

**A.W. VON SCHMIDT'S CADASTRAL SURVEY OF THE  
OWENS LAKE SHORELANDS:**

**CLUES TO THE PRESENCE/ABSENCE OF SAND DUNES IN 1856**

*Report to the*  
**Great Basin Unified Air Pollution Control District,  
Bishop, California**

*by*  
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**Introduction**

In 1855, '56, and '57, Alexis Waldemer von Schmidt, under contract with the United States Land Office, conducted cadastral surveys on the east side of California's Sierra Nevada. His task was threefold: To extend the Mount Diablo Base Line eastward across the Sierra; to establish the township and range system over east-Sierran public lands of the newly constituted State of California; and to "meander" (that is, to map the shoreline configuration of) the major water bodies of the eastern Sierra, including Mono and Owens lakes. His survey of the Mono Basin occupied portions of all three years; his field work in the lower Owens Valley began on May 22, 1856, and was completed by late July of that same year.

Von Schmidt's survey notes, in combination with his plats (the survey maps of the individual cadastral townships) constitute the earliest substantive written record of the landscape over large areas of eastern California. They provide a strong basis for establishing the 1855-57 surface elevation and shoreline configuration of Owens and Mono and lakes (e.g. Stine, 1981), and can be used to characterize, as either "level" or "rolling," the topography of the lake shorelands that existed at the time of the surveys. This report focuses on the historic shoreland geomorphology of Mono and Owens lakes--specifically, on the prominent dunefields that presently exist adjacent to the two water bodies. Employing von Schmidt's notes and plats, it seeks to answer this question: Were today's Keeler Dunes (at the northeastern corner of historic Owens Lake) and today's Olancho Dunes (adjacent to the lake's southeastern corner) in existence during the mid-1850s, at the time of the cadastral surveys?

**Primer on cadastral surveys:**

A township is a square of land, six miles on a side. It is subdivided into square "sections," each of them one mile by one mile (total 36 square-mile sections per township). The sections in each township are numbered in rows: The upper row (of 6 sections) is numbered 1-6 from right to left; the second row is numbered 7-12 from left to right; the third is numbered 13-18 from right to left; the fourth, 19-24 from left to right, etc.

Section lines are measured in units of "chains" (80 chains to a mile, i.e. to a section-side), and "links" (100 links per chain). One chain is equivalent to 66 feet; one link = 0.66 feet, or 7.92 inches.

Townships themselves are numbered relative to the intersection point of a “base line” and a “meridian.” The townships throughout Nevada, and over nearly all of California, are identified relative to the “Mt. Diablo Baseline” and the “Mt. Diablo Meridian,” which intersect at the summit of Mt. Diablo in California’s Central Coast Range. Most of the Mono Basin is covered by the 26th, 27th, and 28th townships east of the Diablo Meridian, and by the 1st, 2nd, and 3rd townships north of the Diablo Baseline. The townships of the Mono Basin are thus designated Township 2 North, Range 26 E (or T2N R26E); Township 3 North, Range 28 E (T3N R28E), etc. The vicinity of Owens Lake, being both farther south and farther east than the Mono Basin, is covered by, among others, Township 16 South, Range 38 East (T16S R38E), and Township 19 South, Range 37 East (T19S R37E).

### **Background**

Like all cadastral surveys of the public lands, von Schmidt’s were informed and constrained by a strict protocol that dictated the surveying methods, the manner in which the ground was to be monumented, the standards to which the township plats were to be drawn, the qualitative and quantitative information that was to be included in the survey notes, and the wording and sequence in which the information was to be presented.

That information included a brief characterization of the land along each of the surveyed section lines. Surveyors were instructed to provide a land rating that was based on agricultural suitability (1st rate, 2nd rate, or 3rd rate), as well as a description of the topography (“level,” “rolling,” “hilly,” “hilly and broken,” “steep and broken,” etc.). (For clarification: The adjective “level” was not used by von Schmidt, or by other surveyors of the public lands, to designate a surface that lacked inclination or gradient; rather, it was used to indicate a surface, however inclined, with relatively little positive or negative relief - that is, a surface with little topographic variation due to deposition onto it, or erosion into it.) It is these designations, and in particular von Schmidt’s use of “level” and “rolling,” that provide a basis, however inferential and qualitative, for assessing the presence/absence of dunes at the time of his surveys.

### **Dunes of the Mono Basin**

The dunefield on the north-Mono shorelands is composed of sand dunes of several different ages. Lakewardmost areas of the field formed during the 20th century, due to the withdrawal of Mono Lake from its historic highstand of 1919. But at elevations somewhat higher than these 20<sup>th</sup>-century (thus, post-von Schmidt) features are dunes that date from prior centuries. This includes a generation of deposits (the “G-1” dunes) that in many places are blanketed with tephra from the Mono Craters eruption of ~660 years ago (these G-1 features must therefore be older than 660 years); and another generation (designated “G-2” dunes) that began to form when Mono Lake withdrew from its “Clover Ranch highstand” approximately 300 years ago (Stine, 1987).

Portions of von Schmidt’s T2N R27E, T3N R27E, and T2N R28E cover the North-Mono Dunefield. (Portions of his T3N R28E also cover the dunefield, but I did not have access to the notes and plats for that township at the time this report was prepared.) To document how he characterized the topography of the dunefield, all of the relevant section-line descriptions in his survey notes were tabulated (see Tables 1, 2, and 3 in Appendix A), and, using simple symbols--a solid line for “level” land, and a dotted line for “rolling” land--were transferred onto the USGS 15-minute Bodie Hills and Trench Canyon quadrangles. Those quadrangles, with section lines coded to reflect von Schmidt’s characterization of topography, are shown on Figure 1.

With three notable and confounding exceptions (detailed in the paragraph immediately below), all of the cadastral section lines of the north-Mono shorelands that run across pre-20th century aggregations of dunes, or across dissected alluvial fans, or across assemblages of wave-deposited embankments (i.e. bars and berms), were characterized by von Schmidt as "rolling." Where his north-Mono section lines crossed shorelands lacking these geomorphic features, he described the land as "level." Based on his many characterizations of topography in the north-Mono Basin, then, a designation of "level" might be taken as indicating an absence of dunes (as well as an absence of dissected alluvial fans and shoreline embankments) at the time of his survey.

Confidence in this conclusion, however, is undermined by three exceptional section-line descriptions-- the northern boundary of Section 23, and the eastern boundaries of Sections 24 and 25, in T3N R27E. In all three cases these lines appear to run across sand dunes that, in all likelihood, existed at the time of the von Schmidt survey. Yet in all three cases von Schmidt characterized the land along these not as "rolling" (as he had with other dune-covered lands), but as "level."

In light of the great majority of von Schmidt's section-line descriptions of the north-Mono shorelands, but with the three exceptional characterizations in mind, it is instructive to consider von Schmidt's 1856 survey of the Owens shorelands in the vicinity of today's Olancha and Keeler dunefields.

### **The Olancha Dunefield**

The Olancha Dunefield is located on the southeastern corner of the Owens shorelands. It is depicted on the USGS 15-minute Keeler quadrangle of 1951 (which was drawn from aerial photos of 1947), and on the USGS 7.5 minute Vermillion Canyon quadrangle of 1987 (drawn from aerial photos of 1976 and 1984). During the interval separating the production of these two maps the Olancha dunes roughly doubled in extent, pointing to dune growth during some or all of that period. To determine how von Schmidt characterized the topography of the area now covered by the dunefield, all of the relevant section-line descriptions in his survey notes were tabulated (see Table 4, Appendix A), and, using the symbols described above, were transferred onto the USGS 7.5-minute Vermillion Canyon quadrangle (Figure 2).

Five section lines cross the area now covered by the Olancha Dunes. Von Schmidt characterized the topography along each of these lines as "level." Nowhere in his traverse of the lands now occupied by the dunefield did he use the characterization "rolling"--the term that he applied, in nearly all cases, when crossing the then-existing dunes of the north-Mono shorelands. (In keeping with his landscape characterizations of the north-Mono shorelands, von Schmidt did apply "rolling" to the undulating alluvial fan surface that lies upslope, and to the east and southeast, of today's Olancha Dunes.)

These characterizations suggest (though, given the three north-Mono exceptions described above, do not conclusively demonstrate) that the Olancha Dunefield did not exist at the time of the von Schmidt survey in 1856.

### **Dunes between Keeler and Swansea**

Active sand deposits are found at several places between the communities of Keeler and Swansea on the northeast shorelands of historic Owens Lake. These deposits include, but are not limited to, the "Keeler Dunes" (the highly active and rapidly shifting sand deposits within one mile northwest of Keeler), as well as several hairpin dunes that lie closer to Swansea.

To determine how von Schmidt characterized the topography of the areas now covered by these dunes, all of the relevant section-line descriptions in his survey notes were tabulated (see Tables 5 and 6, Appendix A), and, using the symbols described above, were transferred onto the USGS 15-minute Keeler and New York Butte quadrangles (Figure 3).

Four of von Schmidt's section lines cross the area presently covered by the Keeler Dunes. This includes two that run north/south (the north boundary of Sec 25 and the eastern boundary of Sec 36 in T16S R37E), and two that run east/west (the north boundary of Sec 36 in T16S R37E, and, in small part, the north boundary of Sec 31 in T16S R38E). Von Schmidt characterized the topography along all four of these lines as "level." This would seem to indicate (though, because of the three Mono exceptions, would not prove) that this area lacked dunes at the time of the cadastral survey in 1856.

Von Schmidt did describe as "rolling" the topography along the north-south-running eastern boundaries of Sections 30 and 31, T16S R38E. This two-mile-long line lies approximately 0.5 to 1.5 miles east of today's Keeler Dunes. Over nearly its entire length the line traverses the intricately dissected, gently undulating surface of the Keeler alluvial fan. That fan, rather than the former presence of some no-longer-existing dunes, best accounts for his characterization. (Note that two other von Schmidt lines in this same vicinity--the fractional line between Sections 29 and 32, and the northern boundary of Sec 30--likewise traverse this fan, and were likewise characterized by von Schmidt as "rolling.")

All of the other section lines that von Schmidt drew between Keeler and Swansea were described as "level." There is thus nothing in the cadastral surveys that would suggest the presence of significant dunes between Keeler and Swansea in 1856.

### **Dunes between Swansea and the historic mouth of the Owens River**

Because active sand sheets are accumulating on the Owens shorelands between Swansea and the historic mouth of the Owens River, von Schmidt's notes and plats were examined for any indication that dunes may have existed in this area at the time of his survey.

To determine how von Schmidt characterized the topography of the areas now covered by these dunes, all of the relevant section-line descriptions in his survey notes were tabulated (see Table 7, Appendix A), and, using the symbols described above, were transferred onto the USGS 15-minute New York Butte quadrangle (Figure 3).

Of the 18 section lines that von Schmidt surveyed in this area (all of them within T16S R37E), 15 were characterized as being "level," while just three were described as "rolling." All three of these exceptions--the fractional east-west boundary between Sections 14 and 23; the north-south boundary between Sections 9 and 10; and the north-south boundary between Sections 7 and 8--traverse lands with concentrated assemblages of littoral embankments (bars and berms) that mark former high shorelines. No evidence of former substantial dunefields can be seen on available aerial photos of this area, and with the littoral embankments accounting for the "rolling" topography, no dunes are necessary to explain von Schmidt's characterization.

### **Summary and Conclusions**

A.W. von Schmidt's notes and plats constitute the earliest detailed written record of the Mono and Owens shorelands. In transecting sand dunes that are known to have existed at the time he surveyed the northern Mono Basin, von Schmidt in nearly all cases characterized the topography as "rolling." During his contemporaneous survey of the lands

surrounding Owens Lake he transected areas that are today characterized by active sand dunes. But he described the topography of these areas not as “rolling,” but as “level.” Von Schmidt’s work thus suggests that no sand dunes existed on the southeastern and northeastern shorelands of Owens Lake at the time of his survey. In light of his three exceptional landscape descriptions on the north-Mono shorelands, however, it would be incorrect to conclude with certainty, based on this analysis alone, that the Keeler and Olancho dunes did not exist in 1856.

**References cited:**

Stine, Scott, 1981. Reinterpretation of the 1857 surface elevation of Mono Lake. Water Resources Center, University of California, Report No. 52, 41 pp.

Stine, Scott, 1987. Mono Lake: The Past 4000 years. Ph.D. dissertation, University of California, Berkeley, 515 pp.

## **APPENDIX A**

### **Topography associated with the section lines surveyed by A.W. von Schmidt in the Mono Basin and Owens Valley, 1855-57**

**TABLE 1**

**A.W. von Schmidt's Township 3 North, Range 27 East--specifically, those sections of the township that cover the dunefield on the northern shorelands of Mono Lake:**

Below I catalog the land/soil descriptions that von Schmidt recorded for the section lines that he surveyed in T3N, R27E--specifically, those lines that cover the area that includes the dunefield on the northern shorelands of Mono Lake. The descriptions are quotes from von Schmidt.

Using two different symbols, I have plotted von Schmidt's land characterizations for the relevant portions of T3N, R27E onto the USGS 15-minute Bodie Hills quadrangle (edition 1951, produced from aerial photos of 1947) and the USGS 15-minute Trench Canyon quadrangle (edition 1958, produced from aerial photos of 1956). A solid red line superimposed on a section boundary indicates that von Schmidt characterized the land along that line as "level." (Recall that this adjective was not used by von Schmidt, or by other surveyors of the public lands, to designate a surface that lacked inclination or gradient; rather, it was used to indicate a surface, however inclined, with relatively little positive or negative relief --that is, a surface with little topographic variation due to deposition onto it, or erosion into it). A dotted red line superimposed on a section boundary indicates that von Schmidt characterized the land along that line as "rolling." (This adjective was used by von Schmidt, and by other surveyors of the public lands, to designate a surface, however inclined, that was characterized by unignorable topographic variation attributable to erosion and/or deposition).

Following are the von Schmidt land characterizations for portions of T3N R27E; these are plotted on the Bodie Hills and Trench Canyon quadrangles shown on Figure 1.

**For Township 3N, Range 27E (northern shorelands of Mono Lake)**

*Note: "S btw Sec 35 and 36" = "South between sections 35 and 36"*

N on east boundary of Sec 36: Land level, soil 2nd rate  
N on east boundary of Sec 25: Land level, soil 2nd rate  
N on east boundary of Sec 24: Land level, soil 2nd rate  
N on east boundary of Sec 13: Land level, soil 2nd rate  
N on east boundary of Sec 12: Land slightly rolling, soil 2nd rate  
N on east boundary of Sec 1: Land rolling slightly, soil 2nd rate  
S btw Sec 35 and 36: Land rolling, 3rd rate  
N btw Sec 25 and 26: Land rolling, 3rd rate  
E btw Sec 24 and 25: Land rolling, 3rd rate  
N btw Sec 23 and 24: Land rolling, 3rd rate  
N btw Sec 13 and 24: Land rolling, soil 3rd rate  
N btw Sec 13 and 14: Land rolling, 3rd rate  
W btw Sec 12 and 13: Land rolling, 3rd rate  
N btw Sec 11 and 12: Land rolling, 3rd rate  
E btw Sec 1 and 12: Land rolling, 3rd rate  
S btw Sec 34 and 35: Land rolling, 3rd rate

**TABLE 1 (cont.)**

N btw Sec 26 and 27: Land rolling, 3rd rate  
E btw Sec 23 and 26: Land rolling, 3rd rate  
N btw Sec 22 and 23: Land level, 3rd rate  
E btw Sec 14 and 23: Land level, 3rd rate  
N btw Sec 14 and 15: Land level, 3rd rate  
E btw Sec 11 and 14: Land level, 3rd rate  
N btw Sec 10 and 11: Land level to foot of hills, 3rd rate  
E btw Sec 2 and 11: Land to the foot of hills, level, 3rd rate  
S btw Sec 33 and 34: Land level, 3rd rate  
N btw Sec 27 and 28: Land level, 3rd rate  
E btw Sec 22 and 27: Land rolling, 3rd rate. A sulphur spring [today's Walford Springs]  
N btw Sec 21 and 22: Land level, 3rd rate  
E btw Sec 15 and 22: Land rolling, 3rd rate  
N btw Sec 15 and 16: Land level, grass portion 2nd rate, balance 3rd rate  
E btw Sec 10 and 15: Land level, 3rd rate  
N btw Sec 9 and 10: Land rolling to foot of hills, 3rd rate  
E btw Sec 3 and 10: Land hilly and broken, 3rd rate  
N btw Sec 3 and 4: Land hilly and broken, 3rd rate  
S btw Sec 32 and 33: Land level, 3rd rate  
N btw Sec 28 and 29: Land level, 3rd rate  
E btw Sec 21 and 28: Land rolling, 3rd rate  
N btw Sec 20 and 21: Land rolling, 3rd rate  
E btw Sec 16 and 21: Land rolling, 3rd rate  
N btw Sec 16 and 17: Land level, grass portion 2nd rate, balance 3rd rate  
E btw Sec 9 and 16: Land rolling, 3rd rate  
N btw Sec 8 and 9: Land level to foot of hills, 3rd rate  
E btw Sec 4 and 9: Land hilly and broken  
N btw Sec 4 and 5: Land hilly and broken, 3rd rate  
S btw Sec 31 and 32: Land level, 3rd rate  
N btw Sec 29 and 30: Land rolling slightly, 3rd rate  
E btw Sec 20 and 29: Land rolling, 3rd rate  
W btw Sec 19 and 30: Land slightly rolling, 3rd rate  
N btw Sec 19 and 20: Land rolling, 3rd rate  
E btw Sec 17 and 20: Land rolling, 3rd rate  
W btw Sec 18 and 19: Land slightly rolling, 3rd rate  
N btw Sec 17 and 18: Land rolling, 3rd rate  
E btw Sec 8 and 17: Land rolling, 3rd rate  
W btw Sec 7 and 18: Land 1st half mile hilly, balance rolling, 3rd rate  
N btw Sec 7 and 8: Land rolling to foot of hills, 3rd rate  
E btw Sec 5 and 8: Land hilly and broken, 3rd rate  
W btw Sec 6 and 7: Land hilly and broken, 3rd rate  
N btw Sec 5 and 6: Land hilly and broken, 3rd rate  
W on the south boundary of Sec 36: Land level, 3rd rate  
W btw Sec 25 and 36: Land level, 3rd rate  
W btw Sec 26 and 35: Land level, 3rd rate

**TABLE 1 (cont.)**

E btw Sec 27 and 34: Land level, 3rd rate  
W btw Sec 28 and 33: Land level, 3rd rate  
W btw Sec 29 and 32: Land level, 3rd rate  
W btw Sec 30 and 31: Land level, 3rd rate  
E btw Sec 6 and 31: Land level, 3rd rate

**TABLE 2**

**A.W. von Schmidt's Township 2 North, Range 27 East--specifically, the two fractional sections of the township that cover the northern shorelands of Mono Lake:**

Below I catalog the land/soil descriptions that von Schmidt recorded for the section lines that he surveyed in T2N, R27E--specifically, those fractional lines that traverse the northern shorelands of Mono Lake. The descriptions are quotes from von Schmidt. Using the two symbols described above (a solid red line for "level" land, and a dotted red line for "rolling" land), I have plotted von Schmidt's characterizations for the relevant portions of T2N, R27E onto the USGS 15-minute Bodie Hills quadrangle (edition 1951, produced from aerial photos of 1947) and the USGS 15-minute Trench Canyon quadrangle (edition 1958, produced from aerial photos of 1956).

Following are the von Schmidt land characterizations for portions of T2N R27E. These are plotted on the Bodie Hills and Trench Canyon quadrangles shown on Figure 1.

**For Township 2N, Range 27E (northern shorelands of Mono Lake)**

W on the north boundary of Sec 1: Land level, 3rd rate  
E on N boundary of Sec 6: Land level, 3rd rate  
S on the west boundary of Sec 6: (no description given)\*\*  
S on E boundary of Sec 1: Land level, soil 2nd rate

\*\* Re. the western boundary of Sec 6: No description for this line was given in the notes for T2N, R27E. But there was one given for that line in the notes for the adjoining T2N, R26E. This is the source of the "level" designation shown on Figure 1.



**TABLE 3**

**A.W. von Schmidt's Township 2 North, Range 28 East--specifically, those sections of the township that cover the area that includes the dunefield on the northern shorelands of Mono Lake:**

Below I catalog the land/soil descriptions that von Schmidt recorded for the section lines that he surveyed in T2N, R28E--specifically, those lines that cover the area that includes the dunefield on the northern shorelands of Mono Lake. The descriptions are quotes from von Schmidt. Using the two symbols described above (a solid red line for "level" land, and a dotted red line for "rolling" land), I have plotted von Schmidt's characterizations for the relevant portions of T2N, R28E onto the USGS 15-minute Trench Canyon quadrangle (edition 1958, produced from aerial photos of 1956)—see Figure 1.

**For Township 2N, Range 28E (northern shorelands of Mono Lake)**

W on the north boundary of Sec 1: Land rolling, soil 2nd rate  
W on the north boundary of Sec 2: Land rolling, soil 2nd rate  
W on the north boundary of Sec 3: Land rolling, soil 2nd rate  
W on the north boundary of Sec 4: Land rolling, soil 2nd rate  
W on the north boundary of Sec 5: Land rolling, soil 2nd rate  
W on the north boundary of Sec 6: Land rolling slightly, soil 2nd rate  
N btw Sec 11 and 12: Land level, soil 3rd rate  
E btw Sec 1 and 12: Land rolling, soil 3rd rate  
N btw Sec 1 and 2: Land rolling, soil 3rd rate  
E btw Sec 11 and 14: Land rolling, soil 3rd rate  
N btw Sec 10 and 11: Land rolling, soil 3rd rate  
E btw Sec 2 and 11: Land rolling, soil 3rd rate  
N btw Sec 2 and 3: Land rolling, soil 3rd rate  
E btw Sec 10 and 15: Land rolling, soil 3rd rate  
N btw Sec 9 and 10: Land rolling, soil 3rd rate  
E btw Sec 3 and 10: Land rolling, soil 3rd rate  
N btw Sec 3 and 4: Land rolling, soil 3rd rate  
E btw Sec 9 and 16: Land rolling, soil 2nd rate  
N btw Sec 8 and 9: Land rolling, soil 3rd rate  
E btw Sec 4 and 9: Land rolling, soil 2nd rate  
N btw Sec 4 and 5: Land rolling, soil 3rd rate  
W btw Sec 5 and 8: Land level, soil 3rd rate  
N btw Sec 5 and 6: Land level, soil 2nd rate

**TABLE 4**

**A.W. von Schmidt's Township 19 South, Range 37 East--specifically, those sections of the township that cover the Olancha Dunes (as depicted on the USGS 7.5 minute Vermillion Canyon quadrangle--provisional edition 1987, produced from aerial photos of 1976 and 1984):**

Below I catalog the land/soil descriptions that von Schmidt recorded for the section lines that he surveyed in T19S, R37E--specifically, those lines that extend across today's Olancha Dunes. The descriptions are quotes from von Schmidt. Using the two symbols described above (a solid red line for "level" land, and a dotted red line for "rolling" land), I have plotted von Schmidt's characterizations for the relevant portions of T19S, R37E onto the USGS 7.5-minute Vermillion Canyon quadrangle (provisional edition 1987, produced from aerial photos of 1976 and 1984)—see Figure 2.

**For Township 19S, Range 37E (vicinity of Olancha Dunes)**

E btw Sec 4 and 9: Land level, soil 2nd rate  
N btw Sec 9 and 10: Land level, soil 3rd rate  
N btw Sec 16 and 17: Land level, soil 2nd rate  
E btw Sec 17 and 20: Land level, soil 2nd rate  
E btw Sec 9 and 16: Land level, soil 2nd rate  
E btw Sec 16 and 21: Land level, soil 2nd rate  
N btw Sec 20 and 21: Land level, soil 2nd rate  
N btw Sec 15 and 16: Land gently rolling, soil 3rd rate

*The following 7 section lines are included to illuminate the rolling and/or sandy conditions on alluvial fans*

N btw Sec 26 and 27: Land level, soil sandy. Timber palmetto [*Yucca brevifolia*]  
E btw Sec 23 and 26: Land rolling, soil sandy  
N btw Sec 22 and 23: Land level, soil sandy. Timber palmetto  
E btw Sec 14 and 23: Land rolling, soil 3rd rate  
N btw Sec 21 and 22: Land gently rolling, soil sandy  
E btw Sec 15 and 22: Land rolling, soil 3rd rate  
N btw Sec 15 and 16: Land gently rolling, soil sandy, 3rd rate

**TABLE 5**

**A.W. von Schmidt's Township 17 South, Range 38 East--specifically, those very few sections of the township that cover the small area of Owens Lake shoreland in the immediate vicinity of Keeler:**

Below I catalog the land/soil descriptions that von Schmidt recorded for the few section lines that he surveyed in relevant portions of T17S, R38E. The descriptions are quotes from von Schmidt. Using the two symbols described above (a solid red line for "level" land, and a dotted red line for "rolling" land), I have plotted von Schmidt's characterizations for T17S, R38E onto the USGS 15-minute Keeler quadrangle (edition 1951, produced from aerial photos of 1947).

Following are the von Schmidt land characterizations for portions of T17S, R38E. These are plotted on the Keeler and New York Butte quadrangles shown on Figure 3.

**For Township 17S, Range 38E (immediate vicinity of Keeler)**

W on the N boundary of Sec 4: Land level, soil 2nd rate

W on the N boundary of Sec 5: Land level, soil 2nd rate

S btw Sec 4 and 5: Land level, soil 2nd rate

**TABLE 6**

**A.W. von Schmidt's Township 16 South, Range 38 East--specifically, those few sections of the township that cover the short stretch of Owens Lake shorelands between the mapped settlements of Swansea and Keeler:**

Below I catalog the land/soil descriptions that von Schmidt recorded for each of the few section lines that he surveyed in relevant portions of T16S, R38E. The descriptions are quotes from von Schmidt. Using the two symbols described above (a solid red line for "level" land, and a dotted red line for "rolling" land), I have plotted von Schmidt's characterizations for T16S, R38E onto the USGS 15-minute New York Butte quadrangle (edition 1950, produced from aerial photos of 1947); note that the very southern portion of these sections extend onto the adjoining USGS 15-minute Keeler quadrangle (edition 1951, produced from aerial photos of 1947)—see Figure 3.

**For Township 16S, Range 38E (near Swansea to near Keeler)**

N btw Sec 31 and 32: Land rolling, soil 3rd rate

E btw Sec 29 and 32: Land rolling, soil 3rd rate

W btw Sec 30 and 31: Land level, soil 2nd rate

N btw Sec 29 and 30: Land rolling, soil 3rd rate

W btw Sec 19 and 30: Land rolling, soil 3rd rate

S on the W boundary of Sec 31: Land level, soil 3rd rate

N on the W boundary of Sec 33: Land first 60 chains level. Last 20 very steep and broken

**TABLE 7**

**A.W. von Schmidt's Township 16 South, Range 37 East--specifically, those sections of the township that cover the shorelands in the northeastern corner of Owens Lake:**

Below I catalog the land/soil descriptions that von Schmidt recorded for each of the section lines that he surveyed in relevant portions of T16S, R37E. The descriptions are quotes from von Schmidt.

Using the two symbols described above (a solid red line for "level" land, and a dotted red line for "rolling" land), I have plotted von Schmidt's land characterizations for T16S, R37E onto the USGS 15-minute New York Butte quadrangle (edition 1950, produced from aerial photos of 1947)—see Figure 3.

**For Township 16S, Range 37E (northeast corner of Owens Lake)**

W btw Sec 25 and 36: Land level, soil 2nd rate

W btw Sec 24 and 25: Land for last 60 chains sloping gradually to the westward, soil 2nd rate

S btw Sec 25 and 26: Land level, soil 2nd rate

W btw Sec 23 and 26: Land level, soil 2nd rate

N btw Sec 23 and 24: (No description of lowlands)

W btw Sec 14 and 23: Land rolling, slightly, from foot of mountains; soil 3rd rate

S btw Sec 22 and 23: Land level, soil 2nd rate

W btw Sec 15 and 22: Land level, soil 2nd rate

N btw Sec 14 and 15: Land level, soil 2nd rate

W btw Sec 10 and 15: Land level, soil 2nd rate

S btw Sec 15 and 16: Land level, soil 2nd rate

N btw Sec 9 and 10: Land slightly rolling, soil 3rd rate

W btw Sec 9 and 16: Land level, soil 2nd rate

S btw Sec 16 and 17: Land level, soil 2nd rate

N btw Sec 8 and 9: Land level, soil 3rd rate

E btw Sec 4 and 9: Land level, soil 3rd rate

N btw Sec 4 and 5: Land level, soil 3rd rate

W btw Sec 8 and 17: Land level, first half mile 2nd rate, last half mile first rate and fine grass

S btw Sec 17 and 18: Land level, soil 1st rate

W btw Sec 7 and 18: Land level, soil 2nd rate

W btw Sec 7 and 18: Land level, soil 2nd rate

N btw Sec 7 and 8: Land rolling, soil 1st rate

E btw Sec 5 and 8: Land level, soil 3rd rate

W btw Sec 6 and 7: Land level, soil 2nd rate

N btw Sec 5 and 6: Land level, soil 3rd rate

N btw Sec 31 and 32: Land rolling, soil 3rd rate

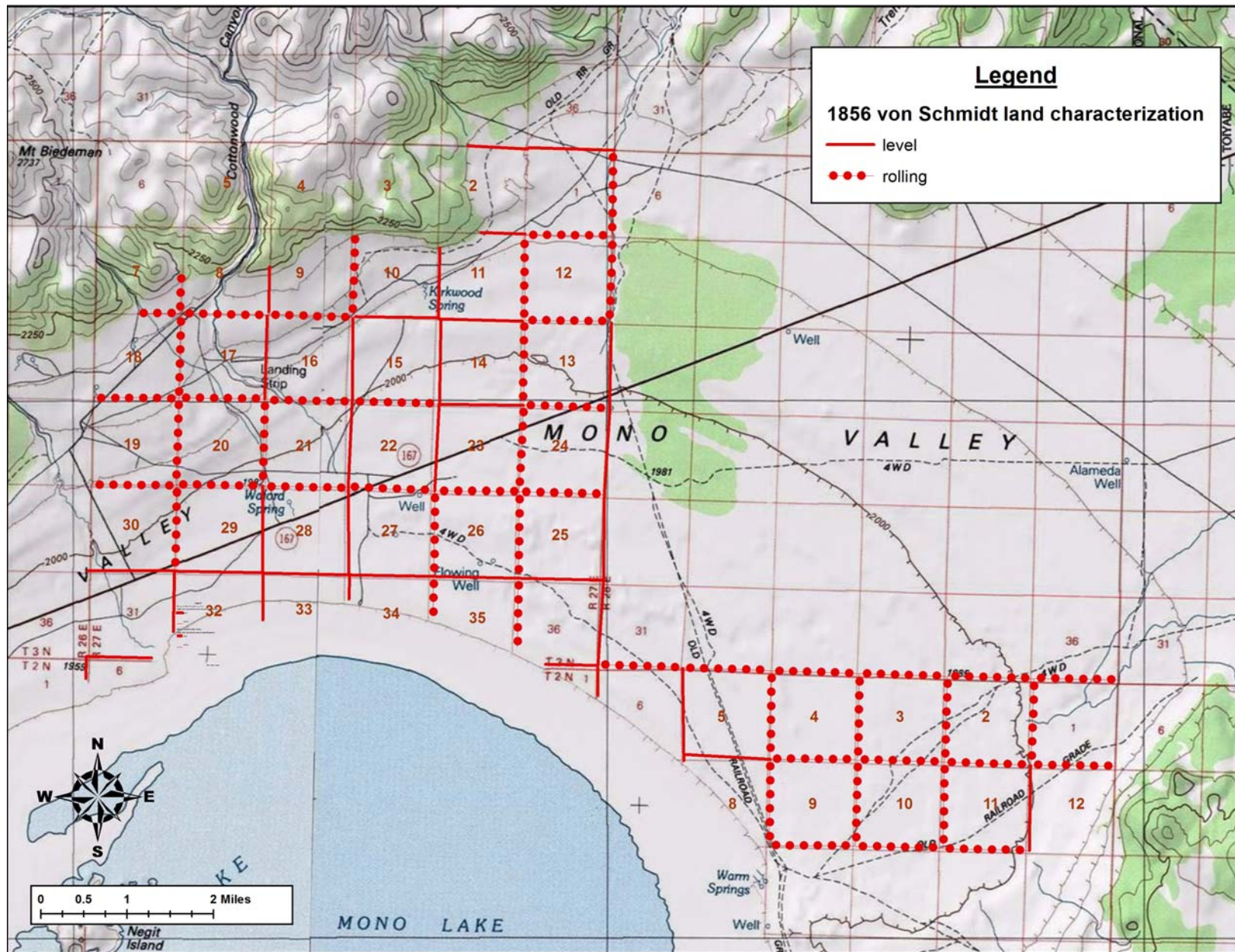
E btw Sec 29 and 32: Land rolling, soil 3rd rate

W btw Sec 30 and 31: Land level, soil 2nd rate

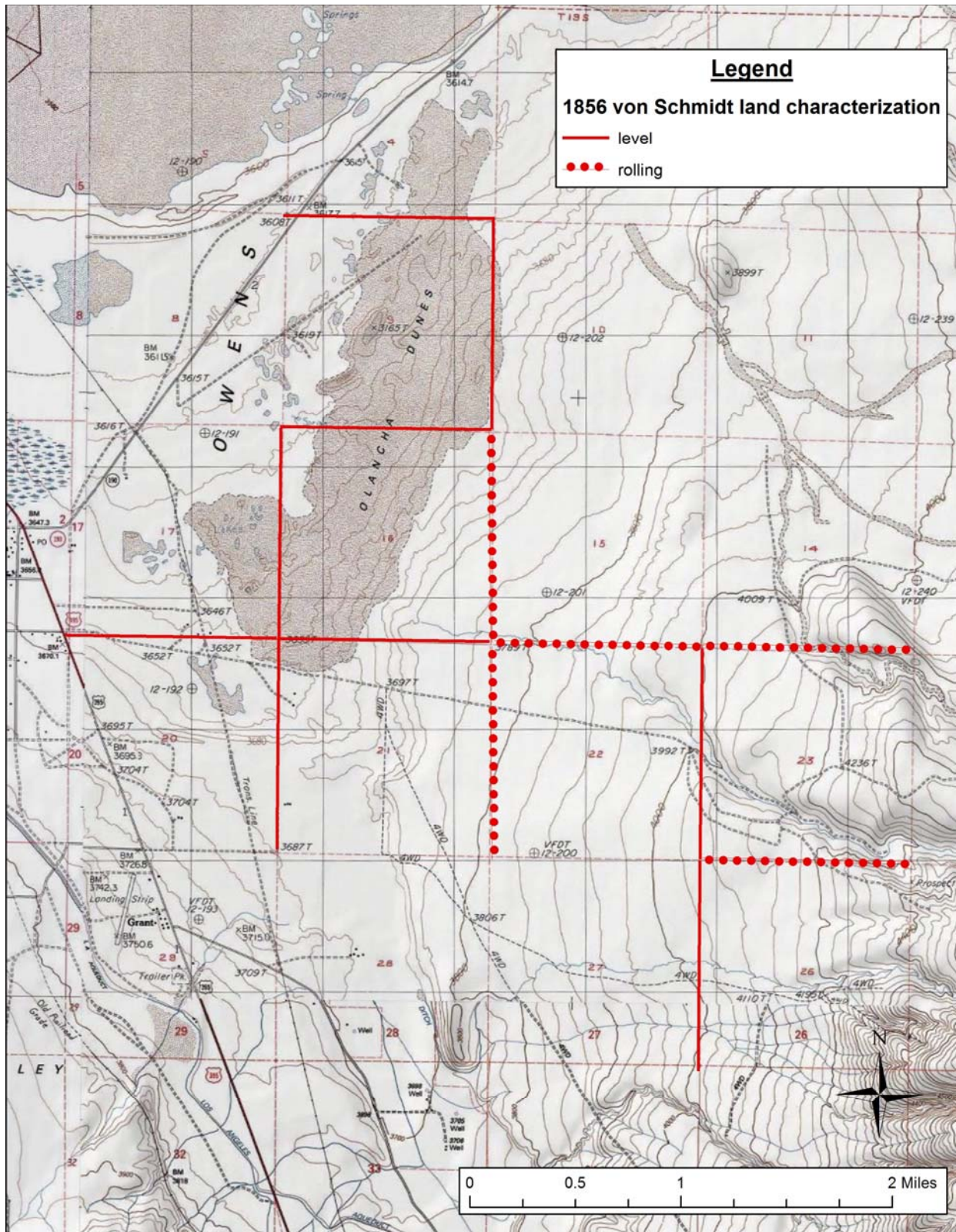
N btw Sec 29 and 30: Land rolling, soil 3rd rate

W btw Sec 19 and 30: Land rolling, soil 3rd rate

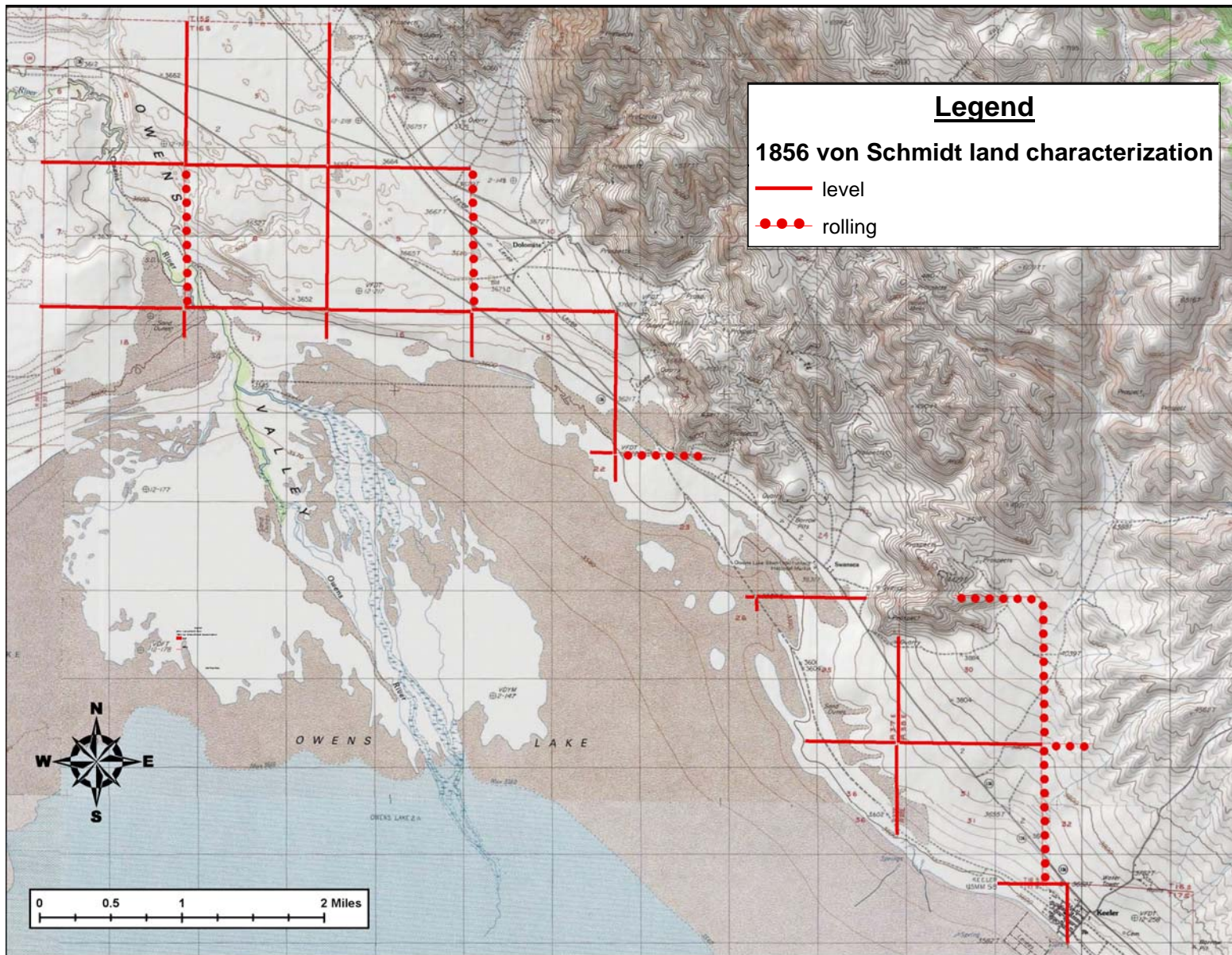
N btw Sec 31 and 32: Land rolling, soil 3rd rate



**Figure 1:** Portions of the Mono Basin’s Bodie Hills and Trench Canyon quadrangles. The section lines that von Schmidt characterized as “level” are depicted in solid red; those characterized as “rolling” are depicted in dotted red.



**Figure 2:** A portion of the Vermilion Canyon quadrangle, showing the area of Owens Lake’s southeastern shoreland that includes today’s Olancha Dunes. The section lines that von Schmidt characterized as “level” are depicted in solid red; those characterized as “rolling” are depicted in dotted red.



**Figure 3:** Portions of the Keeler and New York Butte quadrangles, including the area of Owens Lake’s northeastern shoreland that is today characterized by active dune accumulation and deflation. The section lines that von Schmidt characterized as “level” are depicted in solid red; those characterized as “rolling” are depicted in dotted red.