

Mt. Diablo Viewshed Area - The Doubtful Claim

Copied by Ashton Shortridge (11/14/06) from <http://www.gsvcs.com/~esquared/outdoor/diablo.htm>

This is NOT my work! I have modified the format in several instances and removed links & email.

It is widely claimed that the area visible from the 3,849' summit of Mount Diablo, which rises near the center of Contra Costa county on the east side of the San Francisco Bay, ranks second in the world after that of Kilimanjaro, in northern Tanzania near the east coast of Africa. From the moment I first heard this claim in 1991, I have been very skeptical. Since 1994 I have been engaged in a campaign to disprove this highly dubious claim.

Background

That Kilimanjaro sports the largest viewshed area in the world is quite believable. Its 19,340-foot summit is the highest on the African continent, and it is well-known to be the highest mountain in the world that is not part of a range. The savanna plains surrounding Kilimanjaro are only 6,000 feet above sea level. Thus, Kilimanjaro is of very large stature, being one of very few places on earth that have more than 10,000 feet of topographic relief. Add to that the fact that, not being part of a range, its view of the distant horizon is almost entirely unobstructed.

Mount Diablo, on the other hand, is of very limited stature; as any "alpine literate" person knows, a mountain whose summit is a mere 3,849 feet above sea level is not by any stretch of the imagination a major peak, and it is highly unlikely that a mountain of such small stature could possibly boast its claimed statistic. There are thousands of mountains and dozens of ranges that are far larger than Mount Diablo, many of which also have views that are mostly or entirely unobstructed by nearby peaks and ridges and hence extend many miles across surrounding plains out to a distant horizon. Furthermore, Mount Diablo's horizon is not entirely unobstructed; about 135° of it are defined by nearby peaks not more than 40 miles away in the same range. I have personally climbed Mount Diablo and seen the view; that it is highly impressive is irrefutable. However, I have also climbed many other mountains that also have views that, at least to the eye, equal or exceed that of Mount Diablo.

First things first

Before making any direct quantitative comparisons of viewshed areas, it is first necessary to concretely define what is included in a summit's "viewshed area" and how it is computed. There are several gray areas in this issue that need to be decided, such as:

- Is water included? This is quite critical for mountains whose views extend over an ocean, e.g. Mauna Kea in Hawaii, Santiago Peak in Orange county, Mount Saint Elias in Alaska, Mount Fairweather in British Columbia, or Pico San Cristobal Colòn in Colombia.
- In the case of broad, multiply sub-peaked, or heavily vegetated summits, how much moving around the summit area is permitted? What is the criterion for deciding when two or more views from slightly different places can be merged into a single panorama or will be considered two or more separate, much more obstructed views? This is an issue for Mauna Kea (whose summit area is pock-marked with several volcanic conelets), Mount Shasta (whose summit area consists of a broad, snowy, windswept plain capped by three pinnacles), and Mount Emmons (whose summit is so broad that a 3- to 5-minute walk is required to take in the view in opposite directions).
- Is the area hidden behind a nearby obstruction but in front of a more distant point that is still visible included? This consideration can be very important, and very difficult to compute, when the line of sight from a summit strikes a furrowed, undulating, or hilly area at a shallow angle, so that valley after valley is blocked by hill after hill. This is an issue for Mount McKinley and for many volcanoes in the Pacific northwest. It is also an issue for Mount Diablo itself, because the Sierra Nevada mountains are visible rising from behind Mount Diablo's horizon.

Exaggeration and Misrepresentation

The individual who first related the claim to me presented a number of "supporting facts" which I doubted as soon as I heard them and later proved to be false. The most incredible of these is that Mount Diablo's view extends to the state of Nevada. Even if the terrain in Nevada's direction from Mount Diablo were entirely at sea level, with no obstructions whatsoever, the curve of the earth would limit the view to 76 miles, whereas the state line is 135 miles away. Furthermore, any hypothetical view of the state of Nevada would be obstructed by the Sierra Nevada mountains, which lie 110 miles away and are far higher than Mount Diablo. Donner Pass, the lowest point along the crest of the Sierra Nevada in the region critical to the view from Mount Diablo, is 7,227 feet above sea level. Thus, to see the state of Nevada from Mount Diablo would require a view over the top of a higher obstruction, which is clearly impossible. Even Mount Rose, the highest point in the Nevada portion of the Sierras, is obstructed by a range in California. It is true that the Sierra Nevada is visible from Mount Diablo, but most of the credit for this fact is due to the stature of the Sierra Nevada and not that of Mount Diablo. In all likelihood, the belief that that state of Nevada is visible from Mount Diablo resulted from a passing of the rumor through a person who, inadvertently or through ignorance, confused "Nevada" with "Sierra Nevada".

The same individual also cited National Geographic magazine as the source of all of his claims. However, personnel at the National Geographic Society have informed me that the only mention of Mount Diablo that has ever been made in its 106-year history was in 1932, and that had nothing to do with its viewshed area.

Most sources of information that iterate the claim state that Mount Diablo's viewshed covers 40,000 square miles; one says 46,000 and proceeds to compare it to the area of the entire state of New York. It is quite possible someone will (if this has not already happened), quote such a comparison to another, who will look up the area of the state of New York (49,000 square miles), and pass that on to yet another who will round it up to 50,000,...; well, I think you get the idea.

The Facts

Using topographical atlases and aeronautical charts (both of which contain a wealth of topographic information), I set out to determine the area visible from the summits of Mount Diablo as well as several other North American peaks. Because of the issues discussed in the "First Things First" section above, the results are not well-defined. But the differences are so great in all cases that comparisons are still clear. The table below shows the results. [*dead link to explanation removed*].

<i>Summit</i>	<i>Viewshed area (miles²)</i>
Mount Diablo	13,000 to 21,700
Mount McKinley	60,500 to 71,800
Mauna Kea	59,100
Pikes Peak	27,800

The figures shown are the minimum and maximum reasonable figures in light of the ambiguities in defining viewshed area. Even with that problem, however, Mount Diablo's viewshed area is still exceeded by all other summits in the list. Even the inflated 40,000 square mile figure found in most sources is still exceeded by those for all other peaks in the table except Pikes Peak.

The above table is by no means exhaustive; the peaks listed therein were chosen because of their stature and the availability of topographic information on their surrounding areas. There are many North

American peaks not in the table which are likely to have similarly broad viewshed areas, particularly some volcanoes in the Cascades and range highpoints in the Great Basin. And, of course, there are major ranges on other continents (e.g. the Andes, Alps, and Himalayas) of similar or even greater stature than the major North American peaks. Over the world, there are probably hundreds of mountains whose viewshed areas exceed 20000 square miles and a few dozen with over 50000.

The Search for the Original Source

A large number of reputable sources of information have iterated the Mount Diablo viewshed area claim; among these are Sierra magazine, the Mount Diablo State Park brochure, and several guide books. All of these are secondary sources. I therefore embarked on a mission to locate the originator of the claim and, once found, evaluate the method used to determine the viewshed areas of Mount Diablo and other peaks. If successful, such a finding would prove once and for all whether or not the Mount Diablo viewshed area claim holds water. What I found, however, was a complete vanity.

My first action was to write a letter to the Mount Diablo State Park and the Mount Diablo Interpretive Association (MDIA). I received a reply from a park ranger who did not know the origin of the claim and shared my skepticism that it is true. I never heard from the MDIA. Later phone calls to the MDIA resulted only in a suggestion to contact the United States Geological Survey (USGS).

Internet surfing on the USGS's World Wide Web pages showed no information of interest. A phone call to them later led to a run-around between the USGS and the National Geodetic Survey. Eventually, however, two individuals at each of these two agencies assured me that neither agency maintains any data on viewshed areas. Yet, if any formal viewshed area data does exist, these two agencies would be by far the most likely to have it.

Correspondence with other sources, alleged sources (National Geographic Society), or probable knowledgeable parties (Earth Science Information Center) of the Mount Diablo viewshed area claim have had no significant results. The outcome of each of these inquiries was at worst no reply and at best a polite denial of any knowledge as to where the information came from.

In one of my telephone calls to the MDIA I was told that the claimed statistic resulted from "an engineering survey in the early part of this century" and that the MDIA was conducting a research project to attempt to locate this source. Later communications with the MDIA failed to glean any additional information on that matter, however.

Conclusions

Two separate bodies of evidence strongly suggest that the claim that Mount Diablo's viewshed area ranks second in the world after Kilimanjaro is false:

1. Quantitative calculations show 3 North American peaks with much larger viewshed areas. The scope from which these peaks were chosen is so limited that in all probability there are many dozens if not thousands more that were not considered. Although the calculations are approximate, the numbers still fall far short even with the most generous possible allowance for margin of error.
2. Multiple efforts to locate the original source of this claim have all failed. None of the iterators of the claim can document it. It is likely that the claim grew by gradual word-of-mouth exaggeration, and once its audience reached a critical mass, it became difficult to stop.

Although my study does not constitute absolute proof that the claim about Mount Diablo's viewshed area is false, the evidence is nonetheless very compelling. I welcome any and all information anyone has regarding this matter. Please send me e-mail if you have any facts that support or dispute my analysis.