td>1987</td>
<td>&gt;500</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>27</td>
<td>18216</td>
<td>Smith River to South Indian Road</td>
<td>1939</td>
<td>2003</td>
<td>~200</td>
<td>Extant/ Unknown</td>
</tr>
<tr>
<td>28a</td>
<td>18214</td>
<td>Smith River to Lake Earl</td>
<td>1972</td>
<td>1988</td>
<td>1500+</td>
<td>Presumed Extant/ Unknown</td>
</tr>
<tr>
<td>28b</td>
<td>18217</td>
<td>Talawa Slough, N. of Lake Earl</td>
<td>1979</td>
<td>2007</td>
<td>unknown</td>
<td>Extant/ Unknown</td>
</tr>
<tr>
<td>28c</td>
<td>18218</td>
<td>Pacific Shores subdivision</td>
<td>1984</td>
<td>?</td>
<td>unknown</td>
<td>Extant/ Unknown</td>
</tr>
<tr>
<td>29</td>
<td>-</td>
<td>Pt. St. George to Pebble Beach</td>
<td>1987</td>
<td>2007</td>
<td>~200</td>
<td>Extant/ Declining</td>
</tr>
<tr>
<td>30a</td>
<td>-</td>
<td>Crescent City airport</td>
<td>1987</td>
<td>2007</td>
<td>~500</td>
<td>Extant/ Unknown</td>
</tr>
<tr>
<td>30b</td>
<td>-</td>
<td>Crescent City landfill</td>
<td>1995</td>
<td>1995</td>
<td>10</td>
<td>Presumed Extant/ Unknown</td>
</tr>
</tbody>
</table>

Footnotes:
1. The historic site has been heavily invaded by gorse and has not been revisited recently, but a large population was documented on private land to the east in 2007. This occurrence (Bandon Dunes Golf Resort) has not been previously documented in ORNHIR.
2. The historic site has been heavily invaded by gorse and has not been revisited since 1978, but ~50 plants are known from two sites nearby.
3. These areas have been heavy invaded by gorse, and the extent to which silvery phacelia can recolonize if gorse is removed is unknown.
4. Silvery phacelia populations are considered stable ONLY with ongoing management of gorse and European beachgrass.
5. This population has not been observed following removal of European beachgrass with heavy equipment, despite annual surveys in association with sand verbena seed planting.
IV. Threats

Threats to this regional endemic include invasion of habitat by European beachgrass and other non-native species, coastal development, off-road vehicle use, and illegal removal for horticultural purposes (Brian 2002).

A. Invasive Non-Natives, Particularly European Beachgrass and Gorse

The primary threat to populations and habitat of silvery phacelia is invasion by non-natives. In particular, silvery phacelia is threatened by European beachgrass (*Ammophila arenaria*) throughout its range, and in addition, by gorse (*Ulex europaeae*) in northern part of its range (particularly in sites near Bandon, Oregon). Some sites are also threatened by iceplant (notably Lone Ranch State Beach in Oregon).

*European beachgrass* tends to alter sand movement, and was planted for dune stabilization by agencies primarily concerned with protecting public roadways. The species has been planted on dune systems around the world, to the detriment of native dune vegetation. A study in New Zealand found that European beachgrass alters habitat of native dunes species by accumulating sand at rates that essentially smother the natives, while the beachgrass can survive much deeper accumulations of sand (Hilton 2005).

Fortunately, silvery phacelia appears to persist for some time beneath a canopy of European beachgrass, potentially allowing for successful recovery of populations by manual removal of European beachgrass. The silvery phacelia population at China Creek in Bandon State Park (Oregon) is apparently healthy, despite dense cover of competing grasses and forbs, including European beachgrass (see photos below). Phacelia plants at this site may be able to persist despite competition because of the fact that it has access to light since it is on the edge of a paved opening as well is on an eroding cliff (Bacheller pers. comm.).

Photos by Noel Bacheller, Oregon State Parks.
The rare observations of silvery phacelia seedlings are typically associated with recent manual removal of European beachgrass (Brian 2006; Rogers pers. comm.). This positive response of seedling establishment may be associated with some level of disturbance as well as increased light penetration and water availability following beachgrass removal. However, similar effects have not been observed following beachgrass removal using heavy equipment, which is conducted regularly at BLM’s New River Area of Critical Environmental Concern to restore western snowy plover nesting habitat (Habitat Conservation Plan for the Western Snowy Plover 2004). Even in areas where silvery phacelia was formerly known to occur, it has not yet recolonized areas opened up by heavy equipment (Rodenkirk pers. comm.). Seed longevity and seed bank dynamics are unknown for the species, so it is unknown whether these areas could be recolonized by silvery phacelia in the future, perhaps when natural sand movement is restored following heavy equipment use. Ongoing management of European beachgrass is crucial to the conservation and recovery of silvery phacelia populations throughout its range.

*Gorse* is an especially aggressive and problematic invasive plant, which has encroached upon many dune systems and areas of open sand in the northern part of phacelia’s range. Gorse is a slowly spreading evergreen shrub covered in stout spines which further complicates manual removal, but once it becomes established there are a few other plants that will so completely dominate an area

![Right: Gorse and European beachgrass invading phacelia-occupied open dunes at Two Mile Creek south of Bandon, OR, 2007.](image1)

![Left: Gorse invading phacelia-occupied area at Two Mile Creek, south of Bandon, OR, 2007.](image2)
(Bossard et al. 2000). Gorse is a member of the pea family, and like many of its relatives is known to promote other invasive non-natives by nitrifying soils through microbial nitrogen fixation. Nitrogen in soils occupied by gorse can accumulate at an annual rate of 20 to 30 pounds per acre, and is reported to accumulate high-nitrogen content litter faster than any other temperate plant species (Bossard et al. 2000). Most of the seeds fall near the parent plant, and manual removal of gorse can be effective if it is begun early in the infestation. However, the longevity of buried seeds means that long-term ongoing management is required to successfully control gorse. Once large stands are established, gorse is very difficult to manage, and indeed some areas of state park lands near Bandon have been completely overtaken with monotypic stands of gorse. Restoration of these areas to a condition that will support healthy silvery phacelia populations may not be possible, but controlling its spread into silvery phacelia habitat is crucial to the conservation and recovery of silvery phacelia populations in Oregon.

B. Development

In Oregon, coastal development is a serious threat to silvery phacelia, since state listed plants are not protected on private lands in Oregon, nor is there a strong state Coastal Management Act or corollary of the California Environmental Quality Act (CEQA). Plant surveys are not required preceding coastal development, and development can extirpate populations without their presence ever being detected. Silvery phacelia plants known to occur on coastal bluffs have been fragmented and partially extirpated by residential and recreational development (see Appendix A, Site #4, Beach Loop Rd.). Development threatens all silvery phacelia populations located on privately-owned lands, including Sites 2, 3, 4, 6, and 19 (see Appendix A for location information).

In California, silvery phacelia is less threatened by development, in part due to stronger environmental protections for rare plants on private lands, but also due to the fact that most of the populations in California are on lands managed by public agencies such as the California Department of Parks and Recreation.

C. Off-Road Vehicle (ORV) use

Although most sites are in areas where ORV use is not allowed, trespass by ORV users is a common occurrence. ORV damage to silvery phacelia is of particular concern at Tolowa Dunes State Parks, Pistol River State Park, and other state-managed lands where enforcement is lacking and silvery phacelia habitat is easily accessible from public roads. It is also a threat on some private lands, notably Two Mile Creek south of Bandon, Oregon.

D. Trails

Lightly used equestrian and pedestrian trails have the potential to be beneficial if properly managed, but could negatively impact silvery phacelia populations if not
properly managed. In areas heavily infested with European beachgrass, light trail use (either by pedestrians and/or equestrians) appears to keep some habitat suitably clear of beachgrass for silvery phacelia to thrive along the edges of trails (see photos below).

Light trail use can eliminate European beachgrass, enabling silvery phacelia to persist in these narrow corridors. Left: Bandon Dunes Golf Resort. Right: Pistol River State Park.

E. Grazing

Grazing and related activities may have the potential to be beneficial if properly managed, but could negatively impact silvery phacelia populations if not properly managed. At Floras Lake, the Bureau of Land Management botanist observed that an adjacent private ranch has a thriving population of phacelia, thought to be due to cattle keeping a few sand dunes free of beachgrass and other competing vegetation by trampling or lying on the plants during the winter (Rodenkirk, pers. comm.). Research should be conducted to determine whether this casual observation is correct or not before grazing is used as a management tool to benefit the silvery phacelia. If cattle are removed from areas known to support silvery phacelia, monitoring should be conducted before and after removal to assess the effects of removing the cattle.

V. Recommendations

Populations of silvery phacelia are typically small and highly fragmented, and most appear to be declining (Rittenhouse 1995). All are threatened by habitat invasion by European beachgrass, and in the northern portion of its range, it is severely threatened by gorse as well. Without ongoing management to control invasive non-native, impacts from uncontrolled ORV use, and conversion of habitat by development, the species is in danger of extinction.

Recommendations include:
- Census all populations not documented in more than 10 years;
- Establish protocols for monitoring trends and habitat;
• Conduct long-term monitoring at priority locations, such as the largest populations (Bandon Dunes Golf Resort, Two Mile Creek) and any populations with invasive plant management projects;
• Support the development of conservation easements on private property to protect silvery phacelia populations and unoccupied suitable habitat;
• Consider state listing in California;
• Increase funding for weed management and habitat restoration;
• Increase funding for protection from ORV trespass on lands managed by the state in both Oregon and California;
• Conduct surveys in western snowy plover habitat: potential habitat restoration sites should be surveyed first to avoid harming existing phacelia populations, but should also be monitored after restoration work is done to detect recovering phacelia populations;
• Conduct research on reproductive biology, pollination biology response to disturbance competition with non-native species and other factors that would increase the knowledge about the species and inform recovery and conservation efforts.
VI. References


Habitat Conservation Plan for the Western Snowy Plover. 2004. Oregon Parks and Recreation Department, Salem, OR.


Oregon Natural Heritage Information Center. 2007. Rare, Threatened and Endangered Species of Oregon. Oregon Natural Heritage Information Center, Oregon State University, Portland, Oregon. 100 pp.


Siddall, J. L, K. L. Chambers, and D. H. Wagner. 1979. Rare, threatened, and endangered vascular plants in Oregon – An interim report. Oregon Natural Areas Preserves Advisory Committee to the State Land Board, Salem, OR.

VII. Personal Communications

Bachellor, Noel. Natural Resource Coordinator/Botanist, Oregon Parks and Recreation Department, Salem, OR. noel.bacheller@state.or.us

Christy, John. Oregon Natural Heritage Information Center, Oregon State University, OR. Pers. comm. 2007 and 2008. john.christy@teleport.com


Rogers, Janet. Caretaker, Two Mile Creek/Keiser Property. Box 1214, Bandon, Oregon, 97411. janjet13@yahoo.com

Vrilakas, Sue. Oregon Natural Heritage Information Center, Oregon State University, OR. Pers. comm. 2007 and 2008. sue.vrilakas@oregonstate.edu


Attachments:

Appendix A. Site Locations, Size Estimates, and Dates of Documentation.

Enclosures:

APPENDIX D:

Sand Dunes Phacelia (Phacelia argentea) at Bandon Coastal Property, Bandon, Oregon, June 29, 2007

**Legend:**
- ○ Sand Dune Phacelia Locations
- Approx. Extent of Suitable Habitat, 2007
- State Park boundary

Mapped by J. Kalt for U.S. Fish & Wildlife Service
APPENDIX E:

Report on the Effect of a 2-Year Flood Level on the Setback for Construction
REPORT
on
THE EFFECT OF A 2-YEAR FLOOD LEVEL
ON THE SETBACK FOR CONSTRUCTION

CUT CREEK ANALYSIS

On April 26, 2008 I conducted a field visit at the Bandon Dunes Golf Resort in order to determine the flood stage level of water that would occur in Cut Creek during a two-year flood condition. An Analysis of potential flooding along Cur Creek was undertaken using historic water flow data from EGR Associates and NOAA Atlas 2 together with an analysis of the upstream watersheds for Chrome Lake and Round Lake. The results indicate that generally along Cut Creek from the pedestrian bridge located south of the main lodge downstream to the delta and creek outfall to the Pacific ocean, the recurrence of a two-year flood would raise the flood stage water level approximately one (1) foot above the normal water level. This would typically widen the surface of the stream flowing in the bottom of the creek bed from a width of 4-6 feet average to a width of eight (8) feet.

To aid in the establishment of the location of the "top of bank" or "backfull stage" along Cut Creek in order to determine the regulatory setback zone, we also prepared cross sections of the Cut Creek riparian corridor at four (4) selected locations:

1. Number 8 Green
2. Number 8 Tee
3. Number 2 Green
4. Number 12 Tee.

Cross sections were drawn to indicate the specific conditions along Cut Creek. Projected water levels during a two-year flood were added to the cross sections to establish the water level height associated with a "two-year recurrence interval flood stage". The elevated flood level on the south bank of Cut Creek was then used to indicate the 50-foot setback at these locations.

Based upon the above analysis, it is my professional opinion that none of the proposed tees, greens, or green-surrounds of the proposed golf course as shown on the attached illustration will be located closer than fifty (50) feet from the "top of bank" or bankfull stage" of Cut Creek as defined above.

Based upon the above cross-sections as well as repeated site visits and close analysis of aerial photographs and topographical maps, a line estimated to be ten (10) feet back of the actual top of bank has been drawn along Cut Creek to be used as a conservative top of bank standard for possible locational adjustments.

The attached design sections entitled "Cut Creek Cross Section Two-Year Recurrence Interval Flood Stage Analysis" illustrate this analysis and the drawing entitled "Cut Creek Setback Line".

[Signature]
Torleiv Ratebo, P.E.

[Stamp]
SECTION "B"
at Tee 8

50 ft setback from Creek bank

Ground line
APPENDIX F:

Recommended Plant Species for Bandon Dunes Native Coastal Plant Community
Recommended Plant Species for
The Bandon Dunes Native Coastal Plant Community

The following are the plant species that form the foundation of the "dune mat" community of early succession on open sand in the duneland environment south of Cut Creek:

Primary Species: These are the "mound builders"
- Silvery Phacelia (Phacelia argentea) – largest population in existence
- Yellow Sandverbena (Abronia latifolia) – listed for concern over time

Secondary Species: These are abundant in the duneland environment
- Woody Beach Knotweed (Polygonum paronychia) – common/open and stabilized dunes
- Beach Evening Primrose (Camissonia cheiranthifolia) – open sand common
- Coastal Strawberry (Fragaria chiloensis) – common/open sand and stabilized dunes

Other Species: These are less abundant at this time, but will expand within the open sand habitat that is restored
- Seashore Bluegrass (Poa macrantha) – favors more sand movement
- Sand Mat (Cardionema ramosissima)
- Beach Silver-top (Glehria littoralis)
- Beach Fescue (Festuca rubra) – favors less sand movement
- Beach Snake-root (Sanicula arctopoides)

Natives Species to Consider Introducing into Our Dune Mat Community:
- Pink Sandverbena (Abronia umbellate) – listed, rare plant
- Silver Burweed (Ambrosia chamissonis)
- Beach Sagewort (Artemisia pycnocephala)
- Beach Morning Glory (Camissonia cheiranthifolia)
- Bluefield Gilia (Gilia capitata)
- Large-headed Sedge (Carex macrocephala)
- American Dunegrass (Elymus mollis)
- Sea Sandwort (Honkenya peploides)

Note:

Seashore Lupine “produces prolifically by seed, and can colonize bare sand surfaces readily”. (Christy) This is a species abundant in the Preserve, which we can collect seed from, and broadcast into the proposed project site.
APPENDIX G:

Silvery Phacelia/
Intern Mapping

Drawing Index:

Silvery Phacelia Density
Silvery Phacelia Density – 1
Silvery Phacelia Density – 2
Silvery Phacelia Density – 3
Silvery Phacelia Population and Proposed Par 3