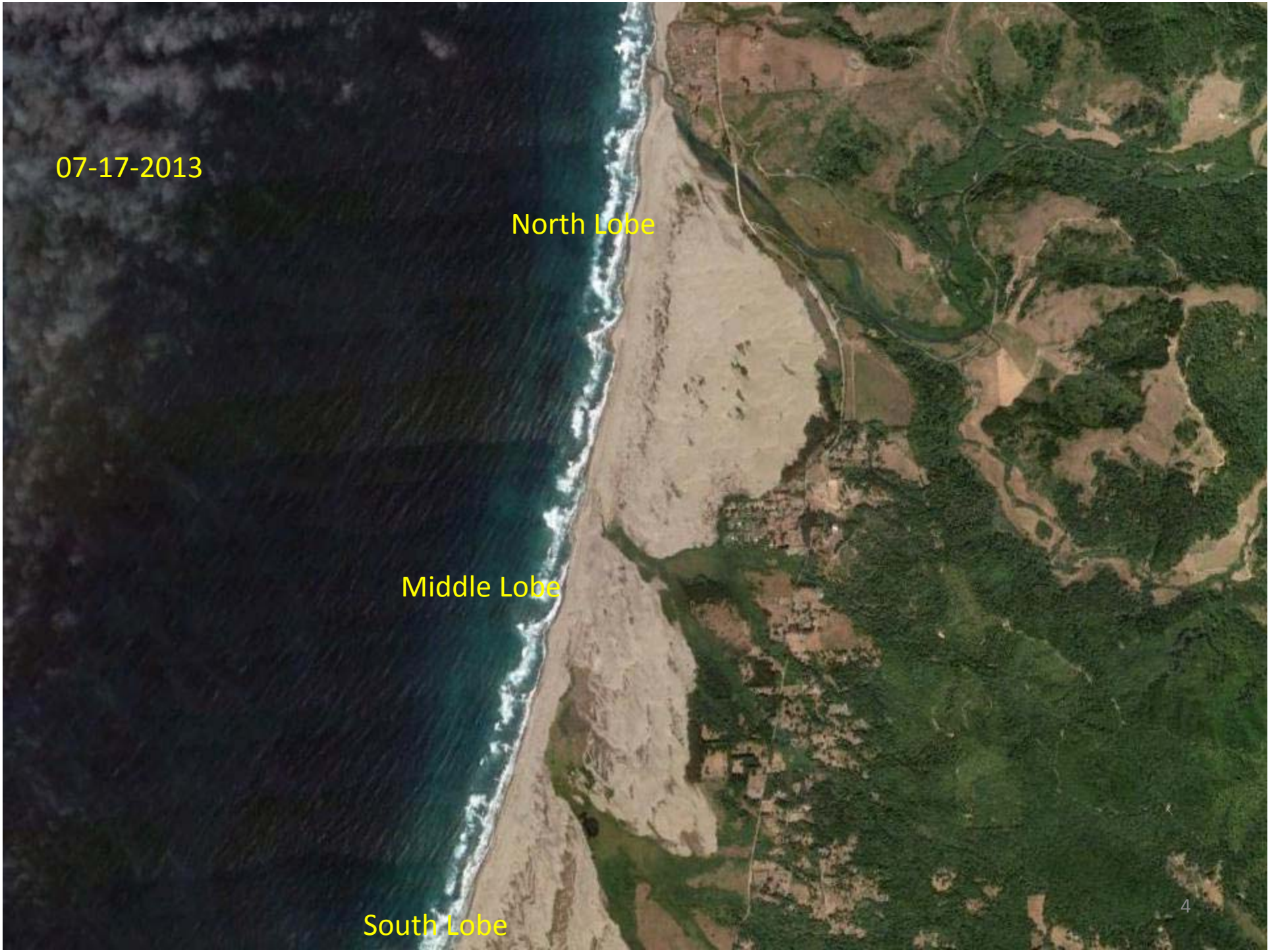
Sand movement at Ten Mile – Inglenook Fen

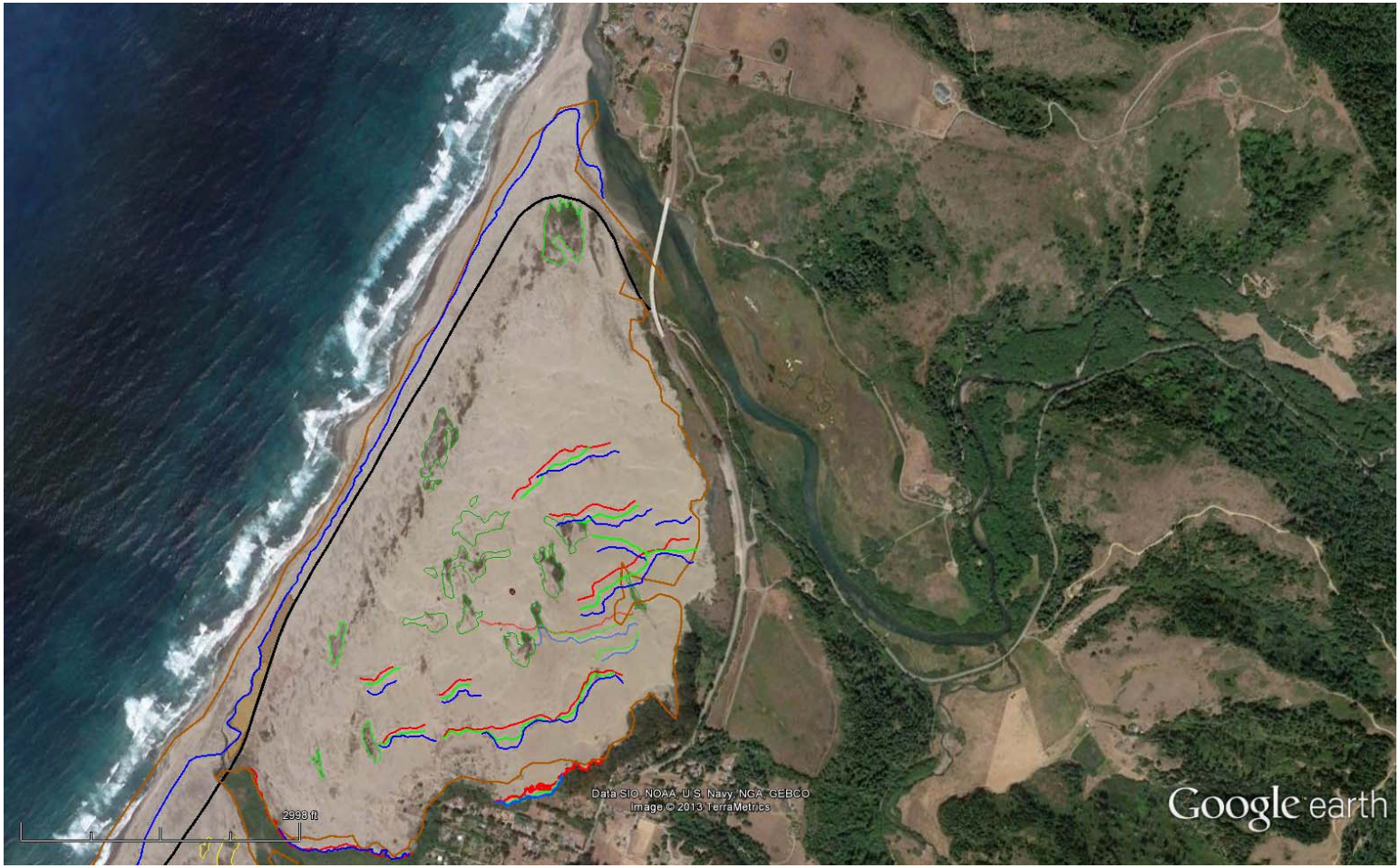
6/10/2012
On road

6/21/2013
On dune on road

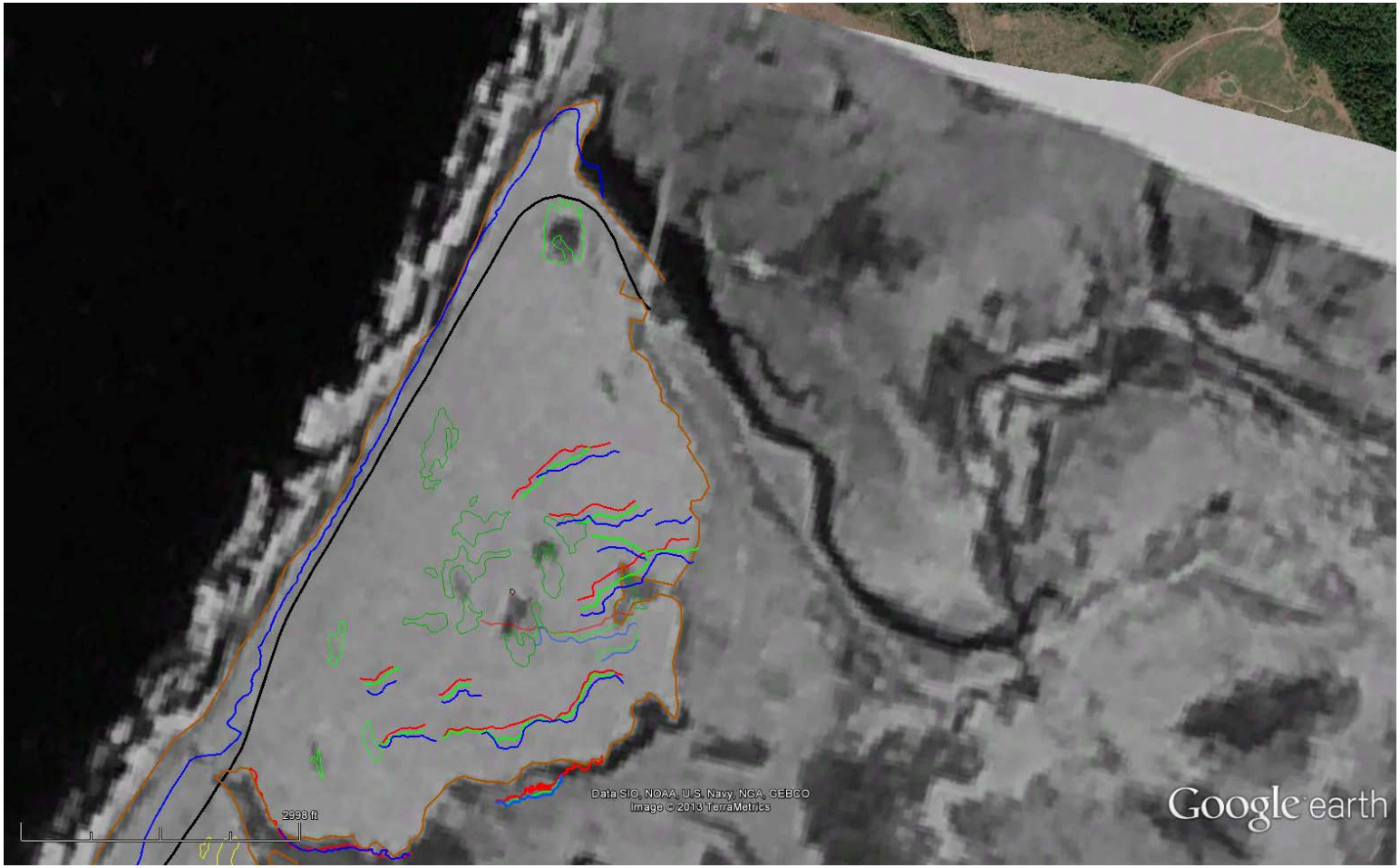

07-17-2013
North Lobe
Middle Lobe
South Lobe


09-10-1998
North Lobe study area

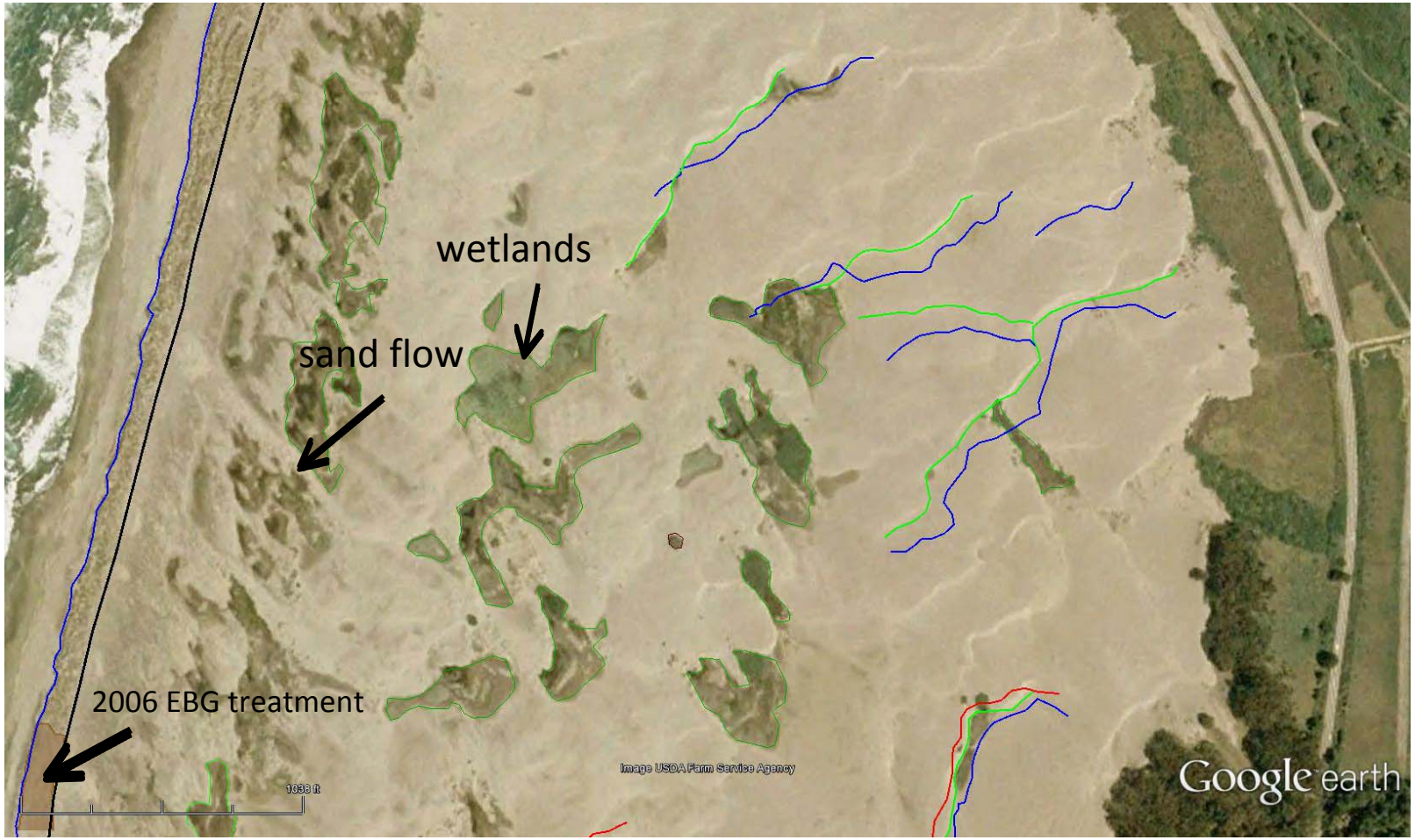
Comparison 1956-2012
08-23-2012 image



Comparison 1956-2012
circa 1956

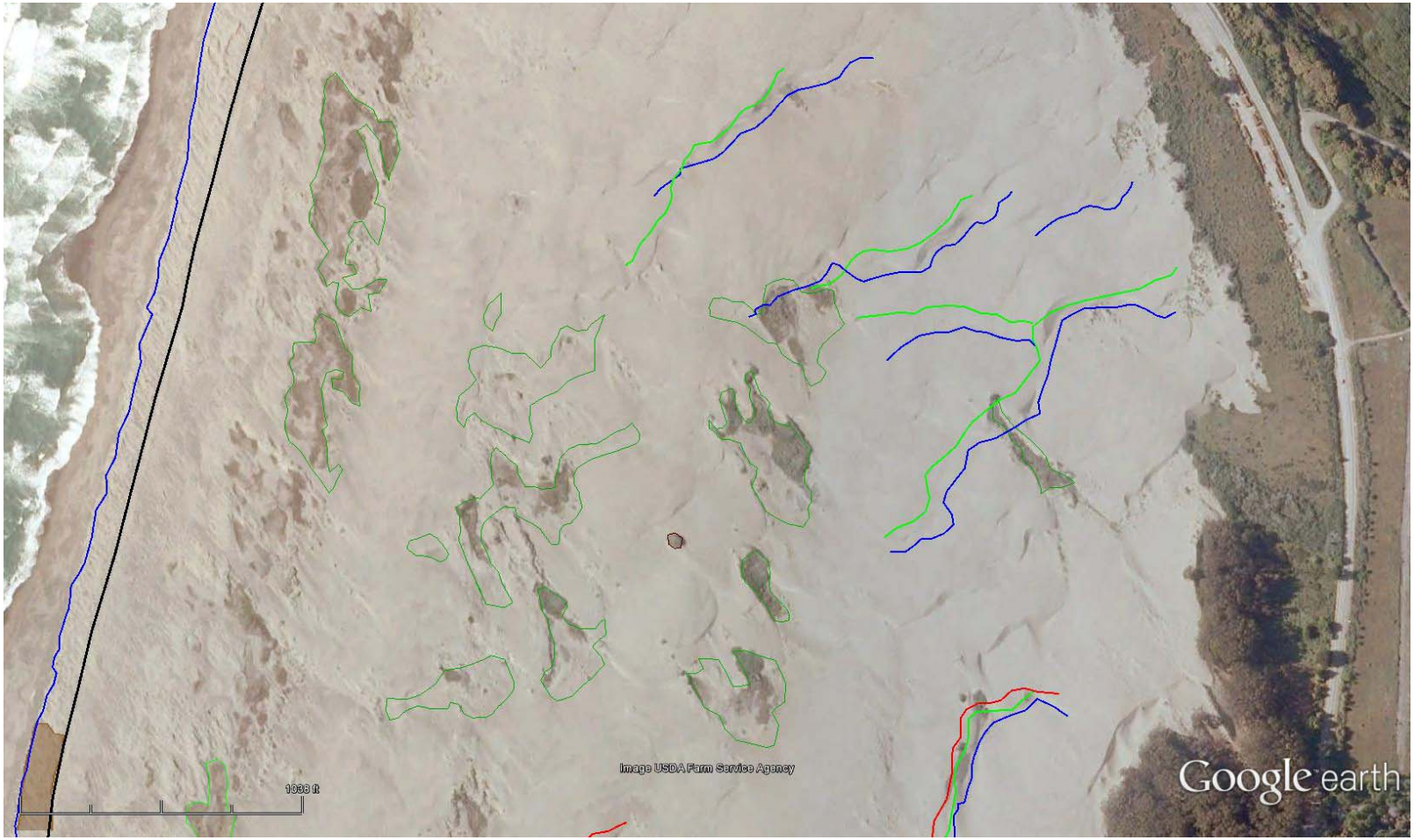


North Lobe study area
08-29-2006 image
USDA Farm Service



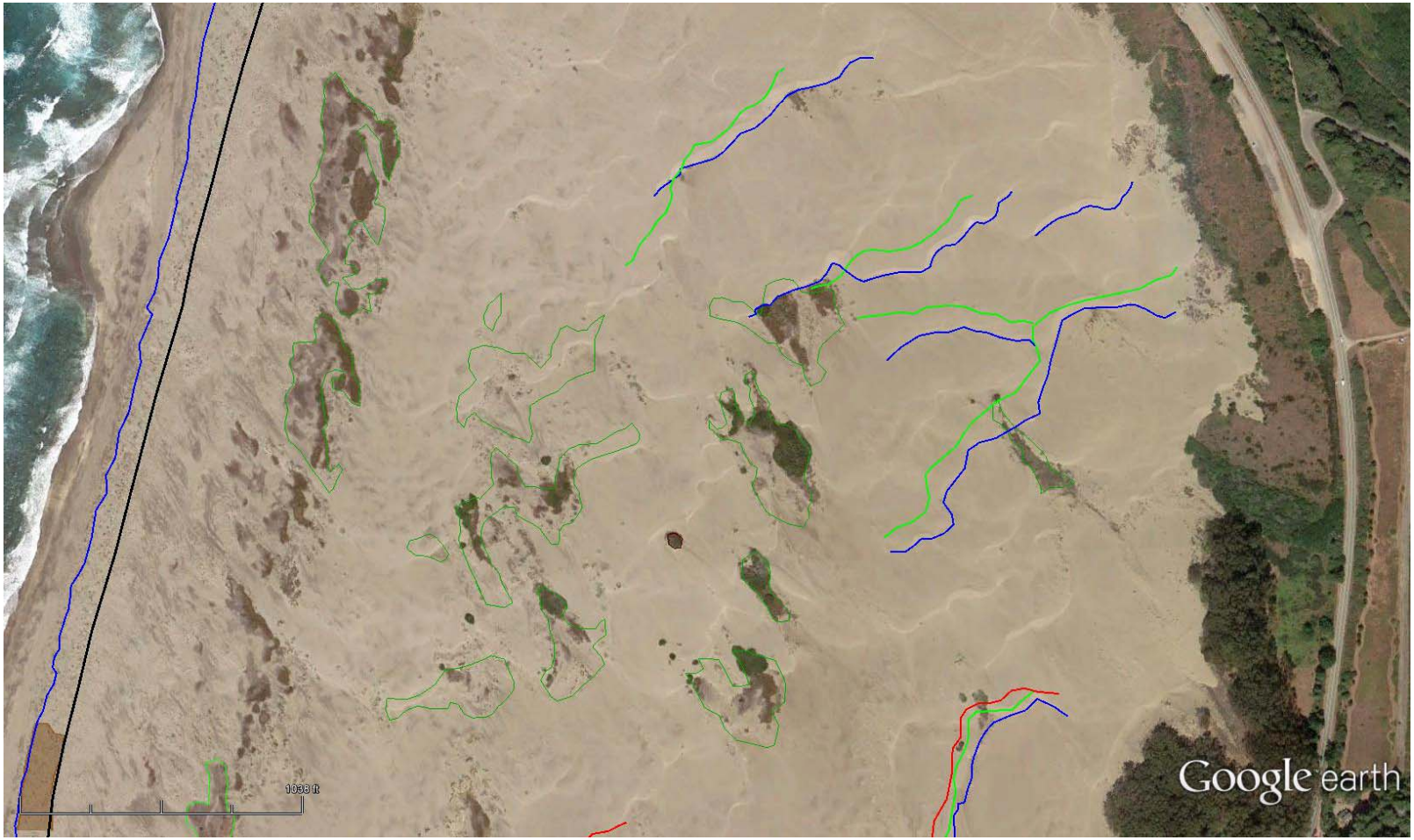
12-30-2005 dune line
08-23-2012 dune line

North Lobe study area
09-15-2010 image
USDA Farm Service



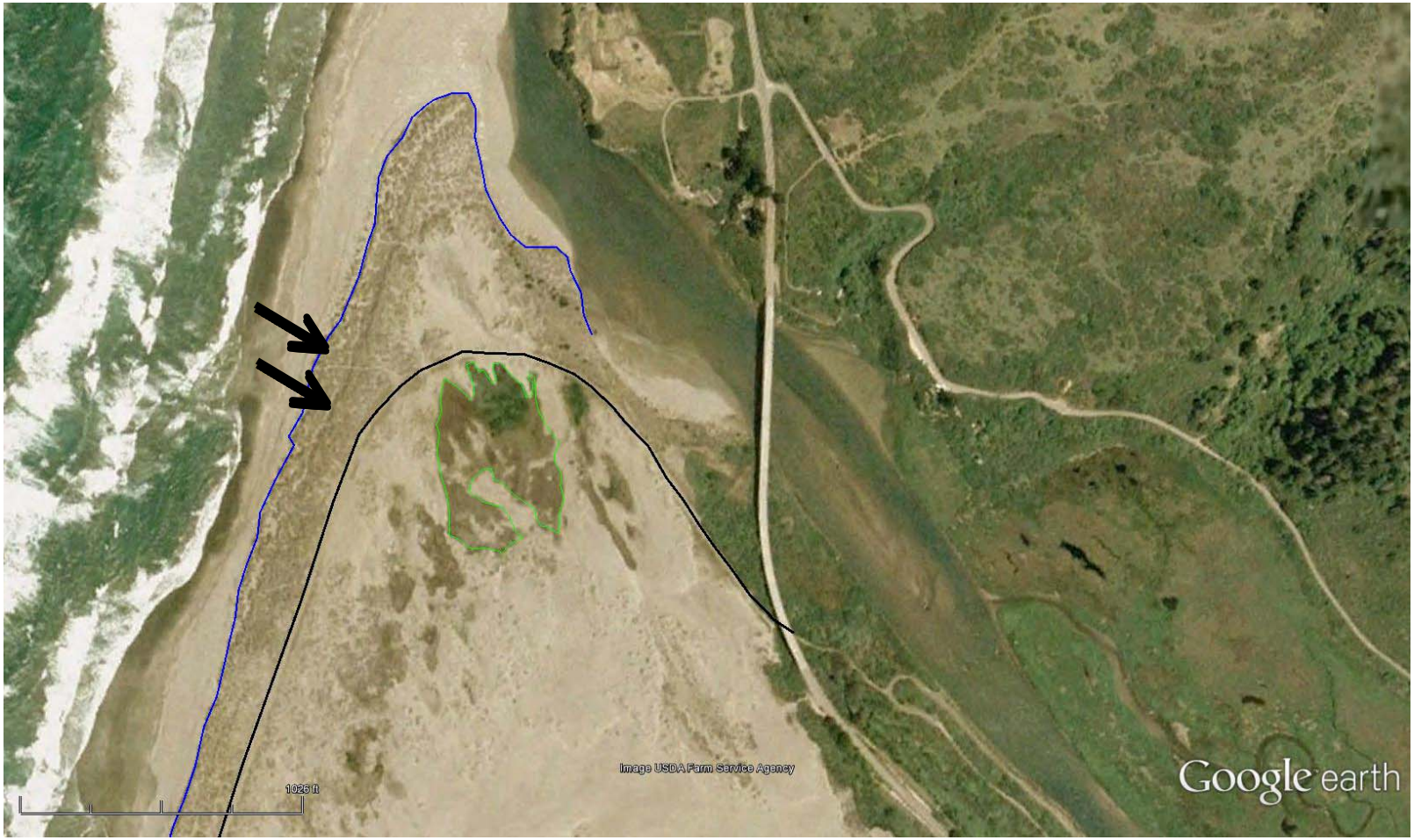
12-30-2005 dune line
08-23-2012 dune line

North Lobe study area
08-23-2012 image

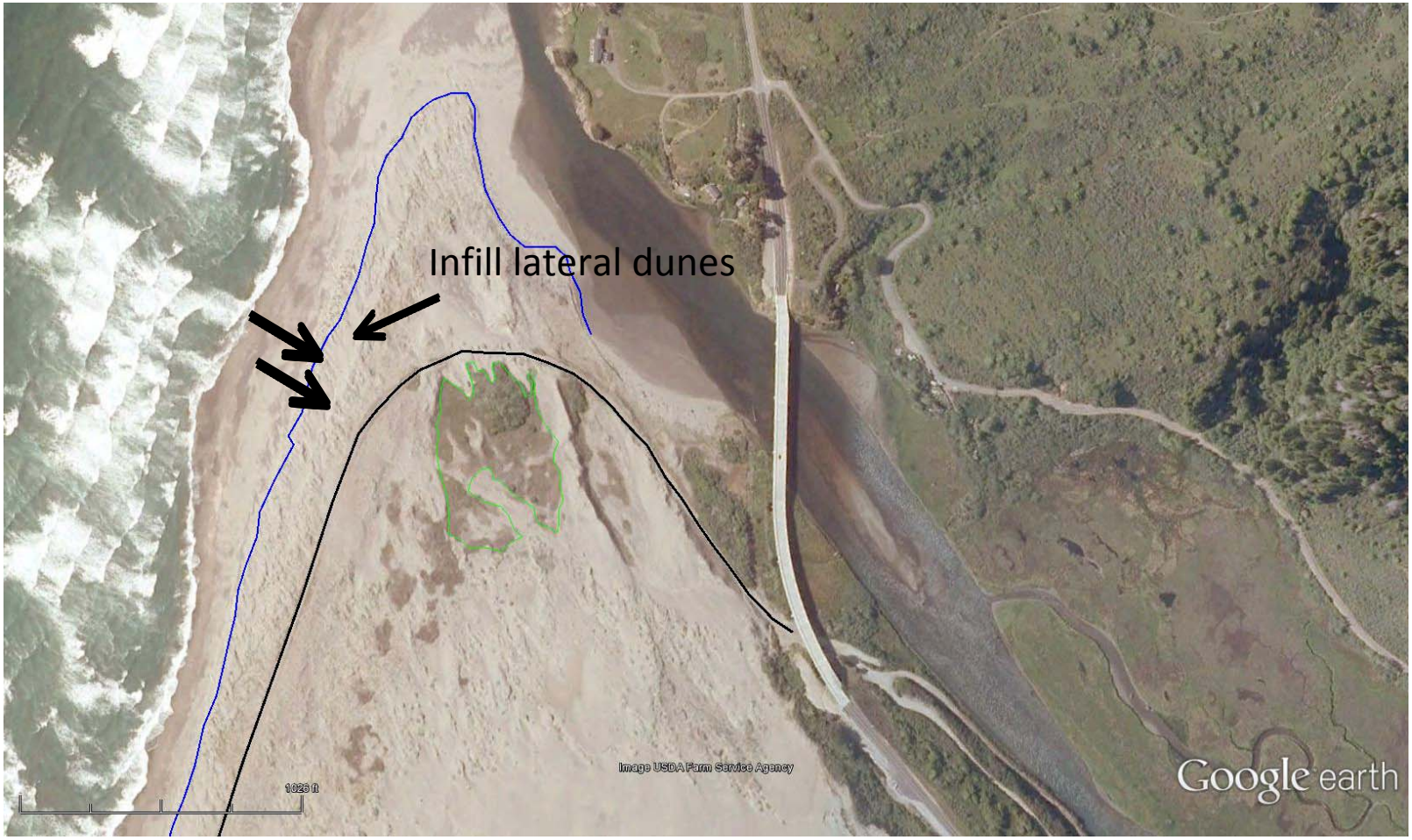


12-30-2005 dune line
08-23-2012 dune line

North Lobe North study area
08-29-2006 image
USDA Farm Service

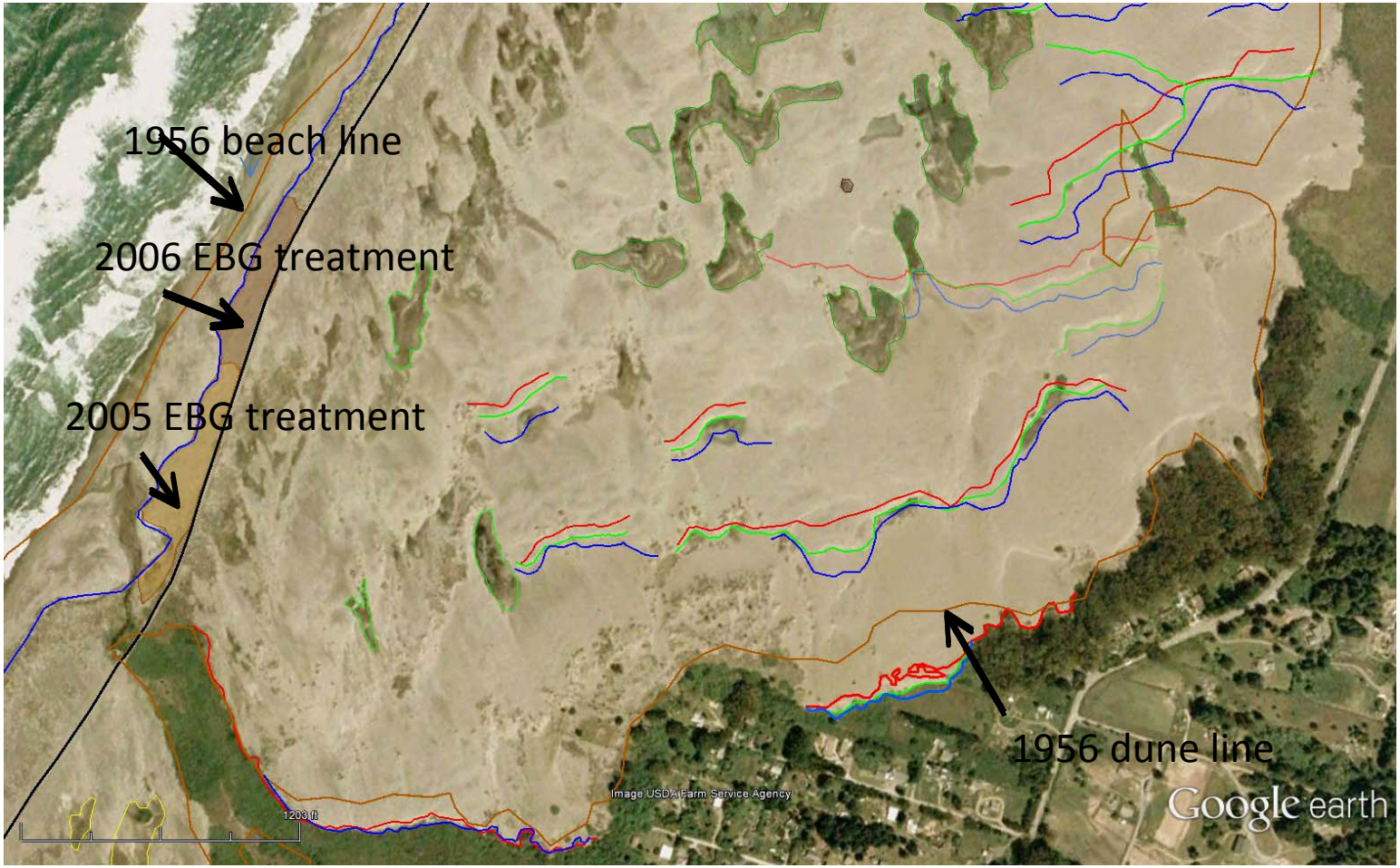


North Lobe North study area
09-15-2010 image
USDA Farm Service

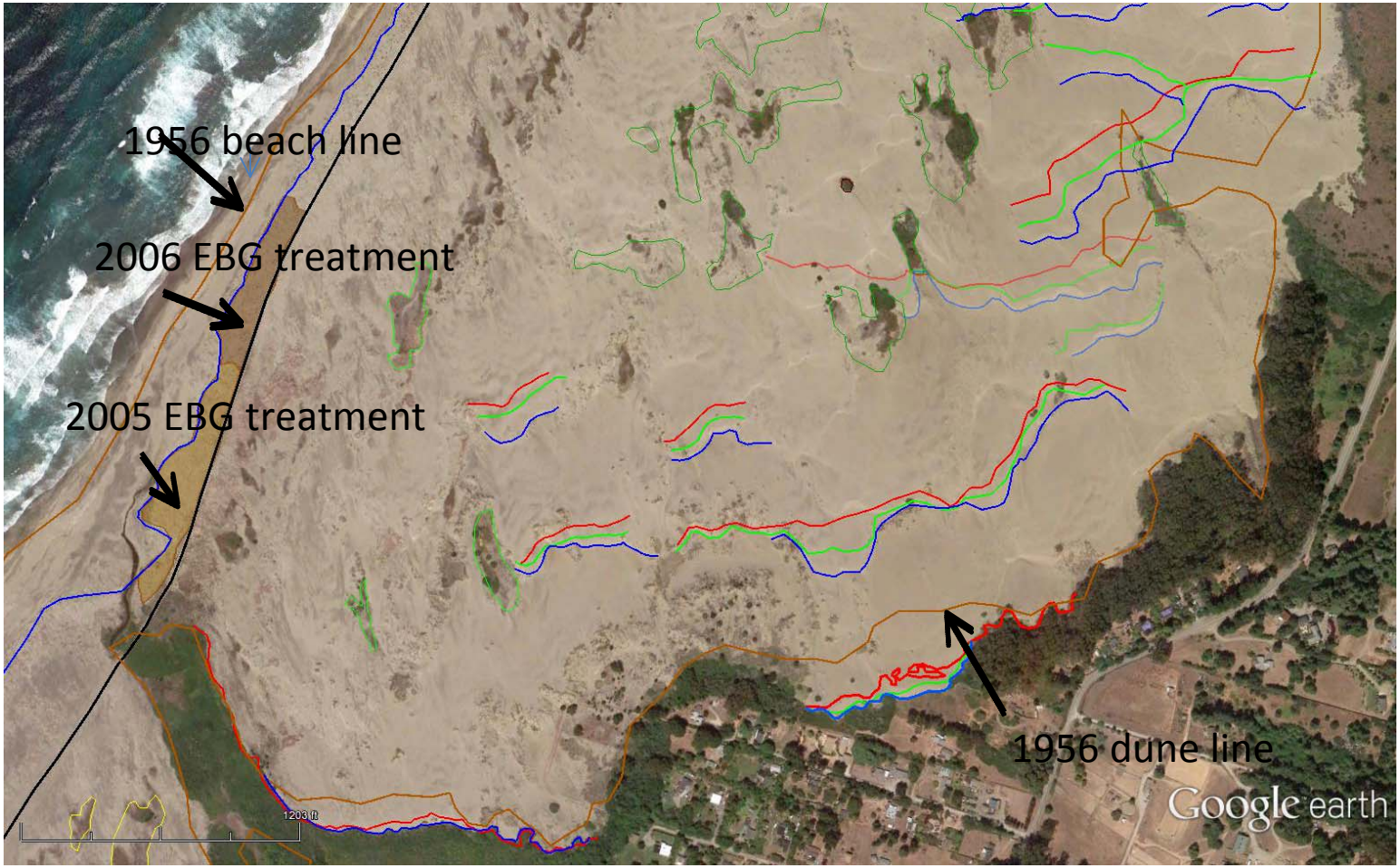


North Lobe North study area
08-23-2012

North Lobe South study area
08-29-2006 image
USDA Farm Service

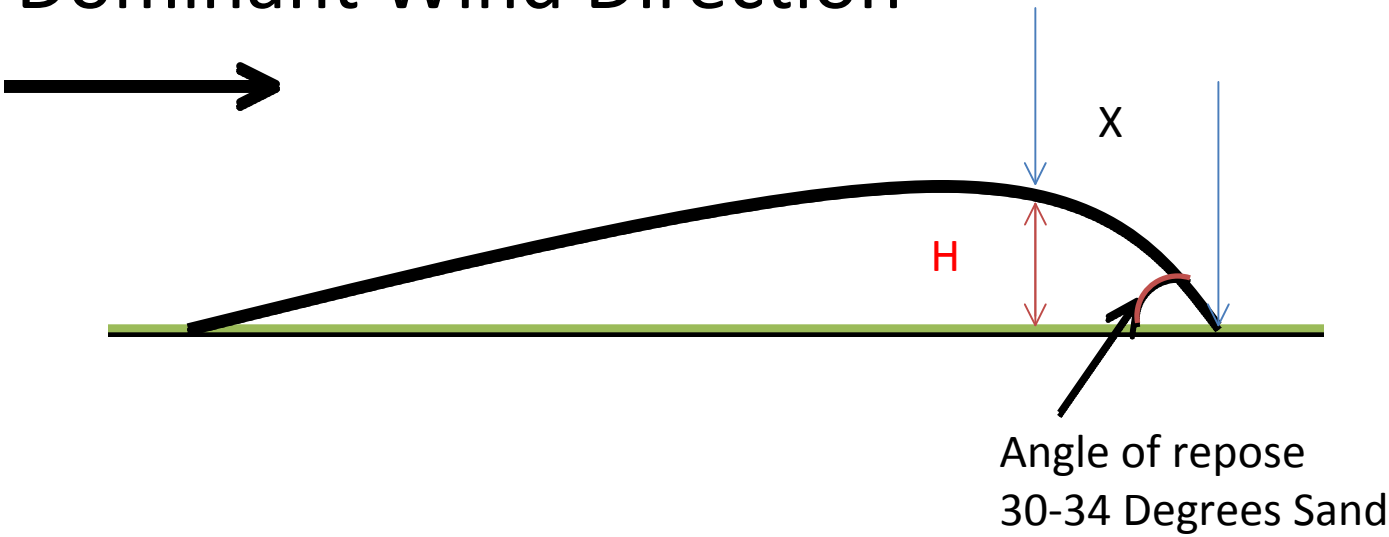


North Lobe South study area
08-23-2012



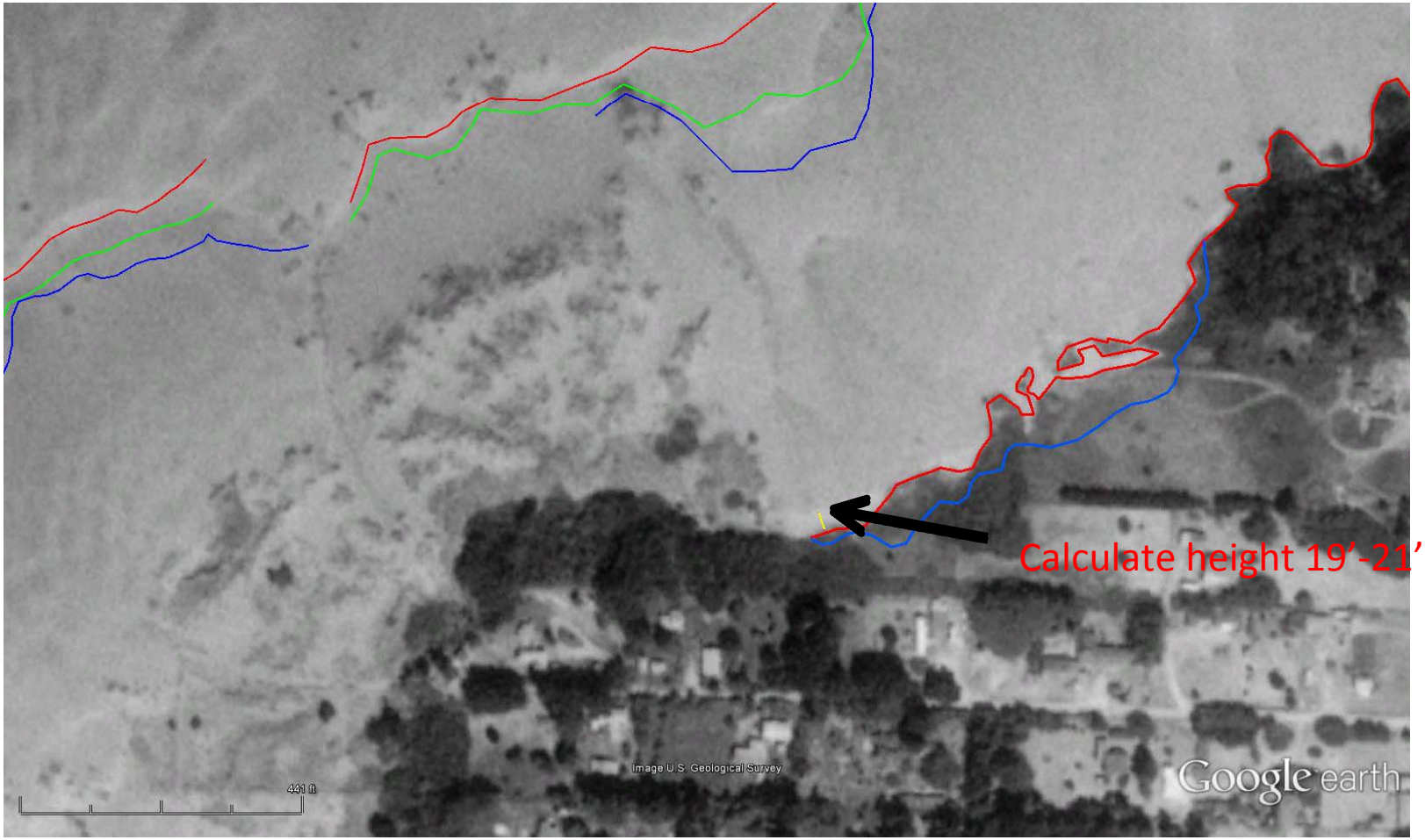
Angle of Repose

- Dominant Wind Direction

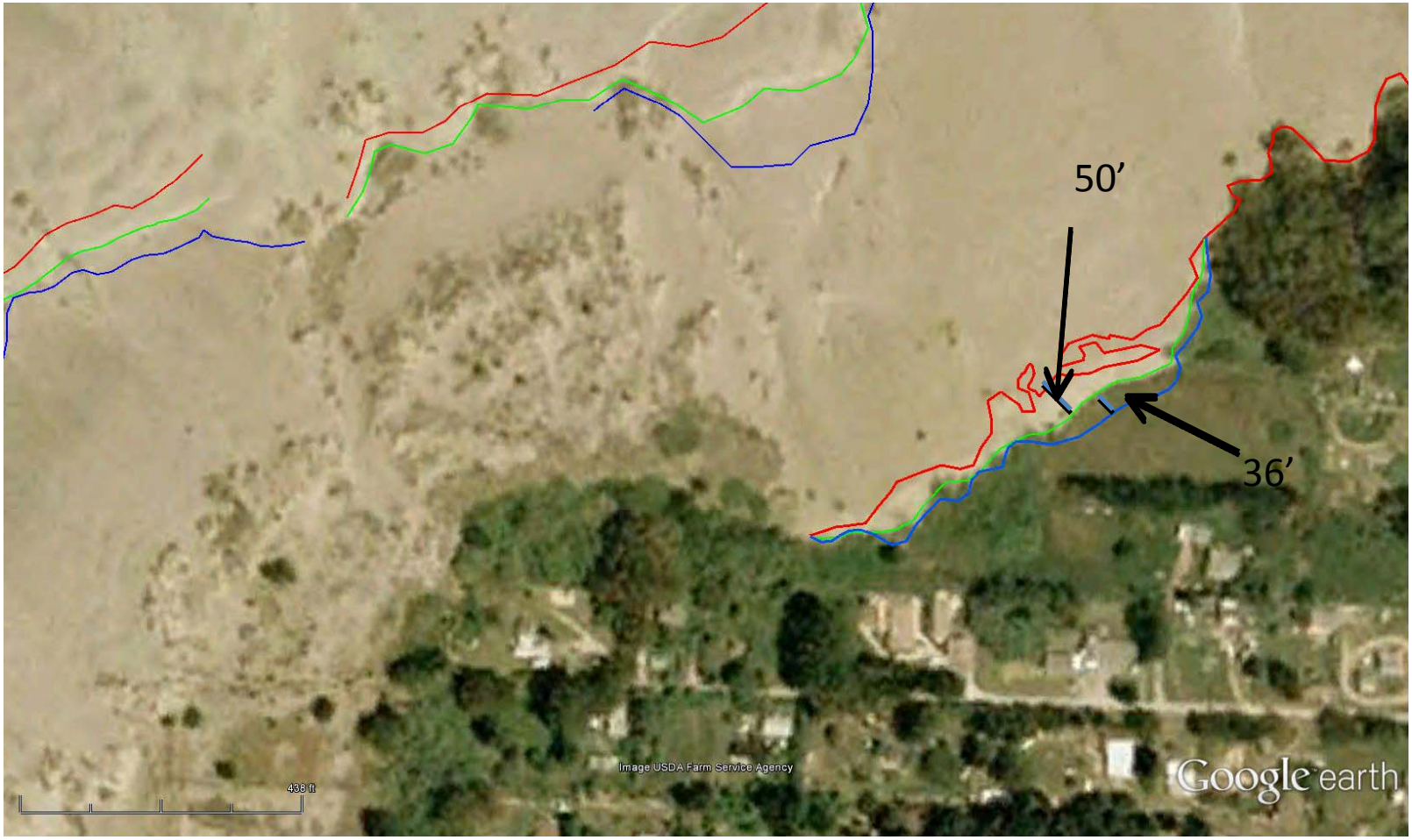


Tan 30= H/X

Beal Lane sand movement/height
09-10-1998 image
USGS



Beal Lane sand movement/height
08-29-2006 image
USDA Farm Service



Beal Lane sand movement/height
08-23-2012

Report on Sand Movement (Erosion) in support of proposed Special Conditions 9g, 9h, and 9i of the proposed modifications of Coastal Development Permit #12-2012

This report is supplied by Eric Freeman as a rebuttal to the California State Parks MacKerricher Dune Rehabilitation Project Coastal Permit #12-2012, and as supporting documentation as part of the WMAC permit appeal.
I am a retired, formerly state licensed Geophysical Engineer, with a degree in Geophysical Engineering (Tau Beta PI) from the Colorado School of Mines, and over 32 years of experience in field. I have closely examined the documents and supporting documents contained in the INGLENOOK FEN – TEN MILE DUNES NATURAL PRESERVE Mitigated Negative Declaration (MND), and referenced documents available. I offer the following comments in rebuttal to information presented to the Mendocino County Coastal Permit Administrator in support of permit #12-2012 by California Department of Parks and Recreation (CDPR).

The Ten- Mile River dune system is located in MacKerricher State Park (Mendocino County). Beginning in the mid-19th century and by the end of the 20th century most of the Ten- Mile River watershed had been logged and re-logged. Heavy erosion followed this deforestation, and through the process of littoral drift, sediments from the watershed caused a dramatic increase in sand supply to the rivers, ocean, and thus the dune system (relative to pre-development levels). In the 1920s, Highway 1 was inundated with sand in this area and had to be realigned. The shoreline accreted sand seaward, and by the 1950's the dunes were relatively stable. Off-road vehicles became popular, and by the 1970's extensive off-road vehicle use led to renewed landward dune movement. Numerous existing riparian swales were inundated; but in some cases vegetation was able to grow faster than it was being buried, eventually ending up on dune crests,; thus slowing the inward movement of sand. Almost every sand particle present today in the dune system made its way down the river, into the ocean, onto the beach, and across the beach to end up in its current location. Therefore an original "natural" condition in respect to these dunes cannot exist without transporting every single grain that experienced human induced erosion back to its original location in the watershed.

The size of a dune is mainly a function of sand supply: the larger the supply from the beach, the higher the dunes. Prevailing wind directions (NW, SW), beach width, longshore current, and time available to build a dune are part of the sand supply picture. Most important however is the sand availability. Sand dunes are eroded by the wind remobilizing sand and blowing it off of the dune, a process known as deflation, and by wave action in the nearshore environment.

The most common deflation feature is the blowout, a depression with a topographically flat floor, which lies below the elevation of the adjacent dunes. Blowouts are flat-floored because sand is blown away until the surface reaches the water table. The wet sand resists being blown away and the surface can become vegetated creating wetland areas. The faster the wind, the bigger the sand sizes that can be picked up and moved. The winnowing of light sand grains leaves behind a dark layer of heavier minerals.

Dune grass stabilizes the sand in which it is growing and the way the grass spreads will affect the shape of the dune. As a result of the clustering nature of some grasses, dunes that are dominated by this grass type may have gaps or overwash passes; other grass types may allow fewer gaps, forming long lateral foredunes. Lateral foredune beach ridges prevent or reduce storm overwash, except in the largest storms.

Once grasses stabilize the dune line, additional plants take hold, particularly on the more protected landward side of the dune. Plants on and near beaches may need varying degrees of protection from wind and salt spray. Under natural conditions, the types and density of vegetation are indicators of the age and length of stability of dunes. Grasses may be established within a season, but shrubs may take 10 to 20 years to become established. Thus by reviewing current vegetation we can achieve some idea of beach dune stability.

There are many points to make relative to sand movement and the Ten Mile Inglenook Fen MND, which this permit appeal process addresses. The following are selected rebuttals to comments within the MND, or supporting documents, with the corresponding requested permit actions sought by this appeal. These requested permit actions have historical county or statewide legal basis, and are sited from legal opinions such as:

SUNDSTROM v. COUNTY OF MENDOCINO
Robert T. SUNDSTROM, Plaintiff and Appellant, v. COUNTY OF MENDOCINO et al.,
Defendants and Respondents. Harold K. MILLER, Real Party in Interest.
202 Cal.App.3d 296, No. A038922. Court of Appeal, First District, Division 1, California.
June 22, 1988.

>1) Removal of the road and culverts, in conjunction with the removal of non-native vegetation on the windward side of the road, will eliminate the barriers to natural sand movement within the Ten Mile Dunes. (MND pg. 15 Sand Grain Analyses MacKerricher State Park Trinda L. Bedrossian, PG 3363, CEG 1064, CPESC 393 Senior Engineering Geologist, Specialist California Geological Survey)

- **Rebuttal*:*** Removal of beachgrass will indeed eliminate a barrier to sand movement and thus increase sand movement (erosion). However, there is little evidence that the road and culverts are a barrier to sand movement.

  Rather, there is a great deal of risk that undesirable consequences will far outweigh any benefit from beachgrass, road and culvert removal: Inland sand movement, environmental hazards associated with removal of untested ballast, the burial and destruction of endangered plants and endangered plant habitat, the increased exposure to inundation with seawater (and its effects on both plants and topography), and the introduction of both non-native material and non-native plants at proposed disposal sites - including Big River Quarry - via the transport and spreading of recovered Haul road-surface and ballast. Another highly-probable unintended consequence is the accidental introduction of new potentially invasive flora (Pampas Grass is a prime example) and fauna transported back from proposed disposal sites to the Ten Mile-Inglenook Fen Preserve.

  These consequences are not addressed by the MND, thus there is no proposed mitigation. This appears to be not only a violation of the Big River Watershed Restoration MND procedures, but also risks transport and introduction of non-native material and non-native plants to areas outside of the current scope of the Ten Mile–Inglenook Fen Preserve.

  Until native vegetation can be established after beachgrass removal, much of the available sand will move landward, filling wetlands and resulting in both increased dune movement and dune height in the backdune environment. These effects can already be seen using available satellite images acquired before and after non-permitted beachgrass removal projects. These effects will be shown in a PowerPoint presentation.

Haul Road black line Base image 2013 Terra Metrics
Beach and sand dune extents in brown from 1956 aerial image

>2) The presence of the road (including the Ten Mile Railroad) and culverts within the project area has prevented the natural formation of foredunes along Ten Mile Dunes for more than 100 years. As documented in detail by Maslach (2004) and Wollenberg (2004), sand has continued to build up along the majority of the west side of the road. This, in effect, has created one long transverse dune on the windward side of the road, and an equally long deflated area east of the road, except where disrupted by the drainages of Inglenook Creek and Fen Creek. (MND pg. 14 Sand Grain Analyses MacKerricher State Park Trinda L. Bedrossian, PG 3363, CEG 1064, CPESC 393 Senior Engineering Geologist, Specialist California Geological Survey)

- **Rebuttal: from the MND:** A review of aerial photographs taken between 1981 and 2010 (CDF, 1981; WAC, 1996 and 2000; USDA, 2010) indicates relatively minor changes have occurred in vegetation cover and drainage patterns along the road during the past thirty years. Vegetation appears to be more well-established farther inland within the northernmost dune lobe than it was in 1981. However, there appears to be less vegetation immediately adjacent to the road than in 1996, both in the northern and southern lobes of the dunes. This may be related to: (1) the accretion of sand and/or the recent removal of non-native vegetation on the west side of the road in the northern lobe of the dunes, and (2) the partial removal of the road itself due to wave action in the two southernmost lobes, particularly during the 1998 El Nino storm events (Lewis, 1998). (From MND pg. 14 Sand Grain Analyses, MacKerricher State Park Trinda L. Bedrossian, PG 3363, CEG 1064, CPESC 393 Senior Engineering Geologist, Specialist California Geological Survey)

- **Rebuttal:** Review of photographs from the California Coastal Records Project from the years 1972 and 1979 show that in areas not affected by continuous beachgrass accumulation at that time, minor foredunes were present primarily in the shadow of driftwood along the shoreline west of the haul road, and in the wind shadow of isolated patches of native vegetation, or beachgrass that had not yet coalesced into a beach ridge. Sand coloration allows tracking of deflation paths (denser dark minerals are less capable of wind borne transport) between these initial foredunes: These initial foredunes appear unaffected by the presence of the then-intact Haul Road. Observation shows that early beachgrass density is coincident with proximity to sand sourcing and thus availability (i.e. near the river, northern area), and appears to have initially been present nearest the Haul Road. The primary source of sand accretion is not the Haul Road, but rather beachgrass introduction and subsequent spread, primarily west of the Haul Road initially.

1979 photo Inglenook creek

2002 Inglenook creek

>3) A comparison of photographs of the Ten Mile foredunes from pre-1980 through 2011 demonstrates the effect of European beachgrass on dune structure. Figure 3 BIO-01, a photograph taken in 2001, shows the steep seaward dune faces formed from Ammophila growth. Figure 3 BIO-02 is a photograph from several decades earlier, showing a low- to non-dune profile in the absence of Ammophila (MND pg. 55).

- **Rebuttal:** As demonstrated in the second rebuttal (above), these photos indicate that the original rail line and the subsequent haul road - both of which were constructed at or slightly above the original ground surface - have had little to no effect on dune creation west of the haul road, despite being present during periods of maximum

upriver deforestation and subsequent sand availability. The major agents in lateral foredune formation (beach ridges) have been the introduction and spread of beachgrass and the downstream migration of sediment loads from deforestation during flooding events (sand availability).

Figure 3. BIO-02 (left): Ten Mile Haul Road, pre-1980, prior to European beachgrass invasion, and **Figure 3. BIO-03** (right) demonstrating recovery of dune mat vegetation in 2011 following removal of beachgrass
Historic photo printed with permission from the collection of the Fort Bragg – Mendocino Coast Historical Society.

Photos from MND

> 4) **Areas formerly dominated by European beachgrass, now comprised of elements of native dune vegetation types (e.g., dune mat plant associations), maybe considered as sites for the implementation of compensation measures for project impacts on native vegetation or special-status plant species. Beachgrass removal, as part of the project, will represent partial compensation for impacts rendered to native vegetation within the project area, and rehabilitation of habitat from Ammophila-dominated stands to native vegetation cover will be implemented, monitored, and evaluated as one component of the project Mitigation, Monitoring, and Restoration Plan (Appendix E.2) and its objectives. (MND pg55)**

- **Rebuttal:** While the current project seeks permitting for beachgrass (Ammophila) removal as a portion of the current project, beachgrass removal – including the use of herbicides, has occurred sporadically over the last 20 years without permits, or environmental reporting, or monitoring, or mitigation. Without any mitigation for this previously non-permitted removal (such as the replanting of native species currently envisioned as mitigation), and without any monitoring or evaluation, or an environmental study of the results from that non-permitted removal, it is impossible to predict with any assurance the results of the current proposal. Rather, the current project permit request starts from a time point that is a direct result of previous non-permitted actions, without consideration for the loss of habitat and the effect on animals, plants, and local communities incurred to date by the previous non-permitted activities. Previous actions by CSP, such as the non-permitted removal of beachgrass, and the effects of Haul Road removal due to neglect and acts of nature, have not been studied - despite CSP's own General Mitigation Plan Goals below (fig1.from MND):

Figure 1. A diagram illustrating the components of the adaptive management process.

General Mitigation Plan Goals

The goals of this mitigation, monitoring, and restoration plan are as follows:

>5) Natural coastal dune formation processes are likely to be re-established, including the formation of foredunes perpendicular to the shoreline along the west side of the three main dune lobes.(MND pg. 15 Sand Grain Analyses MacKerricher State Park Trinda L. Bedrossian, PG 3363, CEG 1064, CPESC 393 Senior Engineering Geologist, Specialist California Geological Survey)

- **Rebuttal:** Analysis of post-1983 El Nino aerial photographs shows no generation of significant lateral foredunes in areas west of Haul Road remnants, where the haul road has been absent for over 30 years, and beachgrass has been minimal to nonexistent.

  Embryonic transverse dunes perpendicular to the Haul Road are present in some areas to the north where beachgrass had been previously removed, however these initial transverse dunes now suffer less sand availability for dune building, due to better foresting practices in the Ten Mile river watershed since the 1950's, and the partial flushing of accumulated sand stored in the river during the El Nino events of 1964, 1983, and 1998, and the lack of reintroduction of native plants.

  Additionally, the successful non-permitted removal of beachgrass in some areas has changed the local topography and thus the wind patterns, leading to the landward transport of previously beachgrass-sequestered sand; this is in essence, erosion. This erosion and sand movement has resulted in the burial of endangered plant

species and wetlands inland, and an influx of sand to the back dunes resulting in increased sand dune movement and sand dune height.

>6) As a result of these natural processes, more sand is likely to blow inland (nearshore) over the short-term, especially in the northern lobe.(MND pg. 15 Sand Grain Analyses MacKerricher State Park Trinda L. Bedrossian, PG 3363, CEG 1064, CPESC 393 Senior Engineering Geologist, Specialist California Geological Survey)

- **Rebuttal:** Analysis indicates this statement is true not only for nearshore, but also for inland dunes, as wind patterns change in response to the removal of beachgrass and storm surges alter the foredunes. For the previously beachgrass-stabilized foredunes west of the Haul Road where beachgrass has been removed through non-permitted activities to date, and as perpendicular foredunes form behind beachgrass remnants and natural vegetation/debris, swales must also form where beachgrass has been removed; this will result in the landward movement of previously beachgrass-encapsulated sand present in these deflation tunnels, which will then be inundated by storms and turn into overwash passes.

  Once grasses stabilize the dune line, additional plants take hold, particularly on the more protected landward side of the dune. These plants need varying degrees of protection from the wind, salt spray, and sand movement to survive. Under natural conditions, the types and density of vegetation are indicators of the age and length of stability of dunes. Grasses may be established over short periods of time while shrubs can take 10 to 20 years to become established.

>7) The addition of sand will change the configuration of the dunes as they migrate to the east (i.e., additional transverse dunes could develop and/or grow in height farther inland), the nature of the vegetation, and the drainage patterns throughout the dunes. (MND pg. 17 Sand Grain Analyses MacKerricher State Park Trinda L. Bedrossian, PG 3363, CEG 1064, CPESC 393 Senior Engineering Geologist, Specialist California Geological Survey)

- **Rebuttal:** Analysis indicates this statement is also true both nearshore (erosion) and inland (dune building) as wind patterns change in response to the removal of beachgrass-stabilized dunes, foredunes west of the haul road will also change in configuration and size. Areas with established vegetation will see less dramatic effects than those exposed to unbroken wind patterns.

>8) Drifting sand has provided substrate for establishment of dune mat along approximately 30% of the remaining length of road in the Preserve. Along with nascent dune mat forming on sand drifts across the road, a considerable area of this alliance could be directly affected – crushing or removal of individual plants, burial, and so on – by project activities along either side of the road. Up to about 30 acres of dune mat has been estimated for potential project-related impacts, although the actual area affected is likely to be much less. (MND pg. 59)

- **Rebuttal:** This statement supports rebuttal contentions and observations that the Haul Road prior to beachgrass invasion and natural removal (via storm damage), and that the Haul Road, is not an obstacle to sand migration, as sand is currently accumulating across it.

>9) Manual removal of European beachgrass comprises a significant portion of the project proposal. As demonstrated in areas cleared of beachgrass to date, the beachgrass alliance displaces native plant communities, especially those nested in the broad Abronia latifolia—Ambrosia chamissonis Alliance. These native-plant

dominated alliances recover rapidly upon removal of Ammophila. Losses of small portions of native plant alliances during haul road de-construction will be compensated through the restoration of natural dune-forming processes and the eventual recovery of native plant communities. (MND pg. 55)

- **Rebuttal***:* It has not been shown in the MND that this "eventual recovery" has actually occurred in areas where beachgrass has been previously removed by non-permitted activities. No reports have been included that offer any support for this recovery, or that detail the extent or geographic placement of native plant communities at any time prior to beachgrass invasion, Haul Road destruction from natural forces, or prior to non-permitted beachgrass removal efforts.

>10) Along the haul road edges, typical dune mat species composition has been modified by several non-native herbaceous species, including silver European hairgrass (Aira praecox), ripgut brome (Bromusdiandrus), brome fescue (Festuca bromoides), stork's bill filaree (Erodium cicutarium), rough cat's-ear (Hypochaeris radicata), California burclover (Medicago polymorpha), English plantain (Plantagolanceolata), and four-leaved allseed (Polycarpon tetraphyllum); Howell's spineflower (Chorizanthe howellii) also grows in abundance along the haul road edge in gaps between active sand drifts. This local weedy vegetation zone in the haul road edges tracks the local pattern of contamination of dune sand by fine sediment and soil imported with the road base. These weeds are normally excluded by dune sand substrate properties (MND pg.58)

- **Rebuttal***:* This statement supports contentions that Introduction of non-native material and non-native plants at fill disposal sites (Big River Quarry) and any other sites via the transport and spreading of recovered Haul road surface and ballast, will result in the spreading or introduction of non-native species. Such undesirable outcomes are not addressed by either the MND or listed mitigations, and appear to be not only a violation of the Big River Watershed Restoration documents, but also CSP policies as to non-native plant introduction. (Due to risks inherent in the transportation and introduction of non-native material and non-native plants to any area outside of the current Ten Mile Dunes –Inglenook Fen Preserve project.)

  It is hard to envision a ninety-six-year seed bank in the rail ballast or a sixty-four-year seed bank in road gravel surviving under asphalt! While these plants may be nurtured by physical conditions present near the Haul Road, or by fine accumulation or seed accumulation in road bed ballast, there is little to no evidence that they were imported by inclusion in the original gravel fines. This local weedy vegetation zone also includes a federally endangered species: **Howell's spineflower (Chorizanthe howellii).** This comment, if intended as written, suggests that somewhere there is an unidentified population of Howells spineflower in an active or inactive quarry.

  This item also suggests a serious need for further review or permit consideration as it opens a point of not addressed in the MND or permit planning review: No consideration was given to the movement of material from the area acting as a transport mechanism for the introduction of non-native vegetation into areas outside the covered MND area, thus no mitigation was envisioned for these actions. And conversely no provisions are made for introduction of invasive plants back into the project area on equipment returning from outside the project area which could back-transport invasive species, such as pampas grass, from the Big River disposal site.

>11) A NOTE ON THE CONCEPTUAL APPROACH FOR THIS PLAN

Beyond the development of a plan that specifically prescribes measures through which to compensate for potential damage or losses of individual rare plants or their habitats (i.e., this mitigation plan), this document represents both a prologue to a broader scaled, long-term effort to sustain the ecological conditions in which these plants grow, as well as the start, perhaps, of another chapter in the Preserve's ecological history. In the recent history of the Preserve, planning and management actions have aimed to rehabilitate and maintain both form and function of its ecosystems. These actions include establishment of the Preserve in 2001 in order to protect its unique environmental and biotic assets, prior campaigns to reduce and eliminate encroachments of human construct and non-native plants, the development of an overall Preserve management plan, and the current road- and European beachgrass-removal proposal and attendant mitigation measures. We intend that the provisions of this plan are consistent with prior planning and management actions, and conducive to improving and maintaining optimal ecological structure and functions throughout the Preserve.

While this specific plan addresses the need for "mitigation" measures applied to sensitive biotic elements that may sustain Project-related impacts, we also aim to establish a comprehensive and holistic, process-oriented approach to Preserve ecosystem management. We are not so interested in mitigation measures formulated to satisfy regulatory quotas or to achieve strictly numerically based objectives as we are in providing for the rehabilitation and maintenance of the entirety of the Preserve's ecology. We aim to work with existing environmental conditions rather than force rigid or contrived solutions into places and habitats where they won't work.

With a more broadly scaled approach to "mitigation" in mind, this plan is developed within a conceptual context of adaptive management: the application of repeated cycles of objective (quantifiable results) formulation, task implementation, monitoring, evaluation, and response to changing ecosystem conditions. The cyclical design of the adaptive management process can be considered an approach to understanding the dynamic state of the Earth, from a human perspective of both uncertainty and curiosity. We will move forward with this uncertainty and curiosity, perhaps to learn some small part of what the Earth has to teach us. (MND)

- **Rebuttal***:* No one could agree that the provisions of this plan are consistent with prior planning and management actions, because those actions have taken place in an unregulated, unmonitored, and unmitigated manner, lacking permits or technical review of the results obtained. Without demonstrated results, it is impossible to know if these actions have been conducive to improving anything; however it is demonstrable that they have resulted in many negative impacts both to the environment and adjoining landowners.

While CEQA requires public agencies to monitor the implementation of mitigation measures, it does not require the agencies to evaluate the effectiveness of these measures.

Summary

Review of remote sensing images and historical photos with an unbiased geological viewpoint, shows that the Haul Road has not been an impediment to normal sand movement in the area. Areas were the Haul Road has been removed by storms may have acted as a levee to saltwater encroachment while in place, but no longer serve that

purpose. The Haul Road was the major artery for transport of timber and supplies out of the Ten Mile river watershed sand covering the Haul road does not appear to have been a major issue prior to European beachgrass introduction.

Since introduction and spread of European beachgrass, continual sand accumulation has resulted in the creation of lateral beach ridges. Removing European beachgrass now without compensating for this removal by the introduction of native vegetation capable of slowing deflation of these sand ridges will result in the release of most of the impounded sand. This sand will move in the downwind direction (SE) initially infilling areas in the deflation plane (wetlands), and subsequently moving eastward into the backdune area, and eventually onto neighboring properties. Most of the immediate damage has been caused by the unpermitted, unmitigated removal of European beachgrass resulting in an ongoing major erosion event. This sand would have moved in the same manner naturally although at a slower rate, which would have allowed the recovery of plants now being buried as the initial waves of sand move across the remaining Haul Road. In areas further to the south were the Haul Road was removed in the 1983 storm and no subsequent plantings occurred, there is little evidence that lateral transverse dunes have formed and the area is now one massive overwash pass with the predictable shoreline erosion that accompanies due to sand supply diminishing at the same time .

Removal of the Haul Road is thus a thinly veiled attempt to remove a human construct and thereby diminish access at the expense of our local human communities, endangered plant communities, and offset property owners.

The main question one should ask is, "Why has CSP waited so long to act on this issue with such apparent immediacy when the effects would have been greatly diminished by not allowing more than twenty-five years of additional sand and European beachgrass accumulation to have occurred (thus increasing treatment areas and costs) since being granted stewardship of this area?" The Haul Road, the last piece of affected property relative to European beachgrass removal efforts, was acquired in 1992. The Pacific coast population of the Western Snowy Plover (Charadrius alexandrinus nivosus) was first listed as threatened under provisions of the Endangered Species Act in 1973, and is the primary reason offered by CSP for their immediate need to enact this massive erosion project now.

Therefore in large part the problems being addressed today are a construct of CSP's own earlier failure to address environmental issues as the custodian of the public's lands.

Proposed Erosion Control Special Conditions:

Special Condition 9(g). [New] To stabilize soils disturbed and denuded by invasive plant eradication activities and road demolition, native species will be planted as seedlings (perennials) or viable seed (annuals) within one month of removal of that exotic vegetation or the cessation of other direct ground disturbance by other construction activities. Eradication of exotic plants shall be phased over a 5-year period to limit soil erosion, with no more than 15 acres eradicated or retreated per calendar year. The removal of invasive species shall be scheduled to ensure the best prospects for the success of the replanting program. All areas that are or have been denuded shall be replanted with native species to achieve a nominal 25% ground cover. This special condition is extended to cover those areas already suffering erosion from the previous unpermitted and unmitigated operations already conducted in order to slow the already induced erosion from those actions.

Special Condition 9(h). [New] Sand migration into wetlands, landward vegetated swales, and neighboring properties will be monitored at one year intervals for a ten year period to facilitate adjustment of the invasive plant removal process and measurement of the success of efforts to reestablish native plants and trees. If the replanting program fails to colonize plots denuded of exotic plants with at least 25% native vegetative cover in a given year, replanting shall occur each successive year to ensure that nominal coverage is achieved.

Special Condition 9(i). [New] A bond or other surety in the amount of two million dollars($2,000,000) shall be established to compensate neighboring property owners for sand encroachment that results in a demonstrable loss of use or devaluation of their property for the 10 years following commencement of the project. A compensation process shall be established in writing, and provided to Mendocino County and all adjacent private property owners, prior to initiating any ground disturbing activities, including, but not limited to invasive plant eradication.

Consideration of the WMAC Alternate path option greatly diminishes or removes the need for a Special condition to cover the removal of non-native material, and non-native plants from the project area with the potential to introduce these invasive plants into other areas, and the back transport of invasive from disposal areas back into the project area. This an unrecognized and unmitigated problem.

EVALUATION OF “INITIAL STUDY, MITIGATED NEGATIVE DECLARATION, INGLENOOK FEN-TEN MILE DUNES NATURAL PRESERVE, MACKERRICHER STATE PARK, DUNE REHABILITATION PROJECT, JULY 30,2012”

.

BY: DAVID E. PAOLI, P.E.

27000 N HIGHWAY 1

FORT BRAGG, CA 95437

August 26, 2012

BACKGROUND OF DAVID E. PAOLI, P.E.

Born in 1941 in Fort Bragg. Educated in Fort Bragg Schools. Received grade of "D" in typing in 8th grade. Vowed to marry a good typist. Graduated from Humboldt State College, major in Civil Engineering, 1965. Married an Award-Winning typist in 1967 who had grown up in Inglenook. I became a California Registered Civil Engineer in 1968. Have actively practiced Civil Engineering and related fields ever since in California, Oregon and Washington State. First surveyed ¾ mile of boundary between State Parks and private land at Inglenook in 1978. Established Paoli Engineering and Surveying in Fort Bragg in 1980. Since establishment, have worked on 2180 projects, many of which involved issues of geology, wetlands, rare plants, soils, erosion, Best Management Practices, boundary and legal issues. Have been resident of Inglenook off-and-on since 1980 and continuously since 2003. Walk approximately 2 miles every day on the Inglenook Fen-Ten Mile River Dunes area. My Award-Winning typist died in 2008 so this EVALUATION is written by me and typed by me, still an amateur after all these years.

Letter by Engineering Geologist Eric Freeman

Date: August 30, 2012

To: Renee Pasquinelli, Senior Environmental Scientist
California State Parks
Mendocino District
12301 North Highway 1 – Box 1
Mendocino, CA 95460
Fax: (707) 937-2953; Email: rpasquinelli@parks.ca.gov

RE: INITIAL STUDY /MITIGATED NEGATIVE DECLARATION, INGLENOOK FEN – TEN MILE DUNES NATURAL PRESERVE, MACKERRICHER STATE PARK DUNE REHABILITATION PROJECT, July 30, 2012 State of California California State Parks

Ms Pasquinelli,

As a concerned citizen of the Northern California coast I would like to submit the following concerns in relation to the above documents:

1) Having had substantial exposure to the process of, and preparation for approval of Environmental Impact Statements in my thirty-two year career as a geophysicist and geologist, I find it extremely concerning and inappropriate that the applicant and the Lead agency in charge of review and approval of the above documented MND for the INGLENOOK FEN – TEN MILE DUNES NATURAL PRESERVE is the same governmental agency. This is both inappropriate and possibly illegal as it shows a complete potential for bias and circumvention of the intent of process necessary to protect the public interest. This is akin to a non-governmental company being given approval over its own submission of either an MND or an EIS. Omissions of data and/or submission of questionable or favorable data would thus be allowed to be approved by mere will of the company submitting the document for review, without public concerns being given appropriate treatment or review. I therefore propose that this submission must be reviewed by another private environmental consultancy or governmental agency, which could in an unbiased way address the environmental and public concerns, such as the California Coastal Commission or some similar agency with California State approval for such review. Due to this conflict of interest, I do not see how the above referenced MND can be approved by the very same agency that is submitting the application without cause for serious concern or exposure to potential litigation.
2) As to the omission or potential bias reference in 1) above it is concerning that the findings of the ground penetrating radar are not provided as there are most certainly railroad ties and trestles under the existing roadbed as has been demonstrated in those areas where the haul road has been excavated by previous storm events and by anecdotal evidence http://www.mendorailhistory.org/1_towns/fort_bragg/ten_mile.htm that, " tires on the trucks of vehicles were penetrated by iron spikes remaining in railroad ties" prior to the chip sealing of the road surface. Railroad ties of the vintage of the rail line in question almost certainly contained creosote and thus arsenic. Also the chip seal and ballast placed over the rail line may be sequestering environmentally harmful materials such as asbestos from brake-linings, oil diesel, lubricants, or other environmentally harmful materials used (such as banned herbicides for weed control) or hauled/spilled by the unregulated railroad during its thirty-three year use as the main supply line to the Ten Miles watershed logging camps, and the following period of time by haul trucks prior to the chip-sealing of the road surface. Since no drilling or sampling

AVOWED PURPOSE OF PROPOSED PROJECT

To improve and increase habitat for endangered species, primarily the Snowy Plover, Howell's Spineflower and Menzies' Wallflower. These habitat improvements will be accomplished by the removal of 2.7 miles of Haul Road and the removal of the final 60 acres of European Beach Grass on State Parks property. Any negative impacts will be mitigated by specific actions identified in the REPORT.

MY POSITION

The Snowy Plover (Plover), Howell's Spineflower (Spineflower) and Menzies' Wallflower (Wallflower) are all found in the same general area. However, we are taught in the Parks report (THE REPORT) that the Plover, in order to nest, needs an area free from plant intrusion. The Parks plan is to remove habitat presently occupied by the two plants and reshape that area for use by the Plover. Parks will make up the plant's loss of area by seeding and transplanting on existing bare dunes and areas presently choked with European Beach Grass (Beachgrass).

My analysis which follows assumes that the removal of the Beachgrass and Haul Road will indeed increase the area available for the Plover to nest, if it chooses to do so. However, the removal of these two items will remove an important buffer that has existed for decades and the result will be a sharp decrease in the habitat available to these plants, damage to large areas of existing wetlands and a sharp increase in the rate of sand movement across the Park and on to private land. The Parks Report does not adequately analyze the effects of their proposal. I believe that based on my evidence plus numerous other deficiencies that are being addressed by other persons commenting on THE REPORT, an Environmental Impact Report should be prepared.

MY METHODOLOGY

Earlier in August, using my survey grade Total Station equipment, I surveyed cross sections at right angles to the Haul Road at five locations, shown on Exhibit A. This is an average of one section every half mile, which is not adequate but the best I could do with limited time and resources. I believe that Parks overflew the entire project using the very latest technology and could have developed cross sections at a reasonable spacing, but that information was apparently never developed for use. My purpose in developing the sections was to estimate the areas and quantities of sand that might be affected by the removal of the Dunegrass and the Haul Road. These quantities are key elements in analyzing the Environmental Impact of the project. The quantities do not show up in THE REPORT, which may mean that they have never been calculated, which I believe demonstrates a serious shortcoming of the work presently done.

Section A, the most southerly section, is in the gap between the washed out section to the south and the still continuous Haul Road to the north. The ocean storms have removed the Haul Road from this

area so I considered it representative of what the Haul Road area to the north would be like after removal of dune grass , pavement and base rock, and ocean storms have done their work over several winters. In short, it would be representative of what Parks is trying to achieve.

Section B is at the 5-foot diameter culvert where Fen Creek crosses under the Haul Road. Section C is about 700 feet south of Inglenook Creek, while Section D is about 1000 feet north of the Inglenook Creek culvert and Section E is about 1000 feet south of the turn on the north end of the Haul Road. This spacing gave me two sections for the north dune, two sections for the middle dune and one section as a base line. Exhibit B shows these five sections. Please note that the horizontal scale and the vertical scale are not the same; the full size drawing has a horizontal scale of 1 inch equals 50 feet and a vertical scale of 1 inch equals 10 feet. This is sometimes done to increase the accuracy of measurements that are plotted by hand, such as these measurements. It is seldom done using electronic plotting and calculating, but it still yields accurate results.

From Section A I deduced the average slope of beach east of the High Tide Line was 1.5 feet per hundred feet, or 1.5%. Per the legend, the solid lines on each section represent the existing ground lines, while the dashed lines represent the approximate future ground line after the removal of the Haul Road and the passage of time necessary to obliterate the Haul Road. These sections and the calculations based upon them are the basis for the subsequent sections of this report.

SNOWY PLOVER HABITAT

I am not a biologist and do not claim to be an expert on any of these rare plants or animals. But I can read and I can measure, and so I conclude that the Plover needs a habitat in proximity to their food source, which here is found in the wet sand adjacent to the ocean. They also need a relatively flat beach and very few plants present for predators to hide behind. Based on these criteria and measuring from the High Tide Line to the existing toe of slope, I calculate that the Plover presently has up to 26 acres of suitable nesting habitat adjacent to the north dune, no usable habitat adjacent to the middle dune, and up to 27 acres of usable habitat adjacent to the south dune. After implementation of the Parks plan there might be an additional 56 acres of habitat on the north dune , 36 acres on the middle dune and no additional habitat on the south dune. These numbers presume that the new area formed by the reshaping will be kept free from plants by a continuing maintenance program. I don't think this was covered in THE REPORT, but it should have been.

So I have made a calculation of how much habitat might be available for the Plover, presently and in the future. But it does not quantify how many birds might nest on the additional land, because I do not find any mention in the report of how many nest now or even if there is a minimum acreage necessary to induce nesting or what the average is in some similar habitat. In looking over available data I did find a 1990 report done for State Parks that included the statement that no Plovers had been seen nesting on this beach for 10 years. So if none had been nesting since 1980, this makes 32 years without a viable production. I have observed that the areas roped off for the plover's nesting use has decreased from 3

areas over the last few years down to 1 this year. This seems to indicate the policy makers believe the possibility of a viable nesting area is in decline and indeed there might not be a viable area here.

Based on elementary mathematics, if (26 +27) acres = 0 chicks, adding (56+36)acres might still yield 0 chicks. Maybe the issue is not the acreage available. Does anyone have any information about how many Plovers used to nest on this beach, or if they ever did nest here? It seems to me that information of that sort should be vital in any management plan. But the information is not in THE REPORT. Have we studied the possibility that Ravens have multiplied and their sharp eyes and beaks wiped out whatever eggs nesting Plovers were trying to hatch, or the skunks and raccoons I see on the beach are responsible, or any other idea of what happened? Maybe the answer is to hire a group of Rangers to keep these animals off the beach. They are much more numerous up here than dogs or people, and much hungrier. To concentrate on one hypothesis such as more area equals more Plover without any factual basis is NOT GOOD SCIENCE and to spend large amounts of time and money ON A HUNCH is not a prudent use of public resources. An EIR is needed.

HOWELL'S SPINEFLOWER AND MENZIES' WALLFLOWER

The fact is most of the 56 acres and 36 acres of dunes that would be significantly reshaped by the Removal Concept is presently habitat to these plants. Based on my observations, the Wallflower has a widespread distribution, but the Spineflower does particularly well in proximity to the Haul Road and the east side of the Haul Road, especially in the Middle Dune area. A widespread erosion of their habitat from the base of dunes to the east side of the Haul Road might remove a significant percentage of their present growing area, perhaps as high as 1/3 of the Spineflower area. I speculate on the number because I did not find an estimate in THE REPORT, so what else can I do? That number should be in THE REPORT.

So let us assume that the Haul Road is gone and the plants just move inland without any net loss in their numbers. Not a problem? My calculations indicate that if the dunes are reshaped as shown on Exhibit B, approximately 698,000 cubic yards of sand will move from its present position on the north dune and 288,000 cubic yards of sand on the middle dune. Most of this sand will move to the east and fill in the low-lying wetland areas immediately east of the Haul Road. If this wetland area is 500 feet wide and 10,000 feet long it will be buried to a depth of 5 feet. Of course this burial will not all happen at once, because the sand will continue to move to the east. Now these numbers are incredibly high and can't be true, but Parks has not included any estimate of the quantity of sand their proposal will move, so until they do, we are stuck with my figures.

What do we know about the reaction of these endangered plants to being covered by several feet of sand? We really don't know anything. An EIR is in order.

So let's assume the sand just disappears and does not fill in the wetlands. The foredune and Haul Road just go away, then everything is swell. Right? Well no. Exhibit C, Titled "Impacts of Sea Level Rise on the California Coast', done in 2009 for the State of California, shows current area at risk from a flooding

event that could occur on the average every 27 years. This takes in a very large area, up to 1500 feet inland based on scale, which could mean a wave of possibly 25 feet high. An event this large would cover the Haul Road and flood the wetland areas with salt water. There is no indication in THE REPORT that these endangered plants tolerate salt water, so I assume they do not. The Haul Road and perhaps much of the foredune will be topped, but what will happen when a smaller flooding occurs, which will happen more frequently? My Exhibit B indicates that with the removal of the Haul Road and foredunes a flooding event of just 6 feet above Mean High Tide will flood the existing wetland area inland from the Haul Road. So this removal will endanger habitat more frequently than presently occurs. An EIR is in order.

WETLANDS

My calculations reported above indicate that many feet of sand will drift into the wetlands close to the Haul Road. This will include the traditional wetland areas along Fen Creek and Inglenook Creek. THE REPORT simply does not deal with these issues.

EROSION

My May, 2012 report titled "Report on the Destabilization of the Ten Mile Sand Dunes" describes , in words and pictures, the damage that is presently occurring from the removal of Beachgrass that Parks started 10 years ago. They started this process without CEQA review and have continued it ever since. This May report is included as an attachment to this present document. I contend that they have been in violation of CEQA for the time that they did their first removal and that any EIR or CEQA document go back and consider the impact from that beginning. Sections of the present THE REPORT clearly state that removal of Beachgrass and Haul Road will cause sand movement. The 2000 report that Parks commissioned, titled " Draft Feasibility Study for the Northern Segment of the MacKerricher Coastal Trail Project" states that "The lack of vegetation in the hind dunes permits unrestricted sand movement over large areas" and " Any management plan developed for European beachgrass shall consider adjacent property owners and their concerns with dune mobilization and encroachment." The sand on the dunes grows plants and is by several definitions a soil. The willful and premeditated erosion of soil that had been stable is a crime in California and subject to huge fines. The erosion of soil on to neighboring properties is something that a civil engineer tries to avoid through Best Management Practices and all levels of government have strict policies against. An EIR is in order.