

# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines

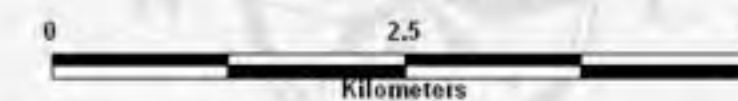


## MUNICIPALITY OF ALEGRIA

Province of Surigao Del Norte

Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- ..... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- △ 1176 Spot Elevation
- Water Body

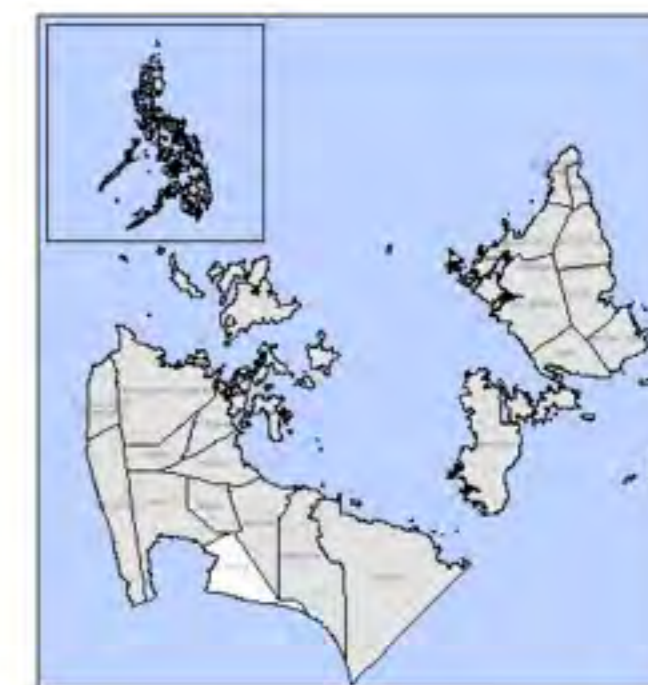
### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Alegria  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

**Disclaimer:**  
 Administrative boundaries are approximate.



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF BACUAG

Province of Surigao Del Norte

Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
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- Main Road
- Secondary Road
- Trails
- Rivers and Creeks
- Rivers Intermittent
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Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Bacuag  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
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# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines

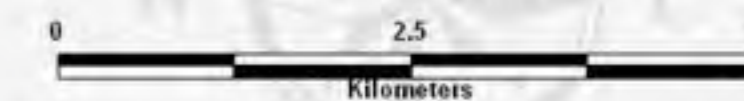


## MUNICIPALITY OF BURGOS

Province of Surigao Del Norte

Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
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- Provincial Boundary
- - - Municipal Boundary
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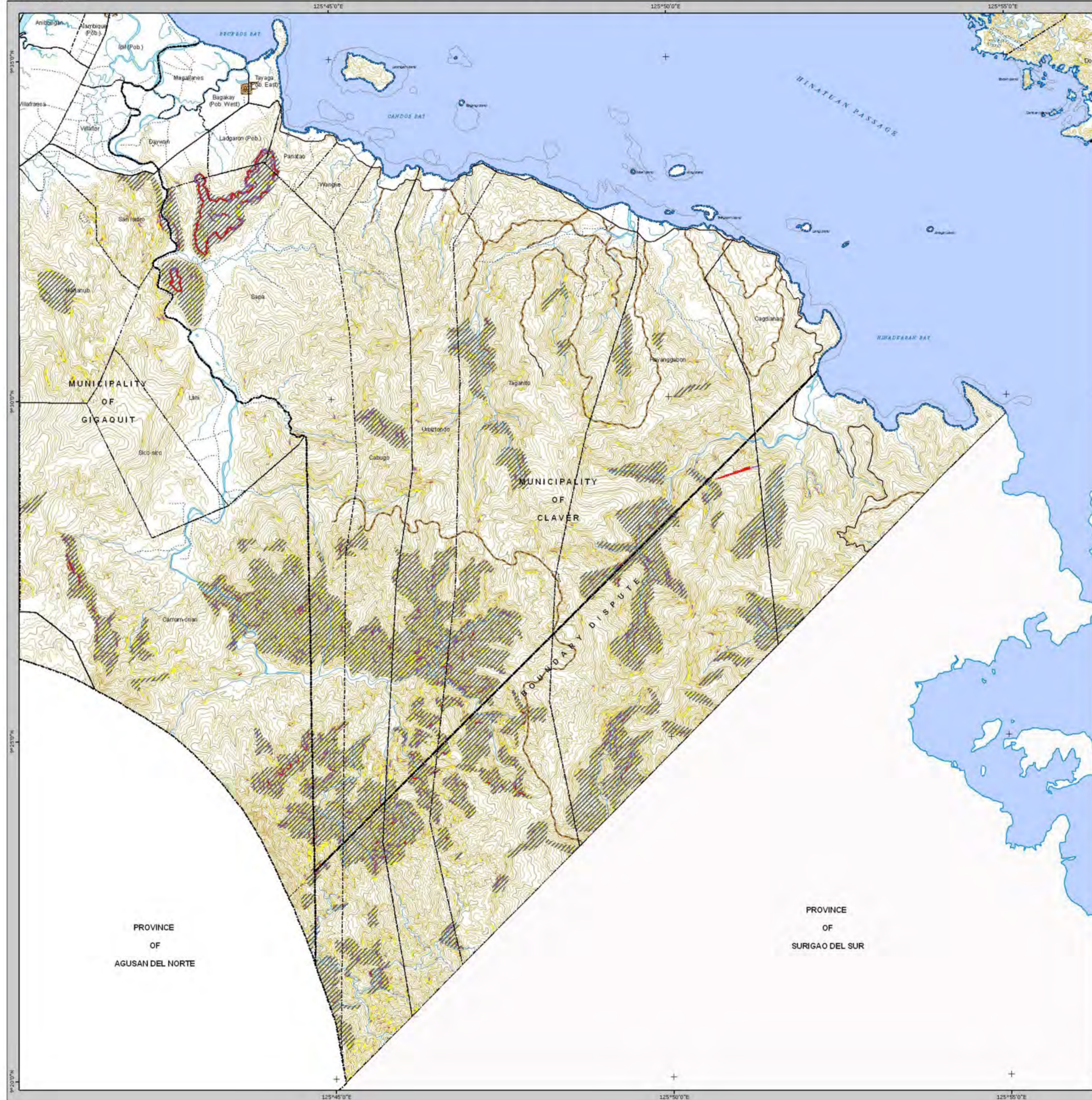
Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Burgos  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
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Mindanao, Philippines

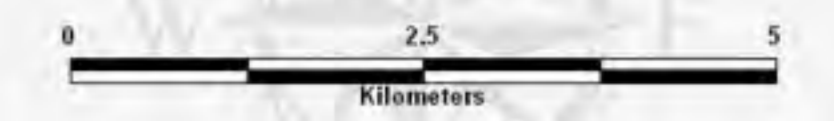


## MUNICIPALITY OF CLAVER

Province of Surigao Del Norte

Region XIII-CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
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- Rivers Intermittent
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### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Claver  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
 Ed. 1 - AMS, Ed. 2 - DMA, 1954 - 1955

### Disclaimer:

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# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF DAPA

Province of Surigao Del Norte  
Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
Projection: Universal Transverse Mercator (UTM)  
Horizontal Datum: Luzon 1911  
Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- - - Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- ... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
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- Contour Depression
- Coastline
- Corals
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- Water Body

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### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Dapa  
Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED 2 - DMA, 1954 - 1955

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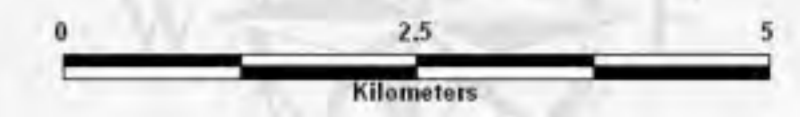
# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

## MUNICIPALITY OF DEL CARMEN

Province of Surigao Del Norte

Region XIII-CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- Spot Elevation
- Water Body

### SUSCEPTIBILITY

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- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

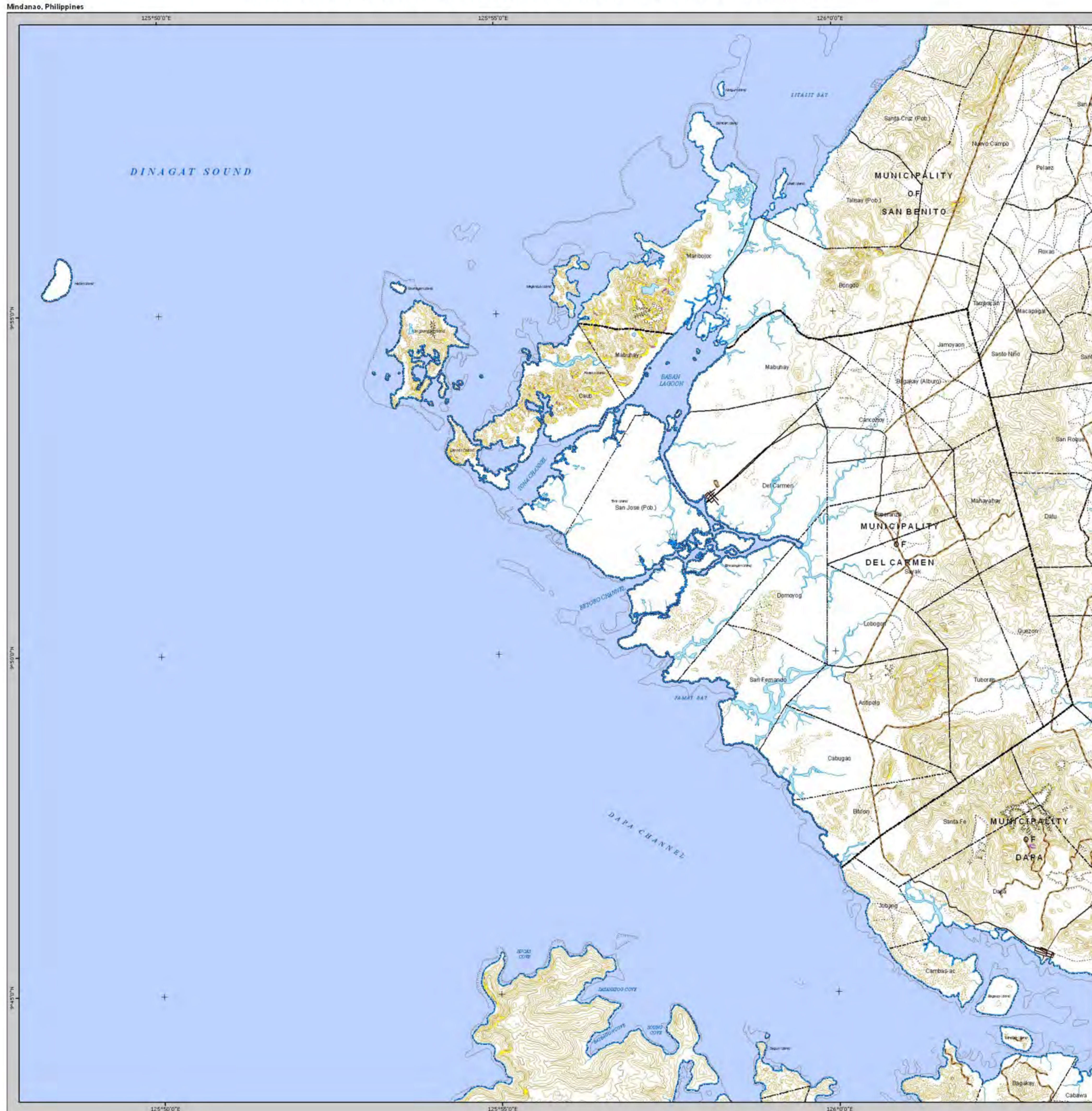
Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

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### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Del Carmen  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed 1 - AMS, ED 2 - DMA, 1954 - 1955

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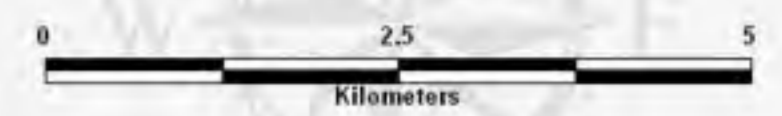
# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

## MUNICIPALITY OF GENERAL LUNA

Province of Surigao Del Norte

Region XIII-CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Canals
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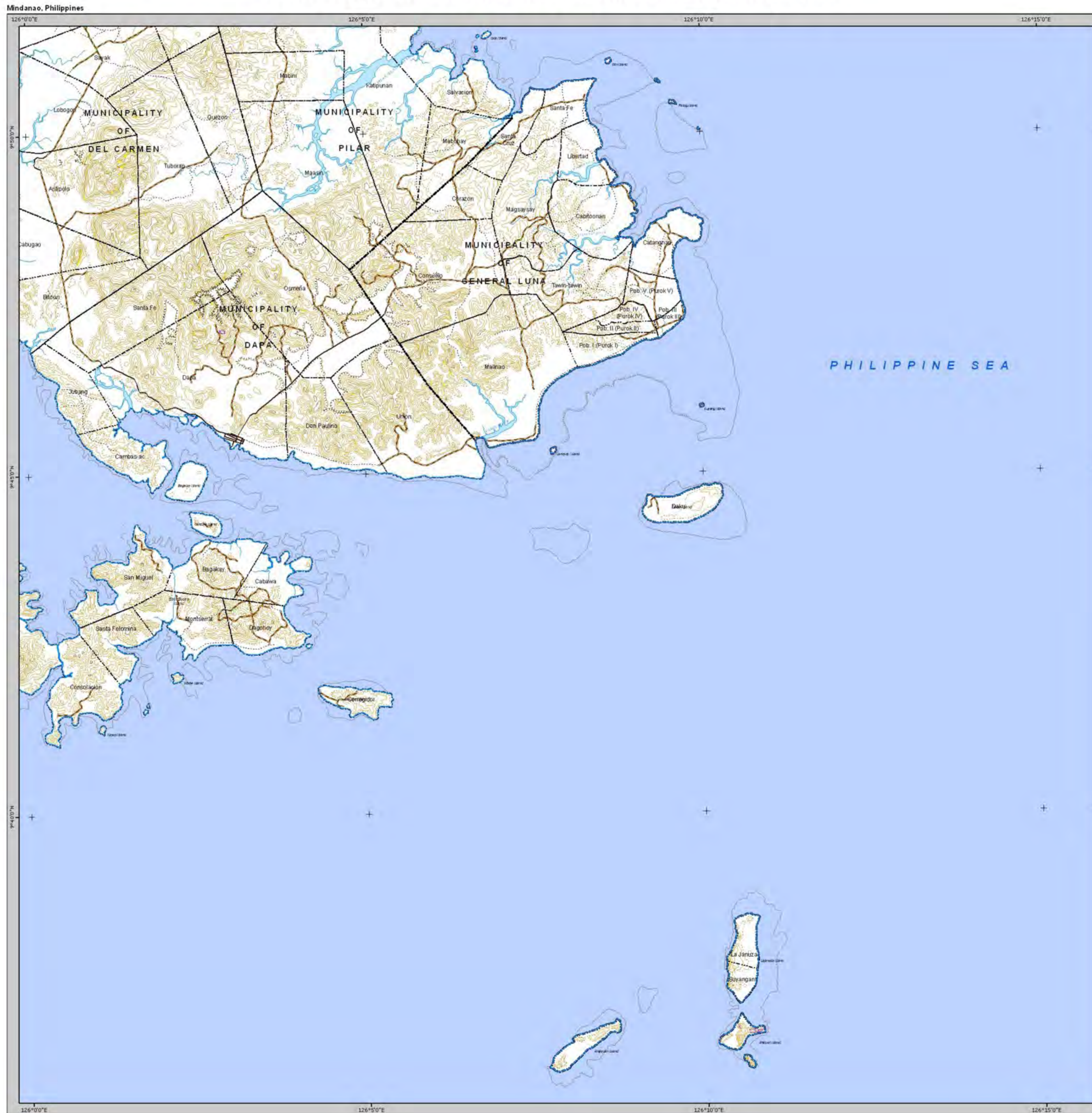


### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Gen. Luna  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

### Disclaimer:

Administrative boundaries are approximate



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOSTI) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Gigaquit  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

**Disclaimer:**  
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## LEGEND

--- Provincial Boundary	— Coastline
--- Municipal Boundary	— Bridges
--- Barangay Boundary	• 1176 Spot Elevation
— Rivers and Creeks	— Water Body
— Rivers Intermittent	
— Canals	
— Contour Index	
— Contour Intermediate	
— Contour Supplementary	
— Contour Depression	

## SUSCEPTIBILITY

<span style="color: red;">■</span>	High Susceptibility
<span style="color: purple;">■</span>	Moderate Susceptibility
<span style="color: yellow;">■</span>	Low Susceptibility
<span style="color: white;">■</span>	Not Susceptible
<span style="border: 1px dashed black; display: inline-block; width: 10px; height: 10px;"></span>	Possible landslide depositional/affected zone

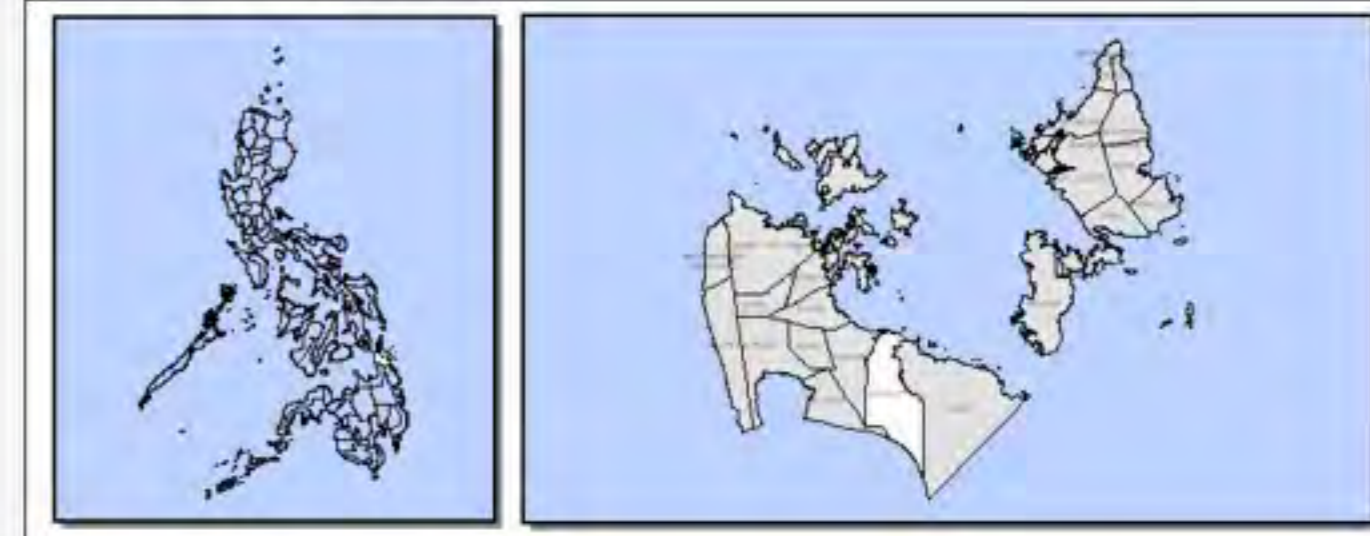
## MUNICIPALITY OF GIGAQUIT Province of Surigao del Norte Region XIII-CARAGA

Scale 1:50,000

0 25 50 100 150 200 250  
 Kilometers

Spheroid: ..... Clark 1866  
 Projection: ..... Universal Transverse Mercator (UTM)  
 Horizontal Datum: ..... Luzon 1911  
 Vertical Datum: ..... Mean Sea Level

## LOCATION MAP



## EXPLANATION

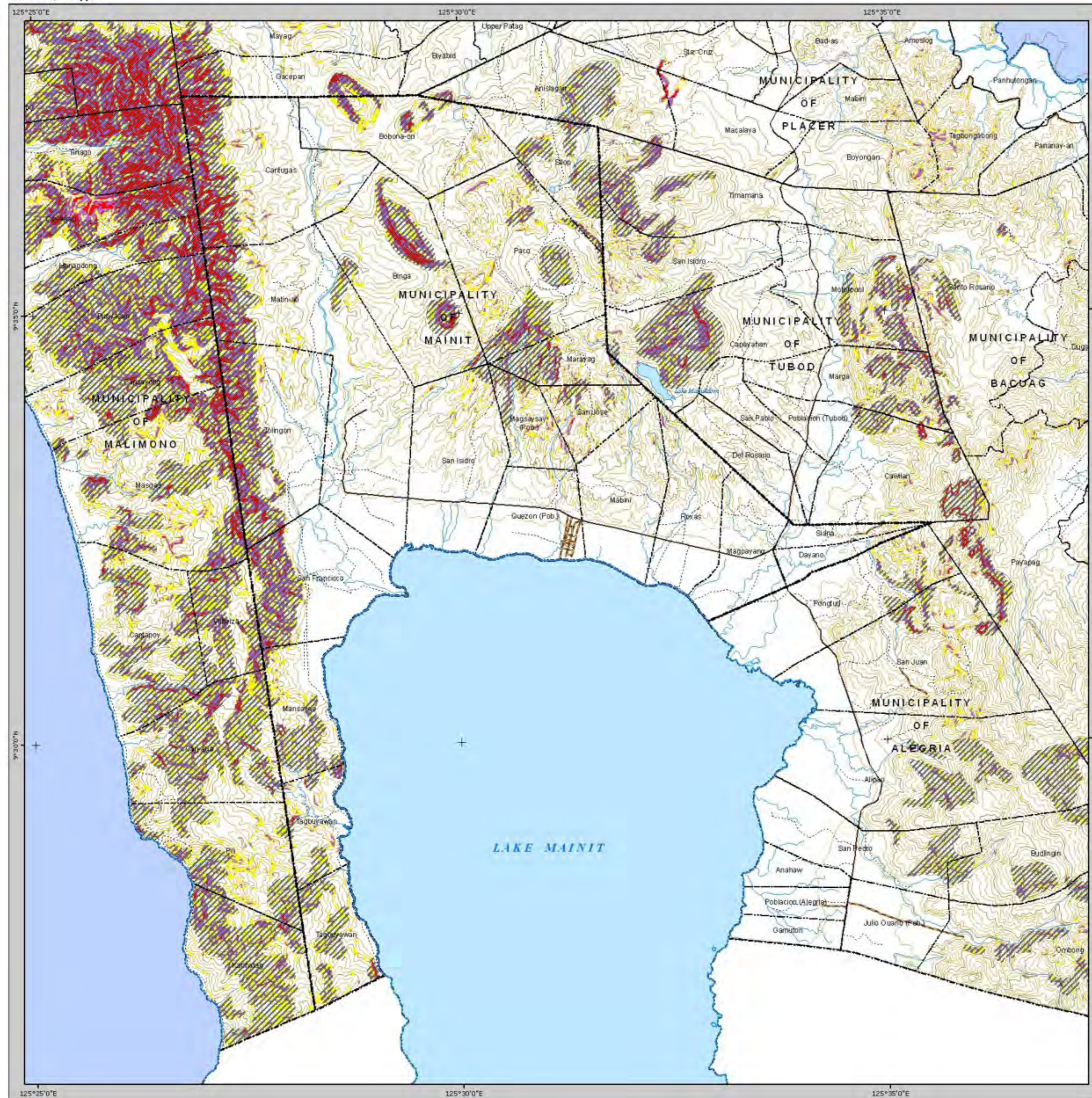
Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.





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Mindanao, Philippines

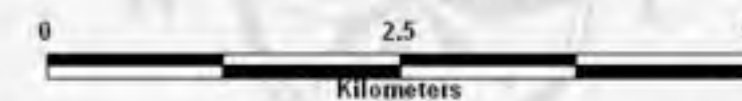


## MUNICIPALITY OF MAINIT

Province of Surigao Del Norte

Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
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### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- == Main Road
- == Secondary Road
- ..... Trails
- Rivers and Creeks
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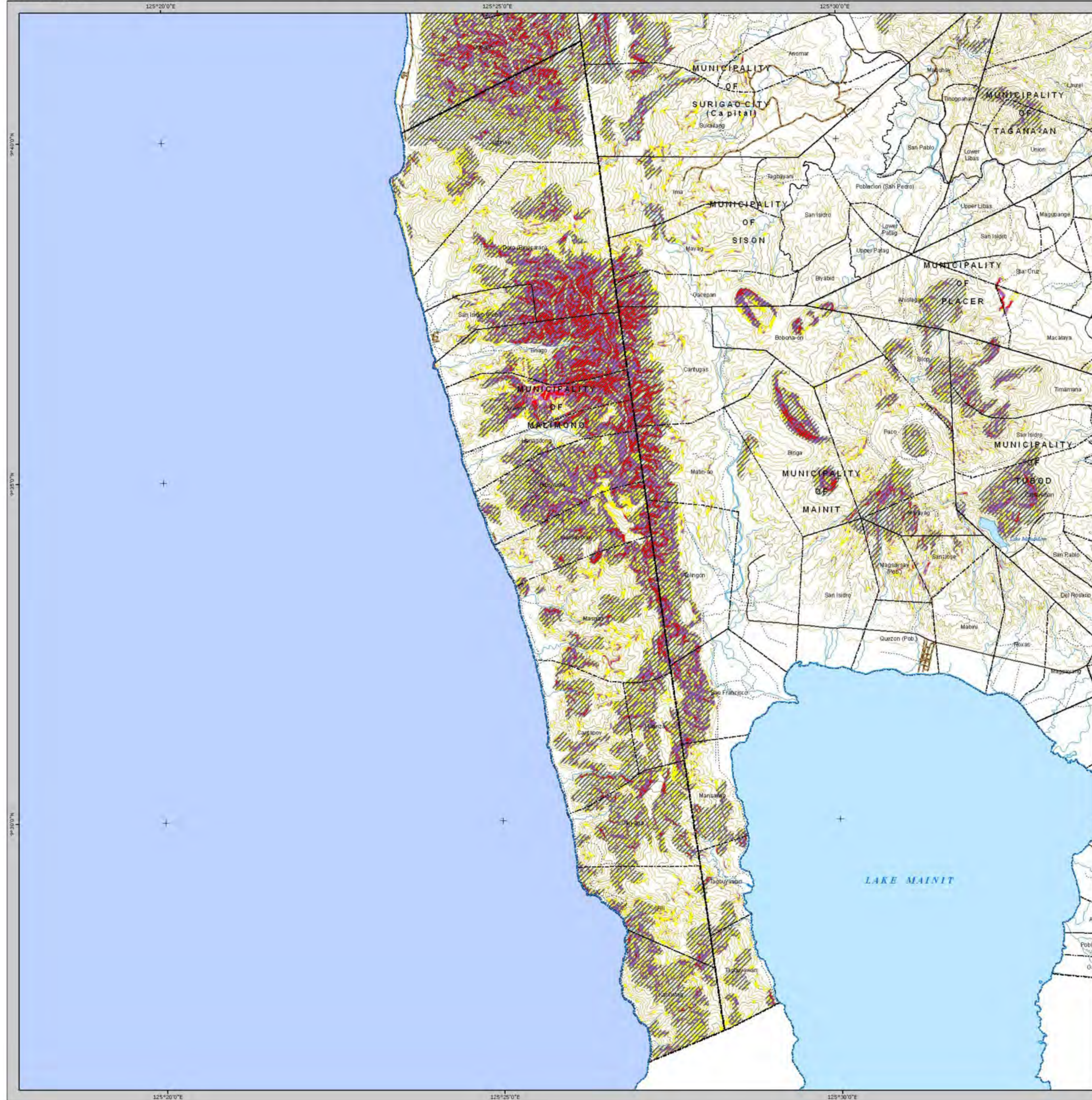
Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Mainit  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

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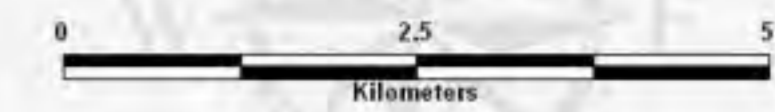
Mindanao, Philippines



## MUNICIPALITY OF MALIMONO

Province of Surigao Del Norte  
Region XIII-CARAGA

Scale 1:50,000



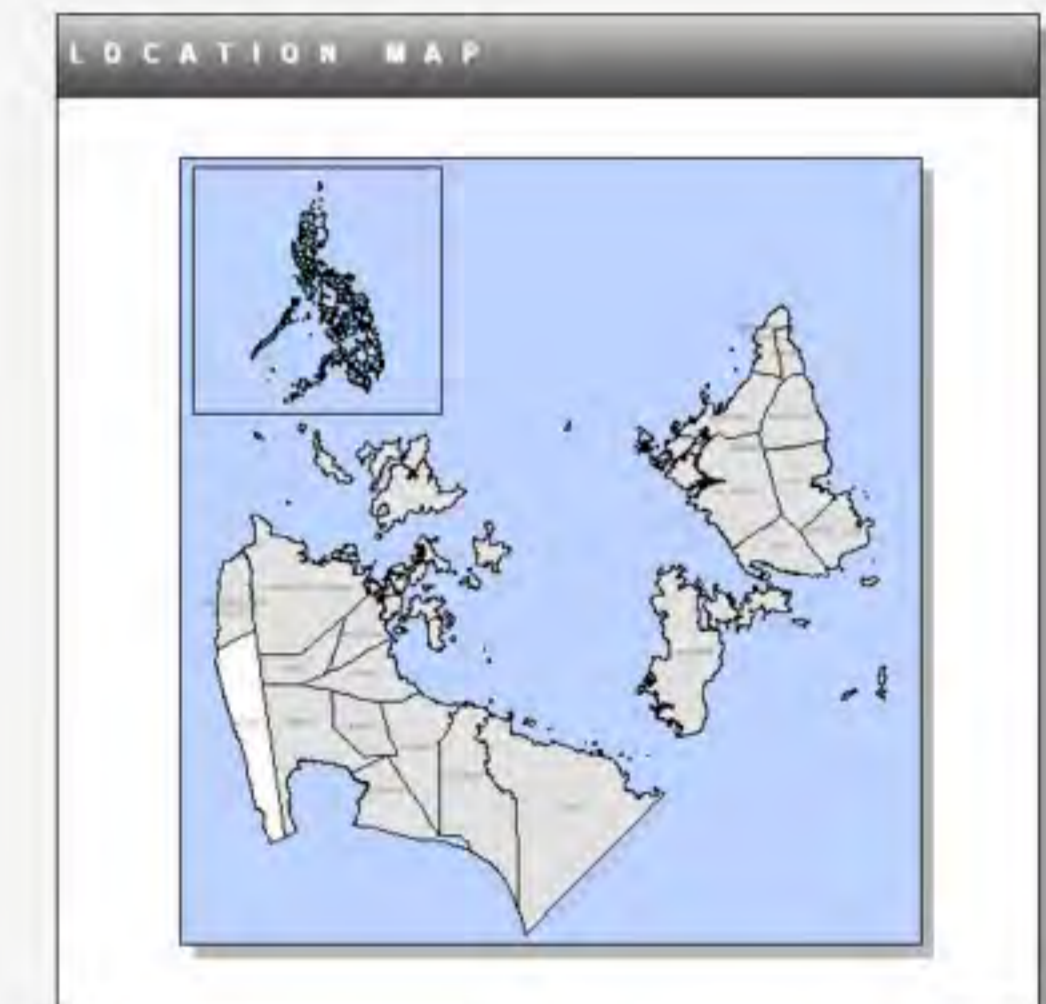
Spheroid: Clark 1866  
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Horizontal Datum: Luzon 1911  
Vertical Datum: Mean Sea Level

LEGEND	
	Provincial Boundary
	Municipal Boundary
	Barangay Boundary
	Main Road
	Secondary Road
	Trails
	Rivers and Creeks
	Rivers Intermittent
	Contour Index
	Contour Intermediate
	Contour Supplementary
	Contour Depression
	Coastline
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**SOURCES OF DATA**

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Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Malimono

Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

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# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF PILAR

Province of Surigao Del Norte  
Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
Projection: Universal Transverse Mercator (UTM)  
Horizontal Datum: Luzon 1911  
Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- ... Trails
- Rivers and Creeks
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Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Pilar  
Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, Ed. 2 - DMA, 1954 - 1955

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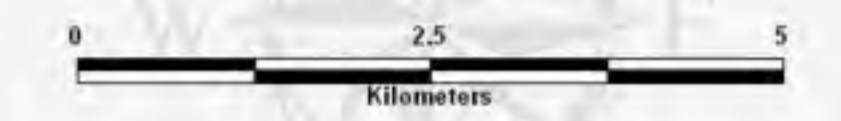
Mindanao, Philippines



## MUNICIPALITY OF PLACER

Province of Surigao Del Norte  
Region XIII-CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
Projection: Universal Transverse Mercator (UTM)  
Horizontal Datum: Luzon 1911  
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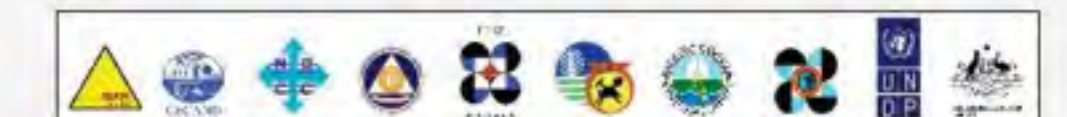


### SOURCES OF DATA

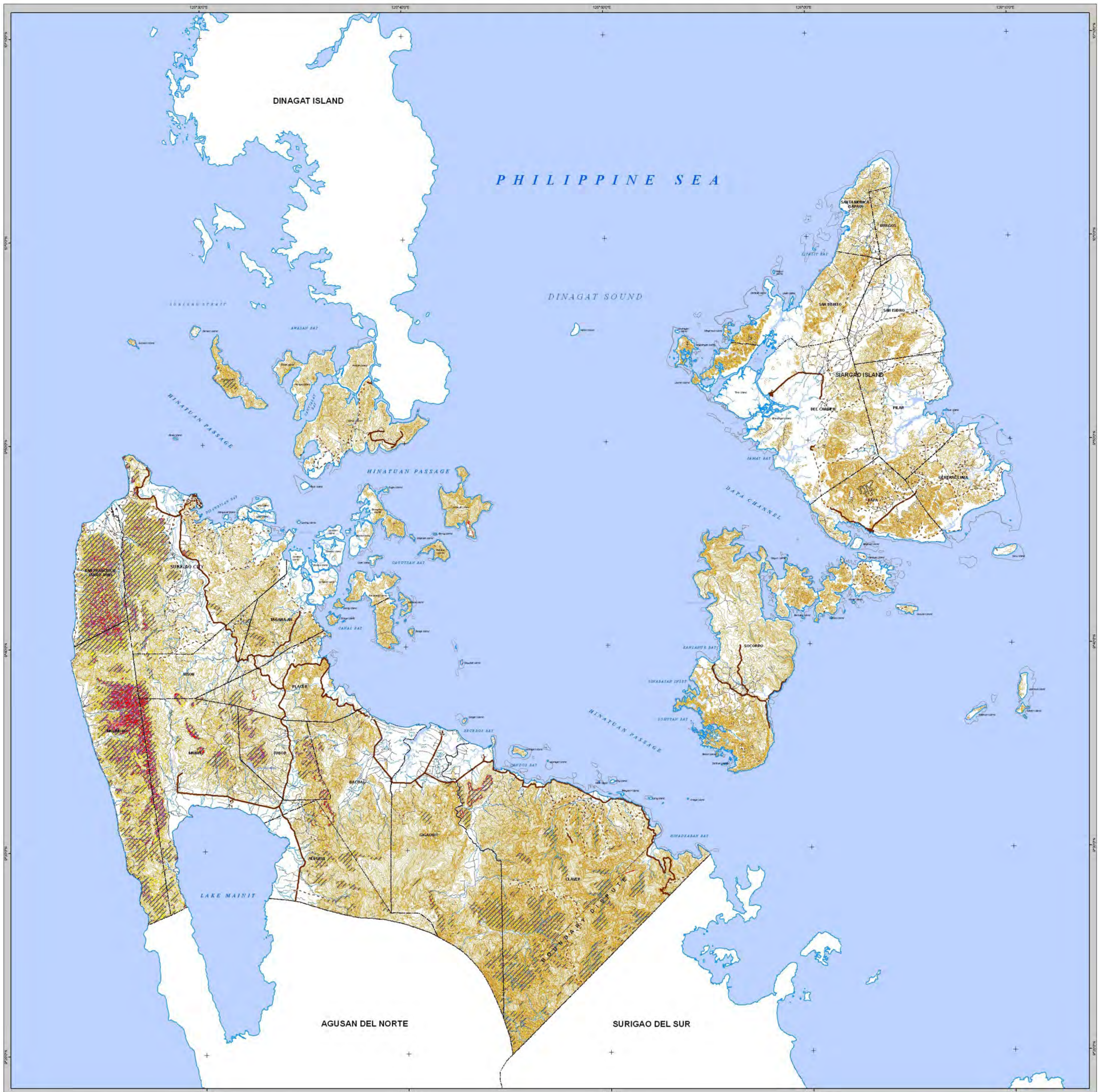
Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Placer  
Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

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# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP



**SOURCES OF DATA**  
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 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
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**LEGEND**

--- Provincial Boundary	--- Coastline
--- Municipal Boundary	--- Rivers and Creeks
--- Main Road	--- Rivers Intermittent
--- Secondary Road	--- Corals
--- Trails	--- Spot Elevation
--- Bridges	--- Fishpen
--- Contour Index	--- Water Body
--- Contour Intermediate	
--- Contour Supplementary	
--- Contour Depression	

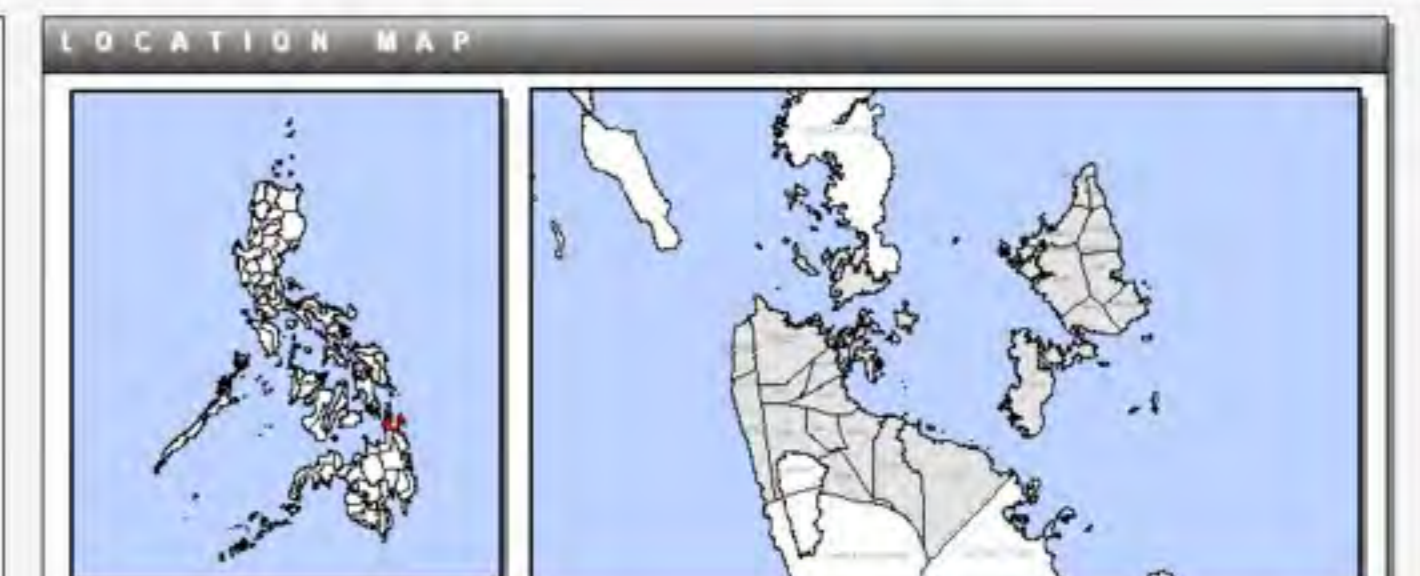
**SUSCEPTIBILITY**

High Susceptibility
Moderate Susceptibility
Low Susceptibility
Not Susceptible
Possible landslide depositional/affected zone

## PROVINCE OF SURIGAO DEL NORTE REGION XIII - CARAGA



Spheroid ..... Clark 1866  
 Projection ..... Universal Transverse Mercator (UTM)  
 Horizontal Datum ..... Luzon 1911  
 Vertical Datum ..... Mean Sea Level



**EXPLANATION**  
 Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF SAN BENITO

Province of Surigao Del Norte

Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- - - Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- ... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- × 1176 Spot Elevation
- Water Body

### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- ▨ Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatchured areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of San Benito  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED 2 - DMA, 1954 - 1955

**Disclaimer:**  
 Administrative boundaries are approximate.



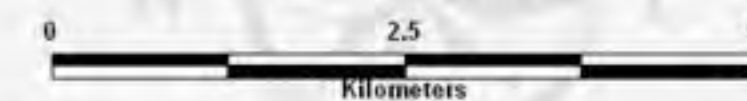
# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

## MUNICIPALITY OF SAN FRANCISCO

Province of Surigao Del Norte

Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- ..... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- ×1176 Spot Elevation
- Water Body

### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



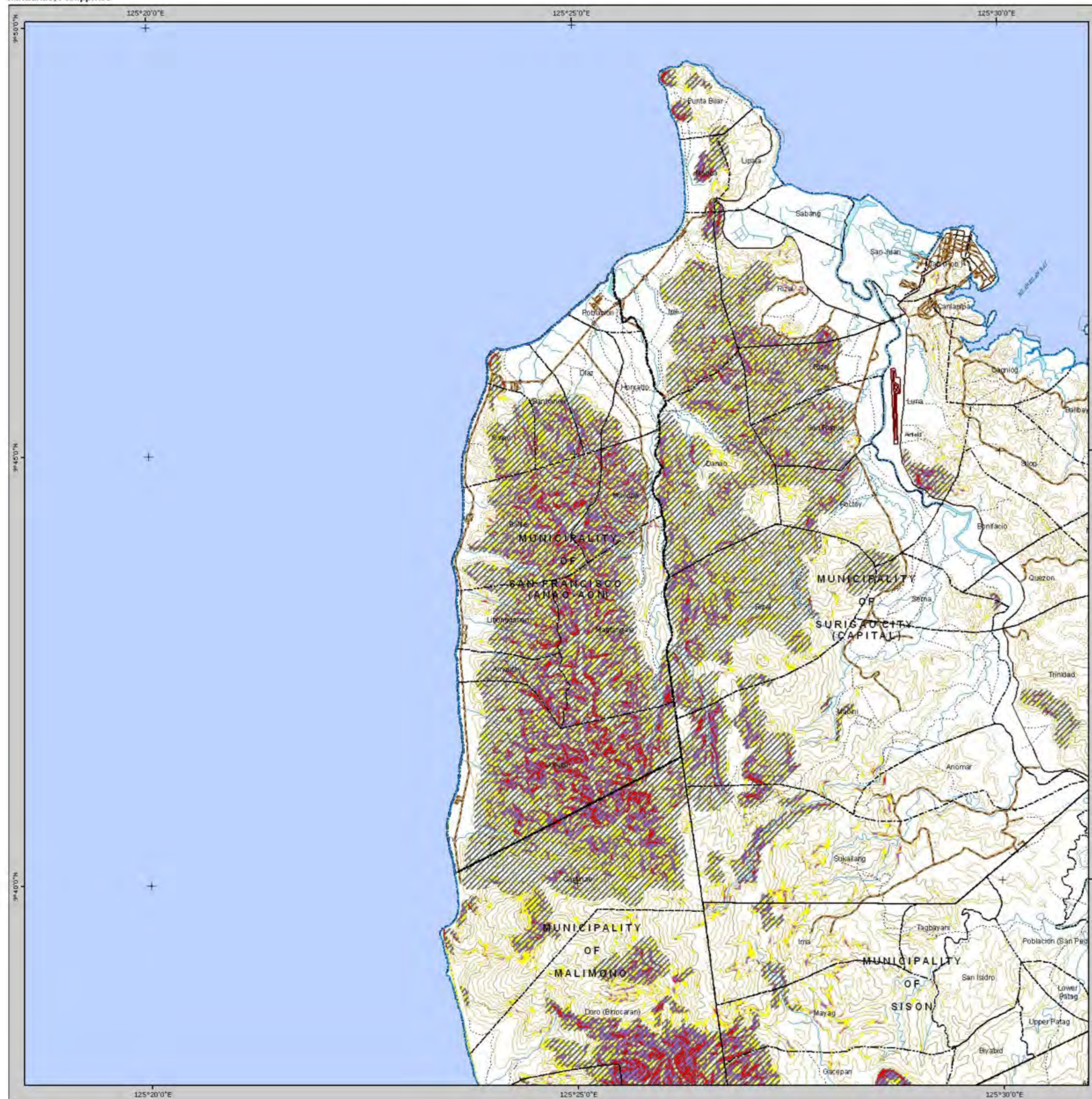
### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capital), Comprehensive Landuse Plan (CLUP) of San Francisco  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED 2 - DMA, 1954 - 1955

**Disclaimer:**  
 Administrative boundaries are approximate.



Mindanao, Philippines



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF SAN ISIDRO

Province of Surigao Del Norte

Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- ... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- × 1176 Spot Elevation
- Water Body

### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of San Isidro  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED 2 - DMA, 1954 - 1955

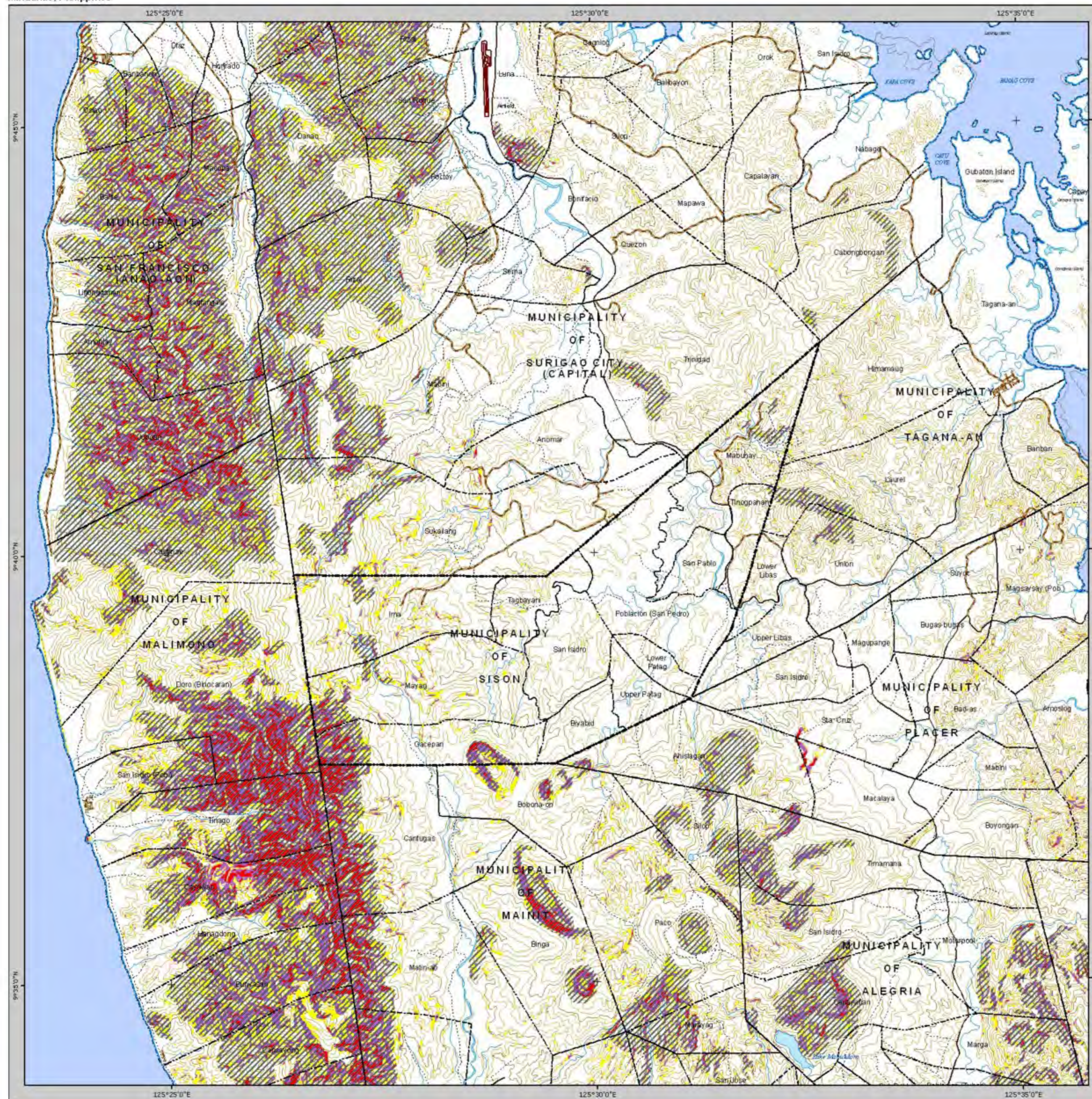
**Disclaimer:**  
 Administrative boundaries are approximate.





# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF SISON

Province of Surigao Del Norte  
Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
Projection: Universal Transverse Mercator (UTM)  
Horizontal Datum: Luzon 1911  
Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- ... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- × 1176 Spot Elevation
- Water Body

### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Sison  
Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

**Disclaimer:**  
Administrative boundaries are approximate.



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF SOCORRO

Province of Surigao Del Norte  
Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
Projection: Universal Transverse Mercator (UTM)  
Horizontal Datum: Luzon 1911  
Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- - - Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- ×1176 Spot Elevation
- Water Body

### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capital), Comprehensive Landuse Plan (CLUP) of Socorro  
Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

**Disclaimer:**  
Administrative boundaries are approximate.



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF STA. MONICA

Province of Surigao Del Norte  
Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
Projection: Universal Transverse Mercator (UTM)  
Horizontal Datum: Luzon 1911  
Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- ==== Main Road
- ==== Secondary Road
- ..... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- ×1176 Spot Elevation
- Water Body

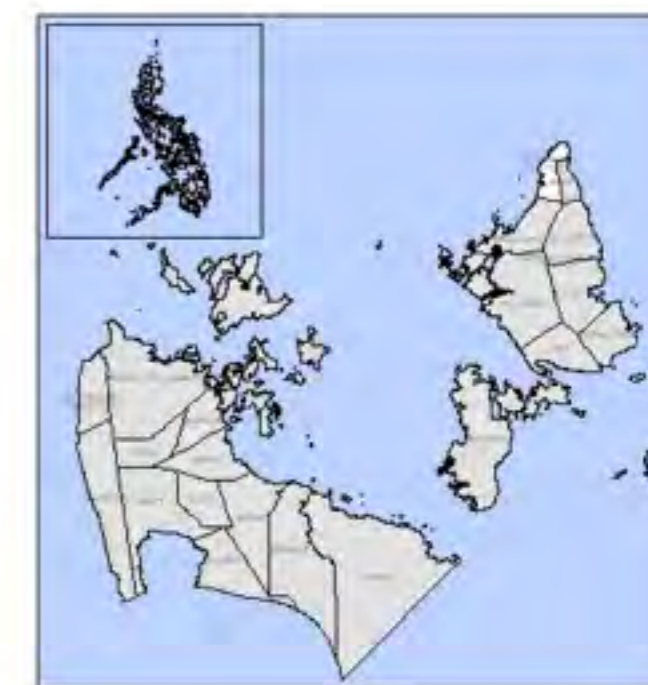
### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Sta. Monica  
Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

**Disclaimer:**  
Administrative boundaries are approximate.



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOSTI) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Surigao City  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

**Disclaimer:**  
 Administrative boundaries are approximate

## LEGEND

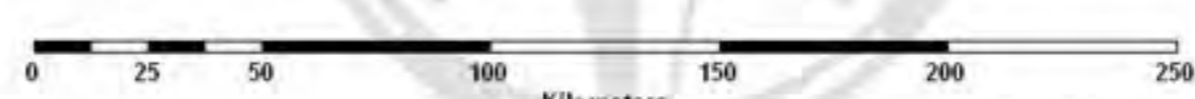
- |                           |                  |
|---------------------------|------------------|
| --- Provincial Boundary   | — Coastline      |
| --- Municipal Boundary    | — Bridges        |
| --- Barangay Boundary     | • Spot Elevation |
| — Rivers and Creeks       | — Water Body     |
| --- Rivers Intermittent   |                  |
| --- Contour Index         |                  |
| --- Contour Intermediate  |                  |
| --- Contour Supplementary |                  |
| --- Contour Depression    |                  |

## SUSCEPTIBILITY

- |  |
|--|
| <span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span> High Susceptibility   |
| <span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span> Moderate Susceptibility  |
| <span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> Low Susceptibility   |
| <span style="display:inline-block; width:15px; height:15px; background-color:white; border:1px solid black;"></span> Not Susceptible   |
| <span style="display:inline-block; width:15px; height:15px; border:1px solid black; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);"></span> Possible landslide depositional/affected zone |

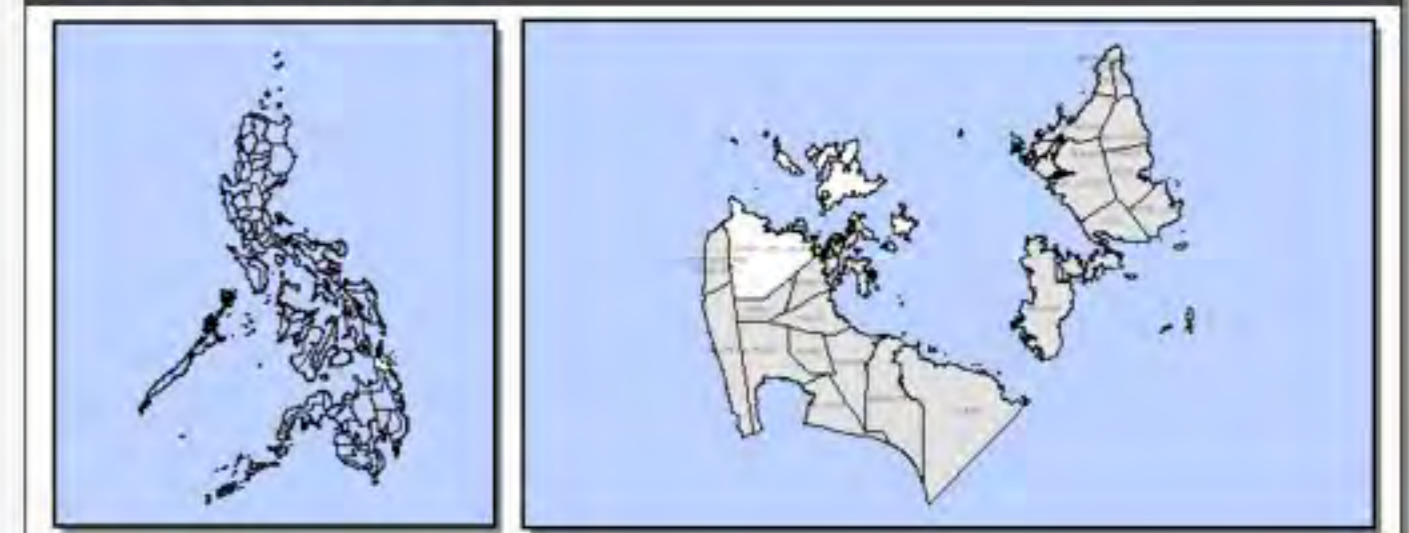
## SURIGAO CITY Province of Surigao Del Norte Region XIII - CARAGA

Scale 1:50,000



Spheroid: ..... Clark 1866  
 Projection: ..... Universal Transverse Mercator (UTM)  
 Horizontal Datum: ..... Luzon 1911  
 Vertical Datum: ..... Mean Sea Level

## LOCATION MAP



## EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF TAGANA-AN

Province of Surigao Del Norte

Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
 Projection: Universal Transverse Mercator (UTM)  
 Horizontal Datum: Luzon 1911  
 Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- ×1176 Spot Elevation
- Water Body

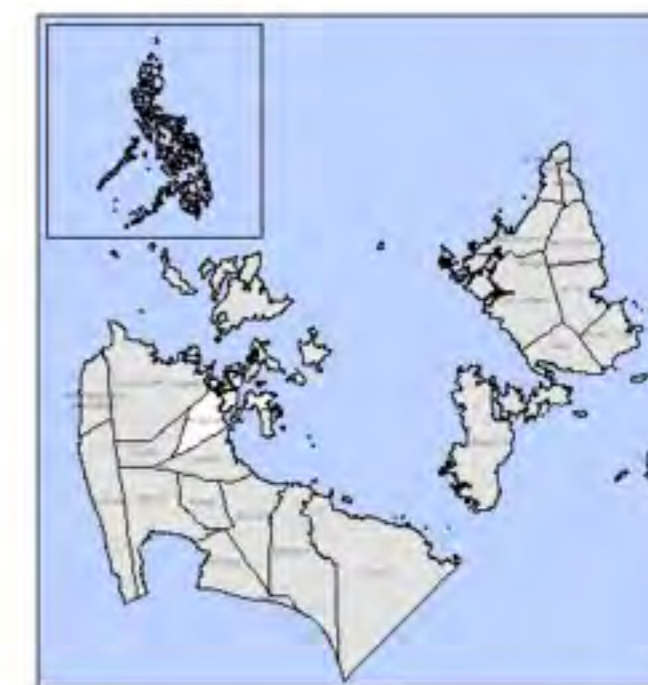
### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



### SOURCES OF DATA

Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Tagana-an  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED 2 - DMA, 1954 - 1955

**Disclaimer:**  
 Administrative boundaries are approximate.



# EARTHQUAKE-INDUCED LANDSLIDE HAZARD MAP

Mindanao, Philippines



## MUNICIPALITY OF TUBOD

Province of Surigao Del Norte  
Region XIII - CARAGA

Scale 1:50,000



Spheroid: Clark 1866  
Projection: Universal Transverse Mercator (UTM)  
Horizontal Datum: Luzon 1911  
Vertical Datum: Mean Sea Level

### LEGEND

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- ==== Main Road
- ==== Secondary Road
- ..... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- ×1176 Spot Elevation
- Water Body

### SUSCEPTIBILITY

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Not Susceptible
- Possible landslide depositional/affected zone

### EXPLANATION

Earthquake-induced landslide hazard map was produced by simulating the largest possible earthquake magnitude occurring in the area. Landslide potentials were calculated using a) the computed Factor of Safety (FoS), b) simulated ground shaking by Fukushima and Tanaka, and c) critical acceleration of slope by Newmark method. The result shows the possible landslide initiation zones at varying degrees, i.e., high, moderate and low. Hatched areas show the possible depositional extent of landslide materials and is considered part of the areas that may be affected by landslides.

### LOCATION MAP



### SOURCES OF DATA

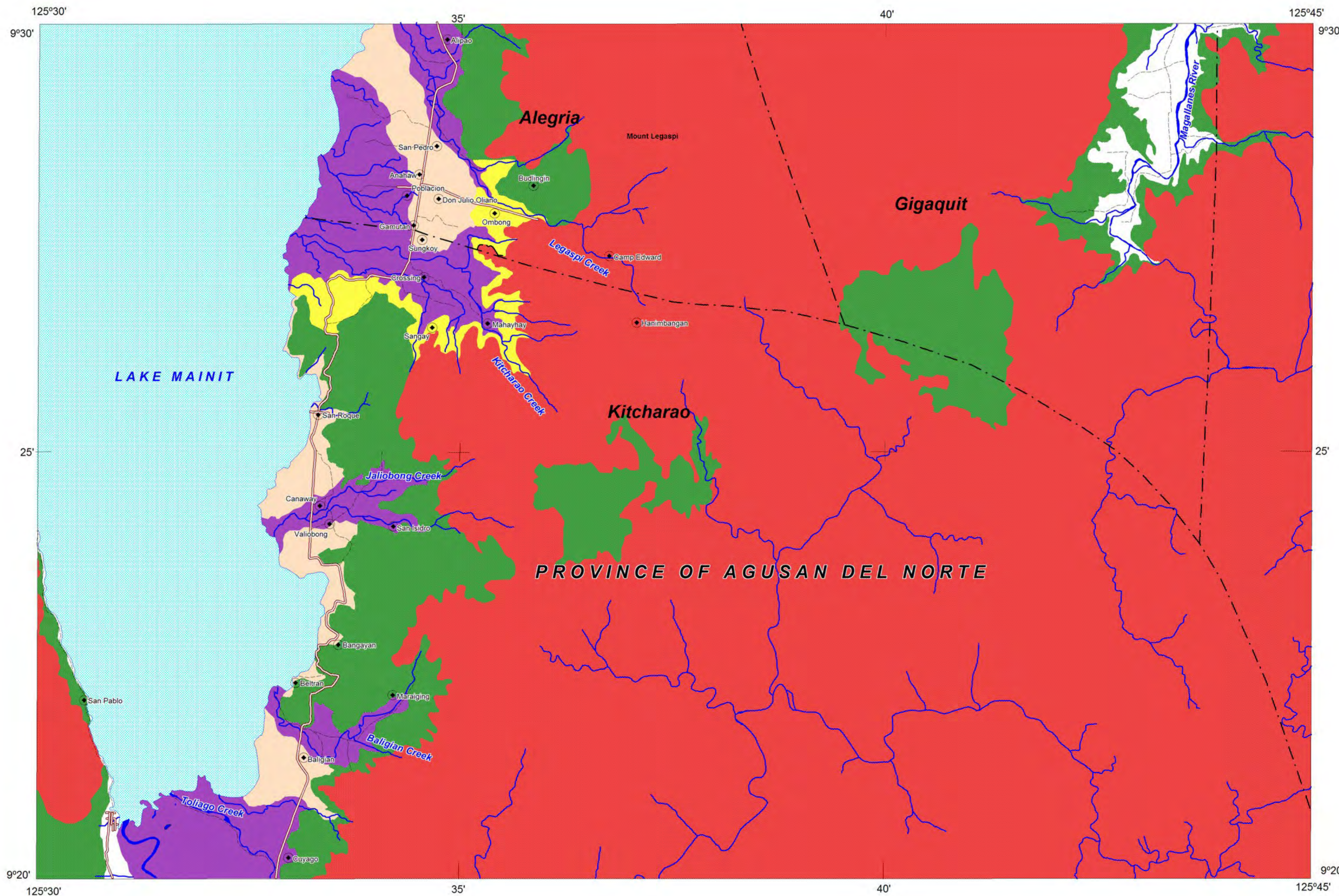
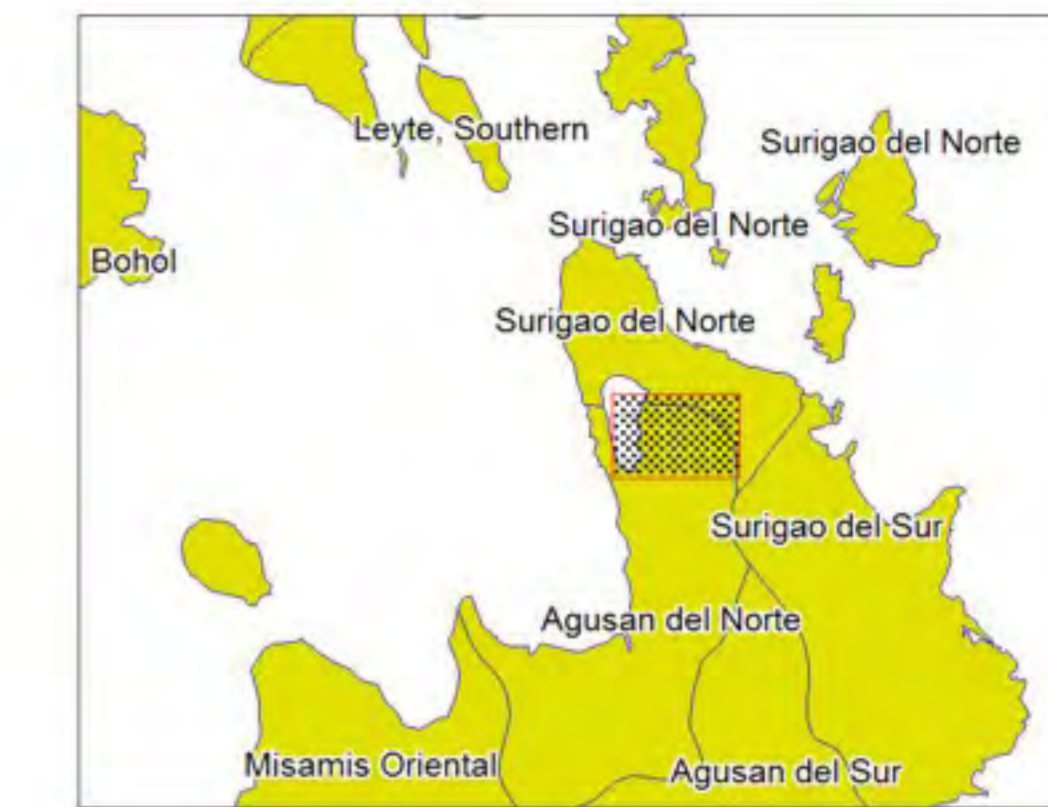
Hazard Data from Philippine Institute of Volcanology and Seismology (PHIVOLCS - DOST) 2007  
Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Tubod  
Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
Ed. 1 - AMS, ED 2 - DMA, 1954 - 1955

**Disclaimer:**  
Administrative boundaries are approximate.



# LANDSLIDE AND FLOOD SUSCEPTIBILITY MAP OF ALEGRIA QUADRANGLE SURIGAO DEL NORTE PROVINCE, PHILIPPINES

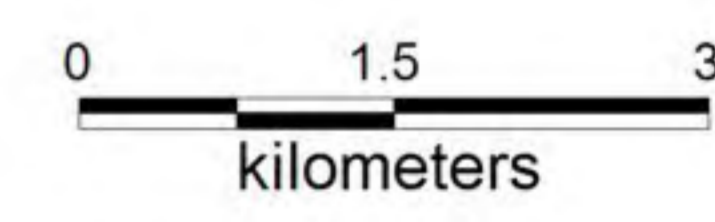
INDEX MAP



**LEGEND :**

- **High susceptibility to landslide**  
Areas with high landslide susceptibility rating have active/recent landslides and tension cracks that would directly affect the community. Those with steep slopes and drainages that are prone to landslide damming are also highly susceptible to landslides.
- **Moderate susceptibility to landslide**  
Areas with moderate landslide susceptibility rating have inactive/old landslides and tension cracks which are located away from the community. These areas usually have moderate slopes.
- **Low susceptibility to landslide**  
Areas with low to gentle slopes and lacking tension cracks have low landslide susceptibility rating.
- **High susceptibility to flooding**  
Areas with greater than 1 meter flood height. These areas are usually flooded for several hours during heavy rains; include landforms of topographic lows such as active river channels, abandoned river channels and areas along river banks; also prone to flashfloods.
- **Low to moderate susceptibility to flooding**  
Areas with less than 1.0 meter flood height. These are usually inundated during prolonged and extensive heavy rainfall or extreme weather condition

- Roads
- River
- Municipal boundary
- Barangay center location

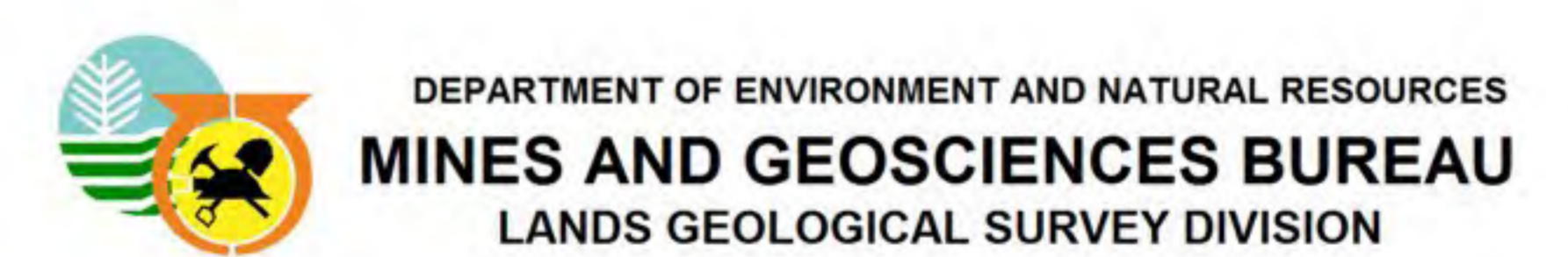


TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

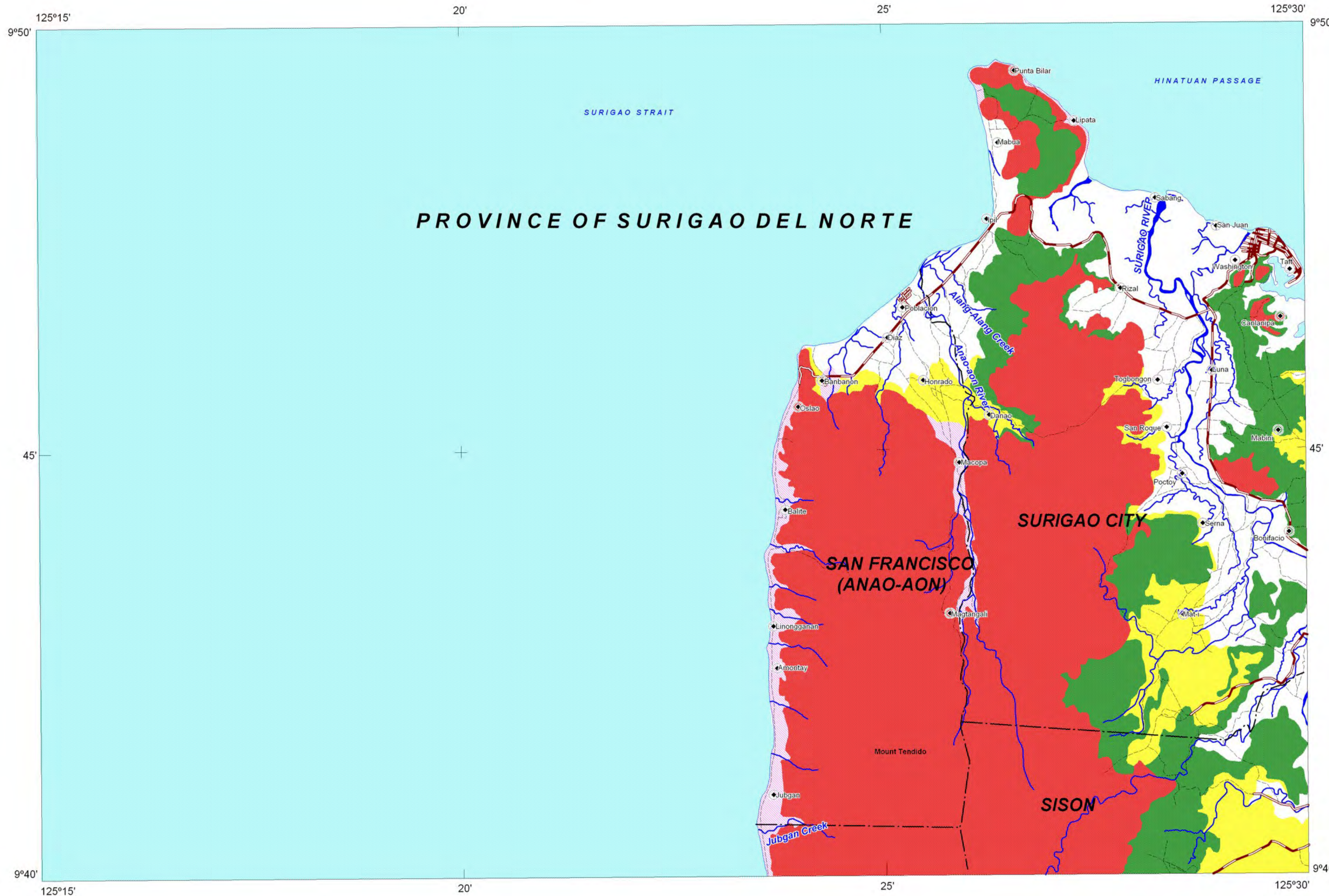
**GIS Processing :**  
Lands Geological Survey Division

**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

**Base Map :**  
Sheet No. 4148 III "Alegria Quadrangle"



# LANDSLIDE SUSCEPTIBILITY MAP OF ANAO-AON QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES

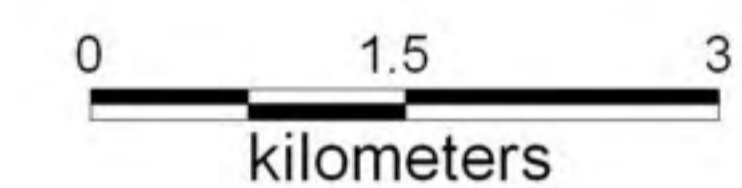


INDEX MAP



**LEGEND :**

- **High Susceptibility to Landslide**  
Areas with high landslide susceptibility rating have active/recent landslides and tension cracks that would directly affect the community. Those with steep slopes and drainages that are prone to landslide damming are also highly susceptible to landslides.
- **Moderate Susceptibility to Landslide**  
Areas with moderate landslide susceptibility rating have inactive/old landslides and tension cracks which are located away from the community. These areas usually have moderate slopes.
- **Low Susceptibility to Landslide**  
Areas with low to gentle slopes and lacking tension cracks have low landslide susceptibility rating.
- Possible Landslide Debris Accumulation Zone**  
These are areas where landslide debris could accumulate.
- Roads
- River
- Municipal boundary
- Barangay hall location



TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

**GIS Processing :**  
Lands Geological Survey Division

**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

**Base Map :**  
Sheet No. 4049 II "Anao-aon Quadrangle"

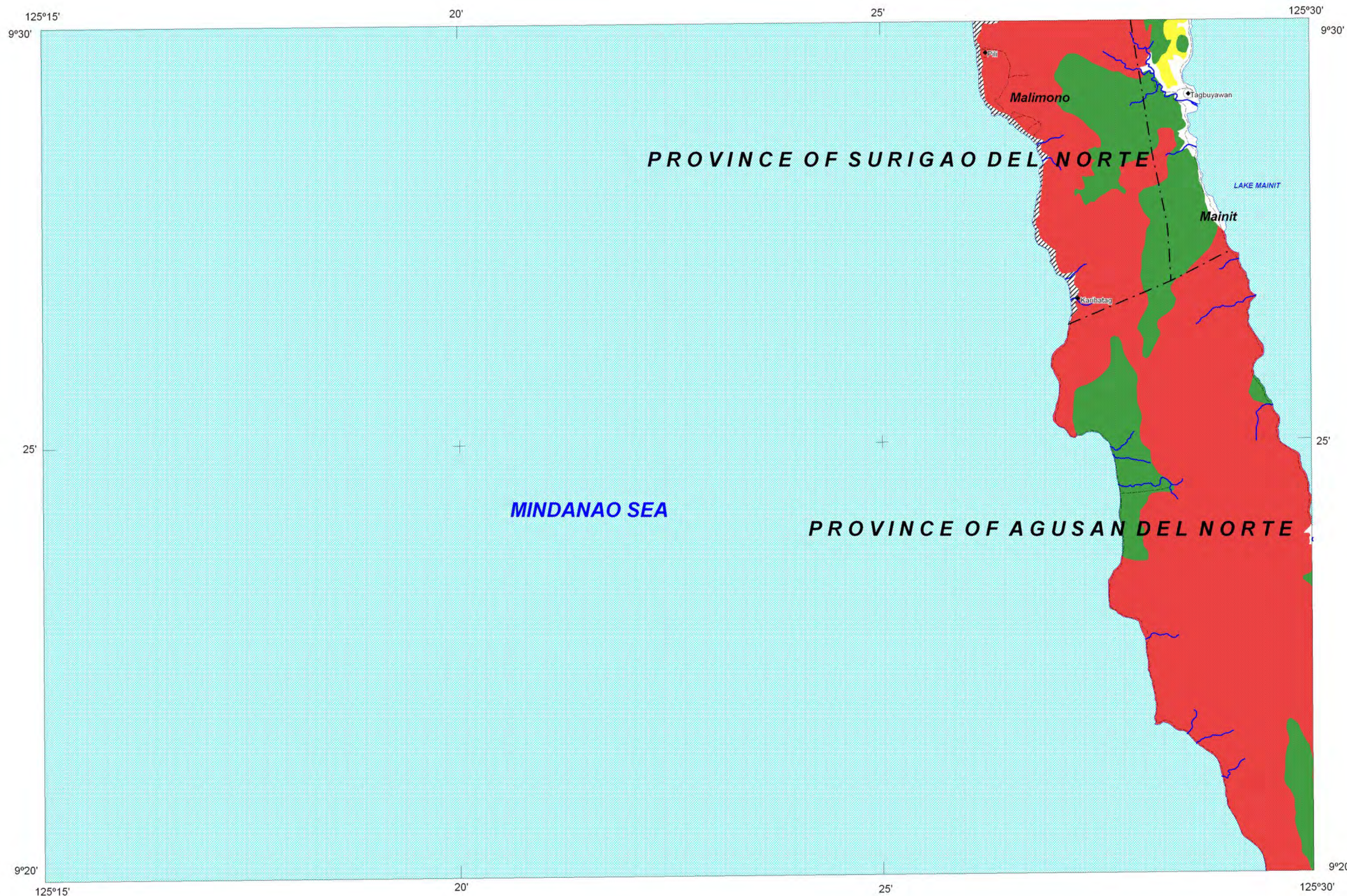
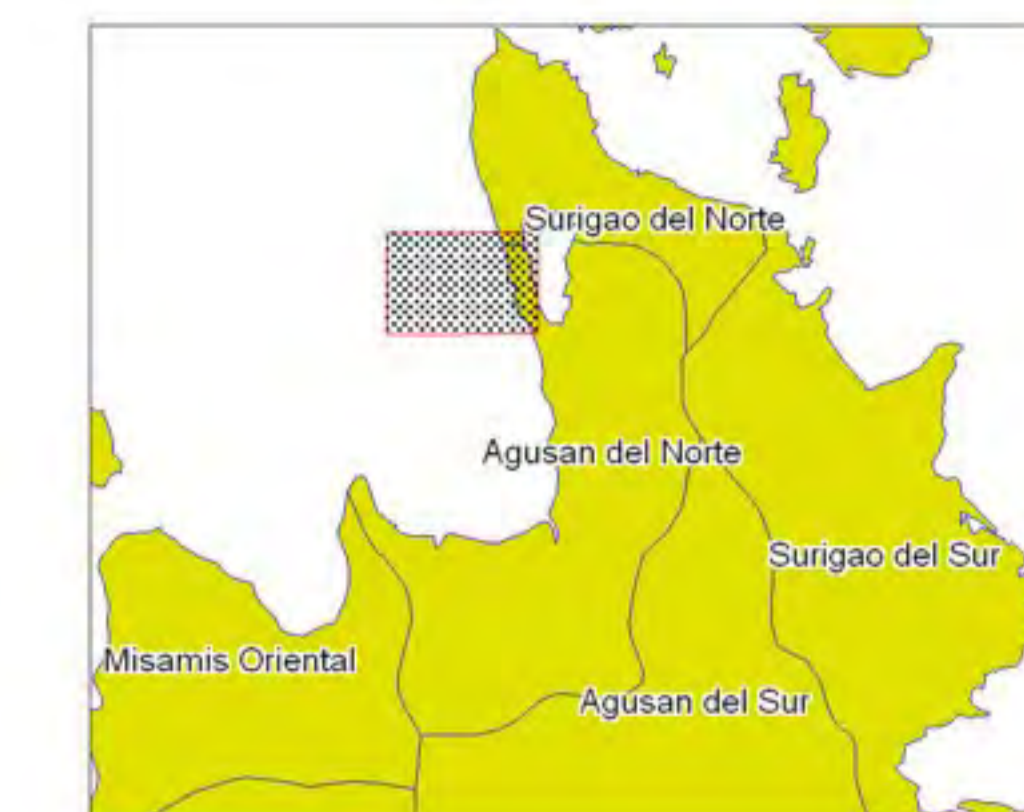


LANDS GEOLOGICAL SURVEY DIVISION  
**MINES AND GEOSCIENCES BUREAU**  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES



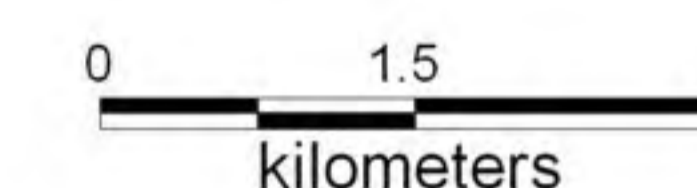
# LANDSLIDE SUSCEPTIBILITY MAP OF BOLOBOLO QUADRANGLE SURIGAO DEL NORTE AND AGUSAN DEL NORTE PROVINCES, PHILIPPINES

INDEX MAP



**LEGEND :**

- **High susceptibility to landslide**  
Areas with high landslide susceptibility rating have active/recent landslides and tension cracks that would directly affect the community. Those with steep slopes and drainages that are prone to landslide damming are also highly susceptible to landslides.
- **Moderate susceptibility to landslide**  
Areas with moderate landslide susceptibility rating have inactive/old landslides and tension cracks which are located away from the community. These areas usually have moderate slopes.
- **Low susceptibility to landslide**  
Areas with low to gentle slopes and lacking tension cracks have low landslide susceptibility rating.
- Possible landslide debris accumulation zone**  
These are areas where landslide debris could accumulate.
- Roads
- River
- Municipal boundary
- Barangay center location



TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

**GIS Processing :**  
Lands Geological Survey Division

**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

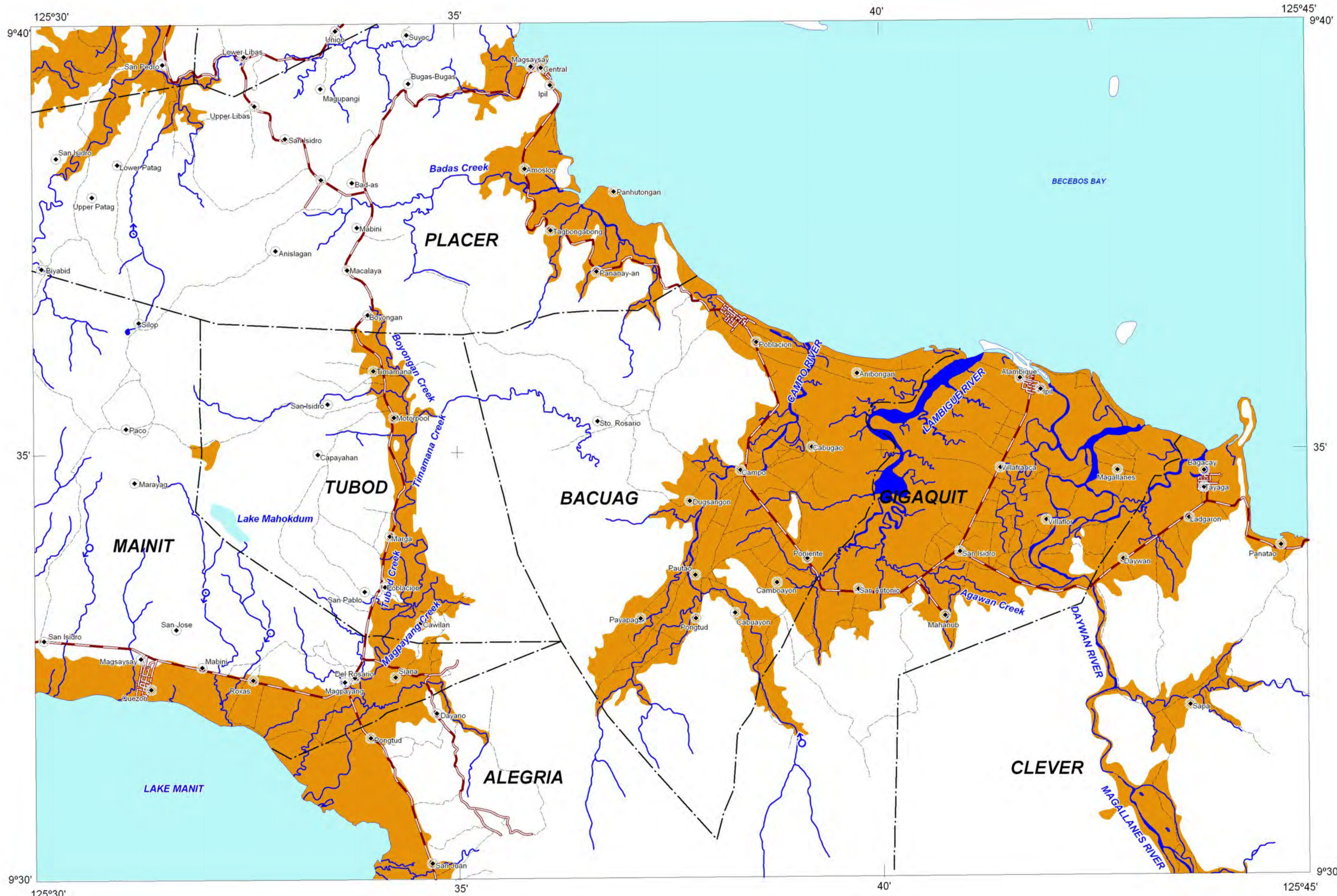
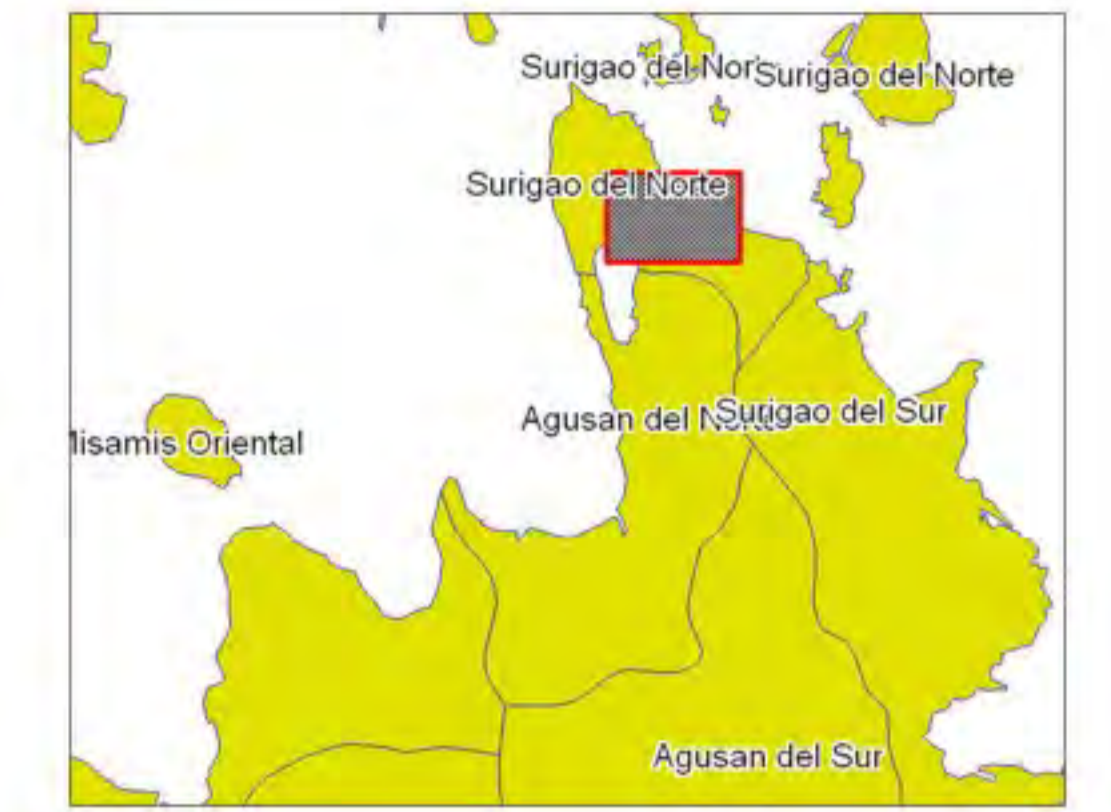
**Base Map :**  
Sheet No. 4048 II "Bolobolo Quadrangle"



DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES  
**MINES AND GEOSCIENCES BUREAU**  
LANDS GEOLOGICAL SURVEY DIVISION

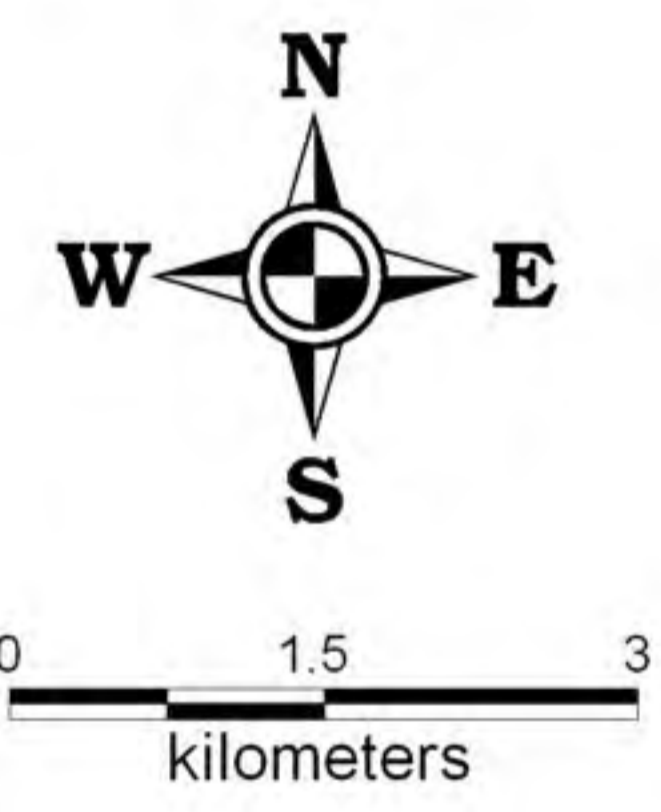
# FLOOD SUSCEPTIBILITY MAP OF MAINIT QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES

INDEX MAP



**LEGEND :**

- Areas Susceptible to Flood  
Areas which are subjected to recurring inundation when the level of a body of water rises and overflows its natural or artificial confines due to heavy or continuous rainfall.
- Areas Not Susceptible to Flood  
Areas where elevation is greater than 20 meters.
- Roads
- Flashflood Exit Points
- River
- Municipal boundary
- Barangay hall location



TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

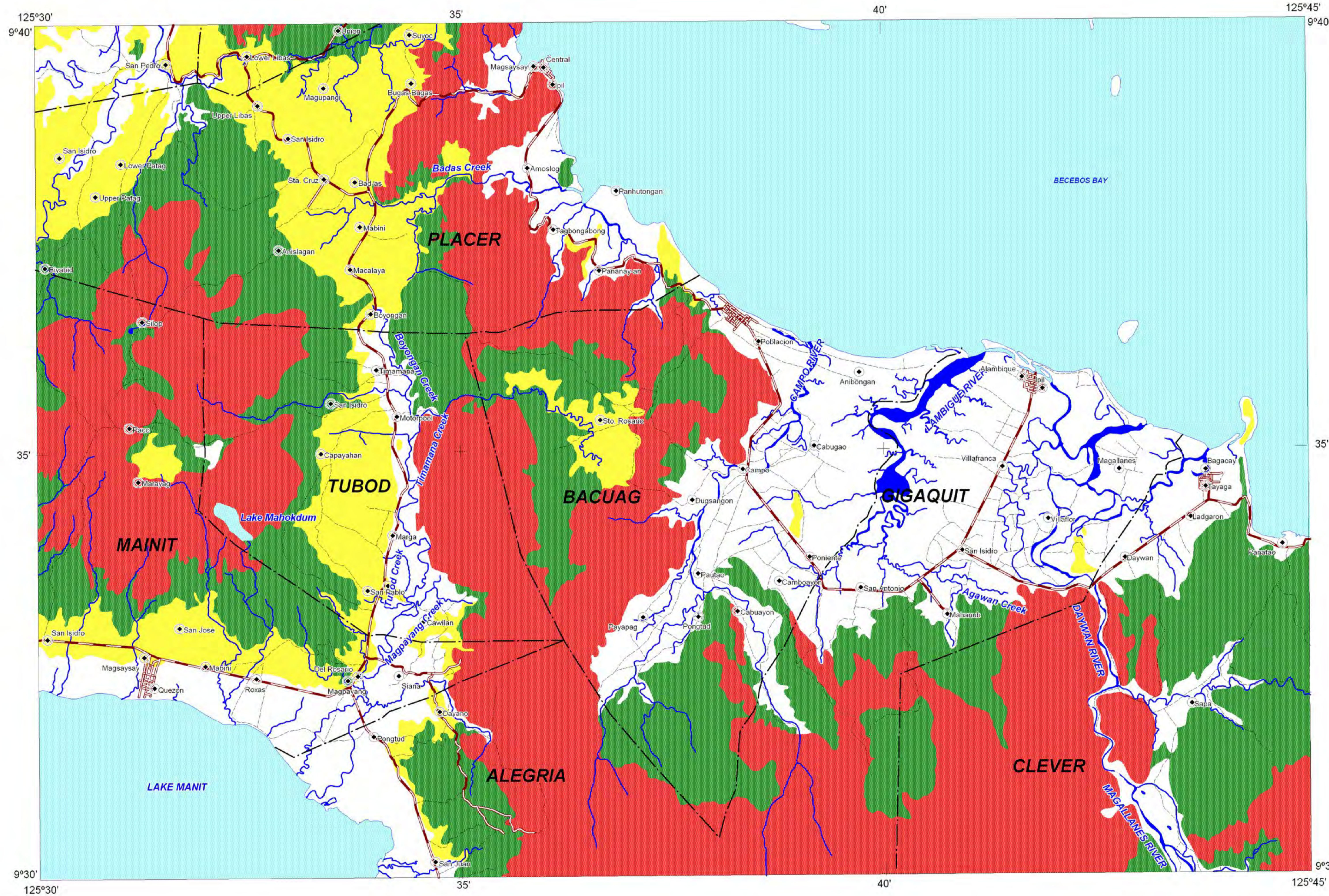
**GIS Processing :**  
Lands Geological Survey Division

**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

**Base Map :**  
Sheet No. 4148 IV "Mainit Quadrangle"

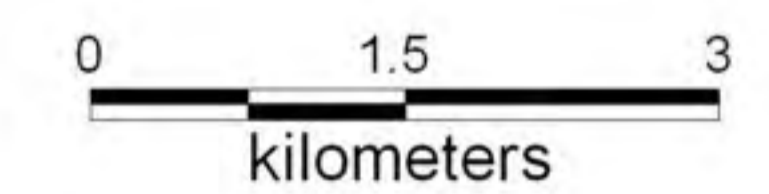
# LANDSLIDE SUSCEPTIBILITY MAP OF MAINIT QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES

INDEX MAP



**LEGEND :**

- **High Susceptibility to Landslide**  
Areas with high landslide susceptibility rating have active/recent landslides and tension cracks that would directly affect the community. Those with steep slopes and drainages that are prone to landslide damming are also highly susceptible to landslides.
- **Moderate Susceptibility to Landslide**  
Areas with moderate landslide susceptibility rating have inactive/old landslides and tension cracks which are located away from the community. These areas usually have moderate slopes.
- **Low Susceptibility to Landslide**  
Areas with low to gentle slopes and lacking tension cracks have low landslide susceptibility rating.
- Roads
- River
- Municipal boundary
- Barangay hall location



TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

**GIS Processing :**  
Lands Geological Survey Division

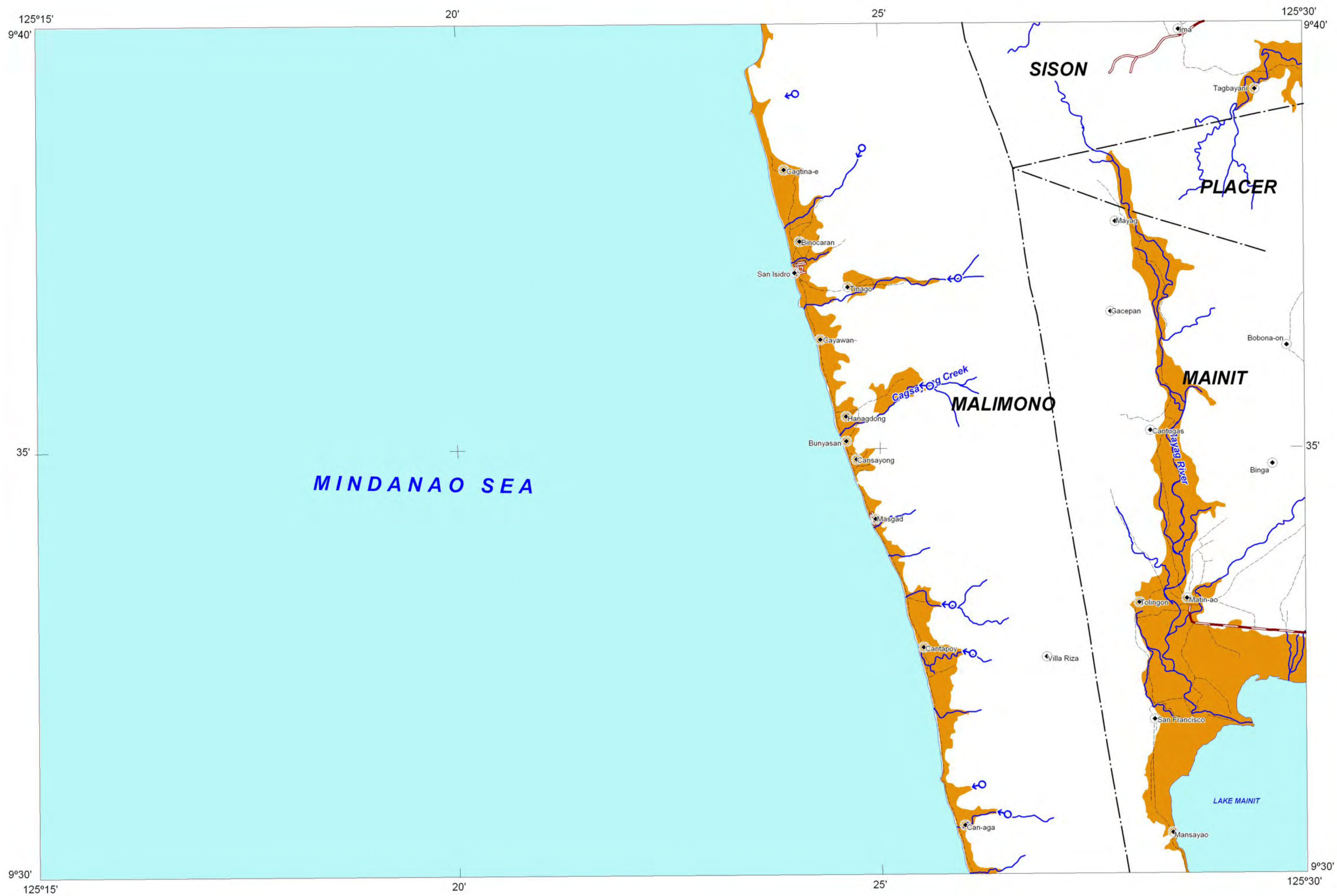
**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

**Base Map :**  
Sheet No. 4148 IV "Mainit Quadrangle"



LANDS GEOLOGICAL SURVEY DIVISION  
**MINES AND GEOSCIENCES BUREAU**  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

# FLOOD SUSCEPTIBILITY MAP OF MALIMONO QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES

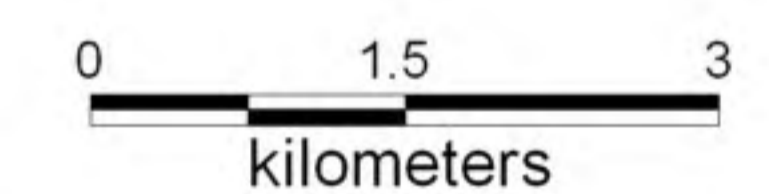


INDEX MAP



**LEGEND :**

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- Flashflood Exit Points
- River
- Municipal boundary
- Barangay hall location



TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

**GIS Processing :**  
Lands Geological Survey Division

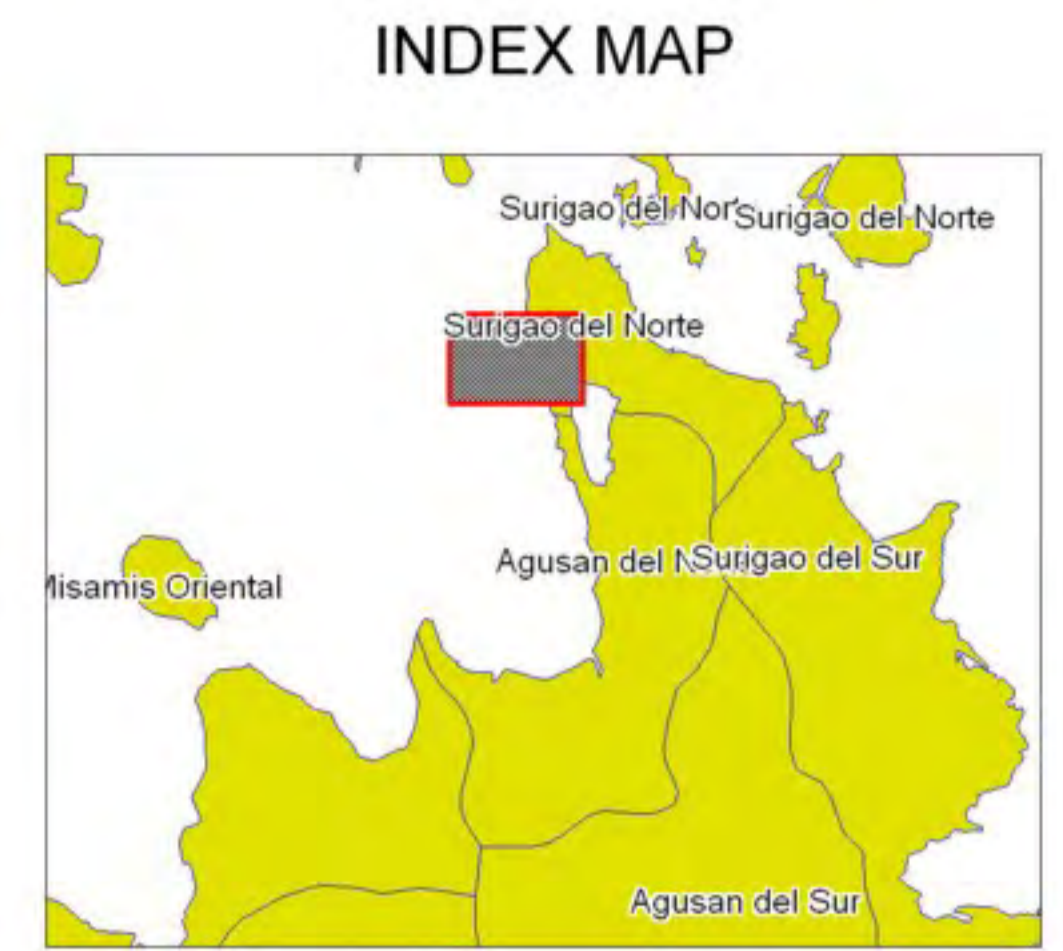
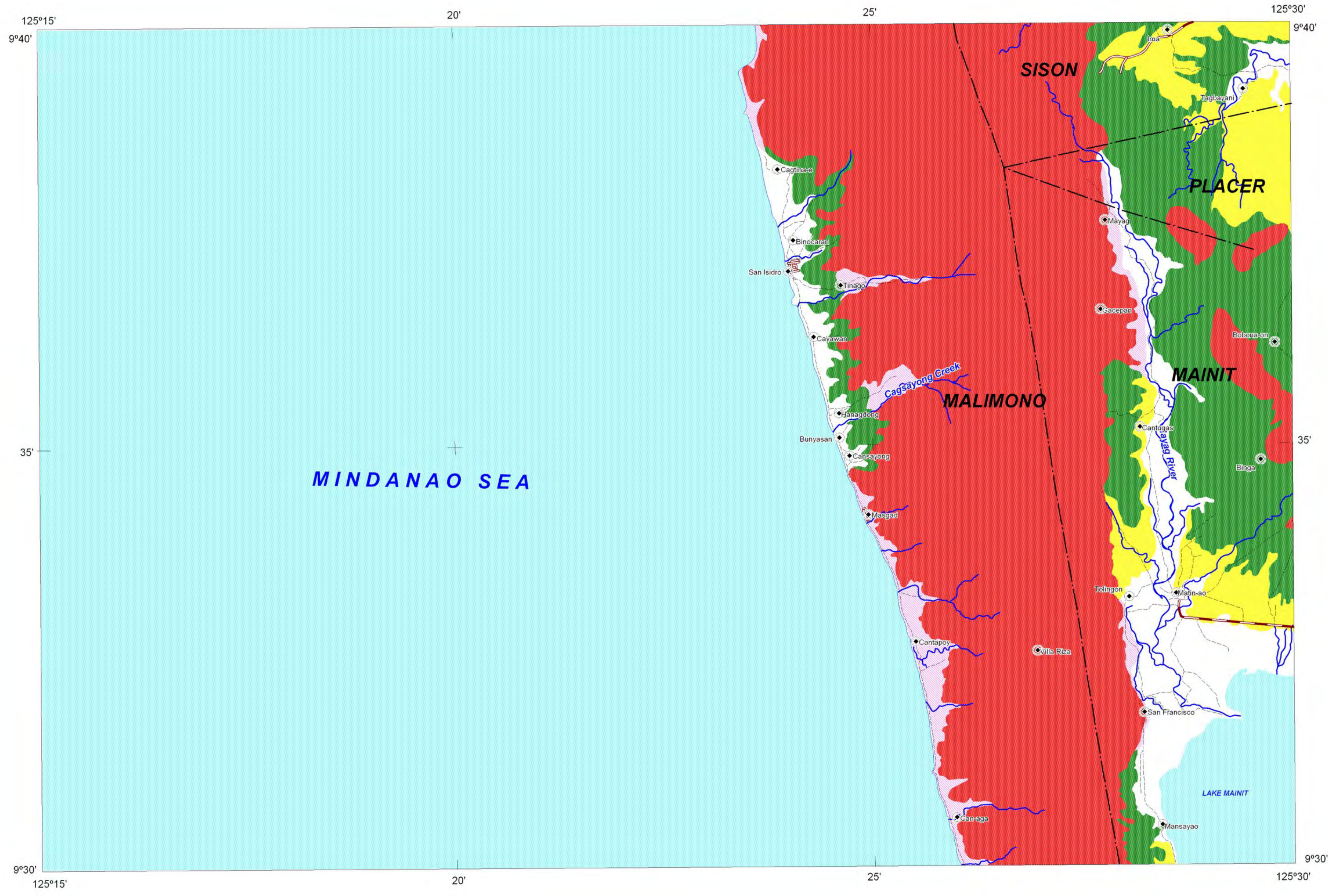
**Data Sources:**  
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Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

**Base Map :**  
Sheet No. 4048 I "Malimono Quadrangle"

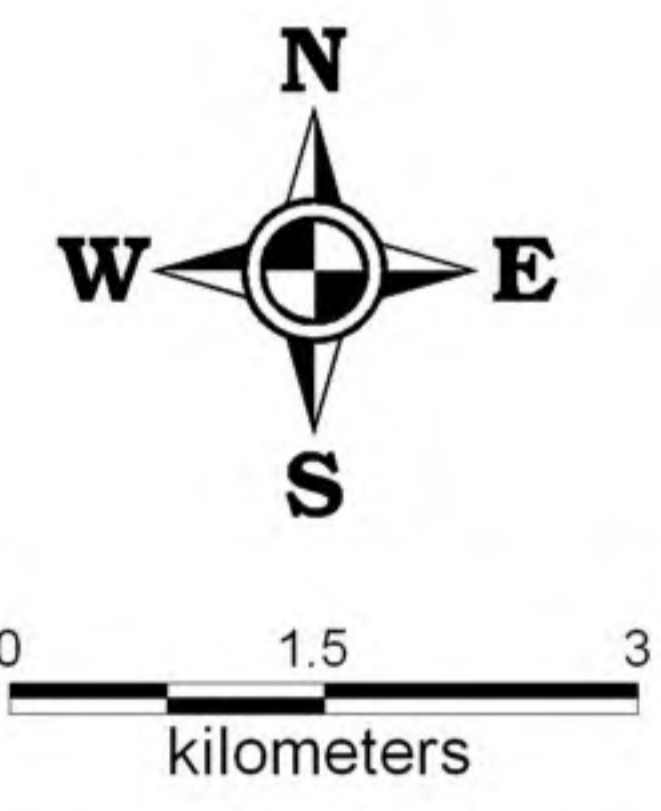


LANDS GEOLOGICAL SURVEY DIVISION  
**MINES AND GEOSCIENCES BUREAU**  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

# LANDSLIDE SUSCEPTIBILITY MAP OF MALIMONO QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES



- LEGEND :**
- **High Susceptibility to Landslide**  
Areas with high landslide susceptibility rating have active/recent landslides and tension cracks that would directly affect the community. Those with steep slopes and drainages that are prone to landslide damming are also highly susceptible to landslides.
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Areas with low to gentle slopes and lacking tension cracks have low landslide susceptibility rating.
  - Possible Landslide Debris Accumulation Zone**  
These are areas where landslide debris could accumulate.
  - Roads
  - River
  - Municipal boundary
  - Barangay hall location



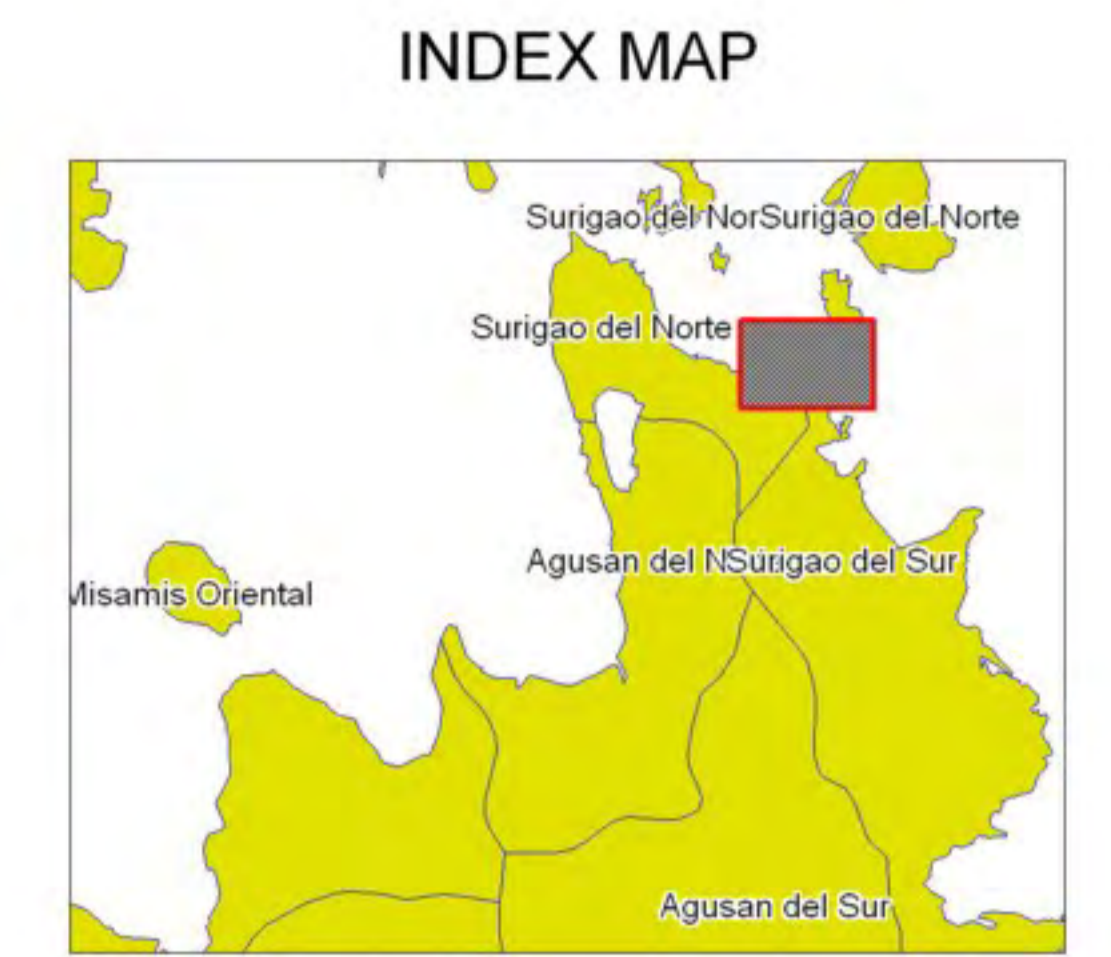
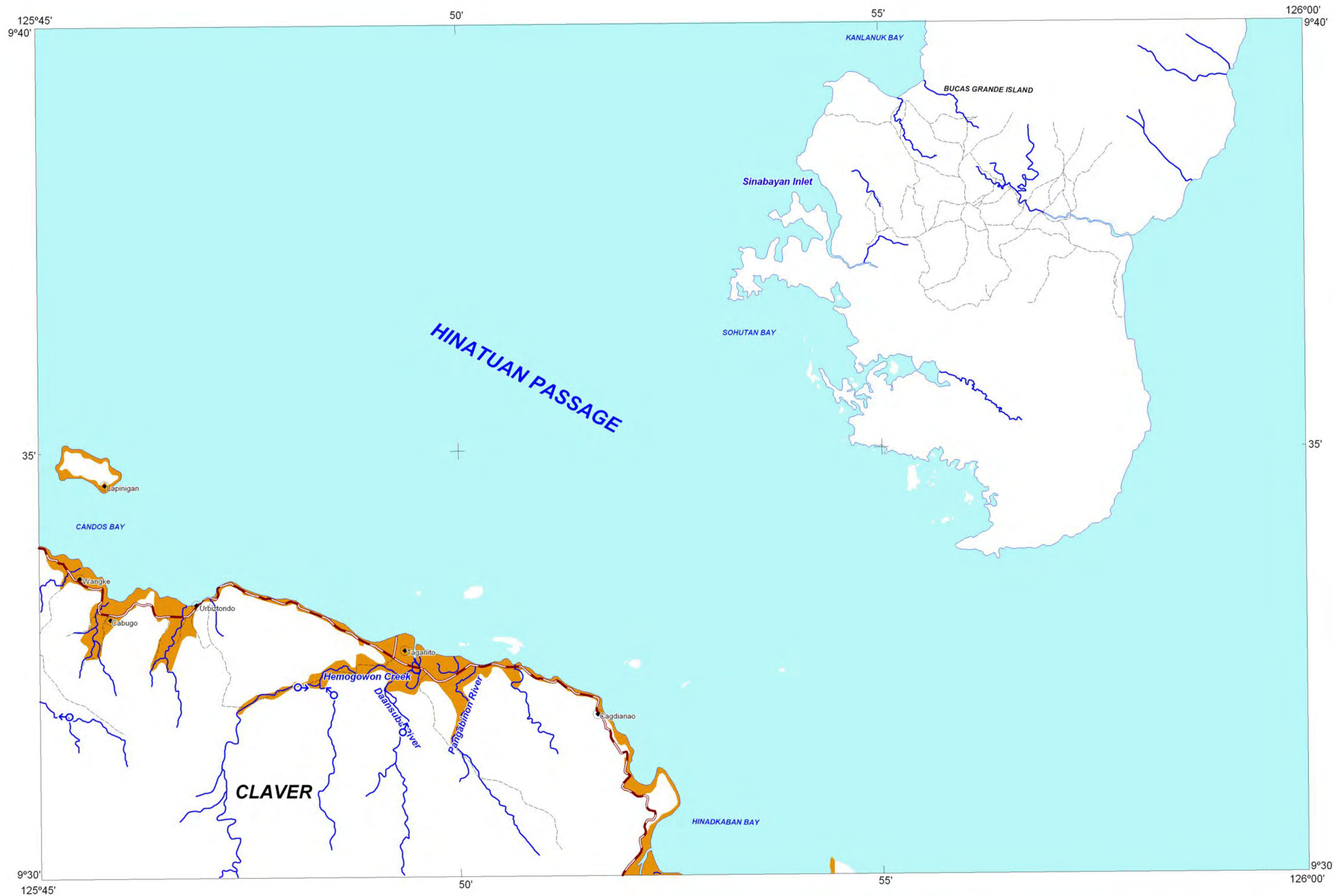
TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

**GIS Processing :**  
Lands Geological Survey Division

**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

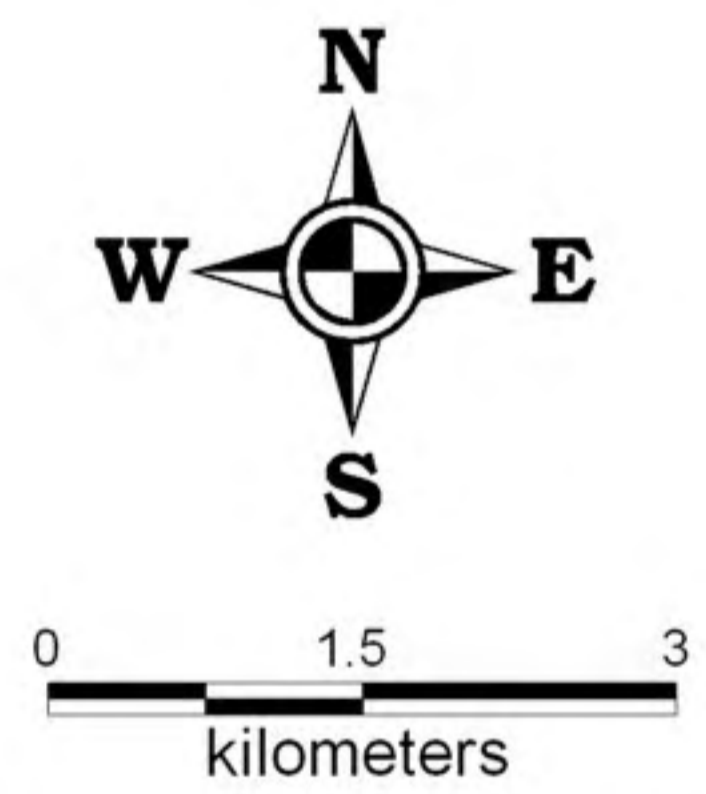
**Base Map :**  
Sheet No. 4048 I "Malimono Quadrangle"

# FLOOD SUSCEPTIBILITY MAP OF SOCORRO QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES



**LEGEND :**

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- Areas Not Susceptible to Flood  
Areas where elevation is greater than 20 meters.
- Roads
- Flashflood Exit Points
- River
- Municipal boundary
- Barangay hall location



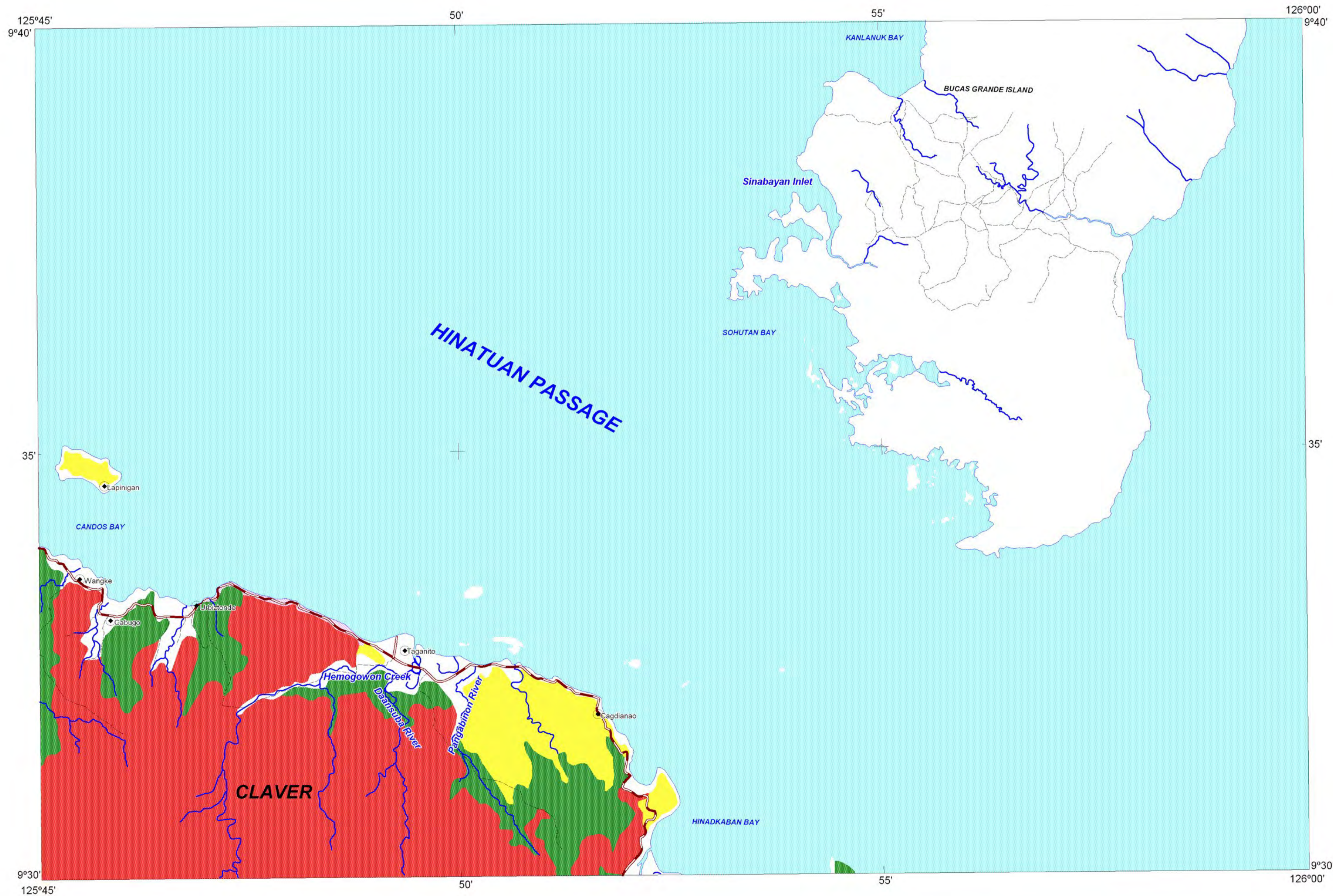
TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

**GIS Processing :**  
Lands Geological Survey Division

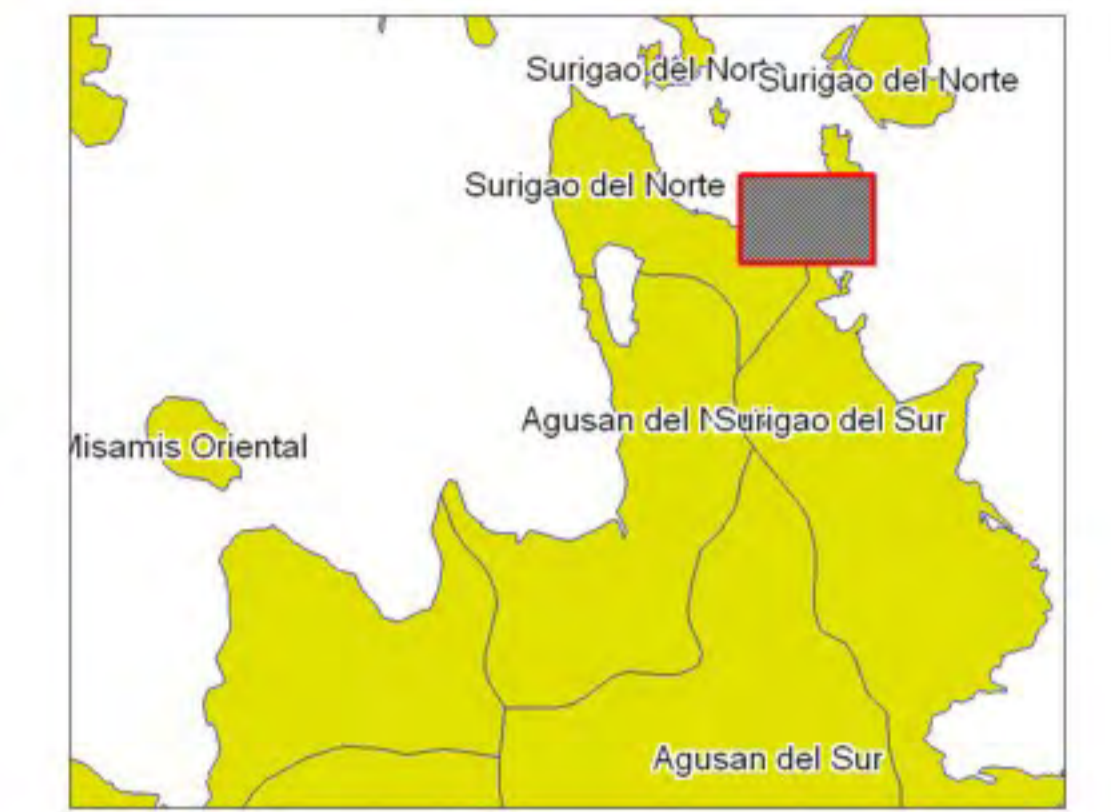
**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

**Base Map :**  
Sheet No. 4148 I "Socorro Quadrangle"

# LANDSLIDE SUSCEPTIBILITY MAP OF SOCORRO QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES

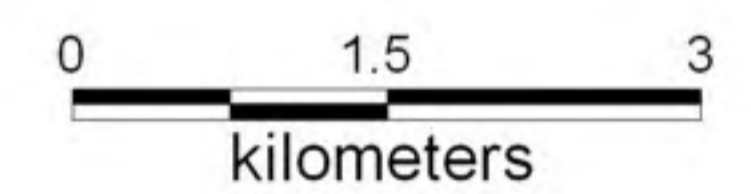


## INDEX MAP



## LEGEND :

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TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

**GIS Processing :**  
Lands Geological Survey Division

**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

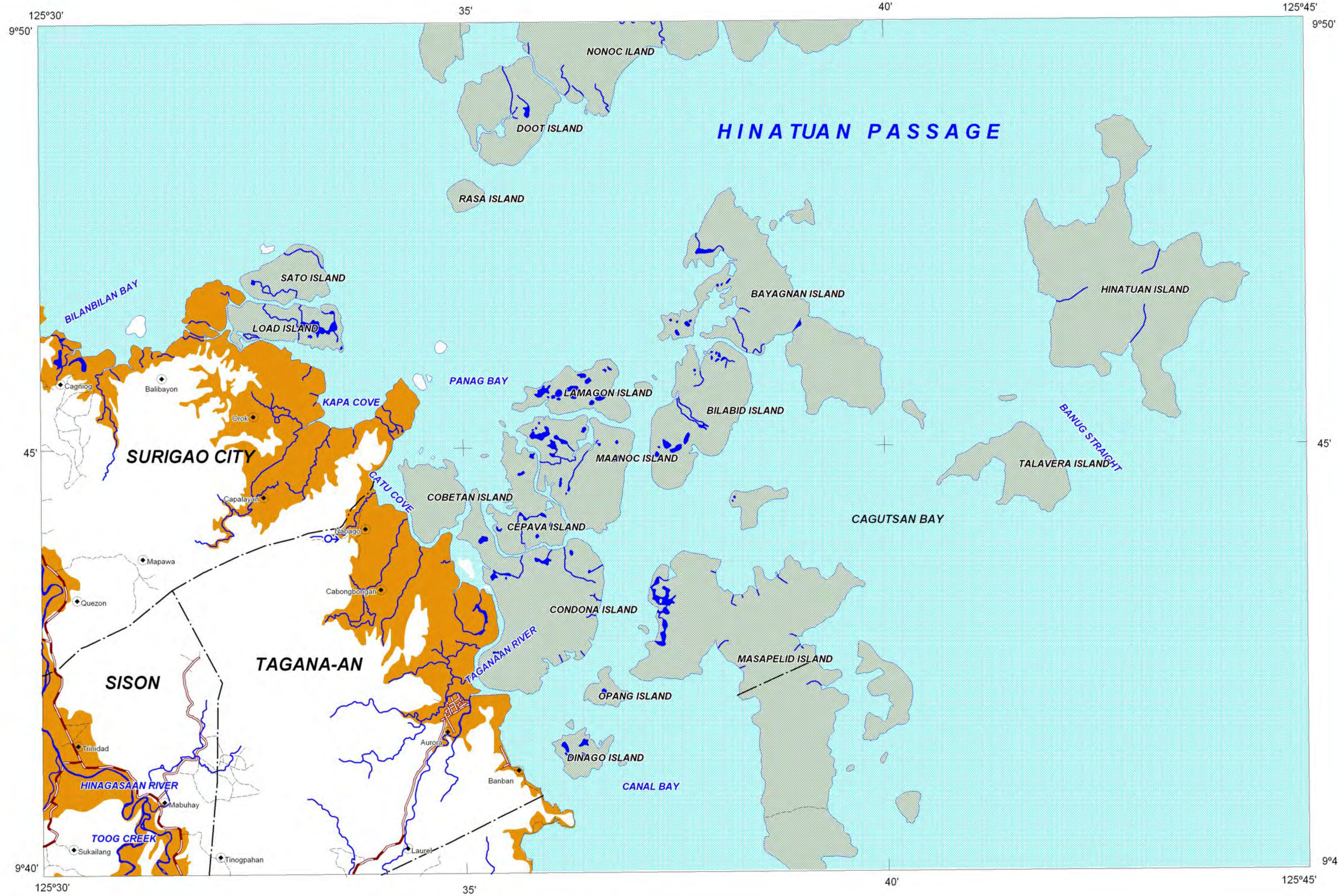
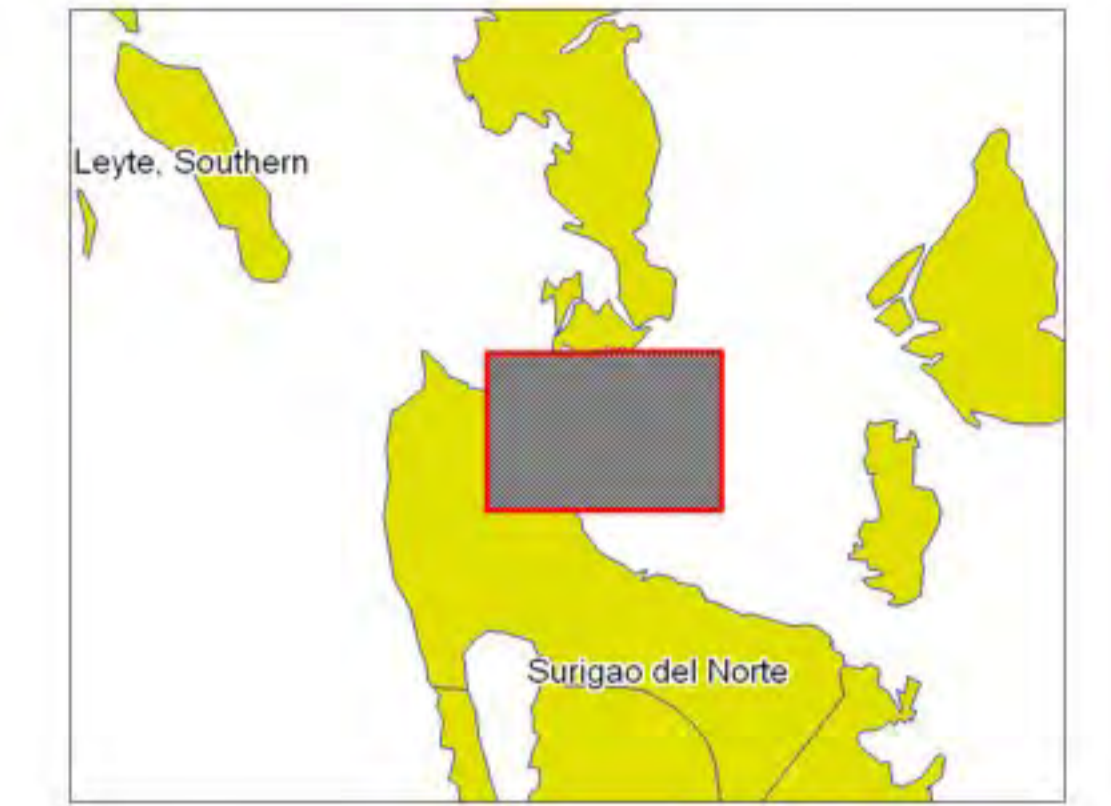
**Base Map :**  
Sheet No. 4148 I "Socorro Quadrangle"



LANDS GEOLOGICAL SURVEY DIVISION  
**MINES AND GEOSCIENCES BUREAU**  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

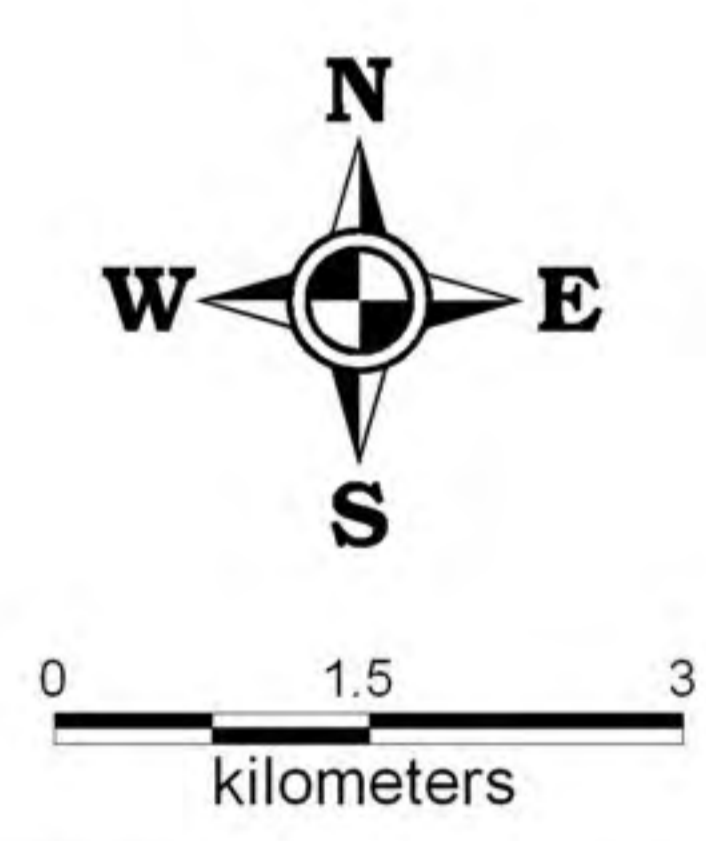
# FLOOD SUSCEPTIBILITY MAP OF TAGANAAN QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES

INDEX MAP



**LEGEND :**

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- Roads
- Flashflood Exit Points
- River
- Municipal boundary
- Barangay hall location



TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

**GIS Processing :**  
Lands Geological Survey Division

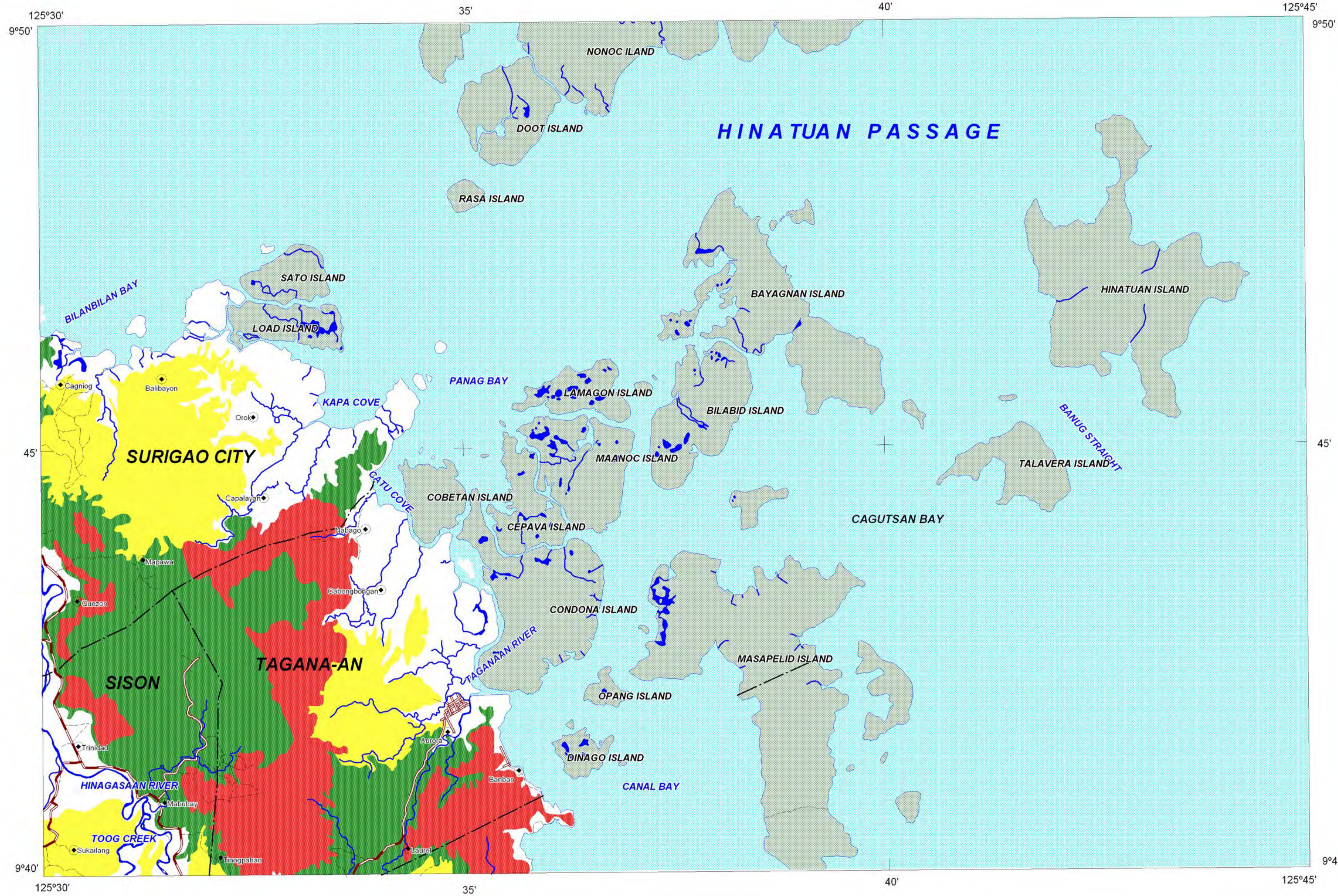
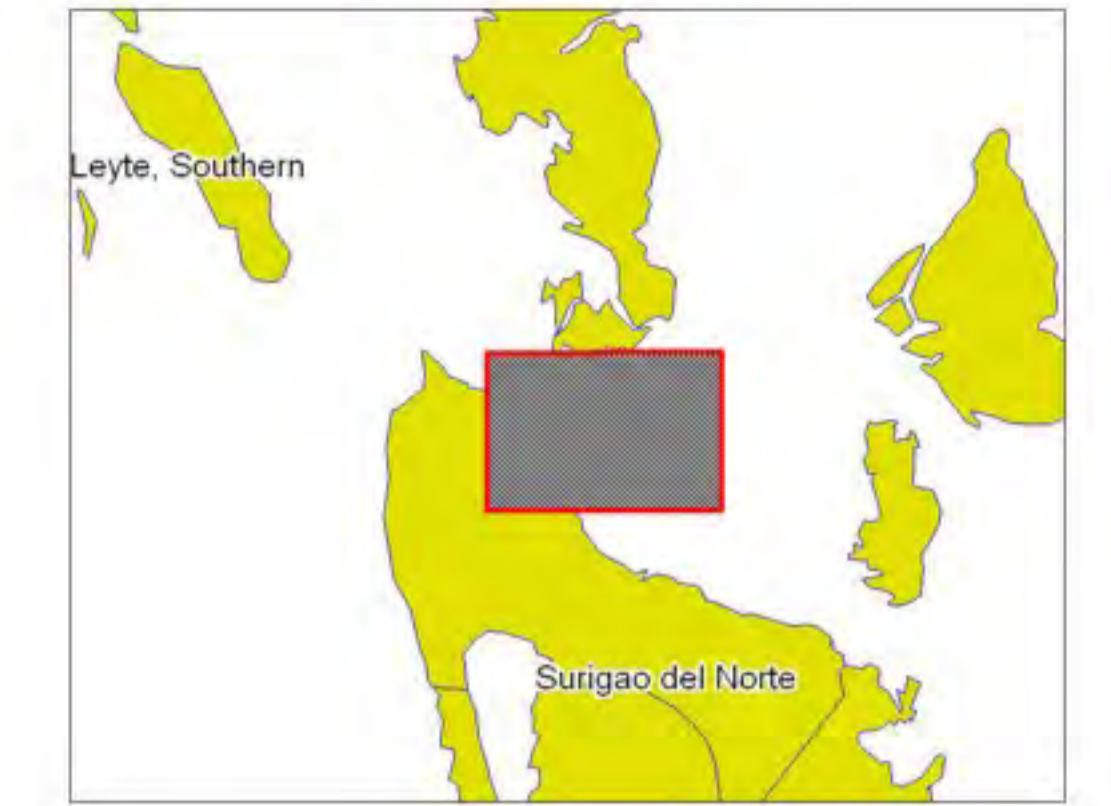
**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

**Base Map :**  
Sheet No. 4149 III "Taganaan Quadrangle"



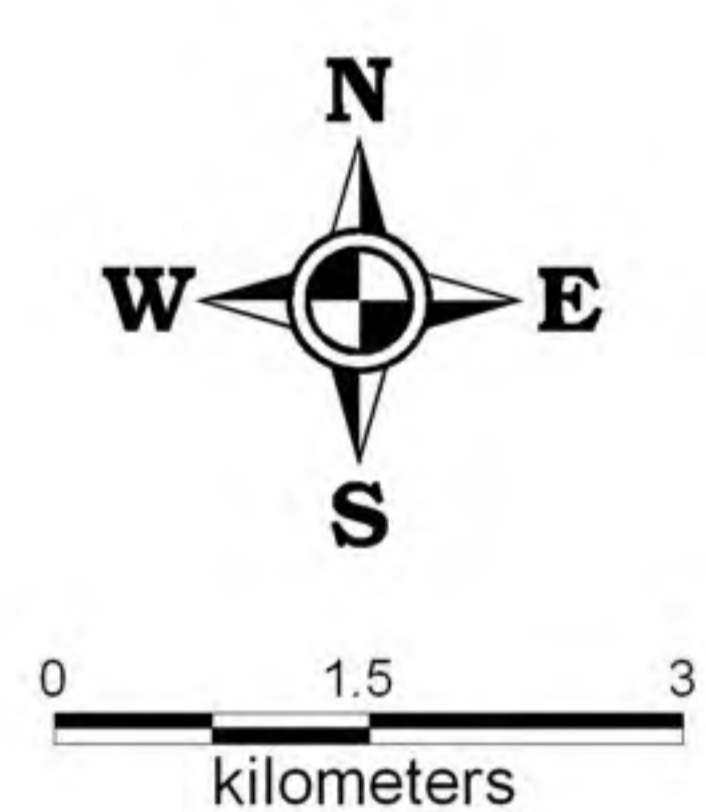
# LANDSLIDE SUSCEPTIBILITY MAP OF TAGANAAN QUADRANGLE, SURIGAO DEL NORTE PROVINCE, PHILIPPINES

INDEX MAP



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TRANSVERSE MERCATOR PROJECTION  
MAPPING SCALE 1:50,000

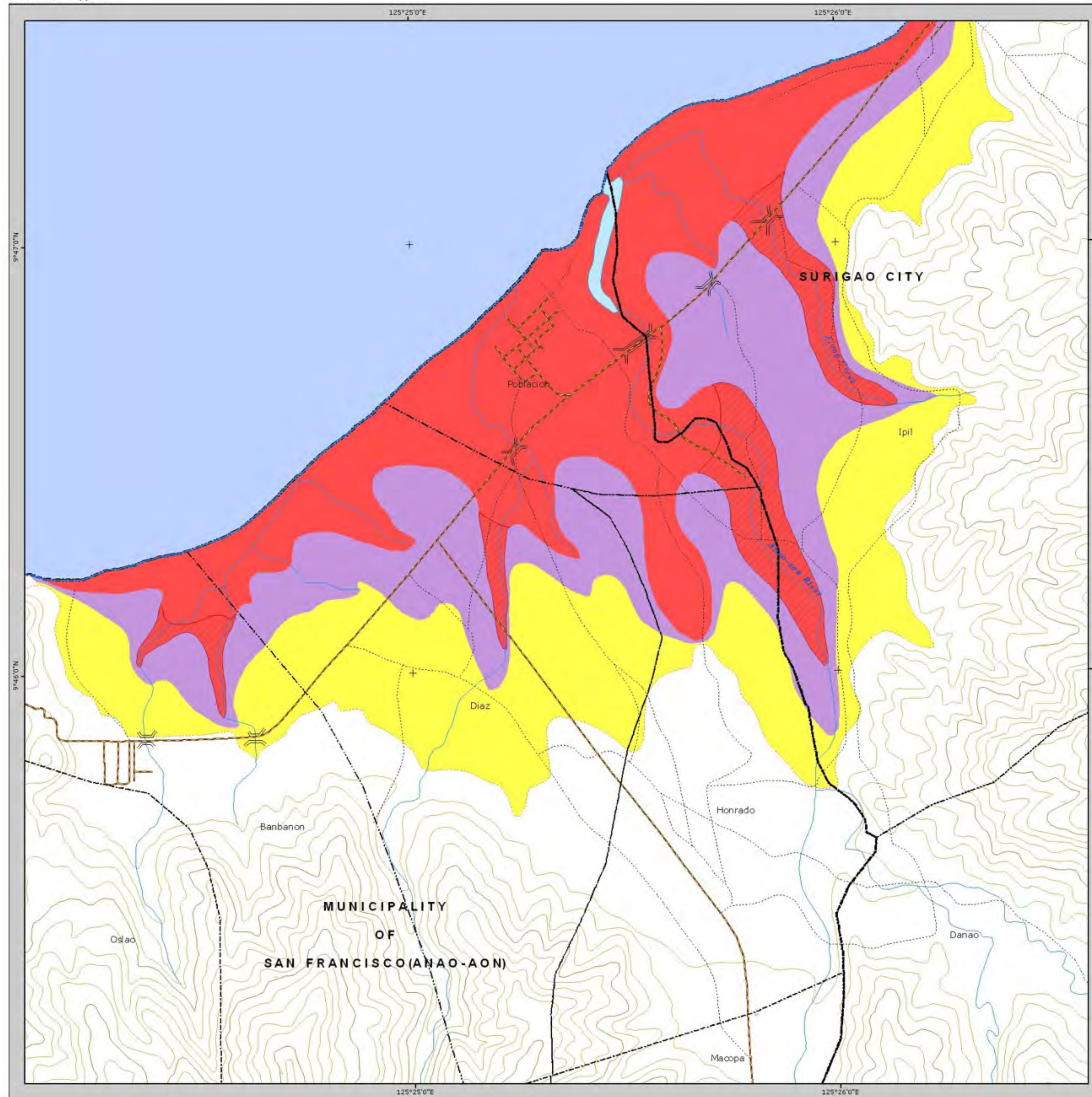
**GIS Processing :**  
Lands Geological Survey Division

**Data Sources:**  
MGB Geohazard Assessment Team  
Geological Database and Information Systems Section  
Lands Geological Survey Division  
Geosciences Division MGB RO XIII

**Base Map :**  
Sheet No. 4149 III "Taganaan Quadrangle"

# FLOOD/ FLASHFLOOD HAZARD MAP

Mindanao, Philippines



**ANAO-AON RIVER**  
**TOWN OF SAN FRANCISCO (ANAO-AON)**  
 Province of Surigao Del Norte  
 Region XIII - CARAGA  
 Scale 1:10,000

0 0.5 1  
 Kilometers

Spheroid: ..... Clark 1886  
 Projection: ..... Universal Transverse Mercator (UTM)  
 Horizontal Datum: ..... Luzon 1911  
 Vertical Datum: ..... Mean Sea Level

**LEGEND**

- Provincial Boundary
- Municipal Boundary
- Barangay Boundary
- Main Road
- Secondary Road
- ..... Trails
- Rivers and Creeks
- Rivers Intermittent
- Contour Index
- Contour Intermediate
- Contour Supplementary
- Contour Depression
- Coastline
- Corals
- Bridges
- X1176 Spot Elevation
- Water Body

**SUSCEPTIBILITY**

- High Susceptibility
- Moderate Susceptibility
- Low Susceptibility
- Flash Flood Hazard Area

**EXPLANATION**

Geomorphological mapping method was employed to study the area for flood hazard mapping. The initial step is to conduct geomorphological analysis of the area by photo-interpretation techniques using aerial photographs and satellite imageries together with the latest topographic maps that lead to the production of a preliminary flood hazard map. Geomorphological mapping was then conducted in the field together with interviews from residents as a means of verification procedures. Flood susceptibility categories were produced using clustering of geomorphological units based from this analysis. There are at least four (4) major flood susceptibility categories produced from this study: 1) High, 2) Moderate, 3) Low, 4) Less likely to be flooded.

**LOCATION MAP**

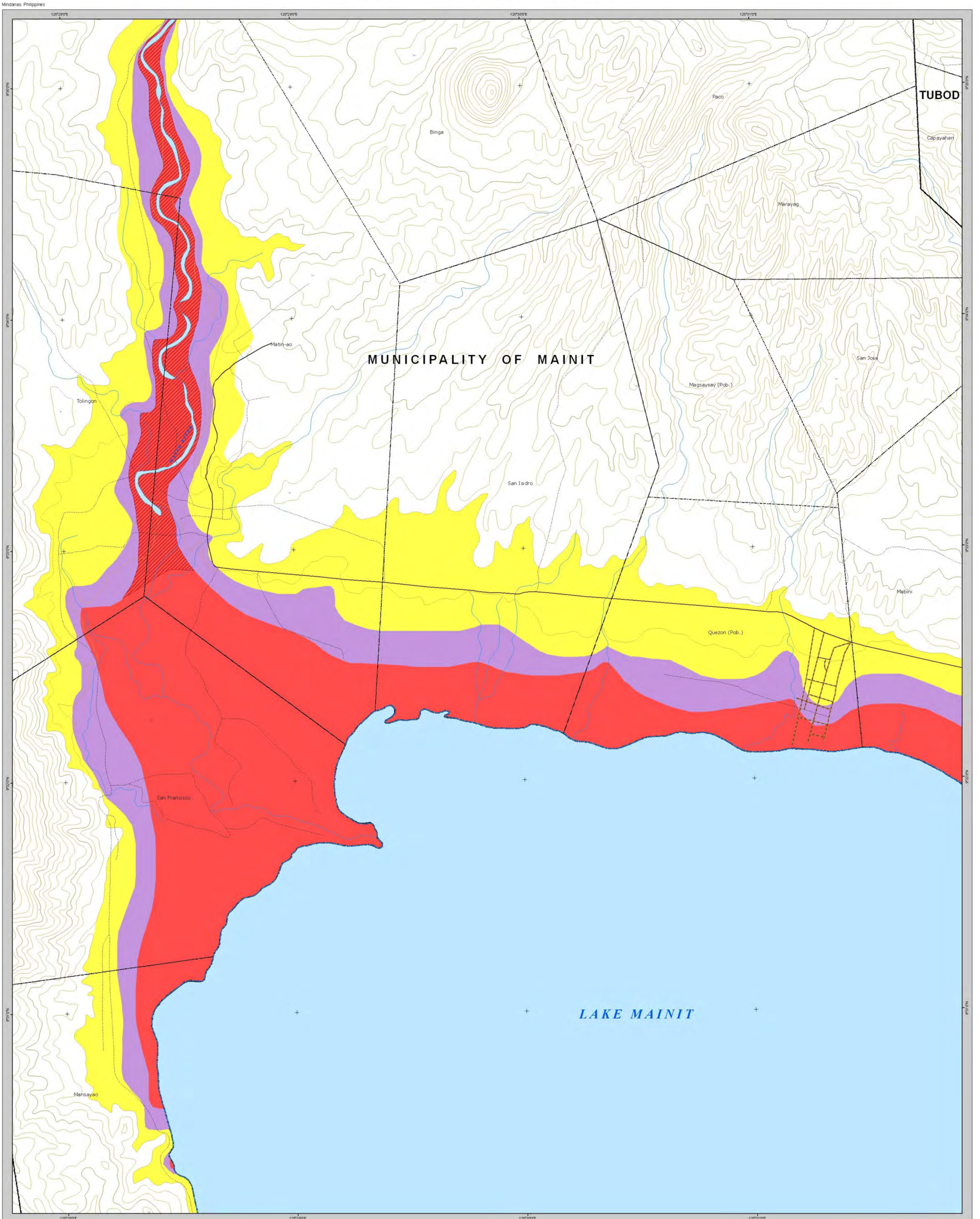
**SOURCES OF DATA**

Hazard Data, DENR, Mines and Geosciences Bureau (MGB - JICA) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of San Francisco (Anao-aon)  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955

**Disclaimer:**  
 Administrative boundaries are approximate.



# FLOOD/FLASHFLOOD HAZARD MAP



**SOURCES OF DATA**  
 Hazard Data, DENR, Mines and Geosciences Bureau (MGB - JICA) 2007  
 Administrative boundary, Administrative Map of Surigao del Norte (Provincial Capitol), Comprehensive Landuse Plan (CLUP) of Mainit  
 Topographic map 1:50,000 scale, NAMRIA - DMA Series 733  
 Ed. 1 - AMS, ED. 2 - DMA, 1954 - 1955  
**Disclaimer:**  
 Administrative boundaries are approximate.

**LEGEND**

----- Provincial Boundary	----- Contour Supplementary
----- Municipal Boundary	----- Contour Depression
----- Barangay Boundary	----- Coastline
----- Rivers and Creeks	----- Bridges
----- Rivers Intermittent	----- Spot Elevation
----- Corals	----- Water Body
----- Contour Index	
----- Contour Intermediate	

**SUSCEPTIBILITY**

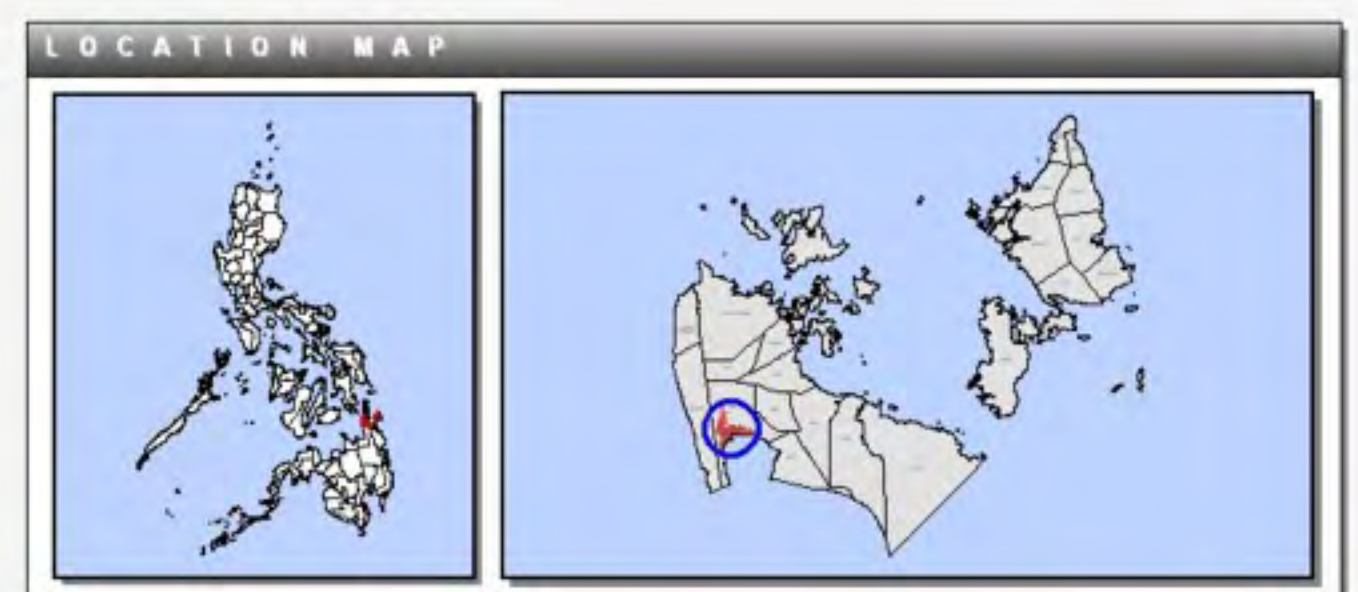
<span style="display:inline-block; width:15px; height:15px; background-color:red; border:1px solid black;"></span> High Susceptibility
<span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span> Moderate Susceptibility
<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span> Low Susceptibility
<span style="display:inline-block; width:15px; height:15px; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px); border:1px solid black;"></span> Flash Flood Hazard Area

**MAYAG RIVER  
TOWN OF MAINIT**

**PROVINCE OF SURIGAO DEL NORTE  
REGION XIII - CARAGA**

**SCALE 1:10,000**

Spheroid ..... Clark 1866  
 Projection ..... Universal Transverse Mercator (UTM)  
 Horizontal Datum ..... Luzon 1911  
 Vertical Datum ..... Mean Sea Level



**EXPLANATION**

Geomorphological mapping method was employed to study the area for flood hazard mapping. The initial step is to conduct geomorphological analysis of the area by photo-interpretation techniques using aerial photographs and satellite images together with the latest topographic maps that lead to the production of a preliminary flood hazard map. Geomorphological mapping was then conducted in the field together with interviews from residents as a means of verification procedures. Flood susceptibility categories were produced using clustering of geomorphological units based on this analysis. There are at least four (4) major flood susceptibility categories produced from this study: 1) High, 2) Moderate, 3) Low, 4) Less likely to be flooded.

