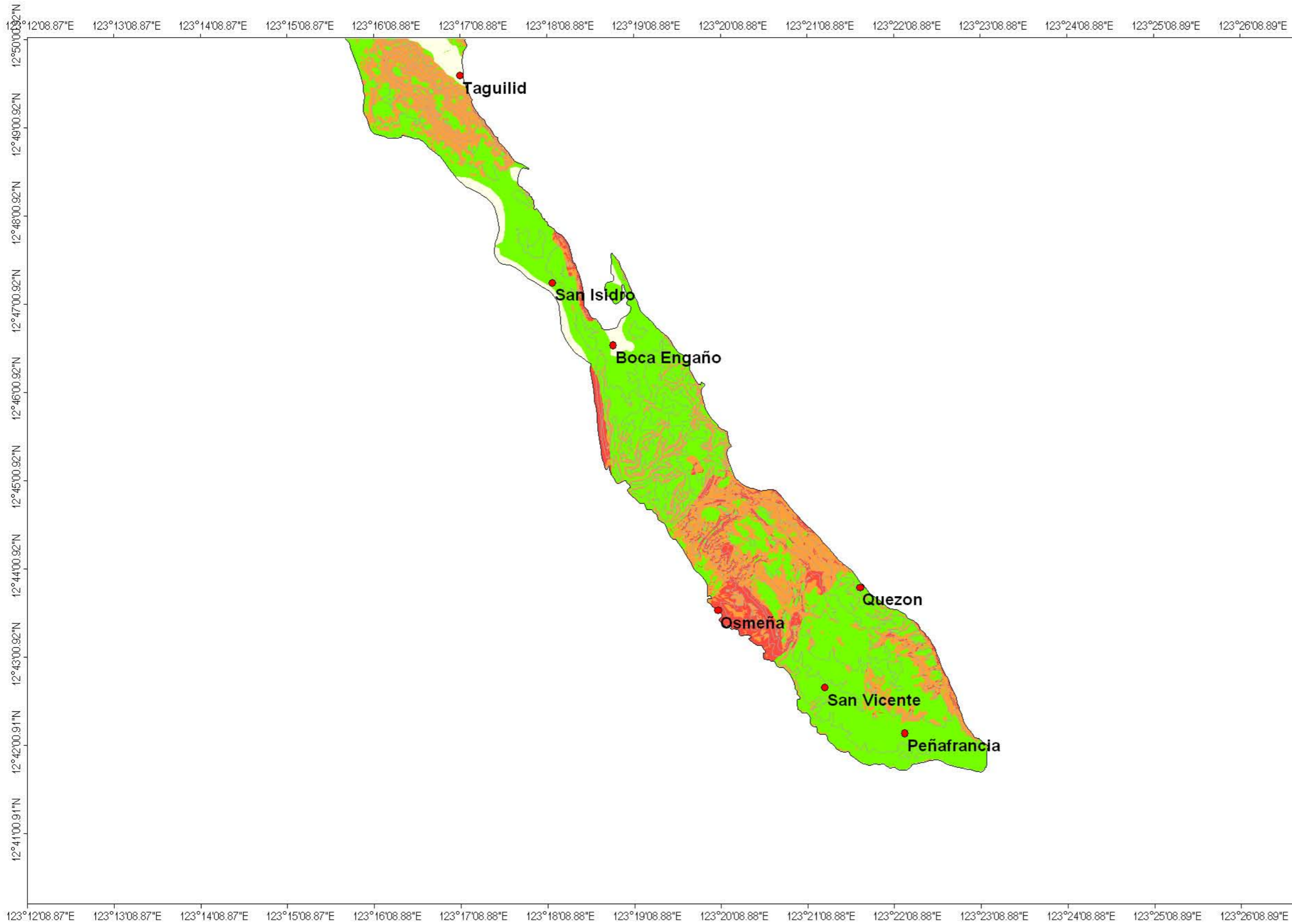


LANDSLIDE SUSCEPTIBILITY MAP OF PEÑAFRANCIA QUADRANGLE



LEGEND :
High Susceptibility
Moderate Susceptibility
Low to Absent
Absent



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2009

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Clarke 1966, Luzon



FLOOD HAZARD MAP OF PEÑAFRANCIA QUADRANGLE



Flood Hazard Zones:

- regularly to frequently flooded areas
- occasionally to rarely flooded areas
- non flood prone areas
- areas prone to river bank erosion

EXPLANATIONS:

Flood hazard susceptibility zones were derived based on the geomorphological analysis of landforms and the fluvial system. Information on flood occurrences, flood depths, duration of inundation as well as topographic information supported the geomorphologically-based flood hazard mapping.

Regular to Frequently Flooded Areas:
Areas that are frequently flooded. Mere heavy rains of 1 to 2 days could bring about flooding in these areas. Moderate to strong typhoons could submerge these areas 1 to 3 meters or more in flood waters for a few days to a few weeks. In Barangay Matubinao flood depths of 8 m have been reported. Housing development in these areas is not recommended.

Occasionally to Rarely Flooded Areas:
Areas that become inundated during moderate to strong typhoons. Flood depth vary from a few centimeters to 1 meter. Floods last from a few hours to a few days.

Non-Flood Prone Areas:
Areas with no reported flood occurrences except low lying areas adjoining rivers or creeks.

Areas Prone to River Bank Erosion:
Areas 0 to 50 meters from river banks of active river channels that are prone to bank erosion.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
 Geomorphological Interpretation : A. E. Dayao, J. N. Malto
 Digital Cartographic Processing by: J. N. Malto, R. L. Mapalad
 GIS Processing by: A. E. Dayao, J. N. Malto
 Checked by: R. A. Juan
 Approved By: R. A. Juan

Other sources of Information:
 1:50,000 NAMRIA Topographic Map

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GROUND SUBSIDENCE AND GROUND SETTLEMENT SUSCEPTIBILITY MAP OF PEÑAFRANCIA QUADRANGLE



MAP LEGEND:
Ground Subsidence and Ground Settlement Susceptibility Zones:

- areas not susceptible to ground subsidence/settlement
- areas susceptible to ground settlement
- areas susceptible to ground subsidence
- sea

EXPLANATIONS:
 Susceptibility map for ground subsidence due to karst or solution processes was primarily derived from the lithologic map of the study area. Field observations on ground subsidence observed on concrete roads and damaged houses supported the mapping. Areas of possible ground settlement were delineated through the analysis of the geomorphological lay of the study area, the sub-surface soils and the ground water levels.

Areas Susceptible to Ground Subsidence:
 Areas that are prone to ground cavitation, sinkhole formation and ground subsidence in areas underlain by limestone and calcareous siltstones and shales.

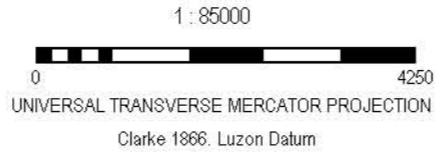
Areas Susceptible to Ground Settlement:
 Areas where fluvialite sands, silts and clays coupled with shallow ground water table are silts of possible ground settlement. Ground settlement may be reduced through appropriate foundation design. buildings having 3 storeys or more should be tested for settlement and/or consolidation. Buildings having 5 storeys or more should undergo detailed geotechnical studies.

Areas Not Susceptible to Ground Settlement or Ground Subsidence:
 Areas where the possibility of ground settlement or ground subsidence is low or absent.

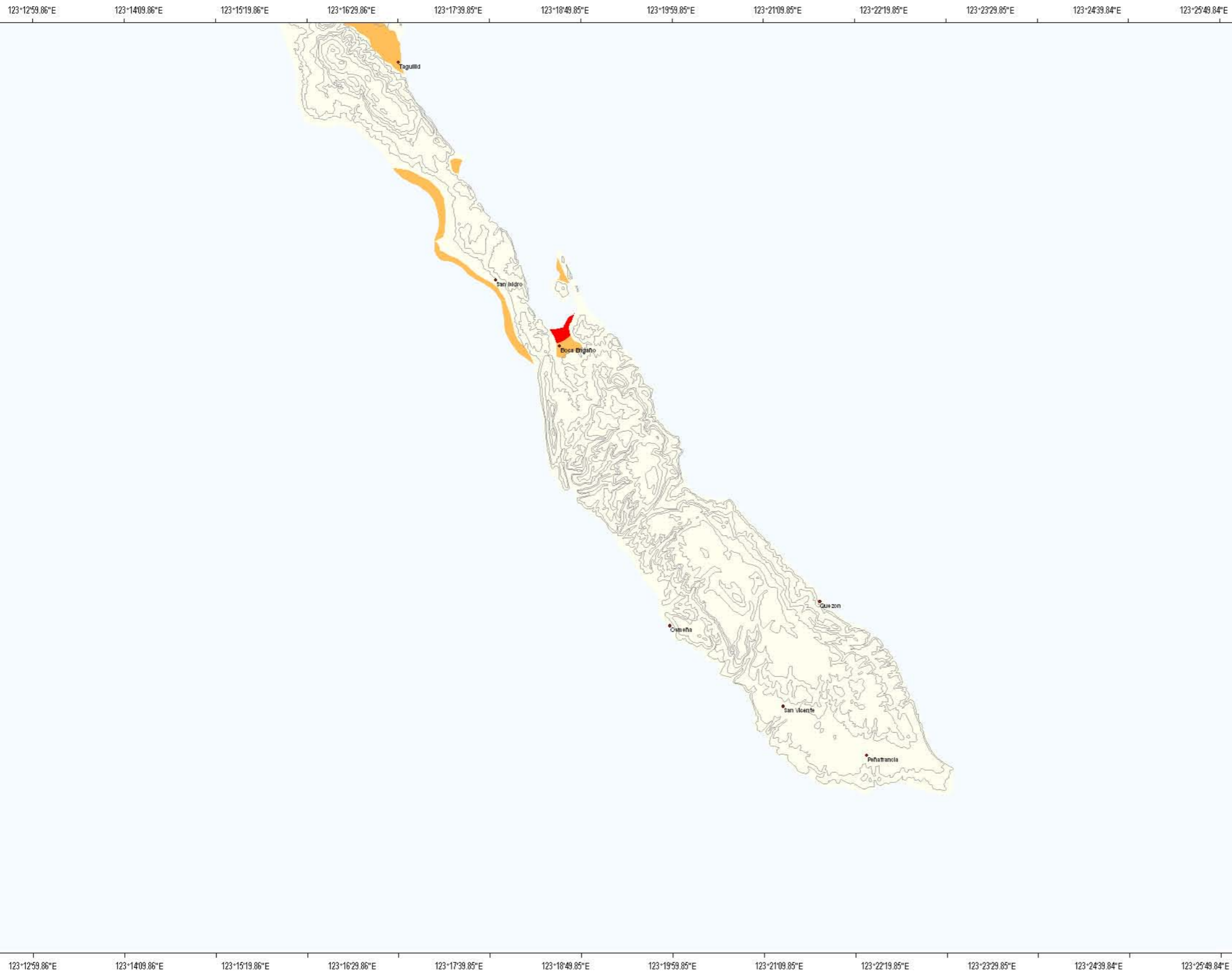
Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
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LIQUEFACTION POTENTIAL MAP OF PEÑAFRANCIA QUADRANGLE



MAP LEGEND:

Ground Subsidence and Ground Subsidence Susceptibility Zones:

- areas where liquefaction is likely
- areas where liquefaction is possible
- sea

EXPLANATIONS:

There are no reported liquefaction occurrence in the study area based on several interviews. However, zones of different liquefaction potential were derived based on the geomorphological lay of the study area following criteria made by Iwasaki and Yasuda.

Areas where liquefaction is likely to occur include the riverbeds, mangrove swamps, lakes, lake fan, ponds and coastal plain. These areas are unsuitable for community or urban settlement.

Areas Where Liquefaction is Possible:
The likelihood of liquefaction occurrence is less for these areas.

Areas Where Liquefaction is Not Likely:
Areas where liquefaction is unlikely to occur. Most parts of the Palanas Quadrangle Map sheet is not prone to liquefaction because of the presence of underlying bedrock.

Field Data Collection: A.E. Dayao, J.M.S. Laud, E.T. Avila, J. N. Malto, E. G. Basilan, M. N. L. Miraballes
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