

FIELD TRIP GUIDE
STRATIGRAPHY AND STRUCTURE SOUTHEAST
OF SAN DIEGO, CALIFORNIA
CONDUCTED BY ERNEST ARTIM
OF
WOODWARD-GIZIENSKI AND ASSOCIATES

Mileage

- 0.0 Meet at the "big wing" at Montgomery Memorial State Park. The field trip will begin here and proceed north and will end near Paradise Valley Road and Euclide Avenue.

Proceed south along National Avenue and North Vista Avenue to Otay Mesa Road.

- 2.4 Turn left (north) onto Otay Mesa Road and continue northeast.

- 2.9 Stop 1

We are standing on the Avondale Terrace as described by Ellis and Lee in 1919. As we look to the north, you will note that the terrace is relatively flat-lying between elevations of 200 feet to 300 feet. Looking east and northeast, the sharp abutment of the Avondale Terrace is the fault scarp of La Nacion Fault. Refer to the Geology Maps 1 and 2. Note that the fault trace that we have mapped runs very close to the terrace contact mapped by Cleveland.

Proceed up Otay Mesa Road across the fault scarp.

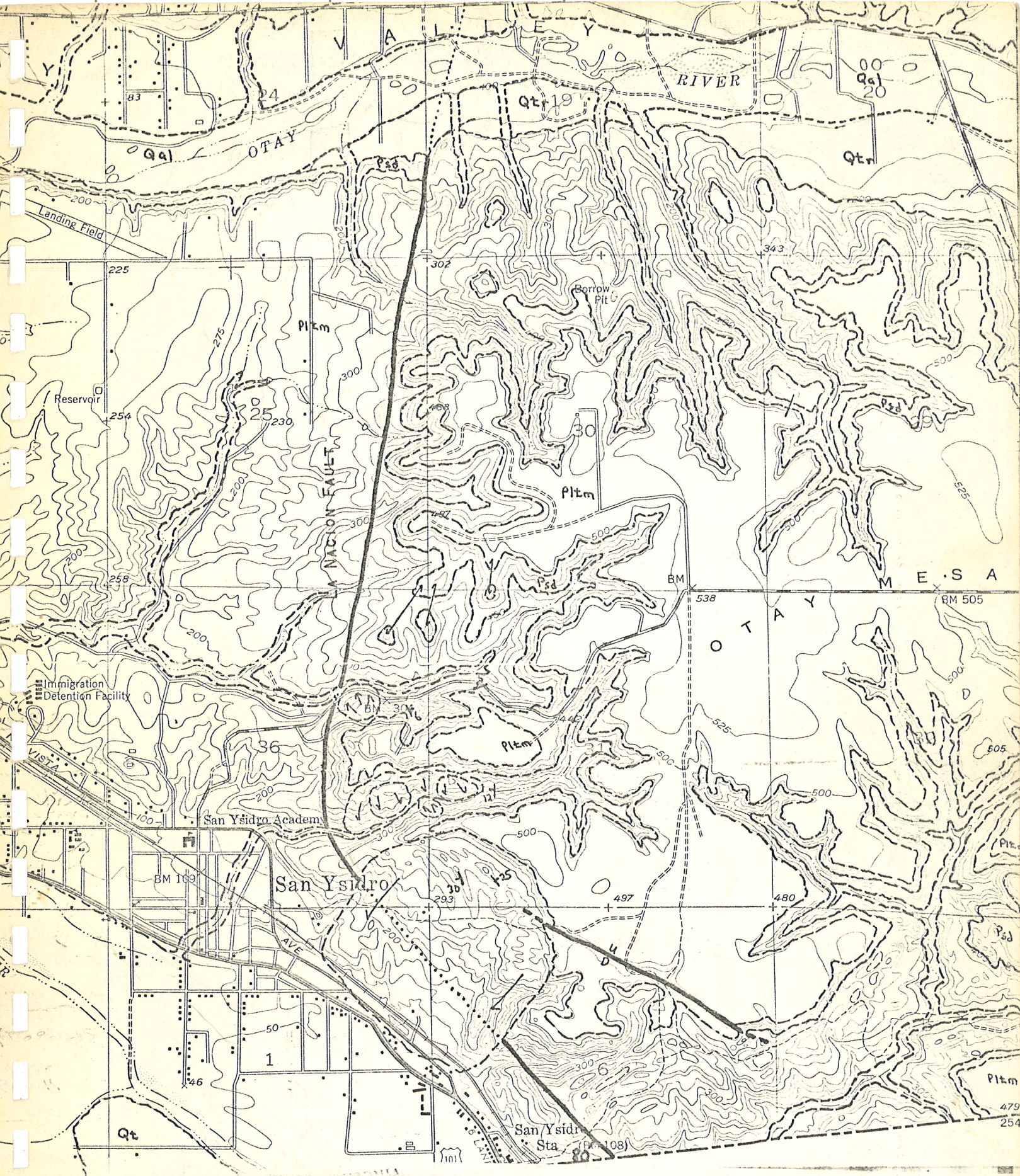
- 3.9 Stop 2

Walk back to outcrop.

This outcrop signifies the break between the Pliocene San Diego formation and the underlying unnamed "Miocene" formation as we have mapped the sediments. Our present contention is that this is the equivalent of the Rosarito Beach formation of Miocene age. The occurrence here of extensive bentonite beds and tuffaceous sandstones to the east seem to verify the volcanic activity present at the time of deposition. The elevation of the geologic contact here is 424 feet. Elsewhere to the east of La Nacion Fault the elevation of the contact of the formation ranges from



FIGURE 1: FIELD TRIP ROUTE MAP



GEOLOGY AFTER ARTIM (1971) AND ARTIM, PINCKNEY (1971)

ARTIM, ERNSET R., 1971, AN UNCONFORMABLE STRATIGRAPHY SEQUENCE IN SOUTHEAST SAN DIEGO, GSA SECTION MEETING, RIVERSIDE, CA, (ABSTRACT)

ARTIM, ERNEST, PINCKNEY, CHARLES, BEMIS, CHARLES, SMILLIE, BRAVEN, 1971,
FAULT SYSTEMS OF WESTERN SAN DIEGO COUNTY, GSA SECTION MEETING,
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400 feet to 434 feet.

Proceed east on Otay Mesa Road to Otay Valley Road.

- 5.9 Turn left (north) onto Otay Valley Road. We have just driven across the Otay Terrace as described by Ellis and Lee in 1919. The elevation of this terrace varies from 425 feet to nearly 550 feet with the major portion of the terrace occurring about 500 feet.

- 6.5 Drive down grade slowly as we pass the same geologic contact as we observed at Stop 2. One Pliocene fossil has been recovered from the upper beds here, above an elevation of 430 feet.

Proceed down the grade to Otay Valley and down Otay Valley Road to Oleander Avenue, which is just before the U.S. 805 interchange.

- 9.5 Turn right (north) onto Oleander Avenue and proceed north to Rivera Avenue.

- 10.5 Turn right (east) on Rivera Avenue and proceed on dirt road to the east.

- 10.8 Stop 3

An exposure of a branch of La Nacion Fault. Pliocene San Diego formation materials on the west and the unnamed "Miocene" formation on the east. Although the existence of this fault has been denied by certain persons, this outcrop speaks for itself. Vertical fault separation of the Pleistocene Terrace materials is 200 feet and fault separation of the Pliocene San Diego formation is in excess of 234 feet. The strike at this point is about N-S and dip is to the west at about 70°.

Proceed back on Rivera to Oleander Avenue, turn left, go one block to Orange Avenue, turn right onto Orange Avenue and proceed to U.S. 805.

- 11.3 Turn right (north) onto U.S. 805 and proceed north to Telegraph Canyon Road.

- 13.0 Turn right (east) onto Telegraph Canyon Road and proceed east. Note the excellent exposures of the Pliocene San Diego formation as we turn onto Telegraph Canyon Road.



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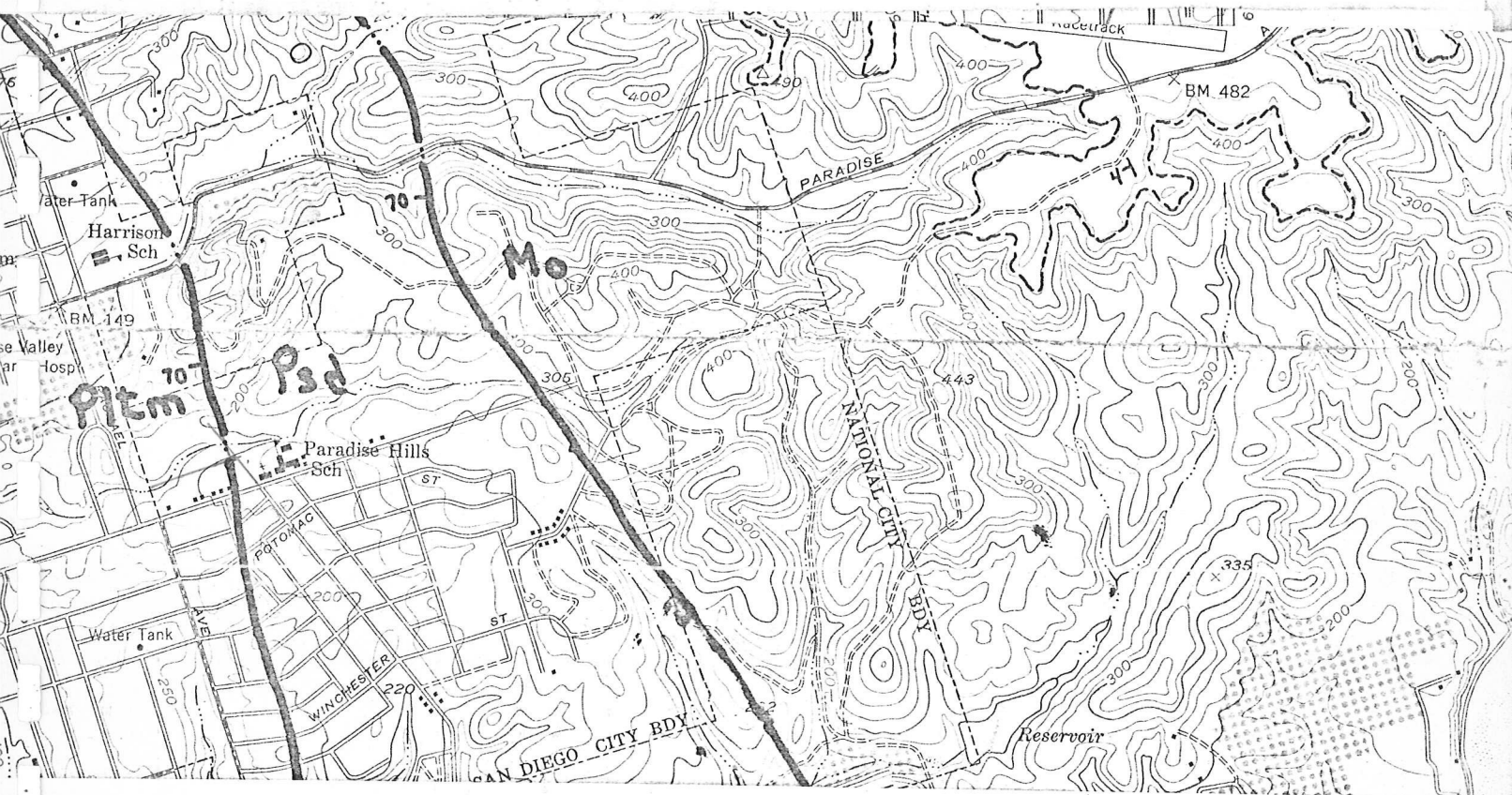
- 14.3 At approximately this point, La Nacion Fault crosses under the road. Note the change in color and change in formational material,
Proceed on to Otay Lakes Road.
- 16.7 Turn left (north) onto Otay Lakes Road and proceed north to Bonita Road.
- 18.1 Downgrade into valley, drive by slowly. Note the same geologic contact at about the same elevation as we had observed at Stop 2.
- 19.6 Note the massive red-brown claystone.
- 19.8 Turn left (west) onto Bonita Road and proceed west to Bonita Bridge.
- 20.5 Turn right (north) onto Bridge, cross the Sweetwater River and proceed west on Sweetwater Road.
- 21.8 Stop 4
Outcrop of the Sweetwater Fault, which separates Pleistocene Terrace materials to the west and Pliocene San Diego formation sands to the east. The terrace to the west is the Chula Vista Terrace, as described by Ellis and Lee in 1919. Fault separation here is vertical and exceeds 100 feet.

We have now seen two different faults separating the Chula Vista Terrace, Avondale Terrace, and Otay Terrace by as much as 300 feet of observable vertical separation. Our contention is that these are not separate marine terraces of different ages, but the same terrace representing different ages of faulting.

Proceed on Sweetwater Road to Route 54 (South-Bay Freeway).
- 22.1 Turn right (east) onto South Bay Freeway and proceed northeasterly.
- 22.2 Look up the canyon in the trailer park and you will see the north-north-westerly extension of the Sweetwater Fault.

Mileage

- 23.2 At approximately this point, La Nacion Fault crosses under the road. Note the change in formational material as we proceed easterly.
- 25.3 Angular unconformity - the underlying sandstone dip 8° south and the claystone contact dips 2° westerly. The sandstone here is traceable northward to mapped exposures of the sandstone member of the Eocene Poway formation.
- Proceed to Sweetwater Road.
- 26.0 Turn left (north) onto Sweetwater Road and proceed to Paradise Valley Road.
- 26.4 Turn left (west) onto Paradise Valley Road and proceed west.
- Note the massive exposures of red-brown claystone as we enter Paradise Valley. This may be the equivalent of the upper brown mudstone of the Eocene Buenos Aires formation.
- 29.4 Stop 5
- Munda Street and Paradise Valley Road.
- This is an outcrop of La Nacion Fault. Note how it truncates the cemented sand layer north of the roads. The vertical fault separation of the Pleistocene terrace materials is in excess of 200 feet here.
- 30.0 Stop 6
- Turn into Burger Mart and park. Plaza Boulevard and Paradise Valley Road. Sweetwater Fault separating the Pleistocene Terrace and the Pliocene San Diego formation.
- Today we have seen a few excellent examples of faulting within a so-called stable land mass.
- Thus we can see that the "simple" geology of San Diego is much more complex than previously supposed, and the "stable" land mass concept is very invalid.
- A few points to ponder are:
- The Sweetwater Fault at the last exposure offsets Pleistocene material



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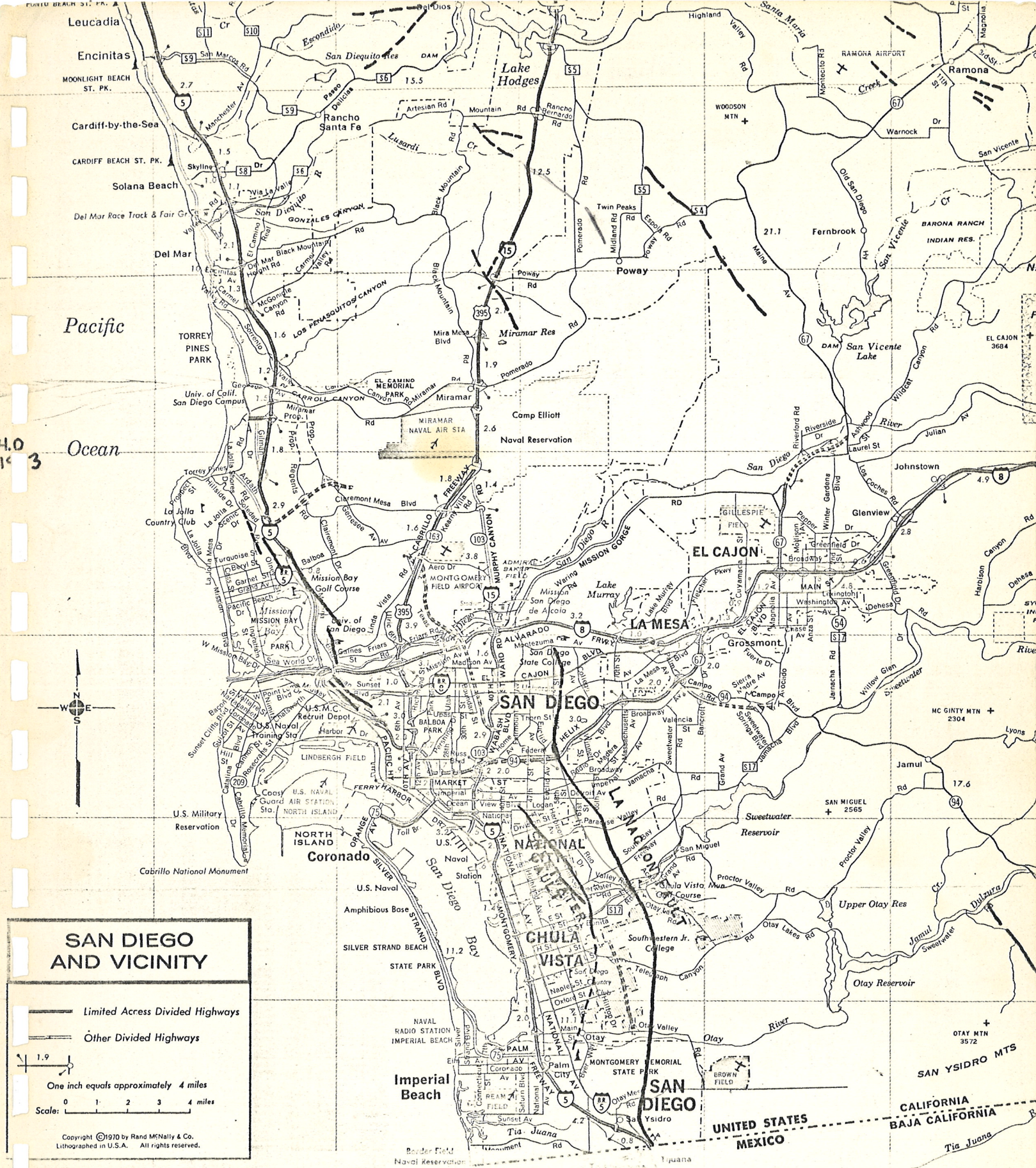
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and trends in the same direction as the faults located at San Juan Street and Washington Street. Are they the same fault?

A 3.0 quake on a scale of 12.0 was recorded at 3:56 p.m. on 1-1-46 south and east of Point Loma. Could this be representative of either the La Nacion or Sweetwater Faults? Are they potentially active?

These are points and questions which we will attempt to answer in a second phase of this study.

END OF TRIP



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