#64

SIERRA CLUB VENTANA CHAPTER

P.O. BOX 5667, CARMEL, CALIFORNIA 93921

CHAPTER OFFICE • ENVIRONMENTAL CENTER (831) 624-8032

Please respond to: Rita Dalessio
16 Via Las Encinas, Carmel Valley CA 93924

March 22, 2004

Thomas A. McCue, Project Planner
Monterey County Planning and Building Inspection Department
Coastal Office
2620 First Avenue
Marina, CA 93933

Re: Pebble Beach Company DEIR

Dear Mr. McCue:

Thank you for the giving the Ventana Chapter of the Sierra Club the opportunity to comment on the Draft Environmental Impact Report (DEIR) recently released by the Pebble Beach Company for their building project in the Del Monte Forest.

The central California coastal areas have many valuable and sensitive biological resources. Any threats to those resources, including new developments, deserve careful review and mitigation. As such, the Ventana Chapter has made use of its own resources to coordinate a comprehensive and science-based review of the DEIR.

The attached review is focused on the biological resource issues. Our comments reflect a coordinated effort that includes input from appropriate scientists and other experts, and a factual basis that is drawn directly from the scientific literature. (Please note the three-page list of scientific literature cited in our comments). One source of information--a recent publication of the University of California--is appended to our comments (Rogers 2002) as it has been frequently cited in the DEIR."

In addition, Sierra Club is submitting comments under separate cover prepared by the Law Offices of Frank P. Angel.

Very truly yours,

Rita Dalessio

Rita Dalessio
Chapter Chair (RD/GT)

Cc: California Coastal Commission

Comments on the Draft Environmental Impact Report
on the Pebble Beach Company's 'Del Monte Forest Preservation and Development Plan'
(Applications PLN010254 and PLN010341)

Response coordinated by: The Sierra Club, Ventana Chapter
Chapter contact: Rita Dalessio

Executive Summary: The Draft Environmental Impact Report (DEIR) is inadequate and inaccurate in its representation of the environmental setting, biological resources, and likely impacts of the project. The description of the Monterey pine forest does not include adequate representation of the structure of biological diversity and abiotic environment, differences in degradation and habitat value within the forest, or spatial variation in genetic diversity within plant species. The status of the Monterey pine forest has not been adequately described: there is substantial evidence that it should be considered an 'environmentally sensitive habitat area' as described in the California Public Resources Code, pertaining to the California Coastal Act. The ongoing threats to the Monterey pine forest have not been adequately described, nor have their cumulative impact with the proposed project assessed. Pitch canker, for example, is a dynamic pathosystem that will continue to change in its virulence and influence the forest in the future. Building additional residences and recreational facilities will increase negative interactions with the forest—including the reasonable probability of introducing new pathogens and exotic invasive plant species. Additional structures and increased human presence will also continue to limit management options, including the ability to control plant introductions and the use of fire—which is a normal, historical forest influence in the project area. Conversion of forest and other natural areas to residential and recreational use will further limit the ability of native plant species to migrate in response to climate change: putting further stresses on them, and increasing extinction probabilities for the local populations or endemic species that don't have sufficient flexibility to adapt in place. Increased forest fragmentation, caused by the project, will cause a diverse array of edge effects—which could include increased vulnerability of edge trees, increased nest predation, changes in microclimate, changes in soil moisture, and other negative impacts. The fragmentation of the forest and associated edge effects will result in substantially less 'reserved' or 'conserved' area than estimated in the DEIR. Many of the suggested mitigation treatments in the DEIR do not, in fact, provide a reasonable expectation of mitigating the anticipated project impacts and do not reduce the impacts to less-than-significant levels. The forest areas conserved by this project are not directed by the biological needs of the species, but by left-over areas from development. This lack of consideration of the species' biology substantially reduces the likelihood that reserved areas will act effectively to conserve biological diversity and longevity. One extreme example of this is the mitigation measure proposed for Yadon's piperia—an endangered plant species. Very little is known about the population dynamics, habitat needs, or genetic diversity of this species. As such, translocation is unlikely to succeed, and removing any populations carries risks for the longevity of the species. A mitigation measure aimed at reducing the impact of removing thousands of trees and associated habitat is inappropriate, inadequate, and carries additional risks to the forest. The proposed mitigation uses planted trees instead of encouraging natural regeneration and natural selection. This measure carries the risk of introducing trees into the forest and adjacent areas that are not genetically compatible, that are not well-adapted to the area, or that are genetically impoverished

relative to natural regeneration. The measure does not conserve forest health, forest character, or genetic diversity, but rather has the undesirable effect of further domesticating the forest. The total impact is a forest that is impaired and that requires increasing management input to replace lost ecosystem function.

****

The Draft Environmental Impact Report (EIR) on the Pebble Beach Company's 'Del Monte Forest Preservation and Development Plan' represents a substantial body of work by those who prepared it and guided its development. While we respect the effort involved, we find that this Draft EIR is substantially flawed in two major respects:

I. In numerous instances, the Draft EIR fails to meet EIR disclosure requirements as required by CEQA; and

II. Many of the suggested mitigation treatments do not, in fact, provide a reasonable expectation of mitigating the anticipated project impacts and do not reduce the impacts to less-than-significant levels.

We have confined our comments to Chapter 3.3 'Biological Resources' of the Draft EIR (hereafter referred to as 'DEIR'). Flaws are ubiquitous throughout this chapter: we provide a sample below. All references to CEQA refer to Article 9 of the CEQA Guidelines: Contents of Environmental Impact Reports.

I. The DEIR is inadequate and inaccurate in its representation of the environmental setting, biological resources, and likely impacts of the project:

1. CEQA (15125) requires a description of the physical environmental conditions in the vicinity of the project. **The description provided of the Monterey pine forest is inadequate.**

a. The diversity in the forest and the way it is structured (i.e., varies from one area to another) have not been adequately described. Any areas with Monterey pine present, are described simply as 'Monterey pine forest', even though there is considerable biological diversity within this forest, structured in a manner that can be described and considered in its components. The Monterey Peninsula has been noted for a high degree of species endemism (e.g., Axelrod 1982, Howitt 1972). This, and the substantial number of federally- or state-listed species in the project area, are just two indicators of the high degree of biological diversity. Some biologically significant structures that can be used to describe the variability in the native Monterey pine forest include geomorphology and associated plant communities (e.g., McBride and Stone 1976, Cylinder 1995), microclimate, (understory) plant communities, and wildlife use. 1

Secondly, there are various 'qualities' of forest based on the degree of degradation (for example, parcels or forest areas could be assigned categorical values on a range from 'severely degraded' to 'undisturbed natural forest'). Finally, the value of the forest as habitat and as a functioning ecosystem is also related somewhat to the size of contiguous forest areas. In general, larger contiguous areas will have more ecosystem value, be better buffered from development impacts, and provide suitable habitat for more species (or, at least, those requiring large geographic areas) than smaller or fragmented areas.

It is a serious inadequacy of the DEIR that such distinctions (of biological diversity that differentiates one forest area from another, in condition of parcel relative to a natural condition, and of differences in parcel size and habitat value) are not made. The habitat or ecosystem value of the forest parcel is directly related to the significance of the project impact.

Furthermore, even though loss of genetic diversity of the Monterey pine forest is considered a significant impact as defined in the DEIR (p 3.3-5), the baseline level of genetic diversity in these local pine forests has not been described. As such, loss of diversity could not be accurately measured or monitored and any mitigation measure towards loss of genetic diversity would not be enforceable (as required by CEQA 15126.4). The genetic diversity of any plant species affected by the project has not been adequately described. This is a serious inadequacy of the DEIR. Genetic diversity is one of the three forms of biodiversity recognized by the World Conservation Union (IUCN) as deserving conservation (McNeely et al. 1990). A recent review of numerous genetic studies showed a positive and significant relationship between genetic diversity and fitness of (plant and animal) populations (Reed and Frankham 2003).

b. The status and sensitivity of the Monterey pine forest have not been adequately described. In a recent review and description of 'special vascular plants, bryophytes, and lichens' (California Department of Fish & Game 2004), Monterey pine received the most extreme ranking, that of 'very threatened'. Monterey pine is on the 'World List of Threatened Trees' (Hilton-Taylor 2000). In recognition of the reviews and expressions of the concern at State and international levels, Monterey pine forest apparently meets and exceeds the criteria for an 'Environmentally Sensitive Habitat Area' as described in the California Public Resources Code (Section 30107.5) of the 1976 California Coastal Act:

" '*Environmentally sensitive area' means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments. In addition, some of these sensitive habitats require further protection from disturbance, and this subset of sensitive habitats is called environmentally sensitive habitat areas.*"

1 (cont.)

c. The current and future threats to the Monterey pine forest posed by introduced invasive species have not been adequately or accurately described. For example, the description of the introduced fungus, *Fusarium circinatum*, and its associated disease—pitch canker—have not been described adequately as to their nature or likely future impact on the forest. Mentioned briefly Chapter 3 (e.g., pp 3.3-67) and in Appendix E (E-6, -7), the ongoing mortality from this pathogen, uncertain information about the nature of any resistance in Monterey pine, and the dynamic nature of this pathogen over time, have been largely ignored. More specifically:

- Prior estimates of mortality in Monterey pine have been vague, uninformed by any knowledge of resistance in Monterey pine, and containing some inherent error because of year-to-year variability or being based on samples rather than comprehensive surveys. But exact precision in such estimates or surveys is not the relevant issue here: Any mortality of Monterey from pitch canker—and there has been considerable, based on even the most conservative estimates—is more than

would have otherwise occurred in the absence of pitch canker, and is a significant additional threat to Monterey pine and its habitat.

- Pine pitch canker disease is thought to be affected by more than the presence of the fungus and a pine tree, and hence has been appropriately described as a 'pest complex' (Owen 1998) in recognition of the fact that beetles are involved in vectoring the disease, and other factors such as microclimate may be involved. As such, if any of these factors change over time, the mortality of pines could change accordingly. It is a dynamic situation. As such, estimates of pine mortality based on past projections or current surveys, are not necessarily reliable as future predictors of mortality. 1
- Adding to the fact that this is a dynamic system is the variability in the fungus itself and its potential to change over time, possibly changing its virulence. There is known genetic diversity within the fungus (e.g., Wikler and Gordon 2000) and evidence that the different fungal types (sometimes called 'vegetative compatibility groups) can recombine under certain conditions (Wikler et al. 2000). The disease reflects a dynamic relationship between the host (pines, in this context) and the pathogen, and given the diversity within the pathogen, there is potential for it to respond to any resistance in the host, and change (or become more virulent) over time. Again, this means that past or current estimates of pine mortality from pitch canker may not adequately reflect future mortality. This uncertainly is not reflected in the DEIR. For example, there is no risk analysis of the pathogen's impact over time.

2. CEQA (15130) requires definition of the geographic scope of the area affected by the cumulative effect. Because genetic resources of Monterey pine are used commercially to a significant degree in other countries, and because there will be loss of genetic diversity associated with the proposed projects, there is a reasonable likelihood of impact on forest industries in other countries. These interests and impacts have not been included in the geographic scope of the area affected. 2

3. CEQA (15384) requires the use of 'substantial evidence' in reaching conclusions such as what constitutes a 'significant effect'. Neither sufficient nor appropriate information is presented to support the conclusion in the DEIR that "an interim loss of no more than 5% [of the extant resource] is identified as providing a reasonable certainty that options for future conservation will not have been foregone" (p 3.3-5). Minimally, there are three weaknesses in this argument. First, choice of the denominator is key to staying within this threshold. If the Del Monte Forest is considered as the reference, in fact, a reduction in Monterey pine forest of 7% is indicated by the project (Table 3.3-2). The report narrative indicates that the project stays within this 5% threshold, but this is accomplished by choosing a larger geographic area as the reference group—a decision that is not substantiated. Second, additional (cumulative) impacts will certainly reduce the amount of forest further (via climate change impacts, pollution, competition from exotic invasive species, introduced diseases, and other influences). As such the '5%' is a minimum impact, not a maximum. Third, as described above, there is substantial and biologically meaningful diversity within the Monterey pine forest in the project area. As such, the 5% threshold, if accepted, should be applied to every subtype within the forest, not as an overall average. 3

4. CEQA (15126.2) requires that the EIR analyze any significant environmental effects the project might cause by bringing development and people into the area affected. These impacts have been inadequately described in the DEIR and can reasonably be expected to be substantial and ongoing. Only in the description of the residential developments (pp 3.3-18 to 3.3-19) does the DEIR provide *some* description of human impact and acknowledges that the project impact goes well beyond the actual footprint of the residences. Because of home-owners' tendencies to remove native vegetation, affiliations with pets that may kill or harass wildlife, and other influences, the DEIR acknowledges that the pine forest within the entire building envelope will be converted to 'suburban forest'. We interpret that impact to be 'loss of Monterey pine habitat'. But the human impacts do not stop at the 'building envelope' boundaries. It is reasonable to expect that the following impacts—related to the development of permanent residences and the introduction of additional homeowners into the area—extend well into neighboring forests, degrading the habitat and ecosystem value of those forests, and that those impacts continue indefinitely: 4

    a. Introduction of exotic, invasive plant species (as planted, as dispersed by seeds, or unintentionally introduced by home owners) into the adjacent forests areas. Those weed species would be expected to compete with native plant species, including Monterey pine, and seriously impact new growth. (See Rogers (2002) for partial list of such species that are particularly invasive and problematic in native Monterey pine forests).

    b. Genetic contamination of native plant populations from native (but genetically inappropriate—i.e., nonlocal, or ill-adapted) plant species that are planted by residents.

    c. Loss of wildlife and interrupted breeding activity of wildlife because of harassment and killing by pets.

    d. Trampling of native plants and additional harassment of wildlife because of use of neighboring forests by residents for walks, dirt bike trips, and other activities—even if explicitly discouraged by Pebble Beach Company.

    e. Additional harassment of wildlife, including possible disruption of breeding activity, because of noise related to residences—first of construction, and then of mechanical equipment related to maintenance activities.

    f. Direct and ongoing loss of wildlife from road kills, because of increased traffic related to residential and recreational use.

    g. Possible introduction of new pathogens that could cause substantial mortality among the native plant species, including Monterey pine. Humans are notorious for inadvertently transferring diseases to native plant species via introduced plants from nurseries, firewood, shoes, vehicles, recreational equipment, tools, and other items. Unfortunately, there are many examples in California of introduced diseases (or insects or invasive exotic plants) that have had serious consequences. Two diseases that have been introduced to California and caused major impacts on native plant species in the last two decades are pine pitch canker (McCain et al. 1987) and sudden oak death (e.g., Garbelotto et al. 2001). The former, as previously mentioned, is an introduced fungus with unknown mechanism of introduction to native pine forests; the latter, caused by the pathogen

Phytophthora ramorum, may be a relatively recent introduction to California although it is not known whether the pathogen was transported from Europe to North America, or was introduced into both locations from a third, as yet unknown location (Rizzo et al. 2002). There is a reasonable expectation that new and serious diseases or insects could arrive onsite that would further negatively impact native plant species. The proximity of substantial numbers of home owners (and their ongoing visitations by guests) greatly increases the probability of introducing new pathogens to native plant, as does the visitation level of international tourists. 4 (cont.)

h. Severe limitations on management options for the forest because of human proximity (including fire—which is a natural, historic disturbance in this area).

i. Additional loss of trees because of the increased proximity of humans and increased frequency of contact between native forests and humans. As indicated in the DEIR (p 3.3-7), removal of any Monterey cypress, Gowen cypress, or Bishop pine trees would be considered a significant impact "except in cases where life, property, or existing access is immediately threatened." Why does the cause of removal determine the significance of its impact? Beyond this, by increasing the number of residents, and the frequency and abundance of human use in forest (and adjacent) areas, the number of 'exceptions' will increase and trees—even those species such as Gowen cypress (*Cupressus goveniana* ssp. *goveniana*) that are threatened—will continue to be removed.

In summary, there are numerous and serious long-term impacts associated with increased number of residences and increased recreational use. These impacts will extend well beyond the immediate project area and have not been sufficiently described as significant impacts associated with all project developments. Because some of the impacts are inadvertent, they are also escape mitigation.

5. CEQA (15126.2) also requires that significant environmental impacts of the proposed project include consideration of alterations to ecological systems. This important 'ecosystem-level' of impact analysis is almost entirely absent from the DEIR. Obvious considerations would be impacts on birds and insects that translate into pollination and seed dispersal impacts on plant species; disrupting balances in wildlife habitat in the sense of favoring species that are more human-tolerant (e.g., raccoons, deer) and discouraging/eliminating those that are more human-intolerant; changing light penetration levels, microclimates, and water availability and distribution in understory species' habitats because of direct, project-related impacts on canopy species (such as pines); shifting species abundances and distributions because of changes in disturbance regimes (such as fire suppression) and other impacts. 5

In particular, changes in the effective precipitation for various species should be discussed because moisture availability—especially during dry summer months—is a critical factor for species presence and persistence. In the Monterey region, rainfall amounts to only 38 to 51 centimeters (15 to 20 inches) per year, but summer fog-drip is a primary source of moisture for plants that would otherwise not be able to persist with such low rainfall (US Fish and Wildlife Service 1998). Recently emerging information derived from studies in coastal California redwood forests has provided evidence that fog-drip from the needles of coniferous species such as pines and redwoods can play critical ecological roles. In the

redwood forests, such fog-drip from the redwoods provides much of the water supply for many understory plant species, including rare and listed species (e.g., Dawson 1998). A reasonable extrapolation of these results (i.e., there are no similar studies as yet for Monterey pine) would suggest that they play a similar role in moisture provision, and that removal of significant numbers of trees could have a biologically significant impact on understory species through reduction in water supply. The interplay between fog and the coastal natural areas is also critical to consider in light of rapidly occurring climate change. Any subsequent changes in the spatial or temporal patterns of fog on the coast, would reasonably impact the plant species. These stresses are in addition to those caused by the project.

6. CEQA (15130) requires discussion of cumulative impacts, including long-term impacts. The DEIR does not effectively consider the inevitable and ongoing erosion and degradation of Monterey pine forest from impacts from previous developments, and exacerbated by the project and probable future development. Previous projects have fragmented the forest (such that the size of any forest parcel is smaller than in natural condition) and brought it into closer proximity with humans and human structures. The project continues this harmful trend. Coastal California forests have a(n) (evolutionary) history of natural fire occurrence (e.g., Axelrod 1980, Millar 1999, DEIR pp 3.3-65-66). The fire adaptations of Monterey pine and other native species reflect these historic natural disturbances. But previous development projects have resulted in the natural disturbance regime (fires) of the native forest being changed and in fire suppression policies being implemented. With increasing development, more aggressive fire prevention policies are enacted—some of which involve unnatural thinning of forest trees which undermines natural selection, and removal of understory species as they could be 'fuel'—both of which change the forest character. These cumulative impacts are creating a forest that is more difficult to maintain in natural condition, by limiting the array of management tools available.

   A second cumulative impact results from the increasingly 'hemmed in' condition of the forest. Historically (i.e., evolutionary time-scales), Monterey pine adjusted to changes in climate by migrating to new conditions, that is, changing its natural range over time (e.g., Axelrod 1980, Burdon et al. 1992, Millar 1998). This migration requires that there be available habitat in close proximity to existing habitat, allowing natural regeneration to gradually shift into more desirable areas. Indications are that climate change is occurring at an accelerated rate. Temperatures rose in the 20th century at a rate unprecedented in the last millennium. Atmospheric CO_2 concentration is now higher than at any time in at least the last 420,000 years and will almost certainly double within the next century (Bradley 2000). Changes in the normal range of temperatures, patterns of precipitation, concentration of CO_2, and other atmospheric characteristics affected by recent and continuing climate change, will affect forest dynamics and possibly species' ranges (e.g., Peters 1990). Globally, these effects are expected to be more pronounced in temperate (including the Monterey pine native range) and arctic forests, where temperature increases are projected to be relatively large. Coastal ecosystems, in particular, may be more immediately and critically affected, given that global mean sea levels are expected to rise about 6 cm per decade (Kappelle et al. 1999). 6

   Continued and cumulative impacts from development and creation of 'hard' forest edges (i.e., abrupt transition to very different land use such as buildings, roads, golf courses, etc.), has substantially reduced (and will continue to reduce) the natural ability of Monterey pine to adjust to environmental changes. The increasing number and severity of 'hard edges', too,

limits the array of forest management tools and may ultimately lead to incremental losses in Monterey pine habitat as existing habitat becomes less suitable for this species as a result of climate change. The project will further limit the ability of native plant species to migrate in response to climate change—putting further stresses on them, and increasing extinction probabilities for the local populations or endemic species that don't have sufficient flexibility to adapt in place. As such, the project impacts that are acknowledged actually underestimate cumulative impacts. The project impacts stated in the DEIR are estimates of the minimum possible impact and are not likely realistic. Conversion of forest and other natural areas to residential and recreational

7. CEQA (15126.2) requires clear identification and description of the direct and indirect significant effects of the project on the environment. A serious effect of the proposed project but one that is largely neglected in the DEIR is that of edge effects. Increased amount of edge effect is one of several important consequences of forest 'fragmentation'—a word that appears frequently in the DEIR. But the negative effects from fragmentation and the creation or exacerbation of edge effects are neither adequately nor accurately discussed, nor are edge effects adequately represented in mitigation measures.

   Developments—including buildings, golf courses, trails, and other structures or changes from a natural condition to some other land use—create an 'interface' between the pre-existing forest or natural landscape and the new development. This interface has an associated 'edge effect' that has long been recognized and discussed with respect to nature conservation (e.g., Thomas et al. 1978, Harris 1984). The impacts from edge effects are numerous and vary in their severity depending on the type of project (that is, the degree of ecological and environmental difference between the project area and the natural forest area), the amount of edge created, and the sensitivity of the adjacent natural environment. However, there are always edge effects from development projects and they extend well into the forest. Some of the commonly cited edge effects include: 7

   - Changes in microclimate for species near the edge, such as increased light levels, decreased soil moisture, increased deposition of pollutants, and other effects (e.g., Foggo et al. 2001).
   - Increased exposure of some species to predation pressure. Increased predator: prey ratios, increased mortality due to pathogens, increased bird species turnover, and increased nest predation are some of the negative impacts on animal species that have been associated with edge effects (Foggo et al. 2001).
   - Increased vulnerability to invasion by exotic invasive plant species.
   - Increased seed predation, decreased seed germination, increased herbivory levels, increased overall plant mortality rates, and decreased pollination success are some of the effects that have been observed on plant species as a result of edge effects (Foggo et al. 2001).
   - Increased vulnerability of trees to wind damage and windthrow (e.g., Harris 1984).

   Some edge effects may just be related to certain project development stages (e.g., noise from building structures that impacts breeding in birds or other species); others continue indefinitely. Rankin de Mérona et al. (1990) showed the severe edge effect on trees in small

lots of the Manaus, Brazil project. Even after two years of isolation, many dead and broken trees occurred around the windward margin of the reserve.

Edge effects are relevant to the proposed project in two respects. First, edge is associated with every project within the overall development plan. Second, edge effects reduce the amount of forest (or other ecosystem type) that is actually being conserved. The dimensions of a parcel obviously determine the amount of 'edge'. As such, a square or circular forest reserve has less edge than a long, linear forest reserve. The negative impacts from 'edge effects' are related to the amount of edge, the type of development, and the varying sensitivities of different species.

The reduction in size of the forest area that is being 'conserved' because of edge effects is significant. Smaller reserves are less effective in conserving species, are more difficult to manage, and are more vulnerable. The rate of species loss and genetic deterioration for most species is inversely proportional to reserve size (Soulé 1986, 1987; Prance 1997). In addition to the problems of maintaining viable interactive populations of plant species in small reserves, there is also the fact that they are much more prone to destruction. For example, a small reserve could be entirely destroyed in a fire or by a storm, whereas in a larger area the destruction is unlikely to be total. (Prance 1997). The edge effect (Lovejoy et al 1986) can alter all of a small reserve, but only a small portion of a larger one. A small reserve is also much more likely to be invaded by exotic species. For plants, a particular disadvantage of small reserves is the loss of agents of pollination and dispersal (Prance 1997). For the project area, this could include bees, butterflies, and other insect pollinators. And smaller reserves don't allow for continued natural disturbance (e.g., fire). In fact, natural disturbances are incompatible with proposed adjacent uses. 7 (cont.)

Because of the well-established and ubiquitous impacts from edge effects, forest (or other) reserves typically include 'buffer areas'. The current consensus view of an optimal reserve design is that based on the Man and the Biosphere programme (UNESCO) (see Cox 1993, Batisse 1986). This establishes a central core area with a stable habitat, surrounded by a buffer zone and outside this, where possible, a transition zone (Hawkes, et al. 1997). This reserve design recognizes the reality of edge effects and considers true 'reserved area' a considerably smaller, central area.

Because edge effects and the required buffer areas have not been recognized or established in the DEIR, we find that the 'preserved', 'conserved', 'dedicated', or 'undeveloped' areas represented in the DEIR substantially over estimate true reserves or natural habitat areas. As such, Tables 3.3-1, 3.3-4, and others are inaccurate and misleading with respect to maintaining and protecting habitat, species, and ecosystem values. In quantitatively representing project areas and their impacts, such tables should disclose the distances of forest edge created by the project, approximate dimensions of current and proposed forest habitat, and amount of area that would be required as 'buffers' for remaining forest areas. As such, remaining 'forest reserves' are not simply what is not directly converted to development, but remaining forest minus development, severely degraded areas (e.g., residential lots), and buffer areas. Buffers should be designated along edges created by development, in widths that are biologically appropriate to protect forest values in those areas. All tables and references to 'conserved forest areas' should be recalculated to include

appropriate buffers, and to provide credible estimates of reserves rather than those presented in the DEIR.

Furthermore, 'reserves' or conservation areas as defined in the DEIR are not designed with respect to the species' biology and genetic diversity. Rather, they are largely 'left over' areas, of lower priority for (former and future) development. This lack of consideration of the species' biology substantially reduces the likelihood that reserved areas will act effectively to conserve biological diversity and longevity.

II. **Many of the suggested mitigation treatments do not, in fact, provide a reasonable expectation of mitigating the anticipated project impacts and do not reduce the impacts to less-than-significant levels.** Some examples follow.

1. Mitigation Measure BIO-D1-1. Redesign golf course layout and avoid development within populations of Yadon's piperia, wherever feasible, within development sites.

Mitigation Measure BIO-D1-1 is insufficient to reduce the project impact to less-than-significant and very likely to be biologically ineffective.

Yadon's piperia (*Piperia yadonii*), a federally endangered plant, is already severely restricted and continues to be impacted by continued fragmentation and destruction of habitat due to urban and golf course development, exclusion by alien species, roadside mowing, and potentially an increase in deer grazing of flowering stems (US Fish and Wildlife Service 1998). 8

The narrative that presumably supports this mitigation measure in the DEIR (3.3-31 – 3.3-34) is confusing and conflicting. Points are made that in general, larger contiguous habitat areas are preferred and have lower extinction risks, but that Yadon's piperia may have a metapopulation structure—a condition of numerous smaller patches, and a species condition that is characterized by local populations being founded and becoming extinct over time. The DEIR does not recognize the inconsistency in those statements, probably because the concept of 'metapopulation' is not well described here. Several points are clear:

- It is not known for sure whether or not Yadon's piperia has a metapopulation structure. Furthermore, it should be noted that metapopulation structure is often confused with other plant population structures and status. For example, a plant species that is on a trajectory towards extinction may appear to have a 'metapopulation' structure (Harrison 1991). In fact, classic metapopulations may not be common in nature (Harrison 1991). Metapopulations are difficult to test in practice, and require detailed, long-term studies on population sizes, dispersal distances, and other traits to properly identify and understand metapopulation structure (Doak and Mills 1994). These studies have not been conducted for Yadon's piperia.
- The description of metapopulation structure in the DEIR is inadequate and unclear. It also contains unsupportable statements, such as "Given that piperia seeds are extremely light and wind-dispersed, it can be argued that Yadon's piperia occurrences on the Monterey peninsula function as a metapopulation." (p 3.3-34). In fact, many plant species (including many forest

tree species such as coast redwood) have seeds that are light and wind-dispersed, and these traits are insufficient to suggest a metapopulation structure.

- The conservation implications for Yadon's piperia of its population structure are not clear.
- The locations of all Yadon's piperia are not known. For example, following germination, orchid seedlings typically grow below ground for one to several years before producing their first basal leaves (US Fish and Wildlife Service 1998). As such, merely avoiding currently known plants by modified golf course design, but developing adjacent areas, may be expected to impact other piperia that are not yet apparent. Moreover, the "avoid development ... wherever feasible" language in the mitigation measure would allow for impacts to currently known plant locations. Impacted plant locations should be identified and the impact should be quantified.
- There is insufficient biological information on Yadon's piperia to be further restricting its habitat, removing existing plants, or assuming other habitats are suitable.

As such, should a conservative strategy of avoiding the impact altogether be adopted, such a strategy would be consistent with the endangered status of this species.

2. Mitigation Measure BIO-D1-3. Implement a final Transplantation Design, Enhancement, and Adaptive Management (TEAM) Plan to offset direct and indirect losses of Yadon's piperia.

Mitigation Measure BIO-D1-3 is insufficient to reduce the project impact to less-than-significant and very likely to be biologically unfeasible. 8 (cont.)

The stated purpose of the TEAM plan (p 3.3-39) is "to create new populations of Yadon's piperia ... and to enhance existing populations...". Based both on general experience in restoration and transplantation programs with other native California plant species, and on the specifics of Yadon's piperia, there is little, if any, for any reasonable expectation that these efforts would be successful.

- Translocation as a mitigation measure does not have a good record of success in California. Of 45 translocation projects (established between 1983 and 1989) that were reviewed for status, only 5 were declared 'successful' (Fiedler 1991). And all but one of those five were less than 20 years old, so long-term success (e.g., ongoing, viable natural regeneration and maintenance of biological diversity) has not been demonstrated even for those projects initially declared 'successful'.
- A translocation project that stands a good chance of success relies upon a comprehensive knowledge of the ecological and reproductive requirements of the species (Howald 1996). We do not have such comprehensive knowledge of Yadon's piperia; in fact, we know very little. And what we do know suggests it would be very challenging to establish. For example, it has been suggested that germination of Yadon's piperia seeds probably involves a symbiotic relationship with a fungus (US Fish and Wildlife Service 1998). That relationship requires (a priori) investigation and would be a challenge to engineer on new sites. We do not understand the general population dynamics of the species, whether it has a metapopulation structure (and, if so, what that implies for restoration attempts). Furthermore, we do not understand the general biology of the species—its specific habitat requirements, how populations interact with each other (e.g., the importance of seed and pollen exchange within and among populations), the degree of genetic diversity within and among populations, etc.

8 (cont.)

All of this information is critical for successful enhancement of existing sites or transplantation and creation of new populations.

- For threatened or endangered plant species, proper management of the remaining genetic diversity and genetic structure is extremely important. Genetic information for Yadon's piperia is not sufficient to allow proper translocation.

Because of the endangered status of the species, and the lack of information about it to inform any restoration or transplantation attempts, it is imperative that the species be maintained in its current habitat. **Minimally, it is essential that comprehensive biological information be obtained, and that successful transplantation be demonstrated to the public and commenting agencies before the project is approved.**

3. Mitigation Measure BIO-I1-1. Incorporate specific tree removal and replanting guidelines into the site-specific RMPs [followed by a list of eight stipulations, many of which pertain to planting trees].

Mitigation Measure BIO-I1-1 is insufficient to reduce the project impact to less-than-significant, does not protect forest health or diversity, and may result in additional (undesirable) impacts itself.

The project would result in direct loss of thousands of native (Monterey pine and other) trees and associated habitat (Impact BIO-I1, p 3.3-61). Although the DEIR in this section (I. Tree Removal) focuses specifically on loss of trees, concomitant with this is loss of land/habitat for these and other species, and loss of other species. This impact should be viewed in its entirety. 9

Planting trees is not a reasonable substitute, in forest context, for natural regeneration. Recall that the criteria for determining 'significant impact' as stated in the DEIR is "the loss, conversion, and/or fragmentation of Monterey pine forest such that the natural forest character is not retained to the maximum extent feasible ... or such that long-term protection of the natural forest resource is not achieved, including preservation of forest plant associations, forest geographic and genetic diversity, native soil cover, and overall forest health." (p 3.3-5). Planting trees is not a proxy or ecological equivalent to having trees regenerate naturally, nor does it protect the other plants, forest understory, or natural forest character. If trees are not regenerating naturally in the forest, or are not allowed to (e.g., if seedlings or small trees are not protected, are routinely uprooted or cut down, or are artificially 'thinned'), this constitutes a serious forest health problem. Abundant natural regeneration, adequate genetic diversity, and allowing for natural selection to take place are necessary for adaptation of plant species. Removing many seedlings or young trees, for example, undermines local adaptation. Interfering with any of these processes has an impact on long-term forest health.

Mature forest trees in natural context represent those that have survived in the long term, and have successfully competed with plants of the same and other species. As such, they possess valuable attributes and would be the parents of the next generation of the species. By cutting down mature trees and replacing them with planted trees, that entire natural selection process is omitted. Even a practice of carefully collecting seeds from local trees and growing them into replacement trees does not substitute for natural selection. In nature, there would be extremely

high numbers of (those same local) seeds and seedlings that are naturally selected to the relative few that survive to maturity. Without that selection process, opportunities for having healthy (in the long term) and naturally adapted parent trees are undermined. Unfortunately, even ill-adapted trees that are planted may survive (especially if 'cared for' by a forest management plan) but they would then further undermine the viability and local adaptation of subsequent generations, with their seed. As such, this undermining of natural selection by planting trees, and then caring for those trees, contributes to 'increased domestication' of the Monterey pine forest. Avoidance of this 'increased domestication' (meaning, in this sense, uncoupling the species from resident natural processes such as natural regeneration and natural selection—thus requiring constant input and management to ensure biological functions such as growth and reproduction) (Rogers 2002) is cited in the DEIR (p 3.3-62) as a conservation measure that is most relevant to the proposed project. But mitigation measure BIO-I1-1 is in direct conflict with the recommended conservation measure that the DEIR indicates is most relevant to the project.

Furthermore, the mitigation measure also fails to include or consider the other three genetic conservation measures that are cited in the same section of the DEIR (p 3.3-62) (including avoiding biologically significant losses of genetic diversity, avoiding further forest fragmentation, and, if supplanting the natural regeneration is required, using seeds instead of seedlings). In fact, the mitigation measure diminishes genetic diversity, does not prevent further forest fragmentation, and uses a poor ratio of introduced versus retained trees (i.e., does NOT use seeds, as suggested, but plants on the very unfortunate ratio of 1:1). This is explained further below.

9 (cont.)

Furthermore, CEQA (15126.4) requires description of any mitigation measures that would cause one or more significant effects in addition to those that would be caused by the project as proposed. Mitigation measure BIO-I1-1 potentially contributes additional adverse impacts to the native forests. Planting Monterey pines (or other native tree species) carries risks that have not been described in the DEIR, and that are in addition to the problems already described. These risks include:

- Genetic contamination: If the planted trees are not well chosen and not well adapted to the area, but do survive to reproductive maturity, the pollen from those trees would cause genetic contamination if, as is likely, any of it successfully fertilized native trees.
- Loss of genetic diversity: The seed collection methods that would provide the basis of the planted trees are poorly described in the DEIR. If seeds are not collected in an appropriate manner from a sufficient number of unrelated trees for each local population, and if this diversity is not maintained throughout the nursery process (e.g., see Kitzmiller, 1990 for examples of undesirable selection of plants in a plant nursery context), there could be loss of genetic diversity. It is particularly concerning and undesirable that the DEIR calls for 'pitch canker resistant stock'. There is not yet sufficient information to determine if any nursery-raised plants are really pitch-canker resistant (i.e., to all strains of the pathogen) and will be resistant in the long term (i.e., throughout all life stages). Furthermore, if plants are 'selected' on the basis of putative pitch-canker resistance, this could well represent a serious reduction in genetic diversity in the long term that could be very useful to the pines in resisting future pathogens or influences. A proper method of managing pitch canker is to provide conditions for abundant natural reproduction and allow natural selection to remove the 'less resistant' seeds and seedlings (e.g., Rogers 2002).

- Possibility of introducing soil-borne pathogens if using containerized stock. (For example, note that the pathogen associated with sudden oak death has been identified, so far, at eight California nurseries (COMTF 2004). This illustrates how easily pathogens can be spread by the activity of planting nursery-origin plants. Introducing these plants into or close to the forest carries risk.) **9 (cont.)**

Literature Cited:

Axelrod, D.I. 1980. *History of the maritime closed-cone pines, Alta and Baja California.* University of California Publications in Geological Sciences. Vol. 120. University of California Press. Berkeley, CA USA.

Axelrod, D.I. 1982. Age and origin of the Monterey endemic area. *Madroño* 29(3): 127-147.

Batisse, M. 1986. Developing and focusing the biosphere reserve concept. Nature and Resources 22: 1-10.

Bradley, R. 2000. 1000 years of climate change. *Science* 288:1353, 1355.

Burdon, R.D., M.H. Bannister, and C.B. Low. 1992. Genetic survey of *Pinus radiata*. 2. Population comparisons for growth rate, disease resistance, and morphology. *New Zealand Journal of Forest Science* 22:138–159.

California Department of Fish & Game. 2004. Special Vascular Plants, Bryophytes, and Lichens List. Natural Diversity Database, Sacramento, CA. http://www.dfg.ca.gov/whdab/pdfs/spplants.pdf

COMTF. 2004. Sudden Oak Death Found in a Los Angeles County Nursery. Press Release March 10, 2004, California Oak Mortality Task Force. (http://www.suddenoakdeath.org).

Cox, G.W. 1993. Conservation Ecology. W.C. Brown. Dubugue, IA.

Cylinder, P.D. 1995. The Monterey ecological staircase and subtypes of Monterey pine forest. *Fremontia* 23: 7–13.

Dawson, T.E. 1998. Fog in the California redwood forest: ecosystem inputs and use by plants. *Oecologia* 117:476-485.

Doak, D.F. and L.S. Mills. 1994. A useful role for theory in conservation. *Ecology* 75: 615–626.

Fiedler, P.L. 1991. Mitigation-related transplantation, relocation, and reintroduction projects involving endangered, threatened and rare plant species in California. Report prepared for the California Department of Fish and Game, Endangered Plant Program, Sacramento, CA.

Foggo, A. C.M.P Ozanne, MR. Speight, and C. Hambler. 2001. Edge effects and tropical forest canopy invertebrates. *Plant Ecology* 153: 347-359.

Garbelotto, M., P. Svihra, and D.M. Rizzo. 2001. Sudden oak death syndrome fells three oak species. *California Agriculture* 55(1): 9-19.

Harris, L.D. 1984. The Fragmented Forest. The University of Chicago Press, Chicago, IL.

Harrison, S. 1991. Local extinction in a metapopulation context: an empirical evaluation. *Biological Journal of the Linnaean Society* 42: 73–88.

Hawkes, J.G., N. Maxted, and D. Zohary. 1997. Reserve design. Pp 132-143 *In*: Plant Genetic Conservation: The *in situ* approach. Maxted, N., V.B. Ford-Lloyd, and J.G. Hawkes, eds. Chapman and Hall, London, UK.

Hilton-Taylor, C. (compiler). 2000. 2000 IUCN Red List of Threatened Species. IUCN, Gland, Switzerland and Cambridge, UK.

Howald, A.M. 1996. Translocation as a mitigation strategy: Lessons from California. Pp. 293-329 *In*: Restoring Diversity. (Falk, D.A., C.I. Millar, and M. Olwell, eds.) Island Press, Covelo, CA.

Howitt, B.F. 1972. Forest heritage: a natural history of the Del Monte Forest. California Native Plant Society, Berkeley, CA.

Kappelle, M., M.M.I. Van Vuuren, and P. Baas. 1999. Effects of climate change on biodiversity: a review and identification of key research issues. *Biodiversity and Conservation* 8:1383–1397.

Kitzmiller, J.H. 1990. Managing genetic diversity in a tree improvement program. *Forest Ecology and Management* 35: 131-149.

Lovejoy, T.E., R.O. Bierregaard Jr., A.B. Rylands, et al. 1986. Edge and other effects of isolation on Amazonian forest fragments. Pp 257-285 *In*: Conservation Biology: The Science of Scarcity and Diversity. M.E. Soulé, ed. Sinauer Associates, Sunderland, MA.

McBride, J.R. and E.C. Stone. 1976. Plant succession on the sand dunes of the Monterey peninsula, California. *American Midland Naturalist* 96:118-132.

McCain, A.H., C.S. Koehler, and S.A. Tjosvold. 1987. Pitch canker threatens California pines. *California Agriculture* 41: 22-23.

McNeely, J.A., K.R. Miller, W.V. Reid, R.A. Mittermeier, and T.B. Werner. 1990. Conserving the world's biological diversity. World Conservation Union, World Resources Institute, Conservation International, World Wildlife Fund-US, and the World Bank, Washington, D.C.

Millar, C.I. 1998. Early evolution of pines. p 69–84 *In*: D.M. Richardson (ed.) *Ecology and biogeography of* Pinus. Cambridge University Press. Cambridge, UK.

Millar, C.I. 1999. Evolution and biogeography of *Pinus radiata,* with a proposed revision of its Quaternary history. *New Zealand Journal of Forest Science* 29:335–365.

Owen, D.R. 1998. Health concerns for California's native Monterey pine forests. *Fremontia* 26: 17-19.

Peters, R.L. 1990. Effects of global warming on forests. *Forest Ecology and Management* 35:13–33.

Prance, G.T. 1997. The conservation of botanical diversity. Pp 3-14 *In*: Plant Genetic Conservation: The *in situ* approach. Maxted, N., V.B. Ford-Lloyd, and J.G. Hawkes, eds. Chapman and Hall, London, UK.

Rankin de Mérona, J.M., R.W. Hutchins, and T.E. Lovejoy. 1990. Tree mortality and recruitment over a five-year period in undisturbed upland rainforest of the Central Amazon. *In*: Four Neotropical Rainforests (A. Gentry, ed.), Yale University Press, New Haven. Pp. 573-584.

Reed, D.H. and R. Frankham. 2003. Correlation between fitness and genetic diversity. *Conservation Biology* 17: 230-237.

Rizzo, D.M., M. Garbelotto, J.M. Davidson, G.W. Slaughter, and S.T. Koike. 2002. *Phytophthora ramorum* as the cause of extensive mortality of *Quercus* spp. and *Lithocarpus densiflorus* in California. *Plant Disease* 86: 205-214.

Rogers, D.L. 2002. *In situ* Genetic Conservation of Monterey Pine (*Pinus radiata* D. Don): Information and Recommendations. Genetic Resources Conservation Program, Report No. 26. University of California, Davis, CA.

Soulé, M.E. (ed.) 1986. Conservation Biology: The Science of Scarcity and Diversity. Sinauer Associates, Sunderland, MA.

Soulé, M.E. 1987. Viable Populations for Conservation. Cambridge University Press, Cambridge, MA.

Thomas, J.W., C. Maser, and J. Rodiek. 1978. Edges—Their interspersion, resulting diversity and its management. Pp 91-100 *In*: R. De Graff (ed.). Proc. Workshop on Nongame Bird Habitat Management in the Coniferous Forests of the Western United States. USDA Forest Service, General Technical Report PNW-64.

US Fish and Wildlife Service. 1998. Final Rule Listing: Five Plants From Monterey County, CA, as Endangered or Threatened. Federal Register, August 12, 1998. Volume 63, Number 155, Pp 43100-43116.

Wikler, K. and T.R. Gordon. 2000. An initial assessment of genetic relationships among populations of *Fusarium circinatum* in different parts of the world. *Canadian Journal of Botany* 78: 709-717.

Wikler, K., T.R. Gordon, S.L. Clark, M.J. Wingfield, and H. Britz. 2000. Potential for outcrossing in an apparently asexual population of *Fusarium circinatum*, the causal agent of pitch canker disease. *Mycologia* 92: 1085-1090.