Robert A. Hamilton

May 27, 2008

Mr. David Reznick
Malibu Bay Company
23705 West Malibu Road, Suite D-2
Malibu, CA 90265

Subject: Review of Memorandum Dated 15 May 2008 from Jonna D. Engel to Deanna Christensen Regarding Dune and ESHA Issues, 30732 Pacific Coast Highway, Malibu, California

Dear Mr. Reznick:

Under contract to the Malibu Bay Company, I assembled a team of four ecologists—Daniel S. Cooper, Wayne R. Ferren, Dr. Cristina P. Sandoval, and myself—to review documents that describe and delineate the biological resources present on a property located at 30743 Pacific Coast Highway in Malibu (hereafter the "project site" or "site"). We conducted this work in conjunction with Dr. Norbert Psuty, who delineated the site's dunes based on his expert understanding of geomorphological principles and prepared a report to me dated 22 November 2007. The ecological team presented our results and conclusions in a report to you dated 6 March 2008. Subsequently, Dr. Sandoval has prepared a report dated 5 May 2008 concerning the Globose Dune Beetle at Broad Beach. Having reviewing these reports and others, and after conducting her own investigations, Dr. Jonna Engel, Ecologist for the California Coastal Commission (Commission) prepared a memorandum dated 15 May 2007 to Deanna Christensen, a Coastal Analyst for the Commission, providing her opinions regarding the southern foredune ecosystem at the site. Dr. Sandoval reviewed Dr. Engel's memorandum and has prepared her own response letter dated 23 May 2008. At your request, the remaining three members of the ecological team provide these clarifications regarding some of Dr. Engel's statements and conclusions pertaining to the project site and its biological resources. The format of this response is to quote from Dr. Engel's memorandum in bold text and then respond in one or more paragraphs.

Page 1: "South of the parcel are four beachfront homes with restored dunes between the homes and the beach."

As shown on the following pages, these dunes (which are southeast of the project site) are not effectively "restored" in the existing condition, despite having undergone some form of restoration in the past. Non-native Highway Iceplant (*Carpobrotus edulis*) is, by far, the most abundant plant on these dunes, forming extensive carpets that extend from the edges of the residences south onto the adjacent dunes.

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Photo 1. View facing northeast of dunes in front of existing residences southeast of project site, with Trancas Creek visible in the background. Non-native Highway Iceplant (reddish vegetation) is abundant, and three large specimens of non-native Pampas Grass (*Cortaderia* sp.) can be seen on the dunes between the two houses. The low, gray vegtation is mostly native Beach Bursage (*Ambrosia chamissonis*) and Beach Evening-Primrose *(Camissonia cheiranthifolia* ssp. *suffruticosa*). Human access through these dunes is loosely controlled, at best; note the large area of bare sand south of the house next to Trancas Creek. 16 April 2008.

Photo 2. View facing northeast of Cristina Sandoval surveying for Globose Dune Beetles within a large swath of secondary dunes dominated by Highway Iceplant. The area shown is immediately up the coast from the area shown in Photo 1. 16 April 2008.

Photo 3. View facing northwest showing the rest of the dunes that are located southeast of the project site. The project site and the yellow house adjacent to the site are visible in the background. The carpet of Highway Iceplant in front of the home immediately southeast of the project site is particularly dense because it is irrigated and new plants have been installed (see photos 4 and 5 on the following page). 16 April 2008.

Photo 4. Irrigation head with Highway Iceplant and Beach Bursage on dunes immediately southeast of the project site. 16 April 2008.

Photo 5. Established Highway Iceplant (reddish trailing branches) with newly planted Highway Iceplant (green sprigs) on dunes immediately southeast of the project site. 16 April 2008.

Page 2: One of Dr. Engel's stated purposes in preparing her memorandum was to "recommend a biologically sound buffer (set-back) dimension between dune ESHA and development."

In evaluating the biological need for a buffer, our team reviewed all of the previous biological reports on this site and conducted our own surveys. We called for new focused surveys for Silvery Legless Lizards and a wetland/jurisdictional delineation, both of which were completed by Glenn Lukos Associates. Drawing upon this extensive body of site-specific evidence and our collective professional experience, our report of 6 March 2008 provided recommendations for the preservation and restoration of the site's dunes and dune-like areas, and the establishment of a conservation easement over these areas. Subsequently, Cristina Sandoval conducted additional focused surveys for the Globose Dune Beetle on the site and in adjacent areas and Robert Hamilton conducted a focused

evaluation of the "primrose/lupine" area. After completing these additional studies our original recommendations still stand. Although we understand that providing buffers for biologically sensitive habitat areas is *generally* warranted, we have found no evidence that "a biologically sound buffer (set-back) dimension" north of the stringline could or should be identified in this particular situation.

Page 5: "Just seaward of the stringline is a backdune area behind remarkably intact foredunes which together form a nearshore southern foredune community."

As shown in Figures 3–6 of our biological report, the Malibu Yacht Club created two substantial "blowout" areas in the foredune ridge some time between 6 August 1976 and July 1977. The Coastal Commission issued a notice of violation to the Malibu Yacht Flub that shows the larger of these blowouts, but it is our understanding that the Commission approved the continued use of the site by the Malibu Yacht Club on 5 January 1978 (Permit No. P-10-26-77-2118). These breaks in the foredune ridge persist to the present time.

Page 5: "Hamilton et al. (2008) single out a small section of the backdune area as a 'primrose/lupine' area, but consider it disturbed and not maintained by natural processes. Psuty (2008) also characterizes this area as disturbed."

The reference should be to "Psuty (2007)." Hamilton et al. (2008) explicitly followed the lead of Psuty (2007) in delineating the "primrose/lupine" area as lying outside of the dune complex in the existing condition. The question of whether or not the primrose/lupine area was part of the foredune complex historically is not relevant to the current characteristics of the site given that the disturbances that gave rise to these conditions were permitted by the Commission (see the preceding response). While in the field, Mr. Hamilton made Dr. Psuty aware that, given the occurrence of sand-requiring native plants and partially-sandy soils in the primrose/lupine area, this part of the site would receive close scrutiny on the question of whether it was dunal or non-dunal. Please see Dr. Psuty's response to Dr. Engel, dated 16 May 2008, regarding delineation of dunes in this part of the site. See also Mr. Hamilton's letter report dated 27 May 2008, which evaluates the vegetation of the primrose/lupine area in greater detail.

Page 5: "The backdune (also referred to as a deflation plain) consists of sand sheets or washover areas interspersed by dune mounds and hummocks and both native and non-native vegetation."

This description of "backdune" refers to mounds and hummocks that are secondary features of the *foredune* complex at Broad Beach. See, for example, pages 1–2 of Dr. Psuty's 2007 report:

> . . . the foredune is not a coherent ridge. It is breached in several places, and its form is altered in association with those breaches. Further, the locations of the breaches are sites where coastal dune forming processes have extended secondary aspects of the foredune a

> bit farther inland. That inland displacement of process and form is finite in dimension and comprises a subsequent modification of the initial foredune morphology. Together, these primary and secondary active foredune geomorphological features comprise the dunal forms on this property.

See also page 3 of Dr. Psuty's 16 May 2008 letter:

> From a process-response perspective, the low sand features in the disturbed area [shown in Figure 1 of his 2007 report and 2008 letter] are the products of the cultural modifications described above and they have been disconnected from their sediment source and mobilizing processes by the planted vegetation at the boundary of the beach club.

And page 4 of Dr. Psuty's letter:

> The descriptive term "backdune" does not connote a process-response connection and does not relate any dunal feature to its origin or source of sediment.

Page 6: "I disagree with Hamilton et al.'s (2008) logic regarding the primrose/lupine patch . . ."

In our opinion, the existing dune ecosystem does not include the primrose/lupine area because this area lacks identifiable dune geomorphology and evidence of ongoing dune-creating processes (e.g., build-ups of wind-blown sand) in the existing condition. Please see Dr. Psuty's response to Dr. Engel regarding the geomorphological delineation of dunes on the project site.

Page 5: "The native plants are classic southern foredune species including beach evening primrose, *Chamissonia* [sic.] *cheiranthifolia,* succulent lupine, *Lupinus succulentus,* and several individuals of the special status sand verbena, *Ambronia* [sic.] *maritima*. Amongst the adult natives were hundreds of small recruits. Several non-native species occurred in this area including sea rocket, *Cakile maritime* [sic.], highway iceplant, Australian saltbush, and European grasses."

Succulent Lupine is not a "classic southern foredune species." It is a widespread native annual plant that occurs in a variety of soils. See, for example, the habitat description for this species from The Jepson Manual[1]: "Abundant. Open or disturbed areas, often seeded on road banks." Four plants of Red Sand Verbena (*Abronia maritima*) occur within the primrose/lupine area, none within 30 feet of the stringline. Please see Mr. Hamilton's letter report dated 27 May 2008 for additional information on the primrose/lupine area and its botanical resources, including numerous photographs showing the vegetation therein.

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[1] http://ucjeps.berkeley.edu/cgi-bin/get_JM_treatment.pl?Lupinus+succulentus

Page 6: "In spite of the intensive disturbance history of the site, dune hummocks and mounds, dominated by native foredune plant species, continue to persist in [the primrose/lupine] area."

This same paragraph of Dr. Engel's memorandum also refers to aerial images that, in her opinion, show "dune hummock and mound persistence" within the primrose/lupine area. Dr. Engel did not cite Figure 10 from our report of 6 March 2008, reproduced below, but this figure shows the primrose/lupine area much more clearly than do any of the aerial-based figures that she did cite. See also Mr. Hamilton's letter report dated 27 May 2008, which contains numerous recent photos of the primrose/lupine area, none of them showing dune hummocks or mounds of wind-blown sand. Our 6 March report noted that the primrose/lupine area apparently had dunal characteristics in the past, but that the flow of eolian (wind-blown) sand into this part of the site now appears to be largely blocked by the sand and vegetation that have built up along the fence to the swim club. This was the conclusion reached by Psuty (2007) and we agree with him. Where we differ from Dr. Psuty is in calling out the primrose/lupine area separately from the ruderal area that adjoins it to the north and east. Dr. Psuty refers to all of that area "disturbed," which is accurate geomorphologically, but we recognize and have described ecological differences between these areas.

Photo 6. This image was included as Figure 10 in our report. It was taken facing west from near the stringline. In the foreground is ruderal vegetation, most of it dead. The area delineated as "primrose/lupine" is in the midground, where the soil is a somewhat lighter color (because the soil is sandier). The mounds of white sand seen in the background are on the adjacent property, not on the project site. Contrary to Dr. Engel's depiction of this area, it is evident that there is little "contemporary dune topography found in this patch."

Page 6. "I disagree with Hamilton et al.'s (2008) logic regarding the primrose/lupine patch and think that this area should be included within the environmentally sensitive disturbed southern foredune habitat area, i.e. EHSA, for the following four reasons:"

Please refer to Dr. Psuty's letter dated 16 May 2008, which addresses Dr. Engel's three points of contention regarding his delineation of dunes on the site. There is no disagreement with Dr. Engel on her fourth point, which is a general statement that even degraded

dunes can meet the definition of ESHA. In fact, we have recommended that the degraded dunes on this site be designated ESHA.

Page 7: "Generally, the Commission protects environmentally sensitive habitat, such as southern foredunes, with buffers or set-backs. Set-backs are necessary to insure that development will not significantly degrade the ESHA."

All of the sensitive biological resources present on this site are set back at least 30 feet south of the stringline (the Globose Dune Beetles occurs no closer than ~45 feet of the stringline and Red Sand Verbena occurs no closer than ~31 feet of the stringline). In order to help ensure that proposed development does not significantly degrade the ESHA, the land owner is proposing to preserve and restore all dunal and non-dunal areas located between the stringline and the beach, and to place this part of the site under a conservation easement. The restoration will be accomplished using methods superior to those employed elsewhere on Broad Beach (e.g., by ensuring that only locally native plant taxa are restored, not installing permanent irrigation, and eradicating invasive exotic plants until the native dune plants are well-established). The provision of an additional set-back north of the stringline would have no effect on many of the dune-degrading processes that are taking place on virtually all of the developed properties up and down Broad Beach, such as the provision of irrigation, the planting and spreading of Highway Iceplant, restoration projects that incorporate the wrong plant taxa, and uncontrolled human access through the dunes.

Page 7: "Buffers also protect against invasive plant and animal species that are often associated with humans and development. Such invasive species arrive on car tires (both during and after construction), fill soils, construction materials, and in myriad other ways throughout the life of the development. Buffers may enable invasive species detection and eradication before they invade sensitive habitats. Critical to buffer function is the fact that a buffer area is not itself a part of the ESHA, but a 'buffer' or 'screen' that protects the habitat area from adverse impacts."

The applicant is proposing to restore the entire area between the stringline and the beach, which includes eradication of any and all non-native plant species. The site's secondary dunes and non-dunal areas that lie closest to the stringline are, in general, moderately to heavily degraded in the existing condition. These areas currently serve as a substantial "buffer" between the ruderal area north of the stringline and the site's most sensitive biological resources, which occur on and around the broken foredune ridge. As noted previously, there is a minimum 30-foot buffer between the stringline and the site's most northerly sensitive species (four Red Sand Verbena plants). We expect that, by restoring the secondary dunes and non-dunal areas, they will have greater biological value post-project than they do in the existing condition. And they will still serve as a buffer between the development north of the stringline and the more sensitive areas to the south.

Page 7: "Sandoval's (2008) globose dune beetle study findings provide evidence supporting the use of a buffer between southern foredunes and development at the MBC property. "

Dr. Sandoval's response to Dr. Engel's memorandum, dated 23 May 2008, states "the main effect of houses on beetle abundance appeared to result from irrigation and non-native plants that were planted seaward of the stringline and not the presence of a house per-se."

Also:

> To clarify, development was highly correlated with landscaping practices in the dune areas seaward of the stringline that had a negative effect on beetle distribution. As stated in my report, I did not study the effect of development by itself, when the dunes were left natural, because that situation did not exist at Broad Bach. Also, there was no effect of development on the abundance of beetles.

As noted on page 19 of our biological report, other researchers have also identified Highway Iceplant adversely affecting the Globose Dune Beetle:

> Consistent with earlier findings by Chris D. Nagano[1], a habitat use and suitability study by Scott A. Snover[2] found that Globose Dune Beetles "occur in much higher densities under the native *Ambrosia* [*chamissonis*] than under the non-native" Highway Iceplant (*Carpobrotus edulis*) and Sea Rocket (*Cakile maritima*) (Snover 1992:53). He continued, "Clearly, the displacement of native vegetation by either *Cakile* or *Carpobrotus* will have a drastic effect on *C. globosus* [Globose Dune Beetle], and possibly other native fauna that have not, as yet, been studied in detail.

Sandoval (2008) found similarly adverse effects of Highway Iceplant on Globose Dune Beetles (GDB) at Broad Beach:

> There were 2.7 GDB/sample in areas without Highway Iceplant (*Carpobrotus edulis*) compared to 0.9 GDB/sample in areas with Highway Iceplant (ANOVA, P = 0.036).

Thus, three researchers have identified Highway Iceplant as having a substantially adverse effect upon the Globose Dune Beetle. Dr. Sandoval found that the provision of permanent irrigation has an even greater adverse effect on Globose Dune Beetles, presumably by making the sand hard and impenetrable to these digging beetles:

> GDB were less abundant at sites that were irrigated (0.2 vs 2.2 GDB/sample, ANOVA, P = 0.05).

In addressing the question of whether the presence of a house north of the stringline might adversely affect Globose Dune Beetles, page 7 of her report states:

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[1] Nagano, C. D. 1982. The population status of seven species of insects inhabiting Tijuana Estuary National Wildlife Refuge, San Diego County, California. Report to the Office of Endangered Species.

[2] Snover, S.A. 1992. Ecology of the Globose Dune Beetle *(Coelus globosus*) in relation to native and non-native host plants. MS thesis, San Diego State University, San Diego, CA.

> Because irrigation is associated with houses and was found to have an important effect in the analysis of beetle density, I did a separate analysis including (along with the presence of a house) whether irrigation occurred along the transect. Areas that were irrigated had a lower (mean transect point = 1.1) distribution than non-irrigated transects (mean transect point = 1.8) (P = 0.048). However, there remained a residual (marginally significant) effect of house independent of irrigation (P = 0.09), which is statistically significant under the one-tailed expectation of a negative effect.

In this analysis, Dr. Sandoval did not control for Highway Iceplant. Page 9 of her report states:

> The presence of houses inland from the foredunes did not affect the density of GDB when compared to the project site without a house. However, GDB were found farther inland at the project site than at parcels with residences. This result appears to reflect a broader distribution of Highway Iceplant (negative correlation) and artificial irrigation (negative correlation) in lots with houses, and the presence of sandy hummocks (positive correlation) within the project site but not in lots with houses.

Finally, Dr. Sandoval concluded:

> Given the absence of GDB beyond point 4 in the transects, it seems that the proposed conservation area (buffer) south of the stringline is sufficient to protect these beetles from development north of the stringline, as long as the appropriate management is in place.

Given that the proposed project has been specifically designed to preserve and restore the dunes in a manner that should increase their value to Globose Dune Beetles (using only temporary irrigation), given that a conservation easement would be placed on the dunes, and considering Dr. Sandoval's conclusion regarding the buffer issue, we do not agree that Sandoval (2008) provides "evidence supporting the use of a buffer between southern foredunes and development at the MBC property."

Page 7: "However, CNNDB and CNPS both recognize southern foredunes as a rare community or habitat type and the Malibu LCP recognizes dunes as ESHA, such that the entire dune habitat and associated organisms are what constitute the ESHA to be protected."

There is agreement on this statement, but our point was that the recommendation to provide a substantial buffer outside of the dune ESHA, in an area that otherwise lacks buffers, ought to have a biological basis outside of a generalized desire to establish a non-dune buffer in this one area.

Page 8: "Although the use of Best Management Practices would be beneficial even in the absence of a buffer, the documented correlation between land-use history and decline of dune habitat is clear evidence of biological impacts warranting a buffer."

The preservation, restoration, and conservation actions that we have recommended would specifically address the "correlation between land-use history and decline of dune habitat."

Enforcement of the provisions of the Coastal Act across the entire Broad Beach dune ecosystem (e.g., citing land owners who plant Highway Iceplant on the dunes and requiring corrective actions) would address the "documented correlation between land-use history and decline of dune habitat."

Page 8: "Furthermore, the results from Sandoval's (2008) study on globose dune beetles demonstrate that development, irrigation, and invasive species all negatively impact the abundance and distribution of this special status species."

Dr. Sandoval's study indicated that irrigation and non-native plant species have adverse effects on the Globose Dune Beetle. She was not able to evaluate any situations in which development was conducted on Broad Beach without the introduction of irrigation, non-native plants, or both in the adjacent dunes. Please see Dr. Sandoval's response to Dr. Engel's memorandum, dated 23 May 2008, and the preceding discussion of Dr. Engel's interpretations of Sandoval (2008).

Page 8: "To protect this ESHA I recommend a minimum 25 foot buffer between the dune ESHA and development. This distance is consistent with . . . the United States Fish and Wildlife Service's recommendation for this site documented in their April 18, 2007 letter as well as in person (pers. comm. Chris Dellith, USFWS Acting Assistant Field Supervisor, May 9, 2008)."

The interest of the USFWS at this site has been limited to the protection of the federally listed Snowy Plover, and no USFWS biologist has suggested that a buffer north of the stringline is needed to protect the plover (or for any other reason). Mr. Dellith's letter of 18 April 2007 clarified the USFWS's earlier written opinion of 13 February 2007 that the proposed project would not result in "take" of the plover. His reference to a 25-foot setback was a statement of the minimum distance that would exist between the stringline and those areas on and adjacent to the foredune ridge that the applicant was proposing to restore at that time. We cannot comment on what Mr. Dellith and Dr. Engel discussed on 9 May 2008, but it is a distortion of the USFWS's official position to cite their letter of 18 April 2007 as being "consistent with" Dr. Engel's recommendation for a 25-foot buffer north of the stringline.

In summary:

- We continue to believe that Dr. Psuty's 2007 report on the geomorphology of the project site provides a scientifically sound delineation of the site's existing dunes.
- Dr. Engel's challenge to Dr. Psuty's delineation of the "primrose/lupine" area does not appear to be based upon any geomorphological principle, but rather on interpretations of the apparent historical conditions and the current presence of sand-loving plants that are "indicators" of sandy soils (but not necessarily dunes). Dr. Psuty's response to Dr. Engel provides additional information explaining why, geomorphologically, this part of the site lies outside of the existing dune complex.

Mr. Hamilton's letter report of 27 May 2008 provides additional details on the botanical resources present in this part of the site.

- We agree with Dr. Engel that the primrose/lupine area has important biological values, which is why we have recommended that it be preserved, restored, and placed under a conservation easement along with the dunes that comprise ESHA on the project site. But we do not believe that it rises to the level of ESHA as defined in Section 30107.5 of the California Coastal Act.
- We believe that Dr. Engel has misinterpreted Dr. Sandoval's findings with regard to the Globose Dune Beetle and the potential efficacy of providing a 25-foot buffer north of the stringline as a means of conserving this species on the site. We do not believe that any sensitive species would derive an identifiable benefit from the provision of a 25-foot buffer north of the stringline.
- We continue to believe that the project site's dune ESHA would be effectively preserved and enhanced by following the restoration and conservation recommendations detailed in our biological report of 6 March 2008.

Thank you for this opportunity to address the Dr. Engel's memorandum dated 15 May 2008. We look forward to working with Commission staff in order to resolve any issues that may remain unclear after they have read this response, those provided by Drs. Psuty and Sandoval, and Mr. Hamilton's letter report on the botanical resources of the primrose/lupine area.

Sincerely,

Robert A. Hamilton
Daniel S. Cooper
Wayne R. Ferren

Robert A. Hamilton

May 27, 2008

Mr. David Reznick
Malibu Bay Company
23705 West Malibu Road, Suite D-2
Malibu, CA 90265

Subject: Botanical Evaluation of Primrose/Lupine Area
30732 Pacific Coast Highway, Malibu, California

Dear Mr. Reznick:

At your request, as part of ongoing ecological investigations at 30743 Pacific Coast Highway in Malibu (hereafter the "project site" or "site"), I recently evaluated the current botanical conditions in a part of the site covering approximately 0.10 acre that has come to be known as the "primrose/lupine area." Figure 1 shows the project site, including the primrose/lupine area. This brief letter report provides some background on the purpose of this evaluation, describes the study methods and provides its results, and discusses possible implications of those results for ongoing site planning.

Figure 1. Project site showing all plant communities, including the "primrose/lupine" area. This area is located on the western side of the site, just south of and partially including the green "stringline" that corresponds to the southern boundary of the existing residences on either side of the site.

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Background

Coastal geomorphologist Norbert Psuty has twice affirmed that the primrose/lupine area is not part of the dune complex at Broad Beach under existing conditions[1,2]. The biological report that I coauthored with Daniel Cooper, Wayne Ferren, and Cristina Sandoval followed Dr. Psuty's delineation[3], but his opinion has been questioned in a memorandum dated 15 May 2008 written by Dr. Jonna Engel of the Commission staff. Dr. Engel also noted that this area supports a special-status plant species, Red Sand Verbena (*Abronia maritima*), and she has recommended that any future development be set back a minimum of 25 feet north of the primrose/lupine.

The primrose/lupine area would automatically be defined as ESHA if the Commission were to agree with Dr. Engel that this area should be regarded as part of the existing dune complex. If the Commission agrees with Dr. Psuty, however, and finds that this area lies outside of the existing dune complex, this report provides detailed information that may help the Commission determine whether this area meets ESHA criteria. This information may also the Commission to determine whether the primrose/lupine area requires a 25-foot setback from future development.

The opinion of Hamilton et al. (2008) regarding whether this area warrants recognition as an ESHA was addressed on page 17 of our report:

> As to whether the primrose/lupine area ought to be identified as a non-dunal ESHA based on its intrinsic value as a biological resource, Section 30107.5 of the California Coastal Act defines an "Environmentally Sensitive Area" as:
>
> > . . . 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.
>
> The primrose/lupine area is disturbed in the existing condition, and we see no evidence suggesting that this non-dunal area provides especially valuable habitat for special status species. For these reasons we do not believe that this area satisfies ESHA criteria given in Section 30107.5. We regard this area as having moderate biological values and recommend preserving and restoring/enhancing this area along with the site's dunes.

Dr. Engel disagreed with our assessment of the situation. The observations and photos in this report may help to resolve this difference of opinion.

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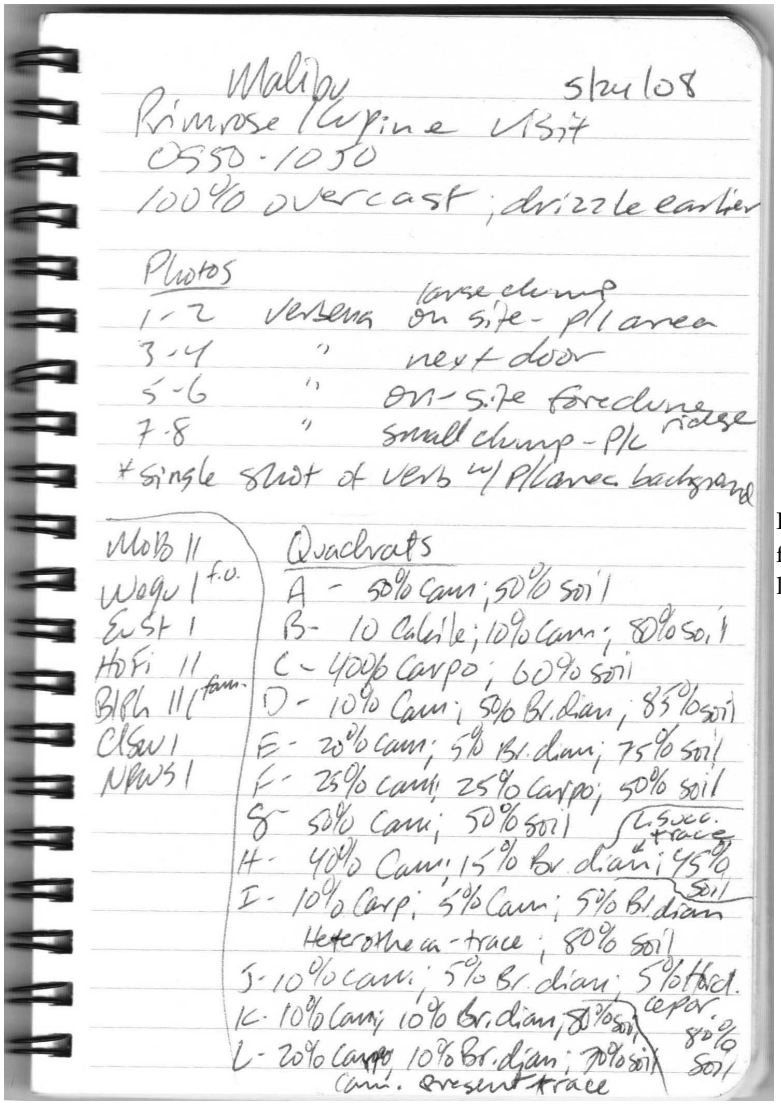
[1] Psuty, N. 22 November 2007. Report on site visit, October 30, 2007; Broad Beach, Malibu, Coastal Dunes; review of other materials.

[2] Psuty, N. 16 May 2008. Review of Memorandum from Jonna D. Engel to Deanna Christensen concerning southern foredune community at 30732 PCH dated May 15, 2008.

[3] Hamilton, R.A., D.S. Cooper, W.R. Ferren and C. P. Sandoval. March 6, 2008. Biological Resources Assessment, 30732 Pacific Coast Highway, Malibu, California. Report prepared for Malibu Bay Company, Malibu, CA.

Methods

I visited the site on 24 May 2008 from 9:50 to 10:50 a.m. Weather was overcast and cool after earlier drizzle. I used a meter-square quadrat made of PVC pipes to provide representative samples of the vegetation at 12 sites scattered throughout the primrose/lupine area. The entire area covers 0.10 acre, and I determined that tossing the quadrat into 12 different parts of the area would provide a reasonable representation of the area's vegetation. This was not true randomized sampling, which would have required a much more intensive effort. I visually estimated the percent cover provided by each plant species within each quadrat to the nearest 5%. If any native species was included within the quadrat but provided less than 5% estimated cover, I noted it as "trace" or "present." I took a photo of each meter-square area sampled, and I also photographed the entire primrose/lupine area from near its eastern and western boundaries. A copy of my field notes is reproduced on the following page as Figure 2.


Malibu 5/24/08
Primrose/Lupine Visit
0550-1050
100% overcast; drizzle earlier

Photos
1-2 verbena large clump on site - p/l area
3-4 " next door
5-6 " on-site foredune ridge
7-8 " small clump - P/L
*single shot of verb w/ P/L area background

MoBo II
Wegu I f.o.
EuSt I
HoFi II
BlPh II fam.
ClSw I
NPWS I

Quadrats
A - 50% Cam; 50% soil
B - 10 Cakile; 10% Cam; 80% soil
C - 40% Carpo; 60% soil
D - 10% Cam; 5% Br. dian; 85% soil
E - 20% Cam; 5% Br. dian; 75% soil
F - 25% Cam; 25% Carpo; 50% soil
G - 50% Cam; 50% soil
H - 40% Cam; 15% Br. dian; 45% soil
L. succ. trace
I - 10% Carp; 5% Cam; 5% Br. dian
Heterotheca - trace; 80% soil
J - 10% Cam; 5% Br. dian; 5% Hord. cepor. 80% soil
K - 10% Cam; 10% Br. dian; 80% soil
L - 20% Carpo 10% Br. dian; 70% soil
Cam. present trace

Figure 2. Scanned copy of my field notes for 24 May 2008. The codes at the bottom left refer to birds observed on the site.

I also examined, photographed, and mapped the locations of the four individual plants of Red Sand Verbena (*Abronia maritima*) that occur within the primrose/lupine area.

Finally, I used Google Earth Pro to determine the distance from the northernmost verbena plant to the stringline and to calculate the approximate square footage of primrose/lupine area that occurs north of the stringline.

Results

Figure 3 shows the sampling locations and the locations of the four Red Sand Verbena plants within the primrose/lupine area.

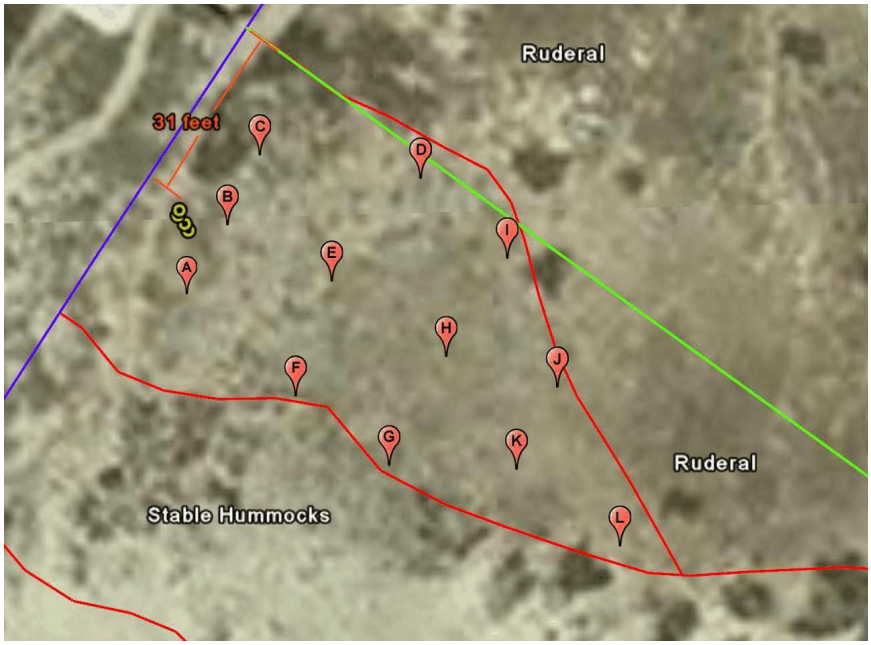


Figure 3.Aerial image at approximate scale 1" = 33' showing the 12 sampling locations within the primrose/lupine area (red markers) and the locations of the four Red Sand Verbena plants (yellow circles with black centers). The green line is the "stringline" that corresponds to the southern boundary of the existing residences on either side of the site.

I determined that the northernmost Red Sand Verbena plant is located approximately 31 feet south of the stringline.

I calculated that approximately 81 square feet (0.002 acre) of the primrose/lupine area occurs north of the stringline.

Figures 4–15 on the following pages show the conditions observed at each of the 12 sampling sites. Figures 16 and 17, on page 8, are photos taken near the western and eastern boundaries of the primrose/lupine area.

Highway Iceplant (*Carpobrotus edulis*) seems to have been somewhat over-represented in the sampling, presumably because several of the sampling locations were near the edges of the primrose/lupine area, where iceplant is more abundant.

Succulent Lupine (*Lupinus succulentus*) was present in only one of the 12 samples (see Figure 11 on page 6), and it provided less than 5% coverage in that quadrat. The dried stalks of this species were scattered across the primrose/lupine area, but they covered little area (much less than the Highway Iceplant did, for example). This showy annual species forms a conspicuous presence in the primrose/lupine area only during its late winter/early spring blooming period; even then, it may cover relatively little area.

Figure 4, Quadrat A. 50% *Camissonia cheiranthifolia* (native); 50% soil.

Figure 5, Quadrat B. 10% *Cakile maritima* (non-native); 10% *Camissonia cheiranthifolia* (native); 80% soil.

Figure 6, Quadrat C. 40% *Carpobrotus edulis* (non-native); 60% soil.

Figure 7, Quadrat D. 10% *Camissonia cheiranthifolia* (native); 5% *Bromus diandrus* (non-native); 85% soil.

Figure 8, Quadrat E. 20% *Camissonia cheiranthifolia* (native); 5% *Bromus diandrus* (non-native); 75% soil.

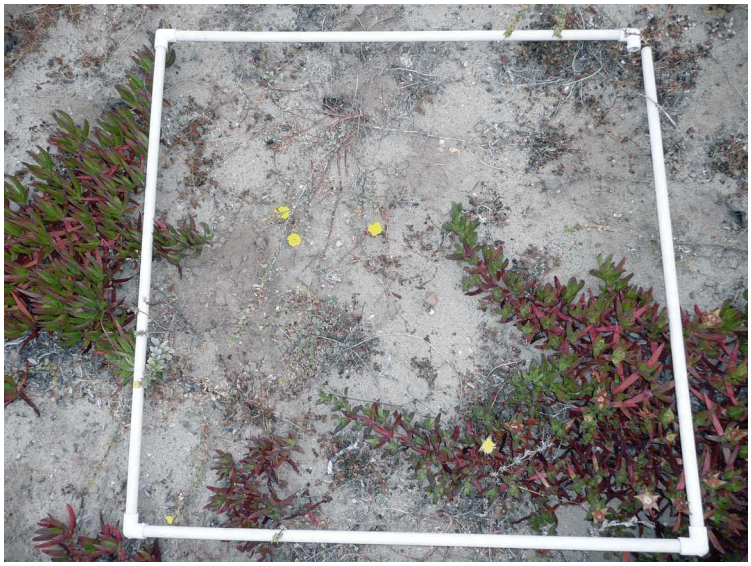


Figure 9, Quadrat F. 25% *Camissonia cheiranthifolia* (native); 25% *Carpobrotus edulis* (non-native);50% soil.

Figure 10, Quadrat G. 50% *Camissonia cheiranthifolia* (native); 50% soil.

Figure 11, Quadrat H. 40% *Camissonia cheiranthifolia* (native); 15% *Bromus diandrus* (non-native); *Lupinus succulentus* present (native); 45% soil.

Figure 12, Quadrat I. 10% *Carpobrotus edulis* (non-native); 5% *Camissonia cheiranthifolia* (native); 5% *Bromus diandrus* (non-native); *Heterotheca grandiflora* present (native); 80% soil.

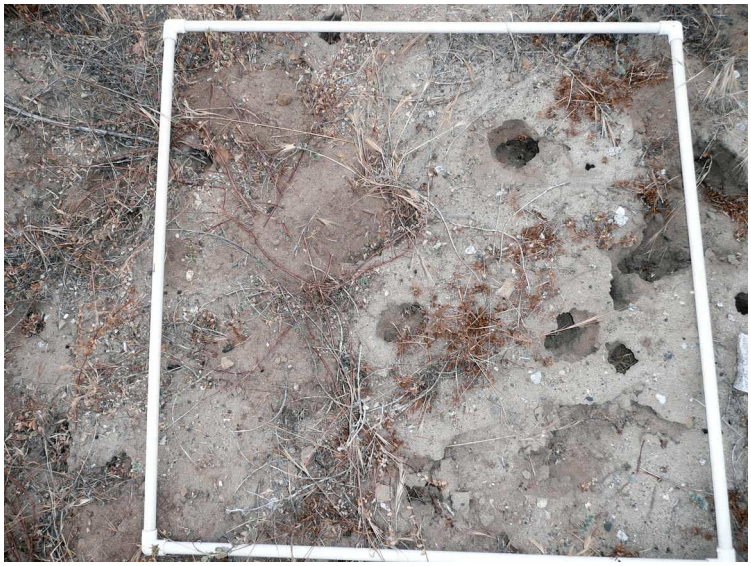


Figure 13, Quadrat J: 10% *Camissonia cheiranthifolia* (native); 5% *Bromus diandrus*; 5% *Hordeum murinum* ssp. *leporinum*; 80% soil.

Figure 14, Quadrat K: 10% *Camissonia cheiranthifolia* (native); 10% *Bromus diandrus* (non-native); 80% soil.

Figure 15, Quadrat L: 20% *Carpobrotus edulis* (non-native); 10% *Bromus diandrus* (non-native); *Camissonia cheiranthifolia* present (native); 70% soil.

Figure 16. View of the primrose/lupine area facing northeast from near the western project boundary on 24 May 2008. Darker soils in the background correspond with the Ruderal area. Two sprawling Red Sand Verbena plants are shown in the foreground and the other two plants are in the midground, just left of the backpack. As shown in Figures 3–14, Beach Evening-Primrose (*Camissonia cheiranthifolia*) is scattered across most of this area, and Highway Iceplant (*Carpobrotus edulis*) occurs in patches. Succulent Lupine (*Lupinus succulentus*) was dead and inconspicuous at the time of this photo.

Figure 17. View of the primrose/lupine area facing west from near the area's eastern limit of the boundary on 24 May 2008. The backpack shown in Figure 16 is visible in the upper lefthand corner of this image. As this photo and others show, the primrose/lupine area supports a relatively sparse growth of native plants and no significant deposits of wind-blown sand.

Discussion and Conclusion

Red Sand Verbena is placed on California Native Plant Society List 4.2. List 4 is a "watch list" of plants with limited distribution and the "2" qualifier means that CNPS regards the species as "fairly endangered" in California. Most of the Red Sand Verbena plants on the project site and elsewhere on the Broad Beach dunes occur on the foredune ridge. The primrose/lupine area contains four plants of this species, the northernmost of which is located approximately 31 feet south of the stringline. Since this puts the species beyond a 25-foot buffer drawn seaward from the stringline, it does not appear that this species would benefit from provision of a buffer north of the stringline.

Page 6 of Dr. Engel's memorandum states, "In spite of the intensive disturbance history of the site, dune hummocks and mounds, dominated by native foredune plant species, continue to persist in this area." The photographic evidence in this report does not support this statement with respect to the persistence of hummocks and mounds. The photos show an area with sandy soils, but also the presence of an obvious soil crust and no accumulations of wind-blown sand.

After conducting this focused botanical assessment, I continue to hold the opinion that the primrose/lupine area has important biological values, mainly due to the dominance of native Beach Evening-Primrose. But I do not believe that this area is part of the site's existing dune complex or that its biological value rises to the level of ESHA as defined in Section 30107.5 of the California Coastal Act. I continue to recommend that this area be preserved, restored, and placed under a conservation easement along with the dunes that comprise ESHA on the project site.

Thank you for this opportunity to conduct these additional investigations on this interesting site.

Sincerely,

Robert A. Hamilton

Robert A. Hamilton
Consulting Biologist

Dr. Norbert P. Psuty
Coastal Geomorphologist
19 Green Hills Road, East Brunswick, NJ 08816

May 16, 2008

To: Robert A. Hamilton
Consulting Biologist
7203 Stearns Street
Long Beach, CA 90815

From: Norbert P. Psuty, Ph.D.
Consulting Coastal Geomorphologist

Re: Review of Memorandum from Jonna D. Engel to Deanna Christensen concerning southern foredune community at 30732 PCH
Dated May 15, 2008

Overview:

This statement constitutes my review of the memorandum composed by Dr. Jonna D. Engel describing the dunal conditions on the land parcel at 30732 Pacific Coast Highway. In conducting this review, I am attempting to describe the coastal foredune conditions in geomorphological terms as they relate to the interaction of coastal dune processes and the coastal landforms that are created. It is imperative to relate the features present today to their formational agents in order to understand the past evolution of the coastal foredune system as well as the potential vectors of change into the future. This relationship of formative processes and resulting topography is necessary to fully comprehend the extent of interaction of the foredune system and the features that occur both immediately inland and to the margins of the land parcel in question.

From a geomorphological perspective, the coastal foredune and its associated secondary dune topography is limited to the areas of foredunes, mobile hummocks, and stable hummocks shown on Figure 1 in this document. As described in my report of 11/22/07 (Psuty, 2007), this tri-partite assemblage of morphologies is linked by the ambient processes and together constitute the breadth of the modern coastal foredune (including primary and secondary components) at this location.

Figure 1. Distribution and association of foredune morphologies at 30732 PCH

Review of specifics in memo by Dr. Engel

Dr. Engel has visited the site and had made observations regarding aspects of the ecology and ecological habitats. She has noted the presence of plants that traditionally inhabit dune systems and has made comments on their presence as indicator species. In essence, she has described conditions that are conducive to the presence of these species. Yet, there is a distinction between sedimentary conditions that provide acceptable habitat and the geomorphological interaction of processes and sediment that create site-specific topographies. Dr. Engel cites a descriptive terminology (Barbour, et al., 2007) that groups dune features into nearshore dunes, moving dunes, and backdunes. Whereas, the descriptions may be adequate for identifying a spatial distribution, there is no causal morphological relationship connoted and there is no inherent developmental association in this trilogy. On the other hand, the geomorphological terminology of "foredune" applies to that primary coastal sand ridge at the inner margin of the beach which is part of sand exchange system between the beach and the adjacent dunal ridge, defined in Psuty

(2004). Subsequent transfers of sand inland of the foredune support the morphological development of secondary coastal dune features (with a variety of shapes and sizes) that are related to the quantity and direction of sand displaced from the foredune to inland positions. It is very important to establish both the source of the sediments that contribute to the secondary dunes as well as the stages in the developmental sequence of the secondary features to fully appreciate the dunal system under review. This is especially true when attempting to distinguish between dunal topographies that are in active exchange of sediment and thus part of the present-day beach-dune system, and those that are either inherited from some other sediment source or are no longer in active exchange with the present-day beach-dune system. From a geomorphological perspective, the processes supporting active exchange may be different both spatially and temporally from the processes that pertain to sand features separated from the active exchange.

The primary foredune and its secondary dune extension (foredune, active hummocks, and stable hummocks) that I describe in Figure 1 are in active exchange. There is no dunal topography related to the modern-day foredune inland of this zone.

There is an area of small stable sand hummocks near the western margin of the property within the topography described as "disturbed" on Figure 1. These sand features were apparently derived from sand transport from southwest to northeast across the bare beach in the swim club property, across the intervening land parcel, and into the parcel at 30732 PCH at some time in the past. These stable sand features are not related to the coastal foredune at 30732 PCH, and are not related to any coastal foredune. They are related to the complete destruction of the foredune at the beach club and the eolian transport of sand from the unstabilized recreational surface, easterly to and through the adjacent property, and onto 30732 PCH. Planted vegetation at the boundary of the beach club is currently trapping the wind-blown sand and it is accumulating as ridge extending inland orthogonal to the trend of the coastal foredune. Planting along the fence line has effectively terminated the eolian sand transport easterly across this boundary and has left a morphological expression on 30732 PCH as a series of low stable sand hummocks on and adjacent to the disturbed surface.

Regarding the four points raised by Dr. Engel in her memo, I provide this professional evaluation:

1. I believe that there is no geomorphological connection between the foredune system at 30732 PCH and the low mounds described as being in the backdune area (in the disturbed area on Fig. 1). From a process-response perspective, the low sand features in the disturbed area are the products of the cultural modifications described above and they have been disconnected from their sediment source and mobilizing processes by the planted vegetation at the boundary of the beach club.
2. The primary substrate in the entire area is sand, whether beach, dune, or stream channel.
3. I believe that the disturbed area is not connected to the dynamics of dune-beach interaction characterizing the modern-day system at 30732 PCH. The

geomorphological concepts applicable to coastal foredune development and evolution in a sand-sharing system do not extend inland of the stable dune hummocks shown on Figure 1. The descriptive term "backdune" does not connote a process-response connection and does not relate any dunal feature to its origin or source of sediment.

4. There is no geomorphological argument with this statement.

I would be remiss if I did not react to the comment about the IPCC Report (Bindoff, 2007). First, it is the Intergovernmental Panel on Climate Change, not the terms used in the Engel memo. And, when sea level rises by the predicted 1.5 m, these dunes are not going to prevent (or ameliorate) coastal change to this area.

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Glossary of Terms – as applied in a coastal environment

Blowouts – These are gaps or depressions in the foredunes where wind may be funneled and erode the sediment on the margins of the blowouts. Sediment transported through blowouts may contribute to dunal development on the landward margins of the foredune ridge.

Eolian Processes – the mechanical processes associated with moving air, or wind; wind processes may erode, transport, as well as deposit sediment.

Foredune –A linear sand ridge located at the upper margin of the bare sand beach. It is at the site of pioneer vegetation that can survive in this harsh environment and trap sediment to create the topographical ridge.

Lag Surface – A coarse veneer that develops as the wind removes fine sediments and leaves the larger particles behind. The materials eventually create a surface that shields the underlying sediments from further eolian transport.

Pioneer Vegetation – The vegetation types that can grow in the very strenuous zone at the seaward margin of the foredune, extending into the upper beach. This is the vegetation that is the most seaward in the dune topography.

Primary Dune – The seawardmost dune ridge in the coastal environment (the foredune)

Sandy Hummocks – Small mounds of wind-blown sand, either vegetated or bare.

Secondary Dune – Dunal features usually extending inland from the foredune, and frequently derived from the erosion and destruction of the foredune. Secondary dunes are modifications of the primary dune.

Sediment Supply – The availability of sediment to be moved and accumulated to create landforms.

Sediment Budget – A measure of whether more sand is entering a system, leaving a system, or whether a system is balanced in some time duration. A negative sediment budget results in erosion; a positive sediment budget results in accumulation, a balanced sediment budget results in no change over some period of time.

Prepared for Malibu Bay Company
Malibu, CA

Prepared by:
Cristina Sandoval, PhD
Response to memo by Dr. Engel

May 23, 2008

Robb,

With respect to your request to evaluate Dr. Engel's comments on my report on globose dune beetles, I have split what I think are the relevant paragraphs.

"Sandoval's (2008) globose dune beetle study findings provide evidence supporting the use of a buffer between southern foredunes and development at the MBC property."

This is Dr. Engel's interpretation of how the results inform her decision about a buffer. Because I did not make a recommendation for or against a buffer, it would be clearer if Dr. Engel clarified that this was her interpretation not mine.

Page 7. "Sandoval (2008) found a negative correlation between globose dune beetle abundance and irrigation; globose dune beetle abundance was lowest in front of homes with irrigation compared to homes without irrigation. Furthermore, globose dune beetles were distributed significantly further inland on the undeveloped project site compared to the developed adjacent sites. And Sandoval (2008) found that globose dune beetles were less abundant in the presence of invasive highway iceplant “both at the project site and at the lots with existing residences.”

This is a reasonably accurate summary of my results. However, it would be clearer to add that the main effect of houses on beetle abundance appeared to result from irrigation and non-native plants that were planted seaward of the stringline and not the presence of

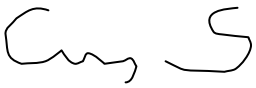
a house per-se, because the beetles did not occur landward of the stringline.

Page 8: "Furthermore, the results from Sandoval's (2008) study on globose dune beetles demonstrate that development, irrigation, and invasive species all negatively impact the abundance and distribution of this special status species."

To clarify, development was highly correlated with landscaping practices in the dune areas seaward of the stringline that had a negative effect on beetle distribution. As stated in my report, I did not study the effect of development by itself, when the dunes were left natural, because that situation did not exist at Broad Beach. Also, there was no effect of development on the abundance of beetles. Therefore, the statement above is more correct if phrased as follows:" "Furthermore, the results from Sandoval's (2008) study on globose dune beetles demonstrate that irrigation, and invasive species seaward of the stringline, typically associated with development in Broad Beach, all negatively impact the abundance and distribution of this special status species. Therefore, the best strategy for insuring that GDB resources are maximized is to avoid the introduction of permanent irrigation and iceplant seaward of the stringline. In the case of this Broad Beach property, the distance from the stringline to the GDB population in itself acts as a sufficient separation for the beetles so long as the iceplant and irrigation intrusions are not introduced. "

I have one minor correction to the memo: Page 4. *Heterotheca grandiflora* and coastal goldenbush, *Isocoma* menziesii are native species to California, not exotic weeds.

Sincerely,



Cristina Sandoval