RED

REFERENCE FOR EMERGENCY AND DISASTER

IBA NA ANG PANAHON: SCIENCE FOR SAFER COMMUNITIES

RED

Reference for Emergency and Disaster
by NOAH Strategic Communication Intervention (NOAH StratComm) Project
& Science and Technology Information Institute (STII)

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MESSAGE *from the* DOST SECRETARY

Part of DOST's thrust in its '8 Outcomes' is disaster preparedness and mitigation. This endeavor is very important to protect whatever economic gains we have garnered using science and technology in achieving the other seven outcomes in our approach to achieving inclusive growth.

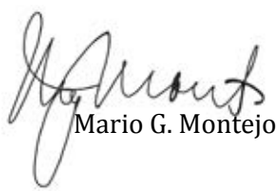
We believe that the key to saving lives and properties in times of natural calamities like typhoons, floods or earthquakes is preparedness. So we must take a proactive role in making our communities safer and more resilient.

The Reference for Emergency and Disaster or RED Book is our response to making our communities, our people in the barangays and our local leaders more aware of the dangers and be prepared when natural hazards occur.

The RED Book serves as a handy tool of information about all possible natural hazards in their areas; the warning information given by agencies like PAGASA and PHIVOLCS; and special programs like Project NOAH and the suggested actions to take during these events.

I believe that correct and accurate information can be of great help to our communities. We cannot prevent hazards from coming but definitely we can prevent disasters from happening.

Make the RED Book your practical guide to protecting your families and your properties in these uncertain times.



Mario G. Montejo

MESSAGE *from the* DOST ASSISTANT SECRETARY

Iba na ang Panahon! The advent of climate change has prompted us at the Department of Science and Technology to look inward and assess our capacity to address the worsening weather conditions.

The negative impact of stronger typhoons, massive flooding, landslides and storm surges can no longer be ignored and we must take it upon ourselves to find solutions in order to make our communities safe.

This is the reason we have come up with the Reference for Emergency and Disaster or RED Book. We need to inform our people down to the communities where they live, work and play that the destruction brought about by natural hazards can be minimized if not totally removed.

The RED Book will give us this information so we can prepare. It contains descriptions of typhoons, floods, landslides, storm surges, earthquakes, tsunamis, and other. It also includes practical tips on how to avert disasters and the things we need to do before, during and after calamities strike.

We can never let another typhoon Yolanda leave our countrymen homeless. We can never allow mothers to grieve for the loss of their children nor let the cries of babies be heard across the devastation caused by these hazards.

We have the science and technology to back us up. We have highly competent scientists and engineers who can find solutions. And most of all we have the will to survive and triumph over adversities.

Early warning, Early action! RED Book!

Raymund E. Liboro

BACKGROUNDER ON PHILIPPINE HAZARDS

The Philippines, being a locus of typhoons, tsunamis, earthquakes and volcanic eruptions, is a hotbed of disasters. Natural hazards inflict loss of lives and costly damage to property. Over the last years, the devastating impacts of typhoon Pedring, Quiel, Sendong, Pablo and, the most recent, Yolanda resulted in a high number of fatalities with economic losses amounting to billions of pesos.

Extreme weather is the common factor in these latest catastrophes. Situated in the humid tropics, the Philippines will inevitably suffer from climate-related calamities similar to those experienced recently. With continued development in the lowlands, and growing populations, it is expected that damage to infrastructure and human losses would persist and even rise unless appropriate measures are immediately implemented by government.

According to the World Risk Report in 2013 that focuses on vulnerability of the population such as susceptibility, capacity to cope and adapt to future natural hazard events, the Philippines ranked as the 3rd most vulnerable country to disaster risks in the world.

RANK	COUNTRY	World Risk Index	Exposure	Vulnerability	Susceptibility	Lack of coping capacities	Lack of adaptive capacities
1.	Vanuatu	36.43%	63.66%	57.23%	34.66%	81.27%	55.77%
2.	Tonga	28.23%	55.27%	51.07%	27.72%	80.56%	44.94%
3.	**Philippines**	**27.52%**	**52.46%**	**52.46%**	**33.74%**	**80.47%**	**43.16%**
4.	Guatemala	20.88%	36.30%	57.53%	38.57%	80.80%	53.21%
5.	Bangladesh	19.81%	31.70%	62.50%	40.92%	86.23%	60.34%
6.	Solomon Islands	18.11%	29.98%	60.40%	43.96%	84.15%	53.09%
7.	Costa Rica	16.94%	42.61%	39.75%	21.58%	64.10%	33.58%
8.	Cambodia	16.90%	27.65%	61.12%	43.47%	86.60%	53.28%
9.	El Salvador	16.85%	32.60%	51.69%	29.50%	75.69%	49.88%
10.	Timor-Leste	16.37%	25.73%	63.61%	52.16%	79.36%	59.31%
11.	Papua New Guinea	15.90%	24.94%	63.77%	51.22%	83.99%	56.10%
12.	Brunei Darussalam	15.80%	41.10%	38.44%	14.48%	64.69%	36.15%
13.	Mauritius	15.18%	37.35%	40.64%	18.96%	60.61%	42.35%
14.	Nicaragua	14.89%	27.23%	54.69%	37.09%	81.32%	45.65%
15.	Japan	14.10%	45.91%	30.71%	16.84%	40.08%	35.22%

Photo By: Anna Theresa P. Valmero, STII-NOAH StratComm

4-POINT AGENDA TO COMMUNICATE DISASTER PREPAREDNESS

The Philippines faces an average of twenty (20) typhoons a year along with floods and storm surges, as well as earthquakes, among others. Recent events and global reports have shown that there is an increasing trend in the intensity and frequency of disasters.

As a disaster laboratory, the Philippine communities face massive destruction from calamities as what Yolanda did. While we cannot stop the occurrence of natural hazards, we can definitely mitigate disaster risk in our communities.

The Department of Science and Technology (DOST) believes that science can be used to better understand and improve disaster planning and preparations at the national and local levels.

Applying science, scenario-based strategies and protocols can be drawn in dealing with calamities: from emphasizing **early warning and early action** to achieve minimum loss and enable quick recovery.

In 2005, the United Nation General Assembly endorsed the Hyogo Framework for Action (HFA) which aims to substantially reduce disaster losses by 2015 by "building the resilience of nations and communities to disasters. It was developed and agreed on with many partners needed to reduce disaster risk – governments, international agencies, disaster experts and many others – bringing them into a common system of coordination."

With lessons learned from the onslaught of Yolanda and following the HFA, a "10-year plan to make the world safer from natural hazards," DOST is continuously advocating this 4-point agenda for effective disaster preparedness efforts in communities:

With lessons learned from the onslaught of Yolanda, DOST has drawn up a 4-point agenda for effective disaster preparedness efforts in communities:

1. **Increase local risk knowledge**
2. **Capacitate hazards monitoring**
3. **Test warning and communications protocol**
4. **Build response capability in communities**

By following this, the government hopes to raise awareness and understanding of hazards and their impacts among local executives, disaster managers, partner civil society organizations, and even the local community media.

This 4-point agenda was the guiding principle behind DOST's nationwide campaign dubbed as "*Iba na ang Panahon*: Science for Safer Communities."

1. KNOW THE LOCAL HAZARDS OR RISKS

The first step in disaster preparedness is knowing the hazards present in the community. Aside from being familiar with the hazards in the area, it is also important to know the negative impact that can affect the lives of people.

Geological

a. Earthquake-related Hazards
   - Ground Shaking
   - Liquefaction
   - Ground Rupture
   - Tsunami
   - Landslide

b. Volcanic Hazards

c. Landslide

Hydrometeorological

a. Tropical Cyclone

b. Flood

c. Storm Surge

d. Rain-induced Landslide

EARTHQUAKES

Definition

An EARTHQUAKE is a feeble shaking to violent trembling of the ground produced by the sudden displacement of rocks or rock materials below the earth's surface. There are around 20 earthquakes recorded in the Philippines every day.

Types of Earthquakes

Tectonic
Sudden displacements along faults in the solid and rigid layer of the earth.

Volcanic
Earthquakes induced by rising magma beneath active volcanoes.

Focus and Epicenter

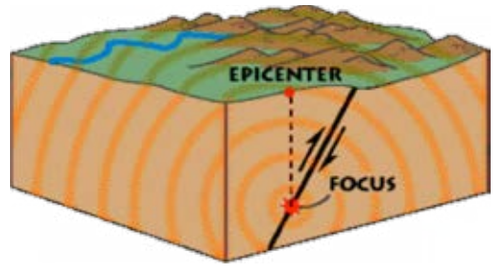


Image from USGS

Focus
Actual location beneath the surface where the earthquake begins. The ground ruptures at this spot, then seismic waves radiate outward in all directions.

Epicenter
Point on the Earth's surface located directly above the focus of an earthquake.

Magnitude & Intensity

Magnitude
The energy released at the source of the earthquake. Magnitude is determined from measurements on seismographs. *Refer to page 67.*

Intensity
The strength of shaking produced by the earthquake at a certain location. Intensity is determined from effects on people, human structures, and the natural environment. In the Philippines, the PHIVOLCS Earthquake Intensity Scale (PEIS) is used to determine the intensity of an earthquake in a specific place. *Refer to page 68.*

Aftershocks
Usually weaker earthquakes that follow the main shock (the strongest and most destructive shock) of an earthquake sequence.

Source: PHIVOLCS

HAZARDS POSED
BY EARTHQUAKE

Ground Shaking

Because of severe ground shaking, low and tall buildings, towers and posts may tilt, split, topple or collapse; foundation of roads, raildroad tracks and bridges may break; water pipes and other utility installations may get dislocated, dams and similar structures may break and cause flooding and other forms of mass movement may be generated.

Liquefaction

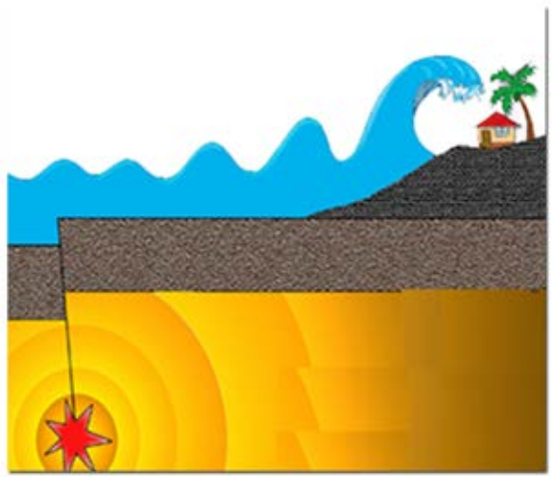
A process where particles of loosely consolidated and water-saturated deposits of fine sand are re-arranged in more compact state. If not properly designed and constructed, houses and buildings may subside or tilt.

Landslide

Downward movement of slope materials either slowly or quickly. The main effects of landsliding would be erosion and burial.

Ground Rupture

A deformation on the ground that marks the intersection of the fault plane with the earth's surface. The most common manifestation is a long fissure extending from a few kilometers to tens of kilometers. Ground rupture may also occur as a series of discontinuous cracks, mounds or depressions. Houses and buildings on top of an active fault can be damaged by ground rupture.



Tsunami

Sea waves generated mostly by submarine earthquakes. Tsunamis occur when the earthquake is shallow-seated and strong enough (magnitude 6.5 or greater) to vertically displace parts of the seabed disturb the mass of water over it. Other causes of tsunamis include submarine or coastal landslides and submarine volcanic eruptions. Tsunamis can flood low lying coastal areas and drown people.

Source: PHIVOLCS

TSUNAMI

Definition

One of the most dangerous hazards related to earthquakes is TSUNAMI, or the series of sea waves commonly generated by under-the-sea earthquakes and whose heights could be greater than five (5) meters.

Locally-generated tsunamis can occur within very short time, with the first waves reaching the nearest shoreline from the epicenter in 2 to 5 minutes after the main earthquake, before any official warning can be transmitted from the national level to the community level.

Natural Signs Of An Approaching Local Tsunami

Shake
A felt earthquake.

Drop
Unusual sea level change, sudden sea water retreat or rise. Exposure of corals, underwater rocks and marine life.

Roar
Rumbling sound of an approaching waves.

Source: PHIVOLCS

VOLCANIC HAZARDS

Volcano

The term VOLCANO signifies a vent, hill or mountain from which molten or hot rocks with gaseous materials are ejected. The term also applies to craters, hills or mountains formed by removal of pre-existing materials or by accumulation of ejected materials.

The Philippine Archipelago has approximately more than 200 volcanoes. Of these, at least 23 are considered active and several have erupted in recent times. Mayon and Taal are the most active followed by Pinatubo, Bulusan, Kanlaon and Hibok-Hibok.

Classification of Volcanoes

Active
Volcanoes that erupted within historical times (within the last 600 years), with accounts of these eruptions documented by man or erupted within the last 10,000 years based on analyses of datable materials. (e.g. Mt. Mayon)

Potentially Active
Morphologically young-looking volcanoes but with no historical records of eruption. (e.g. Mt. Apo)

Inactive
Volcanoes with no record of eruptions and the physical form is being changed by agents of weathering and erosion via formation of deep and long gullies. (e.g. Mt. Makiling)

Source: PHIVOLCS

Directly Associated with Eruption

Pyroclastic Flow
Refers to hot dry masses of fragment volcanic materials that move at high speed along the slope and in contact with ground surface. Pyroclastic flows can burn and bury people.

This includes:
- pumice flow
- ash flow
- block-and-ash flow
- nuee ardente (burning cloud)
- glowing avalanche

Lava Flow
Highly elongated mass of molten rock materials cascading downslope from an erupting vent. The lava flow being extruded has low silica and low water contents.

Tephra Fall
The rain of volcanic fragments that may range in size from ash, lapilli and blocks.

Particle size: less than 2 mm diameter (ash), 2-64 mm diameter (lapilli), more than 64 mm diameter (blocks and bombs)

Volcanic Gas
One of the basic components of a magma or lava. Active and inactive volcanoes may release to the atmosphere gases in the form of: water vapor, hydrogen sulfide, sulfur dioxide, carbon monoxide, hydrogen chloride and hydrogen fluoride.

Indirectly Associated with Eruption

Lahar
(An Indonesian term), sometimes called mudflows or volcanic debris flows, are flowing mixtures of volcanic debris and water.

- Primary or hot lahar - associated directly with volcanic eruption
- Secondary or cold lahar - caused by heavy rainfall.

Tsunami
Although most tsunamis are associated with submarine earthquakes, waves can also be generated by underwater volcanic eruptions. *Refer to page 78.*

Seiche
Sloshing of a closed body of water from earthquake shaking. Swimming pools often have seiches during earthquakes.

Volcanic Landslide
Landslides are common on volcanoes because their massive cones (1) typically rise hundreds to thousands of meters above the surrounding terrain; and (2) are often weakened by the very process that created them — the rise and eruption of molten rock.

Fissuring
A fissure is an elongated fracture or crack at the surface from which lava erupts.

Other Eruption Phenomena

Debris Avalanche
Fast downhill movement of soil and rock caused by slope failure on the cones of stratovolcanoes

Hydrothermal Explosions
Explosions from instantaneous flashing of steam upon contact with hot rocks

Secondary Explosions
Caused by the contact of water with hot pyroclastic flow deposits

Subsidence
Ground deformation resulting from the downward adjustment of surface materials to the voids caused by volcanic activity

Source: PHIVOLCS

PRECURSORS OF AN IMPENDING VOLCANIC ERUPTION

The following are commonly observed signs that a volcano is about to erupt. These precursors may vary from volcano to volcano.

- Increase in the frequency of volcanic quakes with rumbling sounds; occurrence of volcanic tremors
- Increased streaming activity; change in color of steam emission from white to gray due to entrained ash
- Crater glow due to presence of magma at or near the crater
- Ground swells (or inflation), ground tilt and ground fissuring due to magma intrusion
- Localized landslides, rockfalls and landslides from the summit area not attributable to heavy rains
- Noticeable increase in the extent of drying up of vegetation around the volcano's upper slopes
- Increase in the temperature of hot springs, wells (e.g. Bulusan and Kanlaon) and crater lake (e.g. Taal) near the volcano
- Noticeable variation in the chemical content of springs, crater lakes within the vicinity of the volcano
- Drying up of springs/wells around the volcano
- Development of new thermal areas and/or reactivation of old ones; appearance of solfataras (volcanic vent that yields hot vapors and sulfurous gases)

Source: PHIVOLCS

LANDSLIDE
PAGGUHO

LANDSLIDES are downward movement of slope materials either slowly or quickly. A landslide may be a rock fall, topple, and slide or lateral spreading. Intense ground shaking can trigger a landslide by loosening the cohesion that bonds the slope materials together, thereby making it easier for gravity to pull it downwards. Hilly and mountainous areas, escarpments, and steep river banks, sea cliffs, and other steep slopes are prone to landsliding.

Kinds of Landslides

- Creep – imperceptibly slow, steady, downward movement of slope-forming soil or rock.
- Slump – a mass of rock and soil suddenly slips down a slope.
- Rock/debris slide
- Rockfall
- Debris flow
- Mudflow

Common Causes of Landslides

- Steep slopes
- Lack of plants and trees in mountains
- Rocks weakened due to weathering
- Breaking of rocks
- Slopes that are too heavy

When Landslides Happen

- When there is heavy and continuous rain (rain-induced landslide)
- When there is ground-shaking due to earthquakes (earthquake-induced landslide)

Signs Of An Impending Landslide

- Cracks on the ground, highways or concrete floors
- Utility posts, trees, gates and walls of buildings tilt
- Bulging ground appears
- Utility lines underground breaks
- Ground water seeps to the surface
- Water in creeks or rivers becomes murky

Source: PHIVOLCS

TROPICAL CYCLONE
BAGYO

A TROPICAL CYCLONE is an intense low pressure system with a minimum sustained wind speed of 35 kilometers per hour (kph). The winds it bring can do the most damage to buildings, residential houses, settlements, power lines and agricultural crops, among others.

Large amount of rainwater due to tropical cyclones can cause flooding that can destroy agricultural crops, houses and infrastracture, affect transportation and mobility, and negatively affect economic and social activities.

Classification of Tropical Cyclones

Tropical Cyclones are classified according to the strength and speed of the maximum sustained winds near the center.

Tropical Depression
Sustained wind is between 35 to 63 kph

Tropical Storm
Sustained wind is between 64 to 117 kph

Typhoon
Sustained wind is more than 118 kph

Signs of Incoming Tropical Cyclones

- Unusually high sea water level even when it is not high tide
- Winds are light
- Reddish color of clouds at sunrise or sunset

Dangers of Tropical Cyclones

Severe flooding caused by continuous heavy rainfall

Damage in agricultural crops

Destruction of infrastructures

Disruption of community lifelines

Contamination of ground water

Outbreak of water-borne diseases

FLOOD
BAHA

FLOODS happen when water from streams, rivers and other bodies of water overflow to low lying areas due to heavy and prolonged rainfall and when rain waters are not drained rapidly due to inadequate or defective drainage system or when coastal water rises due to high tide or storm surge. Human activities can also influence the occurrence of floods.

Causes of Flood

Natural Causes

Intense and prolonged rainfall

Storm Surge (due to strong winds brought by a storm)

High Tide (periodic rising of sea water levels due to gravitational effect of the moon)

Human Activities

Increased urbanization and coastal development

Indiscriminate dumping of garbage in waterways, canals and drainage system

Informal settlers constructing illegal structures along and on top of waterways

Deforestation

Blasting that causes landslides and damming of rivers

Failure of levees

STORM SURGE
DALUYONG NG BAGYO

Definition
STORM SURGE is the abnormal rise of sea water due to low pressure and strong winds brought by tropical cyclones resulting in sea water moving towards the coastline causing flood in low-lying areas.

Causes of Storm Surge
- Strong winds brought by tropical cyclone and the low atmospheric pressure
- The actual height of the storm surge wave is increased when the storm surge coincides with the occurrence of high tide
- Shallow coastline causes higher surge height while deeper slope causes lower surge height

RAIN-INDUCED LANDSLIDES
PAGGUHO NG LUPA SANHI NG PAG-ULAN

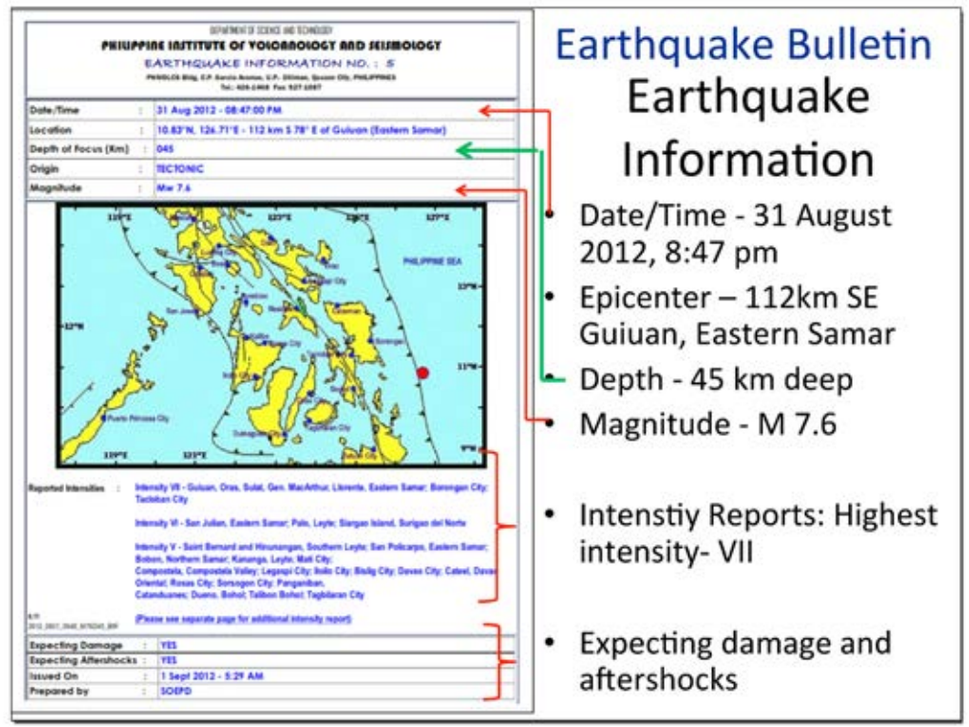
Definition
LANDSLIDES caused by heavy rain due to storms and southwest monsoon *(habagat)* is the sliding down of soil, rocks or mud from an elevated place like a mountain or cliff resulting in houses or structures, properties and even people being buried.

2. MONITOR THE HAZARDS

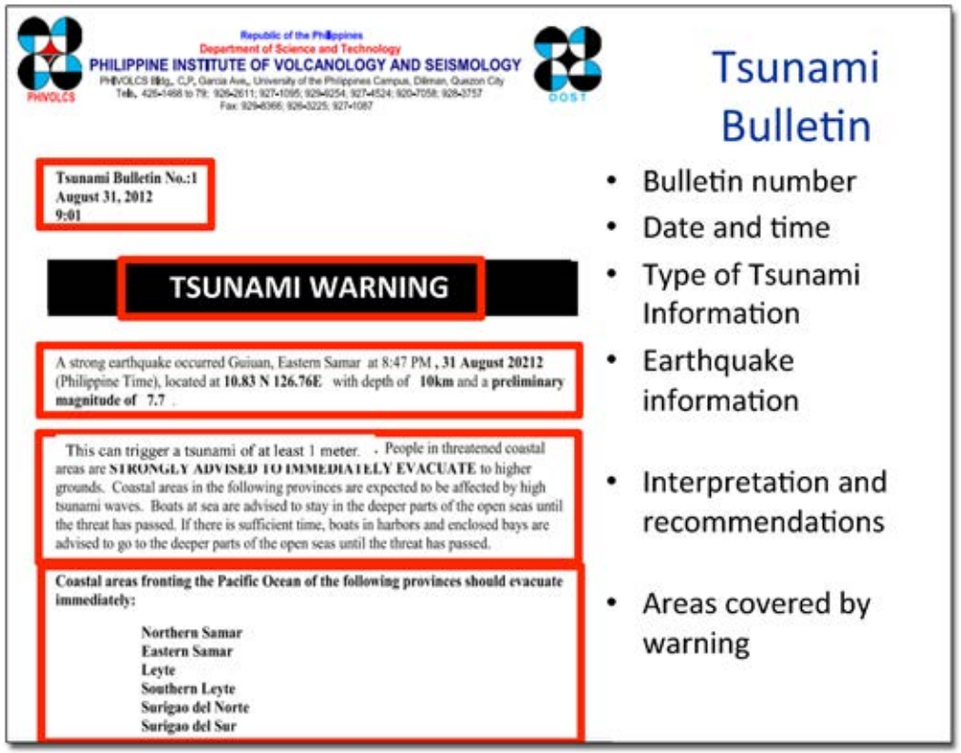
During natural calamities, it is very important to monitor hazard situations by collecting information through the use of available tools from the warning agencies Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and Philippine Institute of Volcanology and Seismology (PHIVOLCS), and disaster-related initiatives such as the Nationwide Operational Assessment of Hazards (Project NOAH) and Disaster Risk and Exposure Assessment for Mitigation (UP DREAM).

For geological hazards, consult the PHIVOLCS website [www.phivolcs.dost.gov.ph] for bulletins and hazard maps regarding earthquake, tsunami, volcanic activities, and landslides. The different kinds of advisories and bulletins issued by PHIVOLCS are the following:

Earthquake Bulletin



Tsunami Bulletin



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Tels. 426-1468 to 79; 926-2611; 927-1095; 929-6254; 927-4524; 920-7058; 928-3757
Fax: 929-6366; 926-0225; 927-1057

Tsunami Bulletin No.:1
August 31, 2012
9:01

TSUNAMI WARNING

A strong earthquake occurred Guiuan, Eastern Samar at 8:47 PM , **31 August 20212** (Philippine Time), located at **10.83 N 126.76E** with depth of **10km** and a **preliminary magnitude of 7.7** .

This can trigger a tsunami of at least 1 meter. . People in threatened coastal areas are **STRONGLY ADVISED TO IMMEDIATELY EVACUATE** to higher grounds. Coastal areas in the following provinces are expected to be affected by high tsunami waves. Boats at sea are advised to stay in the deeper parts of the open seas until the threat has passed. If there is sufficient time, boats in harbors and enclosed bays are advised to go to the deeper parts of the open seas until the threat has passed.

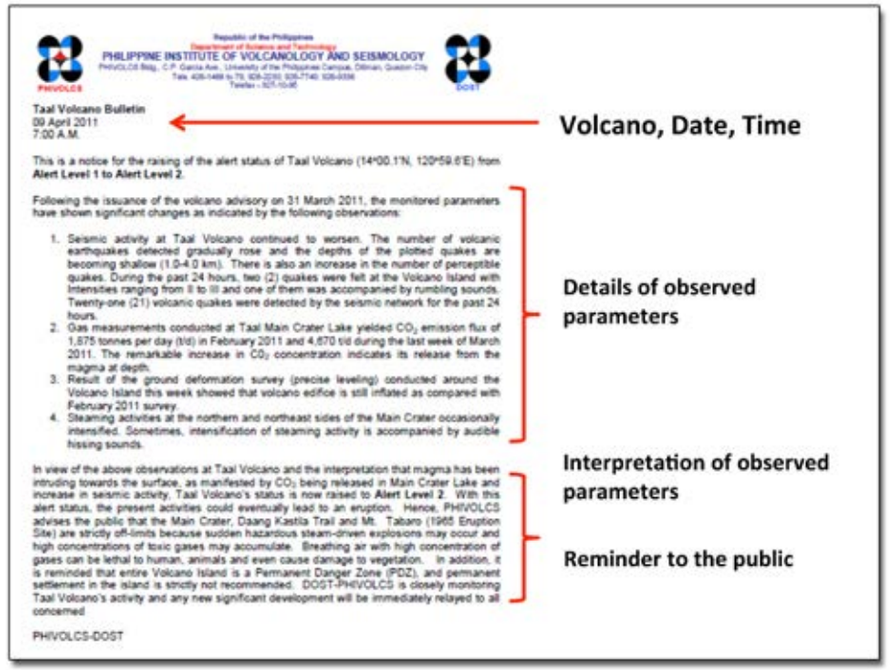
Coastal areas fronting the Pacific Ocean of the following provinces should evacuate immediately:

Northern Samar
Eastern Samar
Leyte
Southern Leyte
Surigao del Norte
Surigao del Sur

Tsunami Bulletin

- Bulletin number
- Date and time
- Type of Tsunami Information
- Earthquake information
- Interpretation and recommendations
- Areas covered by warning

Volcano Bulletin



Republic of the Philippines
Department of Science and Technology
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY

Taal Volcano Bulletin
09 April 2011
7:00 A.M.

Volcano, Date, Time

This is a notice for the raising of the alert status of Taal Volcano (14°00.1'N, 120°59.6'E) from **Alert Level 1 to Alert Level 2.**

Following the issuance of the volcano advisory on 31 March 2011, the monitored parameters have shown significant changes as indicated by the following observations:

1. Seismic activity at Taal Volcano continued to worsen. The number of volcanic earthquakes detected gradually rose and the depths of the plotted quakes are becoming shallow (1.0-4.0 km). There is also an increase in the number of perceptible quakes. During the past 24 hours, two (2) quakes were felt at the Volcano Island with intensities ranging from II to III and one of them was accompanied by rumbling sounds. Twenty-one (21) volcanic quakes were detected by the seismic network for the past 24 hours.
2. Gas measurements conducted at Taal Main Crater Lake yielded CO_2 emission flux of 1,875 tonnes per day (t/d) in February 2011 and 4,670 t/d during the last week of March 2011. The remarkable increase in CO_2 concentration indicates its release from the magma at depth.
3. Result of the ground deformation survey (precise leveling) conducted around the Volcano Island this week showed that volcano edifice is still inflated as compared with February 2011 survey.
4. Steaming activities at the northern and northeast sides of the Main Crater occasionally intensified. Sometimes, intensification of steaming activity is accompanied by audible hissing sounds.

Details of observed parameters

In view of the above observations at Taal Volcano and the interpretation that magma has been intruding towards the surface, as manifested by CO_2 being released in Main Crater Lake and increase in seismic activity, Taal Volcano's status is now raised to **Alert Level 2**. With this alert status, the present activities could eventually lead to an eruption. Hence, PHIVOLCS advises the public that the Main Crater, Daang Kastila Trail and Mt. Tabano (1965 Eruption Site) are strictly off-limits because sudden hazardous steam-driven explosions may occur and high concentrations of toxic gases may accumulate. Breathing air with high concentration of gases can be lethal to human, animals and even cause damage to vegetation. In addition, it is reminded that entire Volcano Island is a Permanent Danger Zone (PDZ), and permanent settlement in the island is strictly not recommended. DOST-PHIVOLCS is closely monitoring Taal Volcano's activity and any new significant development will be immediately relayed to all concerned

Interpretation of observed parameters

Reminder to the public

PHIVOLCS-DOST

Volcano Alert Level Scheme

ALERT	CRITERIA	INTERPRETATION
0 (NORMAL)	All monitored parameters are within background/ baseline levels.	No eruption is foreseen.
1 (ABNORMAL)	Slight increase in volcanic earthquakes, steam/ gas activity, slight inflation.	The source of activity is shallow or near crater. Entry into PDZ is forbidden.
2 Elevated Level of Volcanic Unrest	Elevated levels of any of the following: volcanic earthquakes, steam/gas activity, ground deformation, other parameters..	Probable ascent and intrusion of magma which may lead to eruption within weeks or months. Entry into PDZ is forbidden.
3 High Level of Volcanic Unrest	Relatively high and increasing unrest due to further intensified in volcanic earthquake, gas, ground deformation parameters	Magmatic processes underway and may lead to eruption within days to weeks. Evacuation of hazard zones.
4 Hazardous Eruption Imminent	Intense unrest characterized by earthquake swarms and tremors, many perceptible, high gas output, intense ground deformation. Activity may involve lava extrusion and dome growth.	Low-level eruption in progress and may lead to hazardous highly explosive eruption. Hazard zones may be extended for a few kilometers or more.
5 Life-Threatening ERUPTION	Highly explosive eruption in progress with billowing tall ash-laden eruption columns, in excess of tens of kilometers, widespread dispersal of volcanic hazards..	Hazardous eruption in progress. Flowing or falling materials encroach into settlements. Additional danger areas may be recommended as eruption progresses.

For hydrometeorological hazards, consult the PAGASA website [http://www.pagasa.dost.gov.ph] and the Project NOAH website [http://www.noah.dost.gov.ph] for regular weather bulletins and advisories regarding tropical cyclones and other weather disturbances.

Weather Advisory

The initial and final weather advisory of a particular weather system can be issued anytime within the day. The succeeding advisory will be issued once a day at 11:00 AM of the following day.

WEATHER ADVISORY NUMBER 01

FOR: **THE LOW PRESSURE AREA (LPA)**

ISSUED AT: ***11:00 AM, 22 NOVEMBER 2013***

THE LOW PRESSURE AREA ESTIMATED AT **220 KM** SOUTH OF PUERTO PRINCESA CITY **(7.8°N 118.3°E)** WILL CONTINUE TO BRING MODERATE TO OCCASIONALLY HEAVY RAINSHOWERS AND THUNDERSTORMS OVER PALAWAN WHILE CLOUDY SKIES WITH LIGHT TO MODERATE RAINSHOWERS AND THUNDERSTORMS OVER EASTERN VISAYAS AND MINDANAO.

THE SURGE OF THE NORTHEAST MONSOON IS EXPECTED TO AFFECT THE SEABOARDS OF NORTHERN LUZON AND EASTERN SEABOARD OF CENTRAL AND SOUTHERN LUZON AND EASTERN VISAYAS. HENCE, SMALL SEACRAFTS AND FISHING VESSELS ARE ADVISED NOT TO VENTURE OUT INTO THE SEA DUE TO THE BIG WAVES GENERATED BY THIS WEATHER SYSTEM.

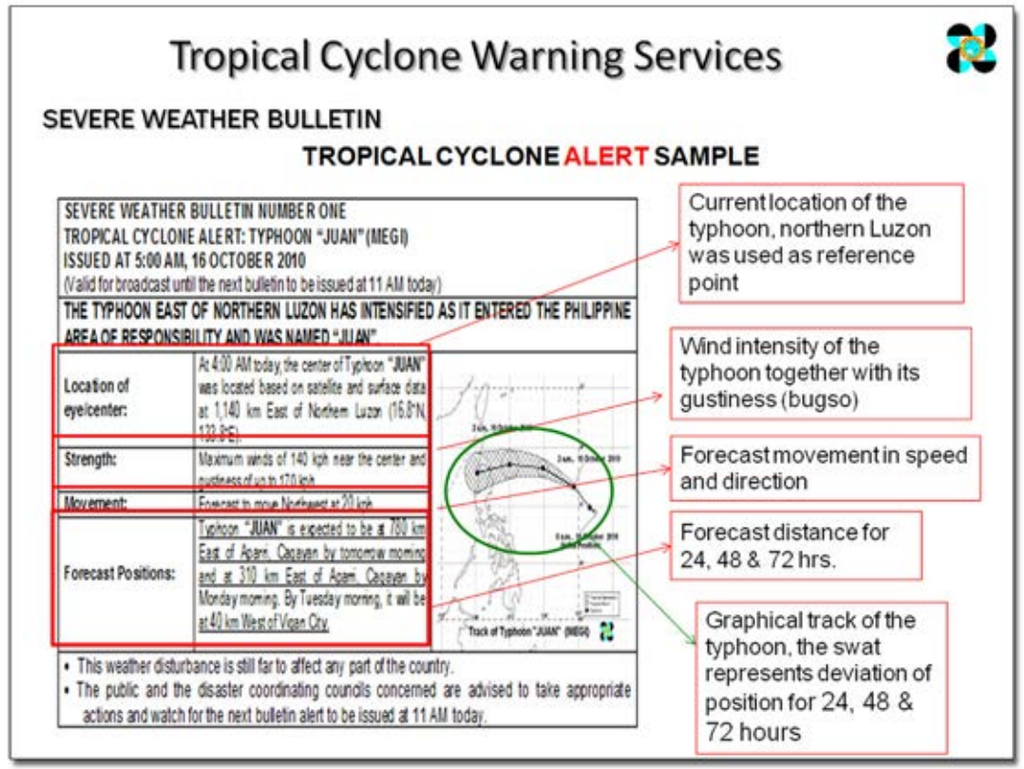
THE NEXT UPDATE ON THIS WEATHER DISTURBANCE WILL BE INCORPORATED ON THE REGULAR ISSUANCE OF PUBLIC WEATHER FORECAST AT 5:00 PM TODAY.

Severe Weather Bulletin

- Tropical Cyclone Alert
- Tropical Cyclone Warning

The Weather Advisory shall be upgraded to Severe Weather Bulletin (either Alert or Warning status) when the tropical cyclone endters the Philippine Area of Responsibility (PAR).

"Alert" status is used when the tropical cyclone has yet to directly affect any part of the country within the next 2-3 days, hence no Public Storm Warning Signals (PSWS).

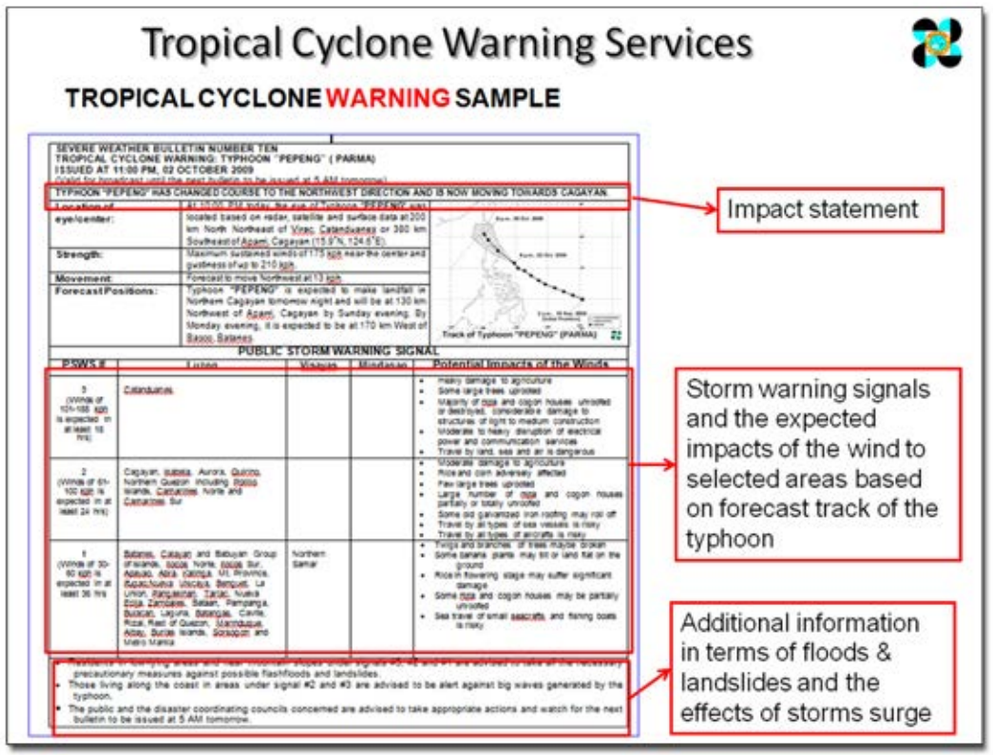


"Warning" status when the tropical cyclone is expected to directly affect any part of the country within the next 36 hours or less (tropical cyclones forming near the coastal areas of the country and/or fast-moving tropical cyclones).

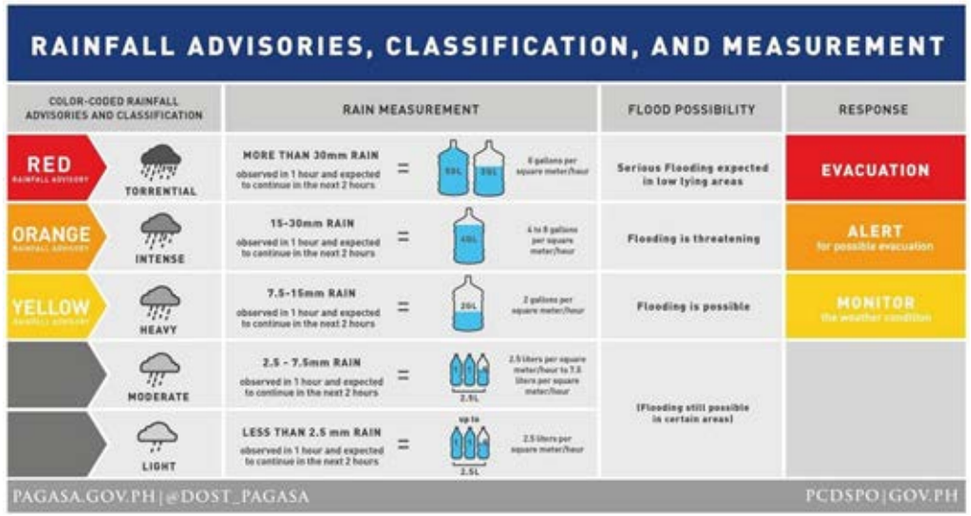
Public Storm Warning Signals (PSWS) are raised over some areas.

With "Warning" status, succeeding severe weather bulletins will be issued every 6 hours (5AM, 11AM, 5PM and 11PM).

Tropical Cyclone Warning Services



Rainfall Advisory



Thunderstorm Advisory

THUNDERSTORM ADVISORY

This will be issued when there is an indication that a thunderstorm is threatening a specific area(s) within the next 2 hours.
Updates will be issued as frequent as necessary.
This will be issued via SMS (text), social media, website.

THUNDERSTORM WATCH

This will inform the public that TSTM* formation is likely within the next twelve (12) hours.
This is more general than a warning.
This will be issued thru social media, website.

THUNDERSTORM INFO

Issued when TSTM* is less likely within the next twelve (12) hours.
This will be issued thru twitter, facebook, website.

*TSTM - thunderstorm

PROJECT NOAH

NATIONWIDE OPERATIONAL ASSESSMENT OF HAZARDS

Another tool for monitoring the latest weather information relating to rainfall, flood, storm surge and landslide is Project NOAH.

Launched in July 2012, Project NOAH is a responsive disaster management program for prevention and mitigation using advanced scientific research and cutting-edge technology resulting in the reduction of risks to highly vulnerable communities.

Project NOAH provides 6-hour lead time warning to vulnerable communities against impending floods. Available in the NOAH website and mobile application are hazard maps reflecting flood-prone areas discernible at a local scale or community level -- anytime, anywhere.

(To learn how to navigate the website www.noah.dost.gov.ph, refer to Appendix p. 84)

DREAM

DISASTER RISK AND EXPOSURE ASSESSMENT FOR MITIGATION

The Disaster Risk and Exposure Assessment for Mitigation or DREAM is a project component of Project NOAH involved in creating multi-hazard maps using the light detection and ranging (LiDAR) technology.

The DREAM project taps on the state-of-the-art tools of science for flood hazard modeling and mapping that is implemented by the UP Training Center for Applied Geodesy and Photogrammetry.

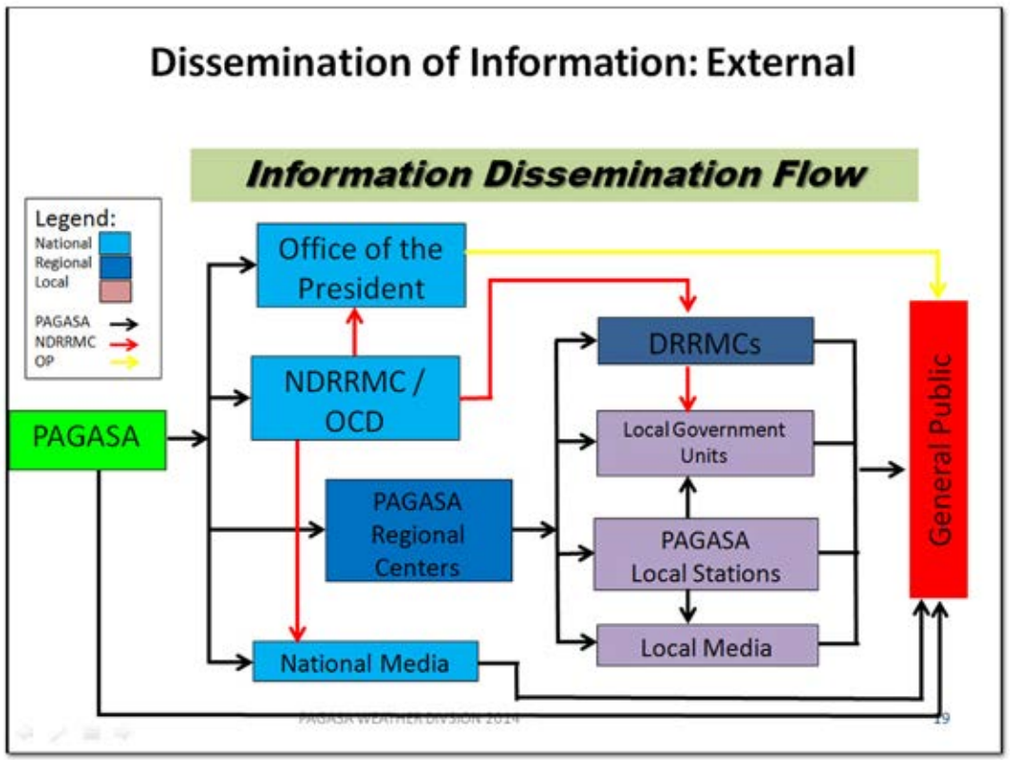
The project aims to generate high resolution, detailed and up-to-date national elevation maps and data sets for the 18 critical river basins in the Philippines. This will be used to create flood hazard modeling to allow early warning of at least 6 hours, a sufficient time for people and communities to prepare.

(Flood hazard maps of the 18 major river basins can be found on Appendix pp. 104 to 141.)

3. WARNING & COMMUNICATION PROTOCOLS

After knowing and identifying the different kinds of hazards, it is equally important to know how these information and warnings are communicated to elicit appropriate response.

Warning agencies like PAGASA follows a certain commuication protocol to ensure that the weather information they generate are effectively relayed to the public.



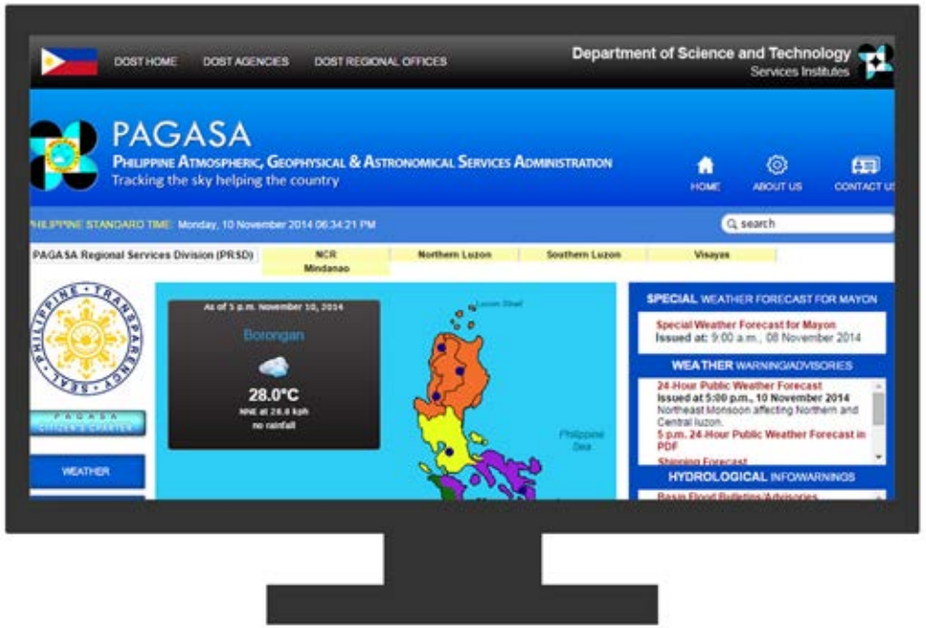
Warning agencies use different platforms – television, radio, newspaper, SMS and online media – for real-time dissemination of information and warnings.

www.phivolcs.dost.gov.ph /phivolcs /phivolcs_DOST

Philippine Institute of Volcanology and Seismology
PHIVOLCS
C.P. Garcia Avenue, U.P. Campus,
Diliman, Quezon City

Earthquake and Tsunami Monitoring (24/7)
(632) 426-1468 to 79 local 124 – 125
(632) 929-9254
Volcano Monitoring (24/7)
(632) 426-1468 to 79 local 127

Earthquake and Tsunami Monitoring (24/7)
(632) 927-1087
Volcano Monitoring (24/7)
(632) 927-1095



www.pagasa.dost.gov.ph /pagasa.dost.gov.ph /dost_pagasa

Philippine Atmospheric Geophysical &
Astronomical Services Administration
PAGASA
Science Garden Complex, BIR Rd.
Diliman, Quezon City

Weather Forecasting (24/7)
(632) 927-2877 / (632) 926-4258
Public Information
(632) 927-9308 / (632) 434-2696
(632) 433-ULAN (recorded weather information system)

Aviation Weather
Tel. number: (632) 832-3023

Earthquake Preparedness Guide

For inquiries and information, please contact:

Department of Science and Technology
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY
C.P. Garcia Avenue, U.P. Campus, Diliman, Quezon City
Tel. Nos. 426-1468 to 79
Website: www.phivolcs.dost.gov.ph
June 2009
Reprinted April 2011

AFTER

Be prepared for aftershocks. Once the shaking stops, take the fastest and safest way out of the building.

Don't...

...use elevators.
...enter damaged buildings.
...use telephones unless necessary.
...PANIC.

Check...

- ✔ yourself and others for injuries.
- ✔ water and electrical lines for damages.
- ✔ for spills of chemical, toxic and flammable materials.
- ✔ and control fires which may spread.

If you need to evacuate your residence, leave a message stating where you are going and bring your emergency supply kit.

Keep updated on disaster prevention instructions from battery-operated radios.

Philippine Institute of Volcanology and Seismology
Department of Science and Technology

EARTHQUAKE PREPAREDNESS GUIDE

What to do Before, During and After an earthquake

BEFORE

The key to effective disaster prevention is planning:

- ✔ Know the earthquake hazards in your area.
- ✔ Follow structural design and engineering practices when constructing a house or building.
- ✔ Evaluate the structural soundness of the buildings and houses; strengthen or retrofit if necessary.

Prepare your homes, workplace or schools:

- ✔ Strap or bolt heavy furnitures/ cabinets to the walls.
- ✔ Check the stability of hanging objects like ceiling fans and chandeliers.
- ✔ Breakable items, harmful chemicals and flammable materials should be stored properly in the lowermost secured shelves.

Familiarize yourself with the exit routes.

Know where fire extinguishers, first aid kits, alarms, and communication facilities are located. Learn how to use them beforehand.

Prepare a handy emergency supply kit with first aid kit, canned food and can opener, water, clothing, blanket, battery-operated radio, flashlights and extra batteries.

Conduct and participate in regular earthquake drills.

DURING

STAY CALM.

When you are INSIDE a structurally sound building or home... STAY THERE!

Do the "DUCK, COVER and HOLD".

- ✔ If possible quickly open the door for exit.
- ✔ Duck under a sturdy desk or table, and hold on to it, or protect your head with your arms.
- ✔ Stay away from glass windows, shelves, cabinets and other heavy objects.
- ✔ Beware of falling objects. Be alert and keep your eyes open.

If you're OUTSIDE..move to an open area!

- ✔ Stay away from trees, powerlines, posts and concrete structures.
- ✔ Move away from steep slopes which may be affected by landslides.
- ✔ If you're near the shore and feel an earthquake, especially if it's too strong, move quickly to higher grounds. **Tsunamis** might follow.

If you're in a moving vehicle, STOP and get out! Do not attempt to cross bridges, overpasses, or flyovers which may have been damaged.

Source: PHIVOLCS

TSUNAMI

is a series of waves usually caused by an earthquake that happens under the sea. It is different from a storm surge.

THREE SIGNS OF AN INCOMING LOCAL TSUNAMI:

1. **Earthquake that is strong enough to be felt.**

2. **Sudden drop or rise of sea water.**

3. **Roaring sound of incoming waves.**

WHAT TO DO:

ADVISORY: No tsunami threat

A large earthquake happened but will not cause a tsunami or if it will produce a tsunami, it will not reach the Philippines.

No evacuation needed.

ADVISORY: Sea level change monitoring

Stay informed of updates comingfrom DOST-PHIVOLCS.

ADVISORY: Minor sea level disturbance

There is minor sea level change in coastal areas with wave heights of less than one meter above the expected ocean tides.

Stay away from the beach and don't go to the coast.

Keep boats away from the dock, shore, and shallow parts of the sea.

Fishermen whose boats are already out in the seas should stay in deep waters as tsunamis in those parts are not very high.

TSUNAMI WARNING:

A destructive tsunami is expected with life threating wave heights of greater than one meter above the expected ocean tides.

Fishermen whose boats are already out in the seas should stay in deep waters as tsunamis in those parts are not very high.

Immediate evacuation of coastal communities that may be affected is strongly advised.

Don't go back to the shore until DOST-PHIVOLCS issues an advisory stating that the tsunami threat has passed or local authorities give an "all clear" advisory meaning it is safe to go back.

Keep boats away from the dock, shore, and shallow parts of the sea.

PHIVOLCS does not issue an "all clear" advisory. It is the local authorities who should do this especially when there is a tsunami which affects the coastal area. PHIVOLCS will lower or cancel alert if there is no more tsunami threat.

ASHFALL

WHAT TO DO DURING ASHFALL

Listen to the radio for updates/developments regarding the volcanic eruption.

Close all windows and doors fo the house and your car.

Cover nose and mouth using a mask or a damp cloth.

Cover water containers and food to avoid contamination with ash.

Wash fruits and vegetables thoroughly before cooking or eating them.

Keep your pets in their shelter or inside the house to help them avoid inhaling ash.

As soon as the ashfall tapers, scrape off the ash that has accumulated on roof tops to prevent collapse.

If you are outside, look for a shelter and wear glasses to protect your eyes. Avoid using contact lenses.

If you are driving a vehicle, pull to the side of the road and stop if there is heavy ashfall.

WHAT TO DO AFTER AN ASHFALL

After removing the ash, clean the roof and gutter with water to prevent corrosion.

Shake loose ash from plants before watering them.

Use powder detergent in washing clothes contaminated with ash.

Use vacuum cleaner or shake loose the ash from furniture before dusting them. Cover your nose and mouth while cleaning.

To remove ash from glass windows and doors of the house and car, use water hose before washing them with soap and lukewarm water.

Collect the ashes and put them in an area far from water drainage to avoid clogging.

IMPORTANT REMINDERS

If you are living near an erupting volcano, evacuate as soon as possible.

If the erupting volcano is under the sea, near the sea or a lake, evacuate immediately because there is high chance that it will produce big waves.

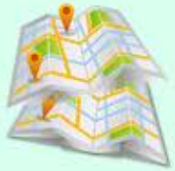
Avoid passing through a creek or river where lava, pyroclastic flows or lahars may flow.

LANDSLIDE

PREPARING FOR A LANDSLIDE

Learn the condition in your area and watch out for signs of an impending landslide such as fissuring of the ground or sudden appearance of springs.

Keep posted on threats of landslide through the barangay landslide threat advisory, reports, and landslide hazard map.



Learn the fastest and safest way going to the nearest evacuation center.

Evacuate immediately in cases of non-stop rainfall and landslide threat in your area.

WHAT TO DO DURING LANDSLIDE

If inside the house or building and evacuation is not possible: Stay inside. Get under a sturdy table.

If outside: Avoid areas that may be affected by landslide. Head to an elevated and safe place.

Do a fetal position and protect your head if landslide can no longer be avoided.

If driving: Don't cross collapsed bridges or roads. Avoid falling rocks and soil.

WHAT TO DO AFTER A LANDSLIDE

Avoid places affected with landslide as the hazard might recur.

Watch out for possible flashfloods if the landslide blocked the water flow.

Check for missing persons and report it to authorities so that rescue operations can start immediately.

Monitor the latest advisories and warnings. Report damaged power, water, and telephone lines.

Check for damaged foundation and other parts of the house or building. Have these repaired when condition is clear and there is no more landslide threat.

PUBLIC STORM WARNING SIGNAL

WHAT TO DO DURING PUBLIC STORM SIGNAL NO. 1:

WINDS TRAVEL AT A SPEED OF NOT MORE THAN 60 KPH AND MAY BE FELT WITHIN THE NEXT 36 HOURS

Listen to the radio and television for the news or log on to the internet for more information about the weather disturbance.

Check the weak parts of the house if it can withstand strong winds and strengthen it, if needed.

Monitor the latest severe weather bulletins issued by DOST-PAGASA every six (6) hours. Also you can check the website of Project NOAH. In the meantime, business may be carried out as usual except when flood occurs.

Classes in the nursery and primary levels are suspended so do not allow your children to go out anymore.

www.noah.dost.gov.ph

WHAT TO DO DURING PUBLIC STORM SIGNAL NO. 2:

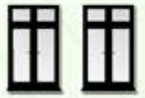
WINDS TRAVEL AT A SPEED OF 61 TO 100 KPH AND MAY BE FELT WITHIN THE NEXT 24 HOURS.

While listening to the radio or watching TV, give special attention to the latest position, direction and speed of the typhoon as it intensifies. Also, log on to Project NOAH.

Be alert especially when travelling by sea and air.

Protect and secure all properties before signals are raised and upgraded.

Ensure that all windows and shutters are securely closed and fastened.



Stay at home and avoid going out unless it is necessary.

Classes in the elementary and high school levels are suspended so do not allow your children to go out anymore.

Have your survival kit ready at all times. *(Refer to page 142)*

WHAT TO DO DURING PUBLIC STORM SIGNAL NO. 3:

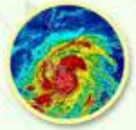
WINDS TRAVEL AT A SPEED OF 101 TO 185 KPH AND MAY BE FELT WITHIN THE NEXT 18 HOURS.

Keep your radio on and listen to the latest news about the typhoon. Also, you can log on to Project NOAH.

Stay in safe and strongly built houses. Do not stay in low-lying areas and go to higher grounds, if needed.

Stay away from riverbanks and coastal areas to avoid getting caught in possible storm surge and flash flood.

Watch out for the passage of the eye of the typhoon where areas become temporarily calm with clear skies. As the eye passes, the bad weather will continue.



Classes in the college level are suspended so do not allow your children to go out anymore.

Have your survival kit ready at all times. *(Refer to page 142)*

WHAT TO DO DURING PUBLIC STORM SIGNAL NO. 4:

WINDS TRAVEL AT A SPEED OF MORE THAN 185 KPH AND MAY BE FELT IN AT LEAST 12 HOURS.

Keep monitoring the situation on the radio and/or TV or log on to Project NOAH, if there is still electricity.

Stay in safe houses or evacuation centers, if needed.

Cancel all travel plans by land, sea and air and do not engage in any outdoor activity.

Have your survival kit ready at all times. *(Refer to page 142)*

FLOODING

WHAT TO DO BEFORE FLOODING

Monitor radio and TV news on weather conditions from PAGASA.

Log on to Project NOAH for updates on storm track, water level sensor readings and historical flood maps.

Know the flood warning system in your community. Know where the nearest evacuation is located.

Prepare your survival kit. *(Refer to page 142)*

Secure and strengthen weak parts of the house like windows and roofs.

Move important household appliances and belongings on upper level of the house.

Turn off electric switches and gas valves when it is time to evacuate.

WHAT TO DO DURING FLOODING

Continuously monitor radio and TV news on weather conditions from PAGASA.

Log on to Project NOAH website for updates on storm track, water level sensor readings and historical flood maps.

Stay indoors unless there is an emergency.

Never attempt to cross rivers or streams where water level is already knee deep.

Beware of flooded roads, bridges and watch out for open manholes and drainages.

Do not go swimming or playing in rivers, streams and canals.

Beware of contaminated food and water specially those that were submerged in flood waters.

Be ready to evacuate with your survival kit when flood waters continue to rise. *(Refer to page 142)*

WHAT TO DO AFTER FLOODING

Be careful of broken electric wires, flammable items and dangerous animals like snakes, rats, etc.

Do not turn on switches. Do not use or plug-in electrical appliances. Have a competent electrician check all electrical outlets and switches first.

Report broken electric lines to concerned agencies like MERALCO.

Do not eat food (from containers) and drink water (from faucets) especially when you know they were submerged in flood waters. If needed, boil water and eat only cooked food.

Consult a doctor immediately when fever is felt and when there is a wound or for immunization.

Do not stay in disaster areas and avoid sight-seeing.

RAIN-INDUCED LANDSLIDES

PAGGUHO NG LUPA SANHI NG PAG-ULAN

What To Do Before A Landslide

Study the condition in your area and watch out for signs of possible landslide like cracking of the soil or sudden gush of water from the soil.

Monitor landslide through weather reports and landslide hazards maps or log on to Project NOAH (www.noah.dost.gov.ph).

Know where the fastest and safest way to the nearest evacuation center.

Evacuate immediately in cases of non-stop rainfall and when there are signs of landslide.

Prepare your **survival kit** with provisions like food, drinking water, flashlight, transistor radio, etc. *(Refer to page 142)*

What To Do During A Landslide

If you are inside the house or building and evacuation is no longer possible, stay inside and get under a table.

If you are outside, avoid areas that may be affected by landslide and if possible go to an elevated and safe place.

If landslide can no longer be avoided, lie down in a fetal position and protect your head.

If you are driving, don't try to cross bridges and roads that are about to collapse and avoid falling rocks and soil.

What To Do After A Landslide

Avoid going to places affected by landslide as the hazard might recur.

Watch out for possible flashfloods if the landslide blocked the water flow.

Check for missing persons and report it to authorities so that rescue operations can start immediately.

Monitor the latest advisories and warnings from the radio and TV or log on to Project NOAH. Report damaged power and water lines, telephone installations and other utility facilities.

Check for damaged foundation and other parts of the house or building. Immediately have repairs done once there is no longer a landslide threat.

STORM SURGE
DALUYONG NG BAGYO

WHAT TO DO DURING STORM SURGE
For Individuals

Monitor public weather forecasts, bulletins and warnings issued by DOST-PAGASA. Also, consult the Project NOAH website (www.noah.dost.gov.ph) for storm surge maps and other weather information.

Make plans for evacuation to higher grounds or evacuation centers.

Secure your home. Move essential items to the upper floors.

Turn off utilities, main electrical switches and gas valves.

If you need to evacuate, bring your **survival kit** with essential items like canned food, drinking water, flashlight, clothes, transistor radio, etc. *(Refer to page 142)*

WHAT TO DO DURING STORM SURGE
For Communities

Community leaders should prepare evacuation plans by identifying evacuation centers that are on higher grounds. Create a communication system easily understood by all residents.

Conduct regular drills and exercises to familiarize every community member with actual storm surge situations.

Evacuate people as soon as possible to higher grounds when there is a strong typhoon that will hit coastal communities.

Make sure that all valuables and important documents are secured. *(Refer to page 142)*

Make sure that there is a back up plan composed of the following: reliable transport system, efficient search and rescue operation, medical assistance, clearing equipment, sanitation and relief and rehabilitation activites.

THE MEDIA'S ROLE IN DISASTER INFORMATION

THE MEDIA'S ROLE IN DISASTER INFORMATION

6 FOCAL POINTS TO CONSIDER IN COVERING DISASTER EVENTS

The first step to disaster preparedness is awareness. Media plays a vital role in making people aware of the hazards by communicating the right information at the right time in order to help save lives.

The suggested **6 Focal Points** serve as guide for broadcasters when covering disasters.

A. Danger

Determine the **"danger"** associated with the natural hazard that can endanger lives.

Typhoon-related "Killer Factor"	Where to look for this information
i. Heavy rainfall that can cause floods	1. DOST PAGASA's rainfall warning 2. DOST PAGASA's weather bulletins 3. Project NOAH's doppler radars 4. DOST PAGASA's Processed MTSAT
ii. Strong winds that can topple down trees and houses as well as send GI roofs of houses flying	1. DOST PAGASA's weather bulletins issued on the website and announced in the media
iii. Storm Surge in low-lying areas	1. Project NOAH's flood models (animation) 2. Project NOAH's list of municipalities to be affected by storm surge and the storm surge height
iv. Rain-induced Landslide (and debris flow)	1. Refer to hazards maps by Project NOAH DREAM, DENR, NAMRIA and MGB

B. Location

Determine the exact location of the communities at risk to different hazards like typhoon path, flood, storm surge, etc.

The media and the public can also dig deeper by understanding the topography of areas in communities that are usually prone to flooding during the rainy season. Using the high-resolution barangay-scale maps produced under the Project NOAH/ UP DREAM Project, the public can also access information about the natural topography and elevation of an area and the history of worst floods to hit the area. These visual or graphical information can help people better locate areas of safety where they can go for evacuation, or even with parking cars for safety.

C. Scale or Magnitude

The scale or magnitude of a natural hazard can be:

a. local in scale that disrupts normal life of a city, town or province
b. regional in scale that disrupts life in multiple provinces
c. multi-regional in scale that disrupts life in multiple regions and can impact supply chains and services at the national level.

Scales or magnitudes will help determine the level of response and coordination between the local and national agencies before, during, and after a disaster. If there is an expected regional or multi-regional impact, agencies concerned have to adjust the prepositioning of primary relief goods, heighten security details and enhance emergency communication system are convened to help strengthen pre-disaster preparedness plans.

D. Timing and Duration

Timing refers to the time when the hazard will be felt or experienced. Duration refers to the length of its stay within a specific region or locality.

E. Impact

The impact of the hazard represents the effect on the community and its residents that includes threat to life and property.

For example: Under PAGASA's Public Storm Warning Signal system, there are forecast impacts depending on the strength of the winds and the amount of rainfall expected from the typhoon.

F. Response

Using science-based forecasts and scenario-driven warnings from DOST warning agencies, national and local disaster risk reduction offices and communities implement their respective disaster preparedness and response plans with a clear goal of preventing loss of life and damage to property.

Using the maps issued by warning agencies, local disaster responders and local chief executives can coordinate with DOST-PAGASA, Project NOAH, UP DREAM and NDRRMC OCD to receive the free hazard maps for their local communities. These maps and data can help in local disaster planning and beyond, with applications ranging from land use plans and seasonal agriculture plans.

By asking these pieces of information from national and local disaster responders, as well as community leaders at LGUs, the media can elevate its performance of its role as a sentinel, a public watchdog to help monitor if local government units are performing their role to ensure community disaster preparedness, instead of the usual reactive stance of only acting after a typhoon hit the area.

It is highly suggested that field reporters, news anchors, producers, and desk editors coordinate with the assigned warning agencies to clarify information as deemed necessary for the report.

GUIDE QUESTIONS
WHEN COVERING DISASTERS

1. What is the difference between a natural hazard and a disaster?

2. What makes a community more vulnerable to the impact of disasters?

3. During typhoon season, what are the basic details that warning agencies and local government units should be able to provide the public?

4. Where can the people in risk-prone areas go for safety?

5. What should be in an emergency bag?

6. What are the lessons and best practices learned by emergency preparedness teams and communities in this disaster?

7. Should the public lose confidence in our weathermen and technology capability of the country if the typhoon diverts out of the forecast track?

8. What tools can be used to gather more information about weather-related hazards?

9. Who can provide further information on weather-related disasters?

10. How can the public help warning agencies in disaster preparedness?

APPENDIX

APPENDIX

TABLE OF CONTENTS

Image from Reuters

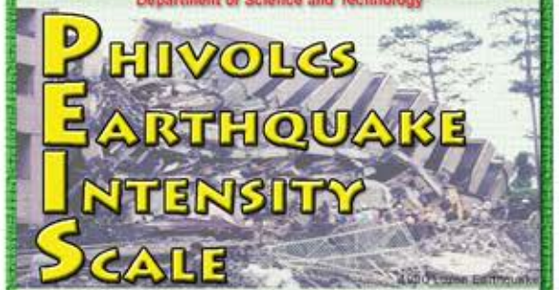
RICHTER MAGNITUDE SCALE

1	Earthquakes with magnitude below 1 are only detectable when an ultra sensitive seismometer is operated under favorable circumstances.
2	Most earthquakes with magnitude below 3 are the "hardly perceptible shocks" and are not felt. They are only recorded by seismographs of nearby stations.
3	Earthquakes with magnitude 3 to 4 are the "very feeble shocks" and only felt near the epicenter.
4	Earthquakes with magnitude 4 to 5 are the "feeble shocks" where damages are usually not reported.
5	Earthquakes with magnitude 5 to 6 are the "earthquakes with moderate strength" and are felt over the wide areas, some of them cause small local damages near the epicenter.
6	Earthquake with magnitude 6 to 7 are the "strong earthquakes" and are accompanied by local damages near the epicenters. First class seismological stations can observe them wherever they occur within the earth.
7	Earthquakes with magnitude 7 to 8 are the "major earthquakes" and can cause considerable damages near the epicenters. Shallow-seated or near-surface major earthquakes, when they occur under the sea, may generate tsunamis. First class seismological stations can observe them wherever they occur within the earth.
8	Earthquakes with magnitude 8 to 9 are the "great earthquakes" occuring once or twice a year. When they occur in land areas, damages affect wide areas. When they occur under the sea, considerable tsunamis are produced. Many aftershocks occur in areas approximately 100 to 1,000 kilometers in diameter.
9	Earthquakes with magnitude over 9 are rare. Only six have been recorded since the start of seismographic observations.

Source: PHIVOLCS

Philippine Institute of Volcanology and Seismology
Department of Science and Technology

PHIVOLCS EARTHQUAKE INTENSITY SCALE



A measure of how an earthquake was felt in a certain locality or area. It is based on relative effect to people, structures, and objects in the surroundings. It is represented by Roman Numerals, with intensity I being the weakest and intensity X the strongest. It is used since 1996, replacing the Rossi-Forel scale.

I. SCARCELY PERCEPTIBLE

- Perceptible to people only under favorable circumstances.
- Delicately-balanced objects are disturbed slightly.
- Still water in containers oscillates slightly.

II. SLIGHTLY FELT

- Felt by few individuals at rest indoors.
- Hanging objects swing slightly.
- Still water in containers oscillates noticeably.

III. WEAK

- Felt by many people indoors specially in upper floors of buildings. Vibration is felt like the passing of a light truck. Dizziness and nausea are experienced by some people.
- Hanging objects swing moderately.
- Still water in containers oscillates moderately.

IV. MODERATELY STRONG

- Felt generally by people indoors and some people outdoors. Light sleepers are awakened. Vibration is felt like the passing of a heavy truck.
- Hanging objects swing considerably. Dinner plates, glasses, windows and doors rattle. Floors and walls of wood-framed buildings creak. Standing motor cars may rock slightly.
- Water in containers oscillates strongly.
- Rumbling sounds may sometimes be heard.

REPORT AN EARTHQUAKE
Text only 0918-9428354
Text / call 0905-3134077
or call (02) 426-1468 local 124 / 125
(02) 929-9254

For text, send:
Name / Date and time of earthquake / Location at the time of earthquake / Intensity rating

(All personal information will be kept private and secured.)

Department of Science and Technology
Philippine Institute of Volcanology and Seismology
PHIVOLCS Bldg., C.P. Garcia Ave., UP Campus, Diliman, Quezon City 1101

Printed June 2009

V. STRONG

- Generally felt by most people indoors and outdoors. Many sleeping people awakened. Some are frightened; some run outdoors. Strong shaking and rocking are felt throughout the building.
- Hanging objects swing violently. Dining utensils clatter and clink; some are broken. Small, light and unstable objects may fall or overturn. Liquids spill from filled open containers. Standing vehicles rock noticeably.
- Shaking of leaves and twigs of trees is noticeable.

VI. VERY STRONG

- Many people are frightened; many run outdoors. Some people lose their balance. Motorists feel like driving with flat tires.
- Heavy objects and furniture move or may be shifted. Small church bells may ring. Wall plaster may crack. Very old or poorly built houses and man-made structures are slightly damaged, though well-built structures are not affected.
- Limited rockfalls and rolling boulders occur in hilly to mountainous areas and escarpments. Trees are noticeably shaken.

VII. DESTRUCTIVE

- Most people are frightened and run outdoors. People find it difficult to stand in upper floors.
- Heavy objects and furniture overturn or topple. Big church bells may ring. Old or poorly built structures suffer considerable damage. Some well-built structures are slightly damaged. Some cracks may appear on dikes, fish ponds, road surfaces, or concrete hollow block walls.
- Limited liquefaction, lateral spreading and landslides are observed. Trees are shaken strongly. (*Liquefaction is a process by which loose saturated sand loses strength during an earthquake, and behaves like liquid.*)

VIII. VERY DESTRUCTIVE

- People are panicky. People find it difficult to stand even outdoors.
- Many well-built buildings are considerably damaged. Concrete dikes and foundations of bridges are destroyed by ground settling or toppling. Railway tracks are bent or broken.
- Tombstones may be displaced, twisted or overturned. Utility posts, towers and monuments may tilt or topple. Water and sewer pipes may be bent, twisted or broken.
- Liquefaction and lateral spreading cause man-made structures to sink, tilt or topple. Numerous landslides and rockfalls occur in mountainous and hilly areas. Boulders are thrown out from their positions particularly near the epicenter. Fissures and fault rupture may be observed. Trees are violently shaken. Water splashes or slops over dikes or banks of rivers.

IX. DEVASTATING

- People are forcibly thrown to the ground. Many cry and shake with fear.
- Most buildings are totally damaged. Bridges and elevated concrete structures are toppled or destroyed.
- Numerous utility posts, towers and monuments are tilted, toppled or broken. Water and sewer pipes are bent, twisted or broken.
- Landslides and liquefaction with lateral spreading and sandboils are widespread. The ground is distorted into undulations. Trees are shaken very violently with some toppled or broken. Boulders are commonly thrown out. River water splashes violently or slops over dikes and banks.

X. COMPLETELY DEVASTATING

- Practically all man-made structures are destroyed.
- Massive landslides and liquefaction, large scale subsidence and uplifting of landforms, and many ground fissures are observed. Changes in river courses and destructive seiches in lakes occur. Many trees are toppled, broken or uprooted.

Source: PHIVOLCS

HOW SAFE IS MY HOUSE?

Self-check for Earthquake Safety of Concrete Hollow Block (CHB) Houses in the Philippines

The integrity and safety of a house depends on how it was made.

DOST PHIVOLCS JICA JST ASEP

Ver. 1.0
February 2014

OBJECTIVE OF THE TEST

This "House self-check" serves to understand and evaluate the integrity of your house and its vulnerability to strong earthquakes. The initial result will verify whether your house was properly built and have followed appropriate construction procedures and recommended measures or if it will require necessary strengthening.

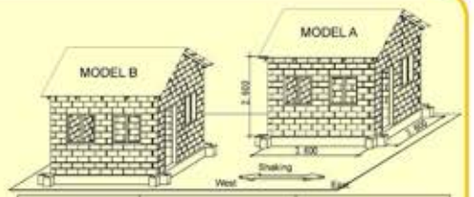
TARGET USERS / HOUSE TYPE

This evaluation is initially intended for 1 to 2-storey Concrete Hollow Block (CHB) houses, including those residences with small shops, offices, garages and the like. It will help the house owners of this type to evaluate their houses by themselves and to understand the likely behavior of their houses during a strong earthquake.

Full scale shaking table test of CHB Houses

A full-scale shaking table experiment on CHB masonry structures was conducted in Japan to showcase two types of CHB houses. One model represented a code-compliant CHB house (Model A) and the other represented the more common residential CHB house (Model B) in the Philippines. The aim of the test was to better understand the vulnerability of its different parts and sections, the failure pattern and the overall behavior of similar structures during large earthquakes.

For the Philippine CHB houses, the application of mortar is another crucial construction activity that should be given equal importance as with appropriate reinforcements. Mortar should be properly applied and compacted requiring proper mixing, pouring and curing to produce homogeneous fill and bond.



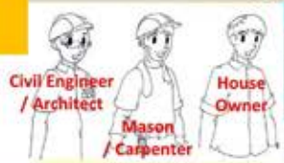
Specification	Model A	Model B
CHB Wall	6" (400x200x150 mm)	4" (400x200x100 mm)
Vertical Steel Bars	10 millimeter diameter spaced at 40 centimeter	6 millimeter diameter spaced 90 centimeter
Horizontal Steel Bars	10 millimeter diameter spaced at 60 centimeter or laid every 3 layers	6 millimeter diameter spaced at 60 centimeter or laid every 3 layers
Mortar Mix (Cement : Sand)	1:4 Compacted	1:4 Not compacted
Roof Frame / Roofing	Wood / G.I. Sheets	Wood / G.I. Sheets

Request and notes to those who distribute this material.

This method in evaluating CHB Houses was developed as an easy and manageable test for laymen to promote inexpensive yet practical performance evaluation of residential houses against earthquakes and to subsequently disseminate information and strategies for strengthening. It aims to help the house owners enhance their awareness and acquire relevant information by doing the evaluation themselves. This test shall lead to a more detailed assessment with assistance from building experts for what the house owners need to know about their house, allay their fears and confusion and learn what to do thereafter.

This earthquake disaster awareness material was prepared by the Philippine Institute of Volcanology and Seismology (PHIVOLCS) of the Department of Science and Technology (DOST) in collaboration with the Association of Structural Engineers of the Philippines (ASEP) under the Japan International Cooperation Agency (JICA) - Japan Science and Technology (JST) Project on the " Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines".

QUESTION 1 — Who built or designed my house?



Items		point
A: Built or designed by a licensed civil engineer/architect.	-	1
B: Not built by a licensed civil engineer/architect.	-	0
C: It is not clear or unknown.	-	0

This question refers to the person who supervised the building of the house.

QUESTION 2 — How old is my house?

Items		point
A: Built in or after 1992.	-	1
B: Built before 1992.	-	0
C: It is not clear or unknown.	-	0

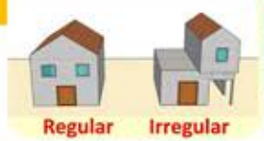
This checks if your house was built under more recent earthquake-resistant building standards.

QUESTION 3 — Has my house been damaged by past earthquakes or other disasters ?

Items		point
A: NO or YES but repaired.	-	1
B: YES but not yet repaired.	-	0
C: It is not clear or unknown.	-	0

This checks if the house sustained structural damage and had undergone repair works.

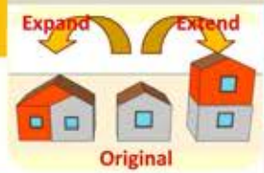
QUESTION 4 — What is the shape of my house?



Items		point
A: Regular (symmetrical, rectangular, box-type, simple)	-	1
B: Irregular/Complicated.	-	0
C: It is not clear or unknown.	-	0

This checks the shape of your house which influences behavior during strong ground shaking. .

QUESTION 5 — Has my house been extended or expanded?



Items		point
A: NO or YES but supervised by a civil engineer/architect.	-	1
B: YES, but not supervised by a civil engineer/architect.	-	0
C: It is not clear or unknown.	-	0

This checks if additional construction was properly executed and correctly attached to the original structure.

QUESTION 6 — Are the external walls of my house 6-inch (150mm) thick CHB?

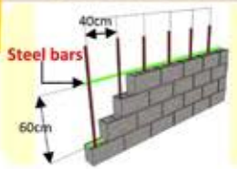
Items		point
A: YES, it is 6-inch	-	1
B: NO, it is thinner than 6-inch.	-	0
C: It is not clear or unknown.	-	0

This checks if the standard size of at least 6" thick CHB was used.

Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines

Self-check for Earthquake Safety of Concrete Hollow Block (CHB) Houses in the Philippines

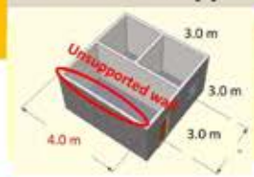
QUESTION 7 — Are steel bars of standard size and spacing used in walls ?



Items		point
A: YES (10mm diameter, tied and spaced correctly) .	-	1
B: NO, fewer and smaller than 10mm.	-	0
C: None or Unknown.	-	0

This checks if standard size and spacing of steel bars were used as reinforcement.

QUESTION 8 — Are there unsupported walls more than 3 meters wide?



Items		point
A: NONE, all unsupported walls are less than 3m wide.	-	1
B: YES, at least one unsupported wall is more than 3m wide.	-	0
C: It is not clear or Unknown.	-	0

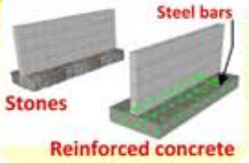
This checks if the wall is properly supported from falling down.

QUESTION 9 — What is the gable wall of my house made of ?

Items		point
A: Light materials, properly anchored CHBs, no gable wall.	-	1
B: Not properly anchored CHBs, Bricks, Stone.	-	0
C: It is not clear or Unknown.	-	0

This checks if the gable wall is properly supported by sufficient steel bars or by a lintel beam.

QUESTION 10 — What is the foundation of my house?



Items		point
A: Reinforced concrete.	-	1
B: Stones or unreinforced concrete.	-	0
C: It is not clear or Unknown.	-	0

This checks if the foundation is properly constructed to support the walls.

QUESTION 11 — What is the soil condition under my house?

Items		point
A: Hard (rock or stiff soil).	-	1
B: Soft (muddy or reclaimed) .	-	0
C: It is not clear or Unknown.	-	0

This checks if the house was built over a stable or stabilized ground.

QUESTION 12 — What is the overall condition of my house?

Items		point
A: Good condition.	-	1
B: Poor condition.	-	0
C: It is not clear or Unknown.	-	0

This describes the overall physical state of the house and checks defect or any deterioration.

Your information

Name: Address:

Score

Please sum up the points of question 1 to 12.

Total	Evaluation and Next steps
11 - 12 points	Though this seems safe for now, please consult experts for confirmation.
8 - 10 points	This requires strengthening, please consult experts.
0 - 7 points	This is disturbing! Please consult experts soon.

COMMENTARY AND RECOMMENDATION FOR SAFER CHB HOUSES

The National Building Code, the National Structural Code of the Philippines and the Full Scale Shaking Table Test for CHB Houses emphasizes adherence to design standards and proper construction implementation for CHB type of structures in the Philippines. The walls of CHB houses play a vital function as the main support of the structure. The code prescribes the use of at least 6" (150mm) thick CHB reinforced with vertical and horizontal steel bars with a minimum diameter of 10 millimeters spaced at 40 centimeters and 60 centimeters on center respectively. It also highly recommends that all CHB cells and joints are filled and compacted with mortar using the correct mix of 1 part of cement to 4 parts (1:4) of washed river sand.

This safety evaluation tool intends to provide more understanding and guidance whether your CHB house conformed with the minimum construction standard.

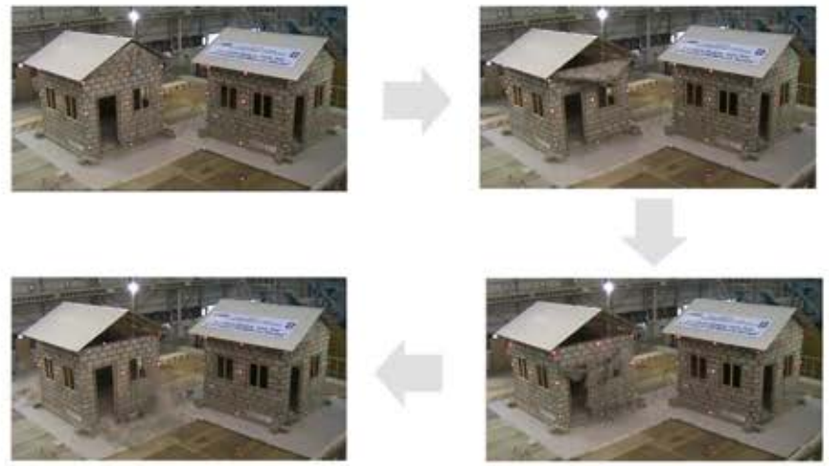
- It is assumed that building construction standards were most likely observed if authorized people took charge of the construction.
- It rates the chance that your house was built compliant to the recent earthquake-resistant building standards similar to special seismic detailing introduced in 1992.
- If damaged by previous earthquakes and disasters and not repaired, the structure is weakened making it vulnerable to a partial or total collapse during a strong ground shaking.
- The shape of the house influences its behavior during strong ground shaking. Box-type or rectangular-shaped houses behave better than those with irregular or unsymmetrical configurations.
- It is assumed that supervised expansion or extension leads to safer and stronger structures.
- The use of standard 6" CHB for external walls produces more stable and stronger structures. This was realized in the Full Scale Shaking Table Test conducted for CHB houses on two models on Feb 2011 in Tsukuba, Japan. Avoid using sand and gravel taken from the shorelines and beaches as materials for CHB, mortar, plaster and concrete mix for foundation for they are known to corrode the steel bars over time resulting to thinner diameter and loss of bond.
- Steel bars embedded in CHB walls, concrete columns, floors and foundation resist the impact of ground shaking. The use of the standard 10 millimeters diameter steel bars spaced at 40 centimeters from side to side and properly connected and tied to steel bars laid every 3 layers of CHB (~60 centimeters) prevent collapse of walls during earthquakes.
- Walls wider than 3 meters span without any perpendicular walls or supports are susceptible to collapse in a strong ground shaking.
- The shaking table test for CHB Houses exhibited that the unanchored gable part of the wall show larger horizontal movement during strong ground shaking. It is recommended that well-reinforced and well-anchored CHBs or light materials be used for the gable wall.
- Reinforced concrete wall foundation resists shaking, slipping and tilting better than stone-foundations.
- Rock or stiff-soil provides better support. Soft soils usually amplify strong ground shaking and tend to spread and subside the ground which may worsen damage to structure. For houses on slopes, tie beams or continues wall foundation prevent uneven settlement during strong ground shaking.
- It is important to observe the state of our house over time. Regular house maintenance must be done to prevent deteriorations like sagging roof, chipped-off plasters and cracks on walls.

Enhancement of Earthquake and Volcano Monitoring and Effective Utilization of Disaster Mitigation Information in the Philippines

Self-check for Earthquake Safety of Concrete Hollow Block (CHB) Houses in the Philippines

COMMENTARY AND RECOMMENDATION FOR SAFER CHB HOUSES

Full Scale Shaking Table Test of CHB Houses, February 2011 in NIED Tsukuba, Japan



Pictures show the eventual collapse of the gable wall of Model B

Picture shows the collapsed gable part of the back wall of model B

It is highly recommended however, that the state of your house be consulted to the proper authorities. The Engineers/Experts of your Local Government Unit may have recommended methods using affordable or low-cost materials to strengthen your house (specifically its walls) in order to protect it from collapse, and to minimize possible falling debris during strong earthquake ground shaking.

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TSUNAMI PREPAREDNESS GUIDELINE

How does a community go about preparedness and planning for tsunami?

The following is an initial checklist that a community can answer to gauge the level of preparedness on tsunami.

GENERAL CHECKLIST

- ☐ Do members of your community know the basic information about earthquakes and tsunami?
- ☐ Does your community have organized efforts based on:
  a) community needs?
  b) resources immediately available to help?
- ☐ Does your community have hazard maps to guide in your preparedness efforts?
- ☐ Does your community have evacuation maps to guide in your preparedness efforts?
- ☐ Are members of the community involved in tsunami preparedness
  a) to educate everyone about evacuation scheme?
  b) to inform everyone with things they can do to increase community safety?
- ☐ Does your community conduct tsunami drills?
- ☐ Is there an established community-based tsunami warning system?
- ☐ Is there a long-term development plan wherein tsunami risk reduction measures are incorporated?
- ☐ Is there plan on how to sustain the efforts in the long term?

From the initial checklist, a community can move further following the suggested step by step procedure on tsunami preparedness. Some activities may be applicable. Some activities can be adjusted depending on the needs of a particular community.

1. Increase awareness on basic tsunami information

Introduce key concepts and basic information, such as natural signs of an impending tsunami, to a capable team or core group of people in the community who will be the prime advocates of tsunami preparedness.

2. Tsunami hazard and risk mapping

A tsunami hazard map shows areas that can be affected by a tsunami. Most often, this kind of map is generated by experts and specialists after careful study of the area.

3. Tsunami evacuation planning

A tsunami evacuation map shows areas identified as safe and areas that are within the hazard zones. This kind of map provides information on how to evacuate to the identified safe areas.

4. Educating the community

After preparing the tsunami evacuation map, another series of information dissemination about the tsunami evacuation plan should be conducted. The three main activities under this are: Community information campaigns, putting up of tsunami signages and conduct of tsunami drill.

5. Establishing tsunami warning system:

- Identify key offices and officials that will be part of the communication flow for information and warning.
- Identify existing equipment (2-way radio, sirens, bell, megaphones, etc.) available in each identified various points to reach the community.
- Identify appropriate warning system scheme and establish final warning system procedure for community (church bell, siren, etc)
- Install additional equipment for warning system
- Establish final flowchart of information test warning and communication system.

6. Identify tsunami mitigation measures

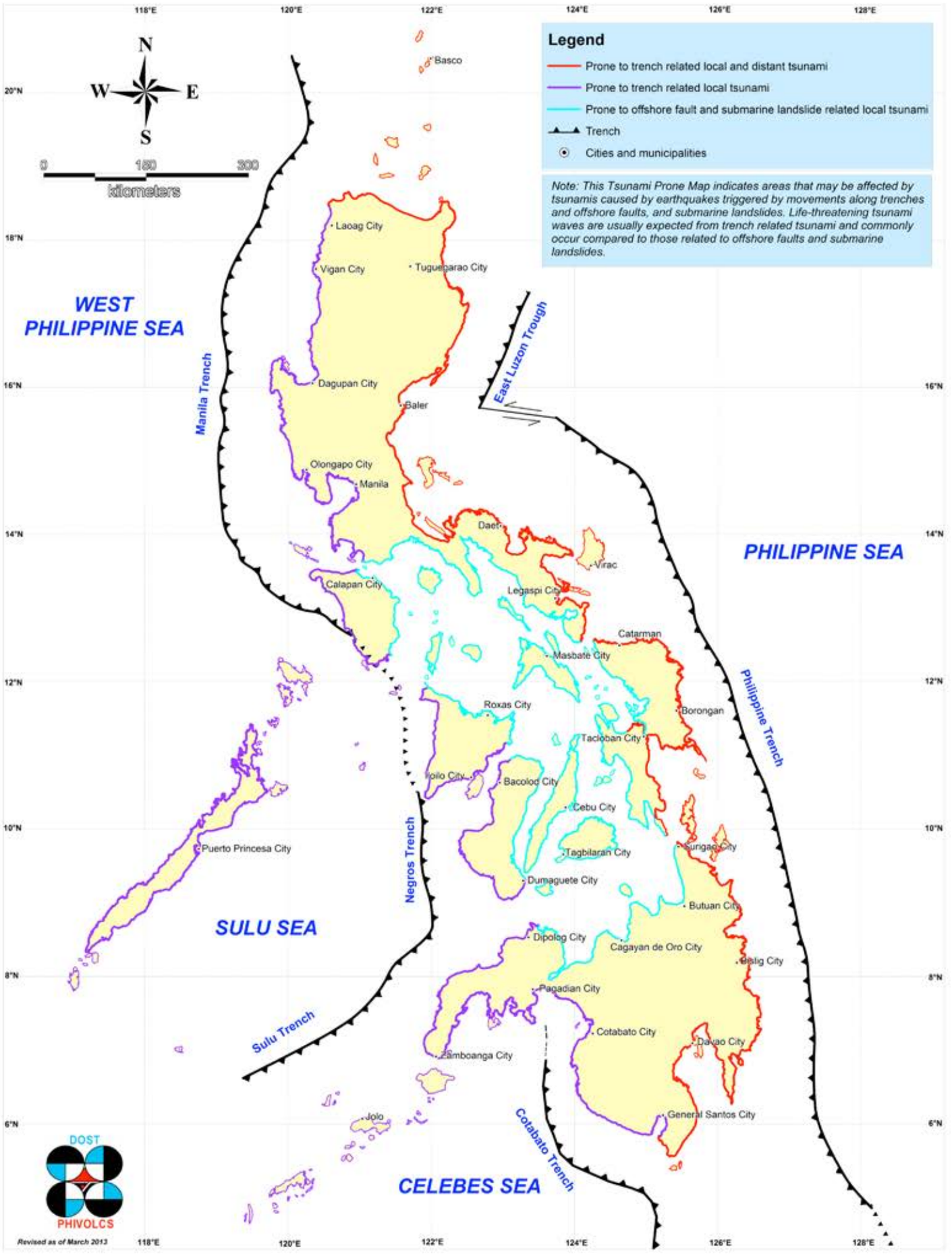
Choice of which mitigation measures to use depends on the community and capability to adapt whichever type of mitigation measure.

List of some tsunami mitigation measures:

Non-structural	Structural
• Information campaign (in schools, in communities) • Tsunami hazard maps • Tsunami evacuation maps • Tsunami warning and information signage • Tsunami marker • Land use planning • Preservation of mangrove area • Coastal zoning	• Construction of sea walls, breakers, tsunami platforms and towers • Construction of additional alternate/access roads from the coastal community; (development of roads perpendicular to the coast for faster evacuation)

Source: PHIVOLCS

Tsunami Prone Areas in the Philippines



Active Volcanoes

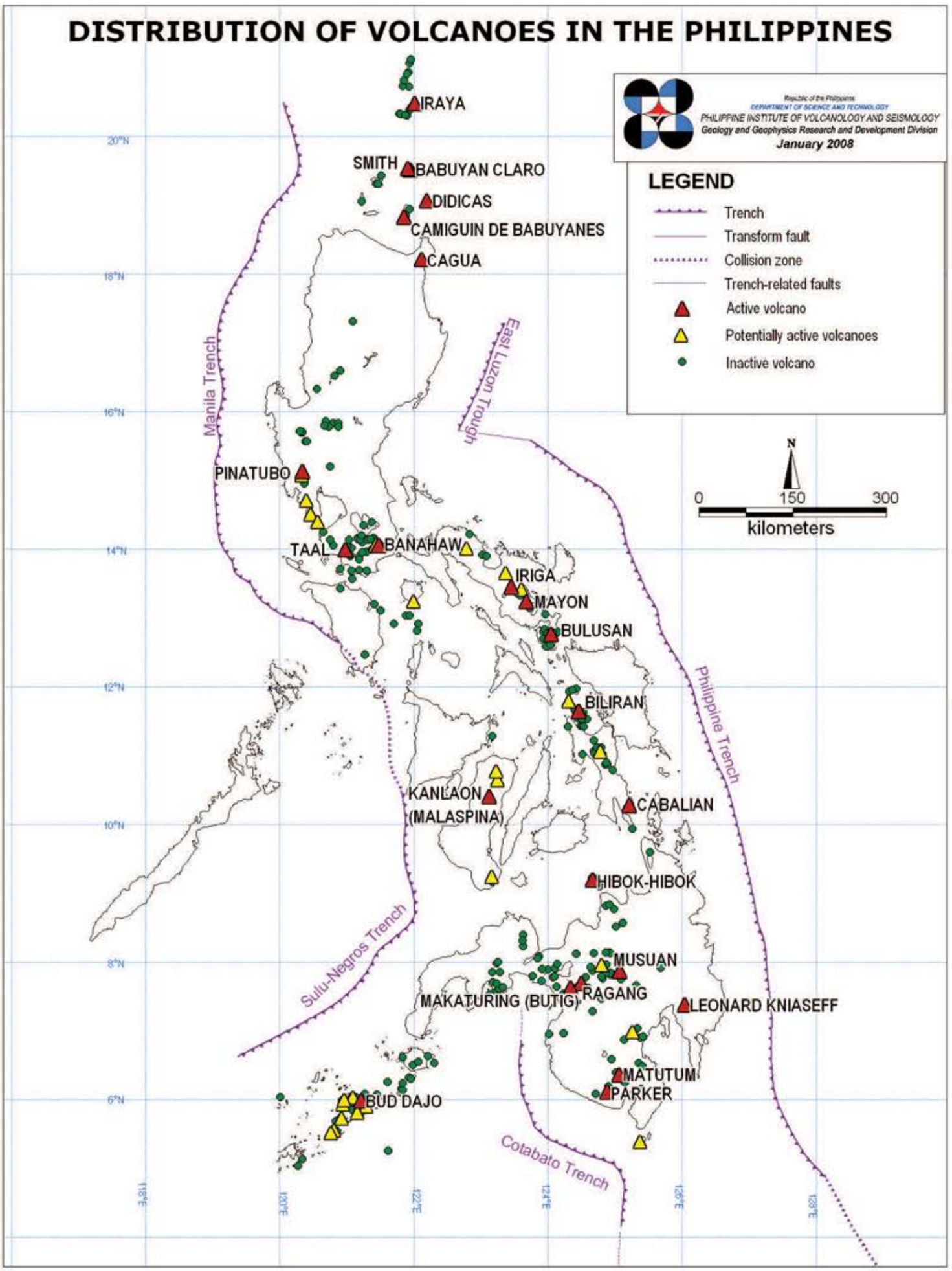
NAME OF VOLCANO	LATITUDE (deg-min)	LONGTITUDE (deg-min)	PROVINCE	ELEVATION (km)	NO. OF HISTORICAL ERUPTIONS	LATEST ERUPTION ACTIVITY
Babuyan Claro	19° 31.5'	121° 57'	Cagayan	0.843	4	1917
Banahaw	14° 00'	121° 29'	Laguna, Quezon	2.169	1	1730
Biliran	11° 30'	124° 27.5'	Biliran Island	1.340	1	1939 Sep 26
Buddajo	6° 0.8'	121° 3.4'	Sulu	0.62	2	1897
Bulusan	12° 46.2'	124° 03'	Sorsogon	1.565	17	2010 Nov - 2011 Feb
Cagua	18° 3.3'	122° 7.4'	Cagayan	1.160	2	1907
Caballian	10° 17' 13.2"	125° 13.25'	Southern Leyte			
Camiguin de Babuyanes	18° 50'	121° 51.6'	Cagayan	0.712	1	1857
Didicas	19° 04.6'	121° 12.1'	Cagayan Babuyan Island Group	0.843	6	1978 Jan 6-9
Hibok Hibok	9° 12.2'	124° 40.5'	Camiguin	1.332	5	1948 Sep 31 - 1953 Jul
Iraya	20° 29'	124° 01'	Batanes	1.009	1	1454
Iriga	13° 27.4'	123° 27.4'	Camarines Sur	1.143	1	1628 Jan 4
Kanlaon (Malaspina)	10° 24.7'	123° 7.9'	Negros Oriental	2.435	26	2006 Jun
Leonard Kniaseff	7° 22.9'	126° 2.8'	Davao del Norte	0.200	No Data	1800 years ago
Makaturing	7° 28.8'	124° 38'	Lanao del Sur	1.940	10	1882
Maturnturn	6° 22'	125° 04'	Cotabato	2.286	1	1911 Mar 07
Mayon	13° 15.4'	123° 41.1'	Albay	2.460	49	2009 Dec
Musuan	7° 52'	125° 04.4'	Bukidnon	0.646	2	1867
Parker	6° 06.08'	124° 53.5'	Cotabato	1.784	1	1641 Jan 04
Pinatubo	15° 08.4'	120° 21'	Boundaries of Pampanga, Tarlac and Zambales	1.445	3	1992 Jul 09 - Aug 16
Ragang	7° 41.5'	124° 41.1'	Cotabato	2.815	8	1916 Jul
Smith	19° 32.4'	121° 55'	Cagayan Babuyan Island Group	0.688	5	1924
Taal	14° 00.1'	120° 59.1'	Batangas	0.311	33	1977 Oct 3

Source: PHIVOLCS

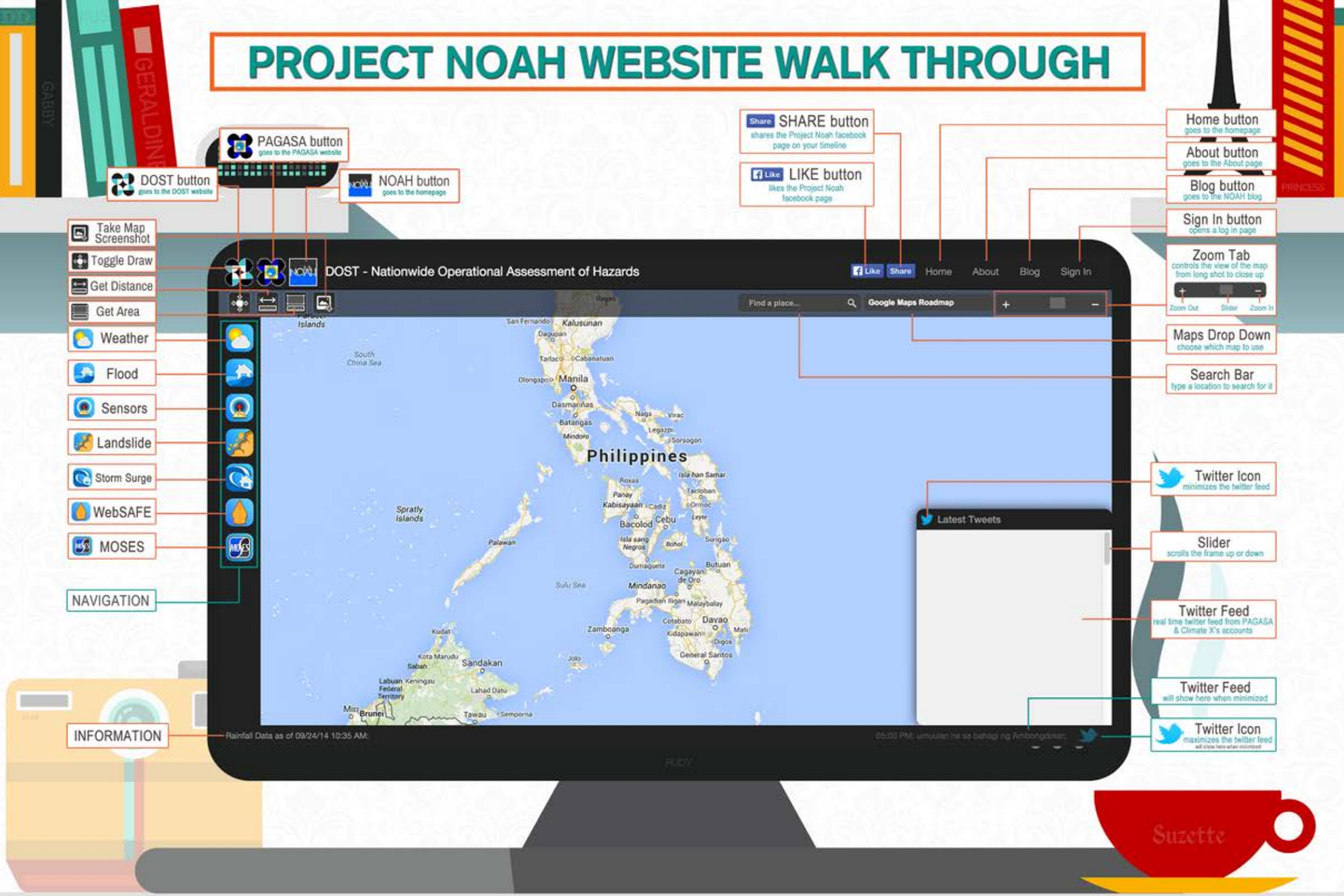
Potentially Active Volcanoes

NAME OF VOLCANO	LATITUDE (deg-min)	LONGTITUDE (deg-min)	PROVINCE	REGION	NEARBY CITY TOWNS
Apo	7° 0.5'	125° 16'	Davao	XI	Kidapawan, Davao City
Balut	5° 23.5'	125° 22.5'	Davao	XI	Davao City
Cancanajag	11° 0.4'	124° 47'	Leyte	VIII	Canhandugan
Corregidor	9° 15'	120° 24'	Bataan	III	Mariveles
Cuernos de Negros	5° 44'	123° 10'	Negros Oriental	VII	Dumaguete City
Dakut	5° 33.4'	120° 56'	Sulu	ARMM	Jolo
Gorra	13° 39'	123° 24'	Sulu	ARMM	Jolo
Isarog	7° 57'	124° 48'	Camarines Sur	V	Tigaon, Tinangis, Mayangayanga, Sta. Cruz, Goa, Simra, Laon, Turat, Pinaglabana, Abucayan,Tagongtong, Buyo
Kalatungan	14° 02'	122° 48'	Bukidnon	X	Pangantucan
Labo	5° 31'	120° 46'	Camarines Sur	V	Asdam, Matacong
Lapac	13° 28'	123° 36'	Sulu	ARMM	Siasi (Brgy Sibaud)
Malinao	13° 15'	122° 00'	Albay	V	Tiwi, Buhi, Sagnay, Malinao, Tabaco, Polangui
Malindig (Marianga)	10° 39'	123° 15'	Marinduque	V	Bagacay, Lipata, Dampulan, Tigui, Malibago, Sihi
Mandalagan	11° 48'	124° 20'	Negros Occidental	VI	Bacolod City
Maripipi	14° 31'	120° 28'	Leyte	VIII	Tacloban City
Mariveles	14° 43'	120° 24'	Bataan	III	Olongapo, Morong, Bagac, Pilar, Balanga, Abucay, Samal, Orani,, Hermosa, Dinalupihan
Natib	15° 05'	120° 20'	Bataan	III	Olongapo, Morong, Pilar, Balanga, Abucay, Samal, Orani, Hermosa, Dinalupihan
Negron	5° 49'	121° 10'	Zambales	III	Angeles City, Olongapo City
Parang	5° 58.5'	121° 24'	Sulu	ARMM	Parang, Maimbung
Parangan	5° 54.3'	120° 18'	Sulu	ARMM	Luuk
Pitogo	14° 04'	121° 18'	Sulu	ARMM	Jolo
San Cristobal		121° 26'	Laguna, Quezon, San Pablo City	V	Dolores, San Pablo City
Silay	10° 46.5'	123° 14'	Negros Occidental	VI	Cadiz
Sinumaan	5° 02'	121° 16'	Sulu	ARMM	Paticul
Tukay	15° 56'	120° 57'	Sulu	ARMM	Parang, Maimbung
Tumatangas	5° 59.9'	120° 58'	Sulu	ARMM	Indanan, Jolo

Source: PHIVOLCS


DISTRIBUTION OF VOLCANOES IN THE PHILIPPINES
Republic of the Philippines
DEPARTMENT OF SCIENCE AND TECHNOLOGY
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY
Geology and Geophysics Research and Development Division
January 2008
LEGEND
Trench
Transform fault
Collision zone
Trench-related faults
Active volcano
Potentially active volcanoes
Inactive volcano
N
0
150
300
kilometers
IRAYA
SMITH
BABUYAN CLARO
DIDICAS
CAMIGUIN DE BABUYANES
CAGUA
PINATUBO
TAAL
BANAHAW
IRIGA
MAYON
BULUSAN
BILIRAN
KANLAON
(MALASPINA)
CABALIAN
HIBOK-HIBOK
MUSUAN
RAGANG
MAKATURING (BUTIG)
LEONARD KNIASEFF
MATUTUM
PARKER
BUD DAJO
Manila Trench
East Luzon Trough
Philippine Trench
Sulu-Negros Trench
Cotabato Trench
20°N
18°N
16°N
14°N
12°N
10°N
8°N
6°N
118°E
120°E
122°E
124°E
126°E
128°E

PROJECT NOAH WEBSITE WALK THROUGH



WEATHER

Index - Weather - Contour

Click the WEATHER ICON to show the Weather Drop Down Menu.

Contour

Click Contour to show the Contour Drop Down Menu.

Temperature Contour
Pressure Contour
Humidity Contour

Temperature, Pressure and Humidity are used to check additional weather parameters.

Rainfall Contour
3-Hour Rainfall
6-Hour Rainfall
12-Hour Rainfall
24-Hour Rainfall

Rainfall Contours give the latest rainfall accumulation in any area using the rainfall color scale as guide. Make sure you get the latest information by checking the time stamp, which is updated every 15 minutes. It displays 3, 6, 12 and 24 hour rainfall readings.

The Pressure Contour map can be used along with the typhoon track of PAGASA to validate if the storm or typhoon is going to pass through the region where atmospheric pressure is lowest. There is normally a drop in the atmospheric pressure before a storm arrives.

WEATHER

Track Incoming Typhoons or Weather Disturbances

Click the Weather Icon to show the Weather Drop Down Menu.

Weather Outlook

PAGASA Cyclone Update

Click Weather Outlook. Click PAGASA Cyclone Update.

PAGASA Cyclone Update shows the cyclone track across the Philippine Area of Responsibility (PAR).

represents the actual track of the typhoon

Index - Weather - Satellite

Satellite

Click the Weather Icon. Click Satellite

MTSAT
Processed MTSAT
MTSAT VIS

Click the satellite of your choice. The MTSAT shows the temperature of the cloud formations. The Processed MTSAT shows white clouds that can bring rain.

During instances when there are cyclones within the Philippine Area of Responsibility (PAR), clouds are often seen swirling around the eye of the typhoon or storm.

WEATHER

Track Incoming Typhoons or Weather Disturbances

Click the Weather Icon to show the Weather Drop Down Menu.

Weather Outlook

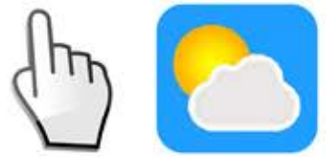
PAGASA Cyclone Update

Click Weather Outlook. Click PAGASA Cyclone Update.

PAGASA Cyclone Update shows the cyclone track across the Philippine Area of Responsibility (PAR).

represents the actual track of the typhoon

Index - Weather - Satellite



Satellite

Click the Weather Icon. Click Satellite

MTSAT
Processed MTSAT
MTSAT VIS

Click the satellite of your choice. The MTSAT shows the temperature of the cloud formations. The Processed MTSAT shows white clouds that can bring rain.

During instances when there are cyclones within the Philippine Area of Responsibility (PAR), clouds are often seen swirling around the eye of the typhoon or storm.

WEATHER

4-Hour Rainfall & 4-Day Weather Forecast

Click the Weather Icon to show the Weather Drop Down Menu.

Weather Outlook

Click Weather Outlook.

4-Hour Rainfall Forecast

Click 4-Hour Rainfall Forecast. Click on any of the icons on the map to show the rain forecast for that location in the next four (4) hours.

4-Day Weather Forecast

Click 4-Day Weather Forecast. Click on any of the icons on the map to show the rain forecast for that location in the next four (4) days.

FLOOD

Know worst flooding incidents, flood levels and safest area

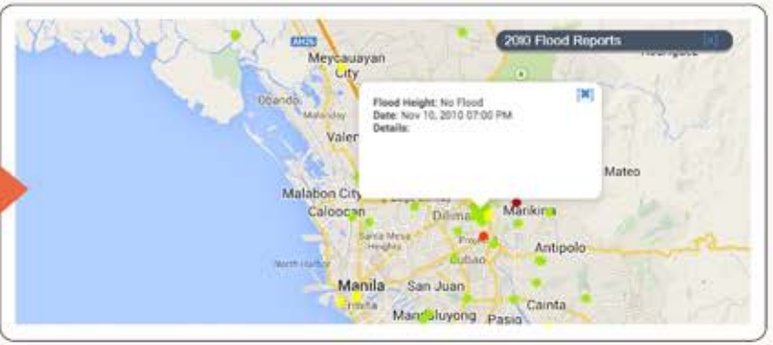
Click the Flood Icon to show the Flood Drop Down Menu.

Flood Hazards

Click on Flood Hazards.

Flood Reports

Click on Flood Reports to show Flood Reports Drop Down Menu. Choose from 2009 to 2014 to show Flood Reports for specific year.



SENSORS

Index - Sensors

Click the Sensors Icon to show the Sensors Drop Down Menu.

Rain Gauges

Rain Gauges
blue push pins

Stream Gauges

Stream Gauges
red push pins

Rain and Stream Gauges

Rain and Stream Gauges
red and green push pins

SENSORS

Index - Sensors

Click the Sensors Icon to show the Sensors Drop Down Menu.

Weather Stations

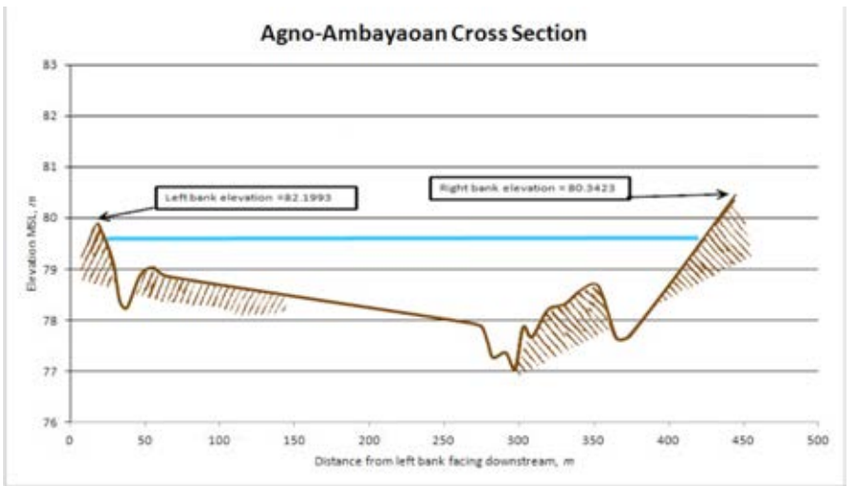
Weather Stations
blue push pins

Tide Levels

Tide Levels
yellow push pins

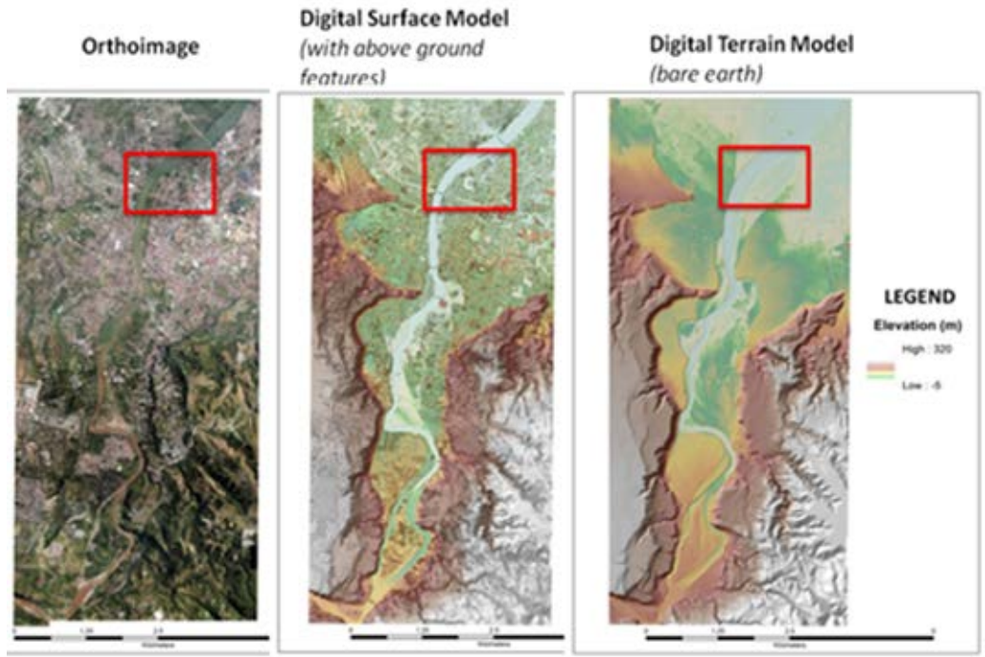
DREAM LIDAR
MAIN PRODUCTS

• Across the Philippines, water level sensors have been strategically placed to properly monitor and forecast the water level in major and critical rivers. Regularly visit the **Water Level Forecast** page to know the water level in the rivers near your area and what the predicted water level will be in the next 12 hours. Also, you will find historical data on rainfall and the resulting water level for each river, and cross-section snapshots of certain parts of the river.



• DREAM products cover the **18 major river basins**, and will cover 285 river basins in the next few years. The LiDAR Coverage page shows which localities already have available **LiDAR data**.

• Through the use of state-of-the-art technologies, the UP DREAM Program is able to produce three-dimensional information products that have practical applications in the fields of urban planning, agricultural mapping, and disaster preparedness. These products are freely available to local government units. For private entities, on the other hand, approval and recommendation from DOST and UP must first be secured for data request. Some charges may also apply. Product samples are downloadable as well.



LiDAR Coverage

The Program identified the most flood-prone and high-risk areas in the country, based on existing disaster data, to come up with an initial listing of 17* target critical river basins. Other priority areas, such as Infanta and Lucena, and cognate systems, like Iponan and Mandulog, were added to the list in the course of the implementation of the Program.

*LiDAR data used for the generation of the Marikina-Pasig flood hazard map was obtained from the GMMA-RAP Project.

Major river basins covered:

- Agno
- Agus
- Agusan
- Bicol
- Buayan-Malungun
- Cagayan
- Cagayan de Oro
- Iponan
- Davao
- Iligan
- Mandulog
- Ilog Hilabangan
- Jalaur
- Mag-asawang Tubig
- Mindanao
- Pampanga
- Panay
- Tagoloan
- Tagum

Other Priority Areas:

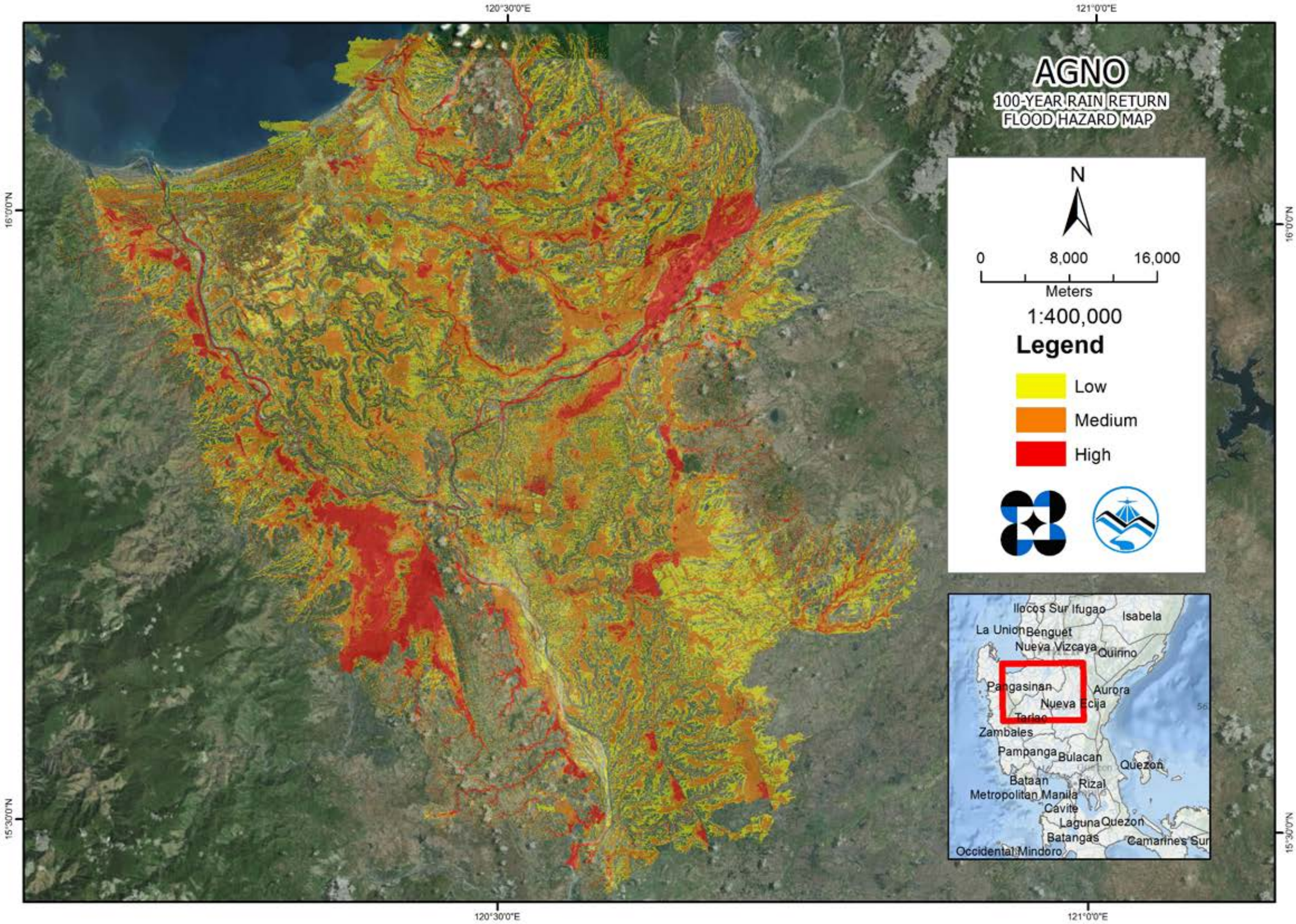
- Infanta
- Lucena

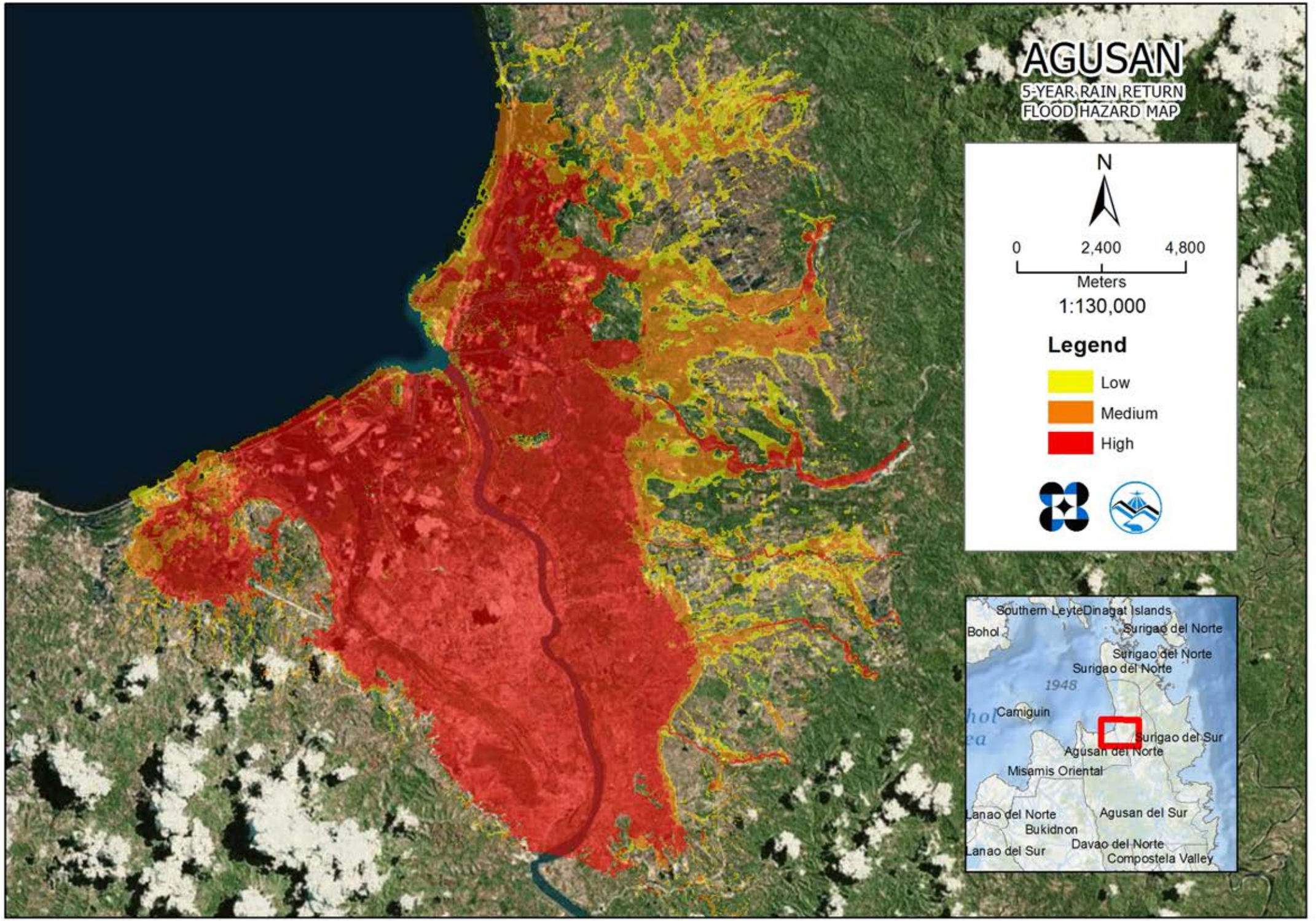
The DREAM Program, represented by its Program Leader Enrico C. Paringit, D.Eng. and Department of Science and Technology Secretary Mario G. Montejo, received on May 8 the Geospatial World Excellence in Policy Implementation Award for 2014, in the Geospatial World Forum awarding ceremony held in Geneva, Switzerland.

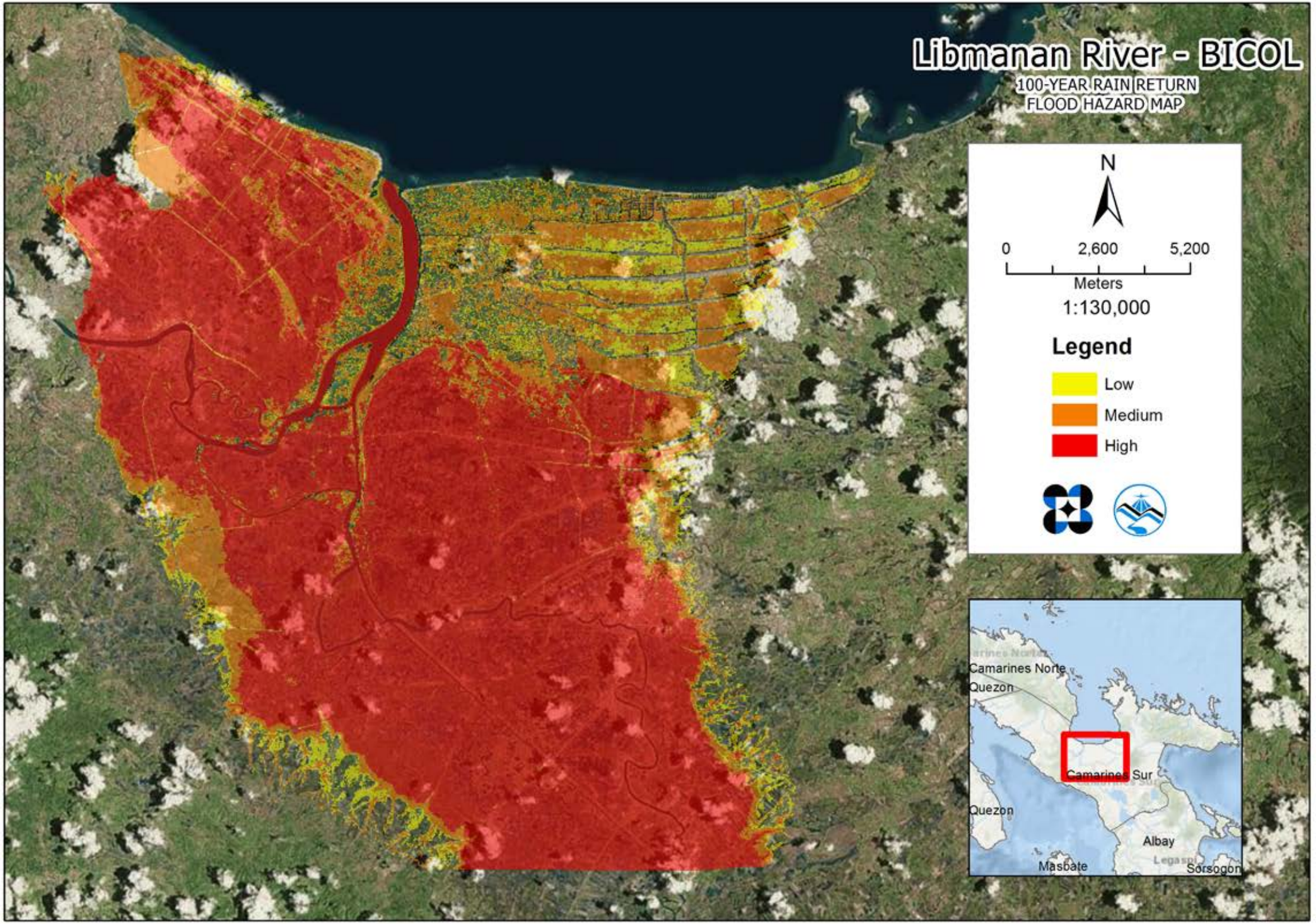
With its receipt of the recognition, the DREAM Program joins the roster of other high-profile international science and technology agencies, such as the National Aeronautics and Space Administration (NASA) of the United States, Standards Agentschap voor Geografische Informatie Vlaanderen (AGIV) of Belgium, and Indonesia Geospatial Information Agency (BIG), among others.

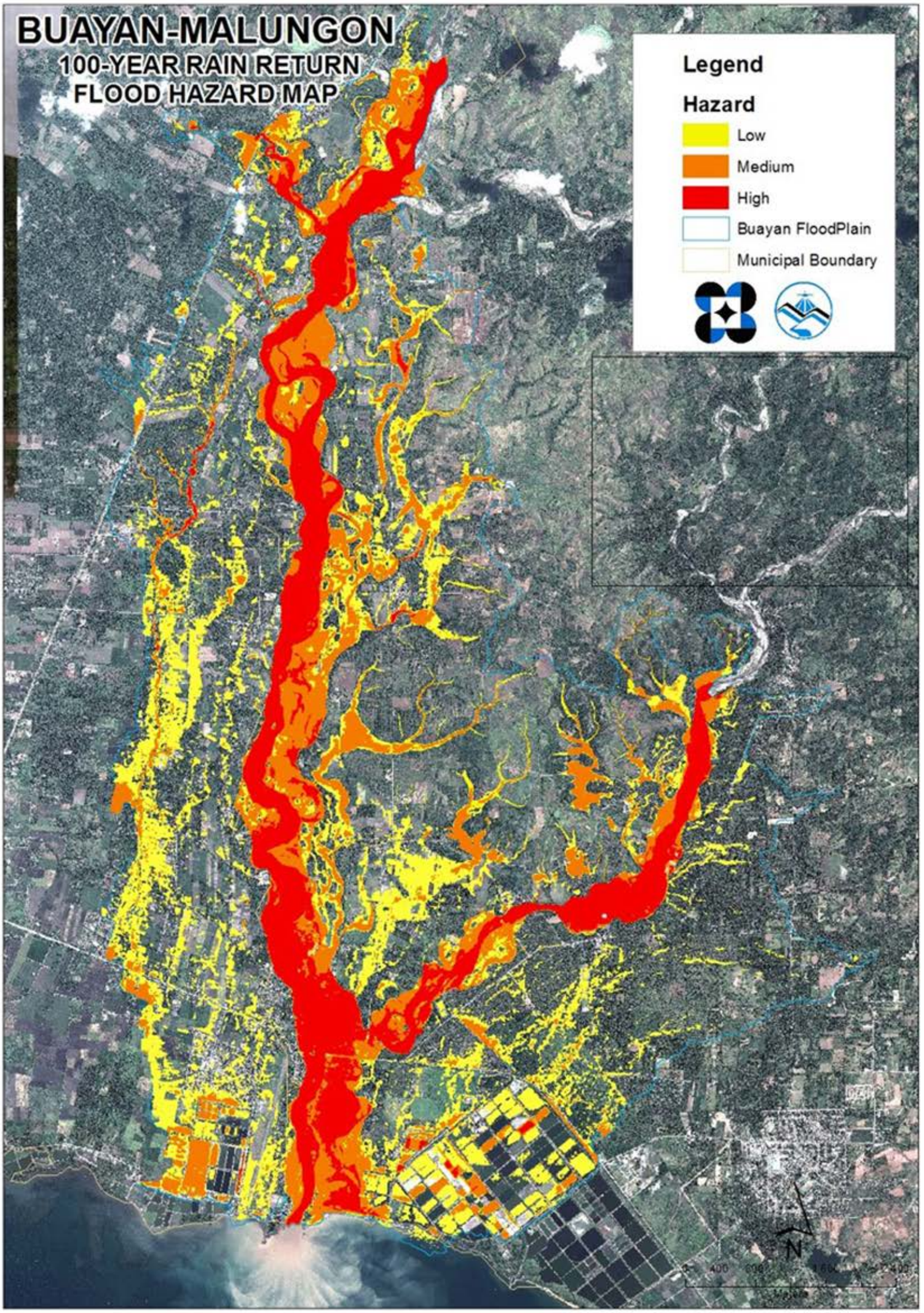
As cited in the organization's website, "[t]he Geospatial World Policy Awards were presented to organisations for exemplary formulation and implementation of geospatial policies which directly or indirectly encourage the geospatial industry.

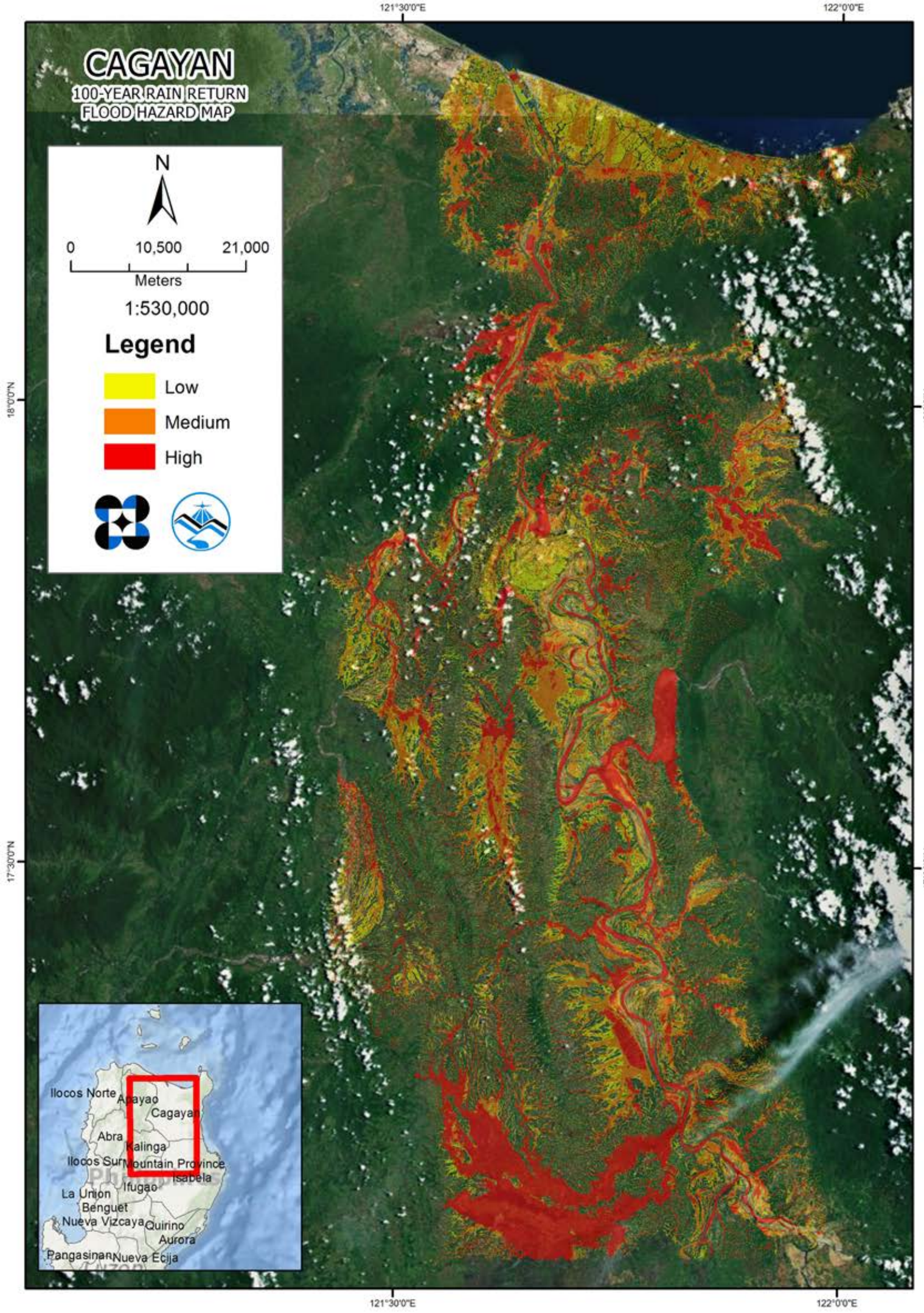
FLOOD HAZARD MAPS FOR 18 MAJOR RIVER BASINS

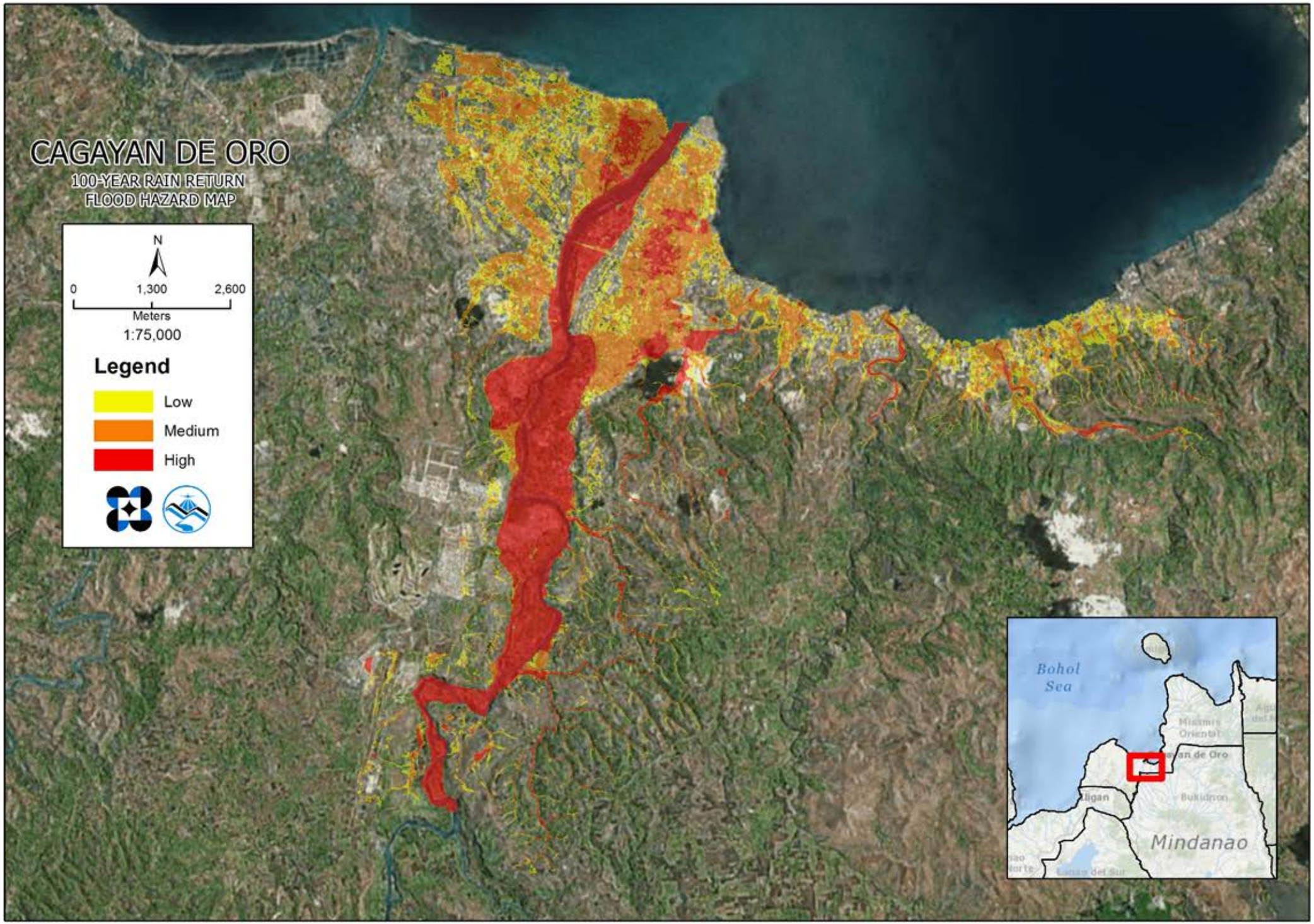

AGNO
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
8,000
16,000
Meters
1:400,000
Legend
Low
Medium
High
120°30'0"E
121°0'0"E
16°0'0"N
15°30'0"N
Ilocos Sur
Ifugao
Isabela
La Union
Benguet
Nueva Vizcaya
Quirino
Pangasinan
Aurora
Nueva Ecija
Tarlac
Zambales
Pampanga
Bulacan
Quezon
Bataan
Rizal
Metropolitan Manila
Cavite
Laguna
Quezon
Batangas
Camarines Sur
Occidental Mindoro

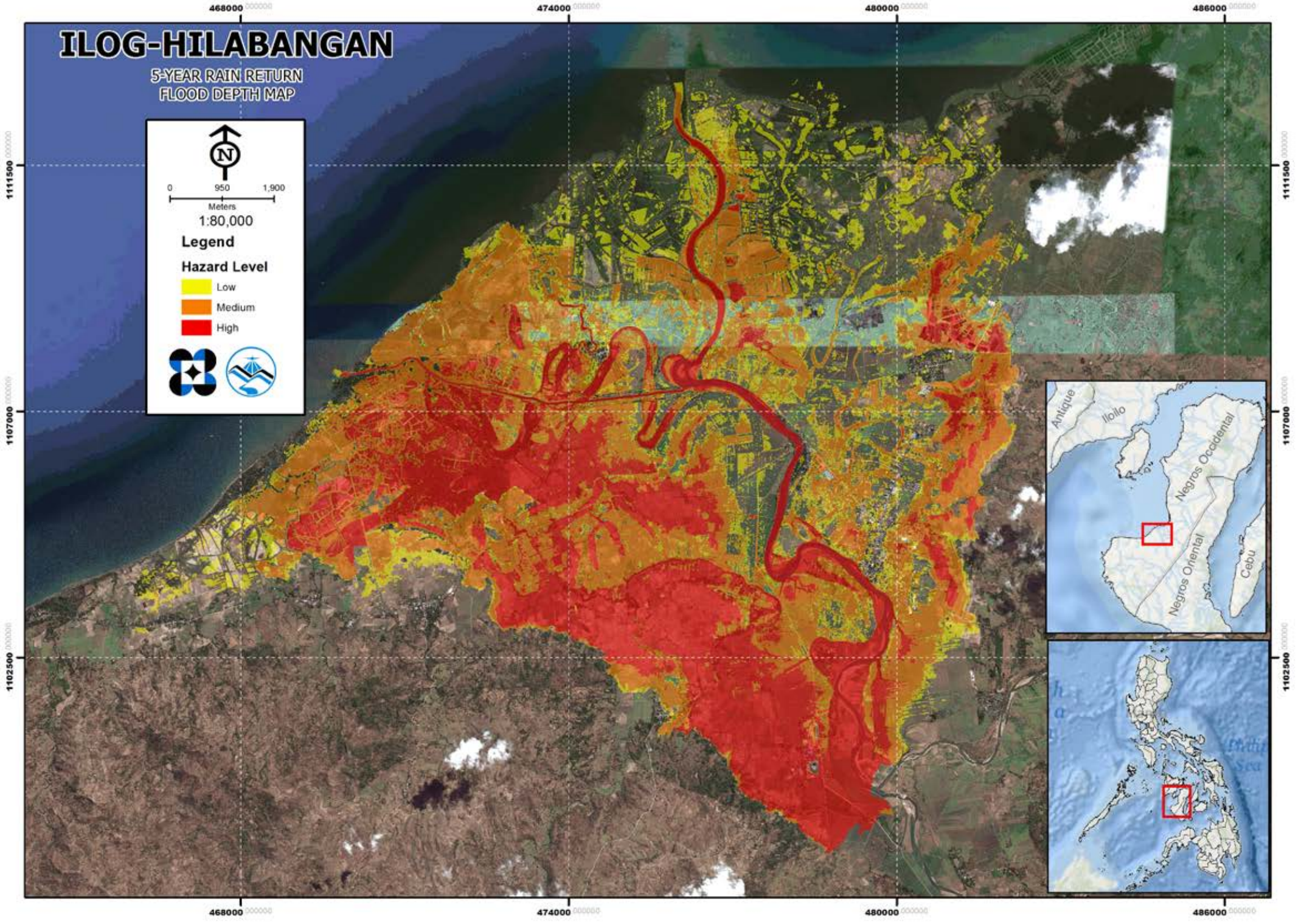

AGUSAN
5-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
2,400
4,800
Meters
1:130,000
Legend
Low
Medium
High
Southern Leyte
Dinagat Islands
Bohol
Surigao del Norte
Surigao del Norte
Surigao del Norte
1948
Camiguin
Surigao del Sur
Agusan del Norte
Misamis Oriental
Lanao del Norte
Agusan del Sur
Bukidnon
Davao del Norte
Lanao del Sur
Compostela Valley

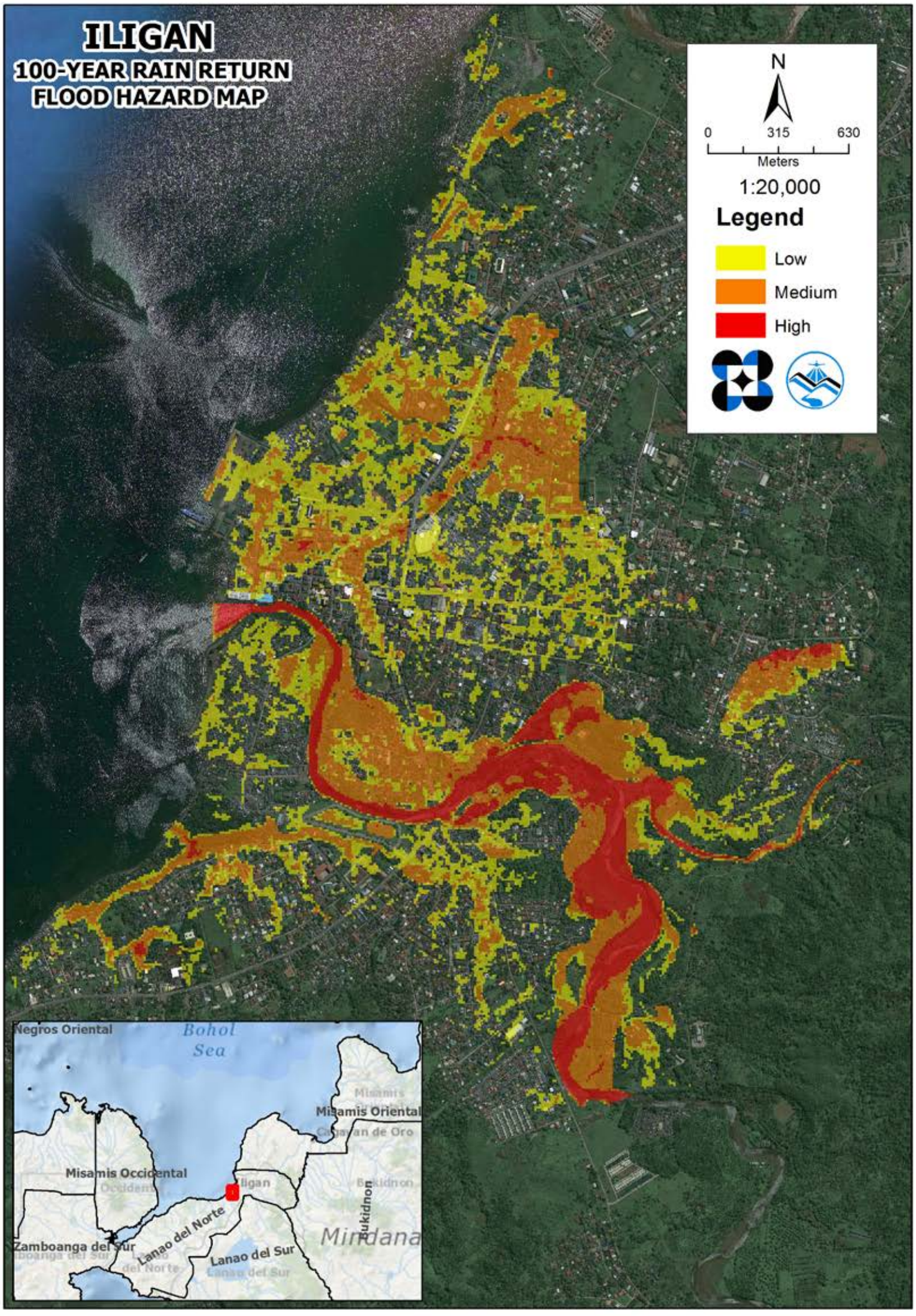

Libmanan River - BICOL
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
2,600
5,200
Meters
1:130,000
Legend
Low
Medium
High
Camarines Norte
Quezon
Camarines Sur
Quezon
Albay
Masbate
Sorsogon


BUAYAN-MALUNGON
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
Legend
Hazard
Low
Medium
High
Buayan FloodPlain
Municipal Boundary
N

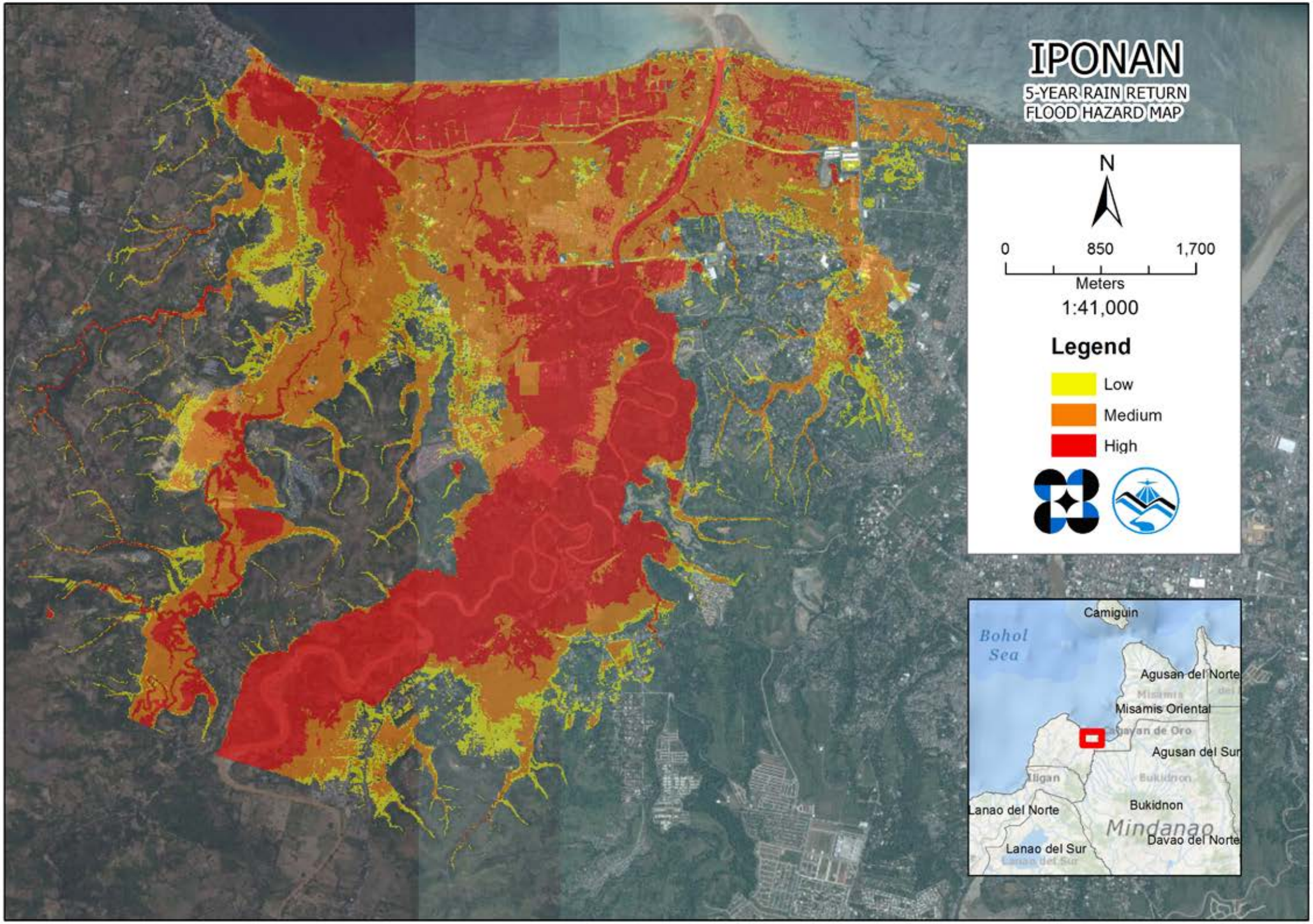

CAGAYAN
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
10,500
21,000
Meters
1:530,000
Legend
Low
Medium
High
121°30'0"E
122°0'0"E
18°0'0"N
17°30'0"N
Ilocos Norte
Apayao
Cagayan
Abra
Kalinga
Ilocos Sur
Mountain Province
Isabela
Ifugao
La Union
Benguet
Nueva Vizcaya
Quirino
Aurora
Pangasinan
Nueva Ecija

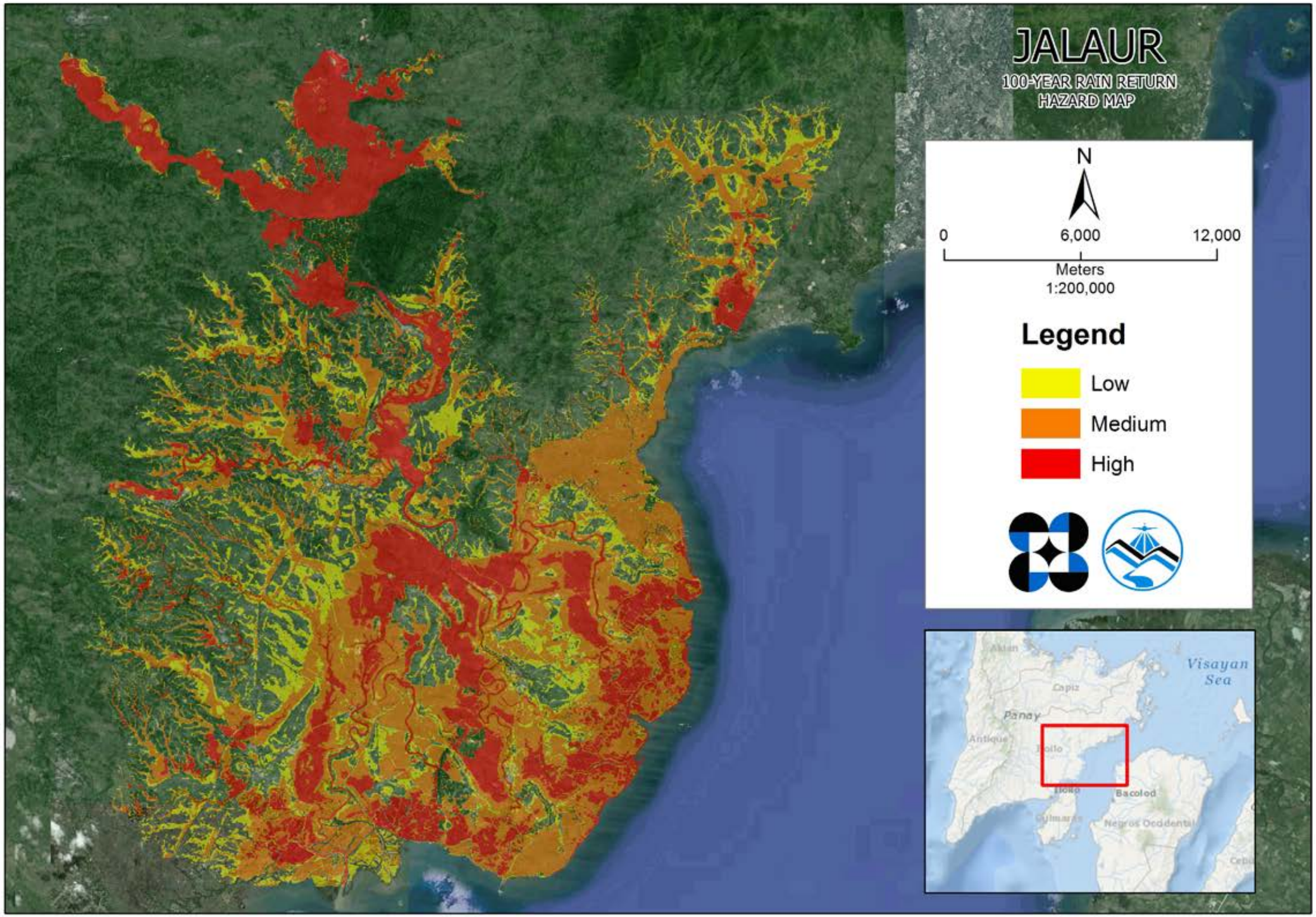

CAGAYAN DE ORO
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
1,300
2,600
Meters
1:75,000
Legend
Low
Medium
High
Bohol Sea
Misamis Oriental
Cagayan de Oro
Iligan
Bukidnon
Mindanao

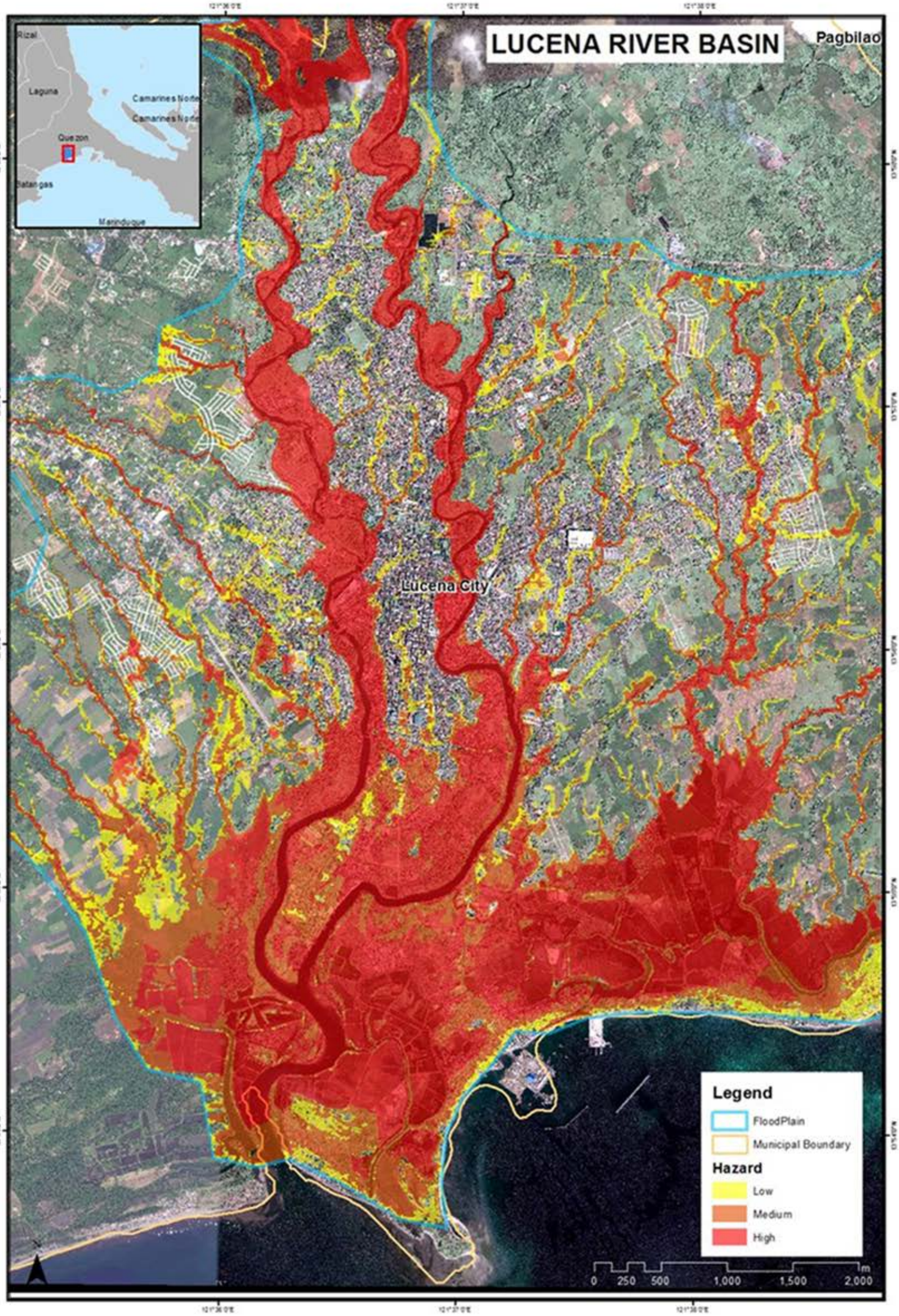

ILOG-HILABANGAN
5-YEAR RAIN RETURN
FLOOD DEPTH MAP
N
0
950
1,900
Meters
1:80,000
Legend
Hazard Level
Low
Medium
High
468000
474000
480000
486000
1111500
1107000
1102500
Antique
Iloilo
Negros Occidental
Negros Oriental
Cebu

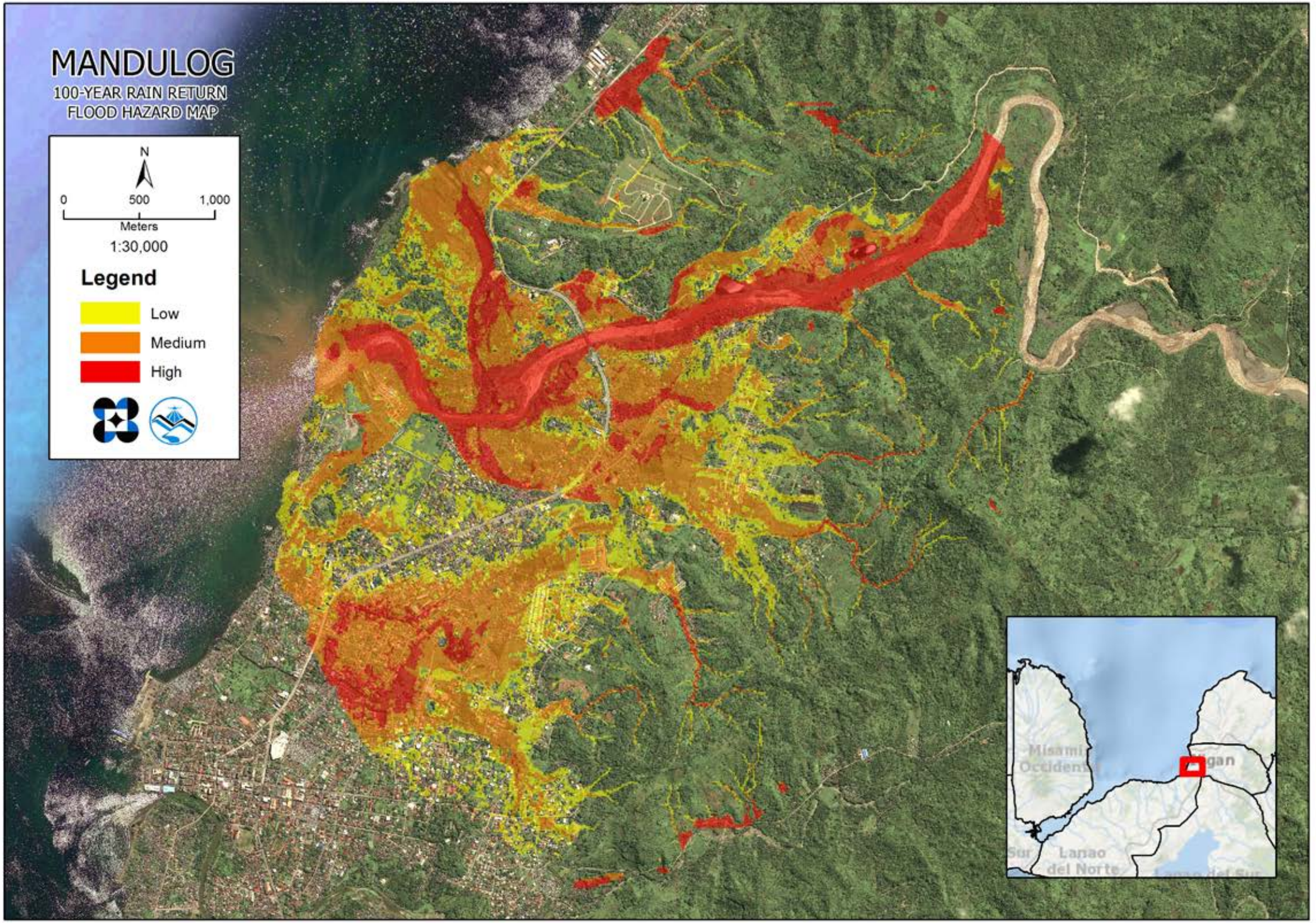

ILIGAN
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
315
630
Meters
1:20,000
Legend
Low
Medium
High
Negros Oriental
Bohol
Sea
Misamis Oriental
Misamis Occidental
Iligan
Bukidnon
Lanao del Norte
Lanao del Sur
Zamboanga del Sur
Mindanao

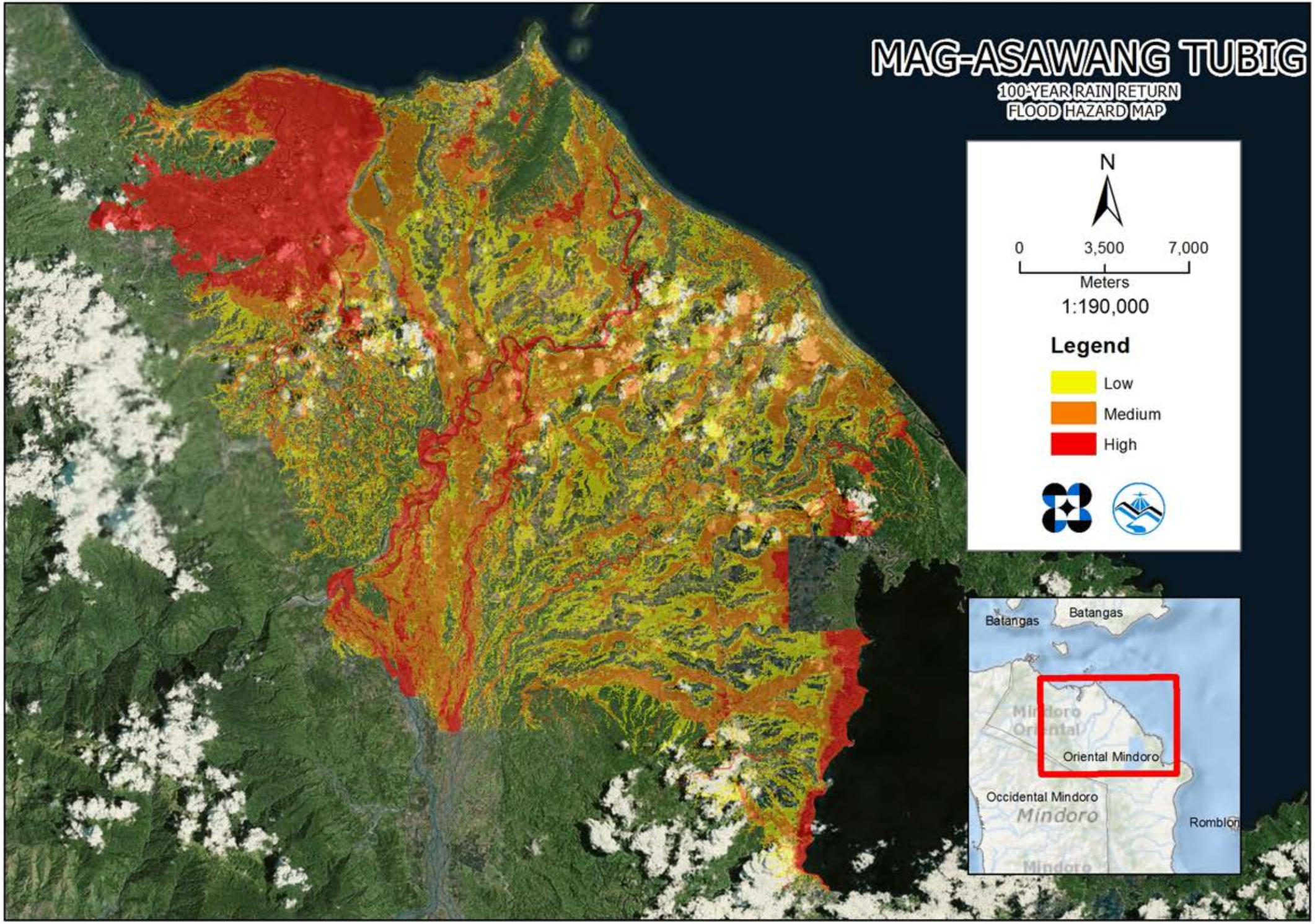

INFANTA
5-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
1,700
3,400
Meters
1:85,000
Legend
Low
Medium
High
Aurora
Bulacan
Quezon
Rizal
Laguna
Camarines Norte
Quezon
Camarines Sur
Batangas

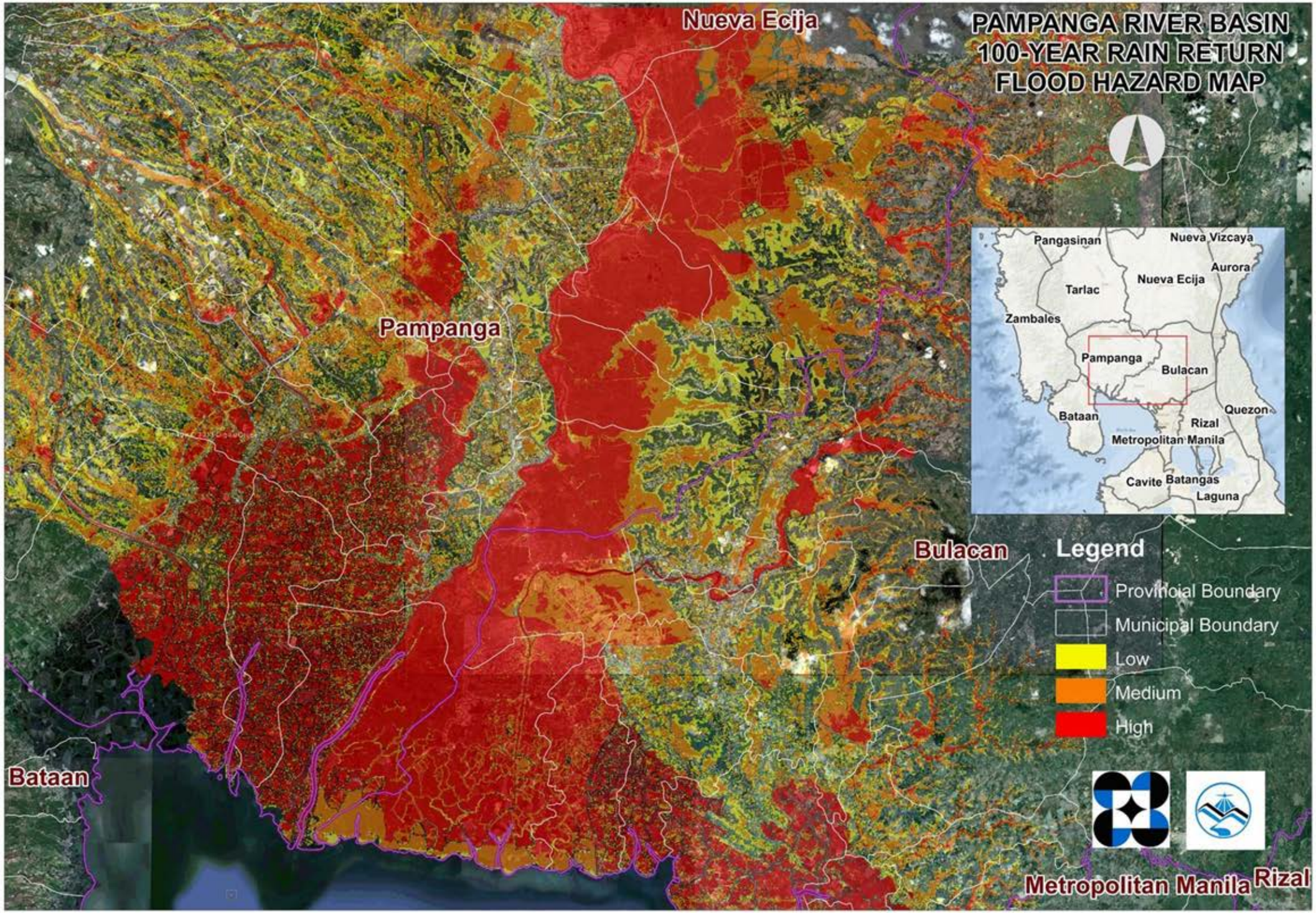

IPONAN
5-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
850
1,700
Meters
1:41,000
Legend
Low
Medium
High
Camiguin
Bohol Sea
Agusan del Norte
Misamis Oriental
Agusan del Sur
Iligan
Bukidnon
Lanao del Norte
Mindanao
Davao del Norte
Lanao del Sur

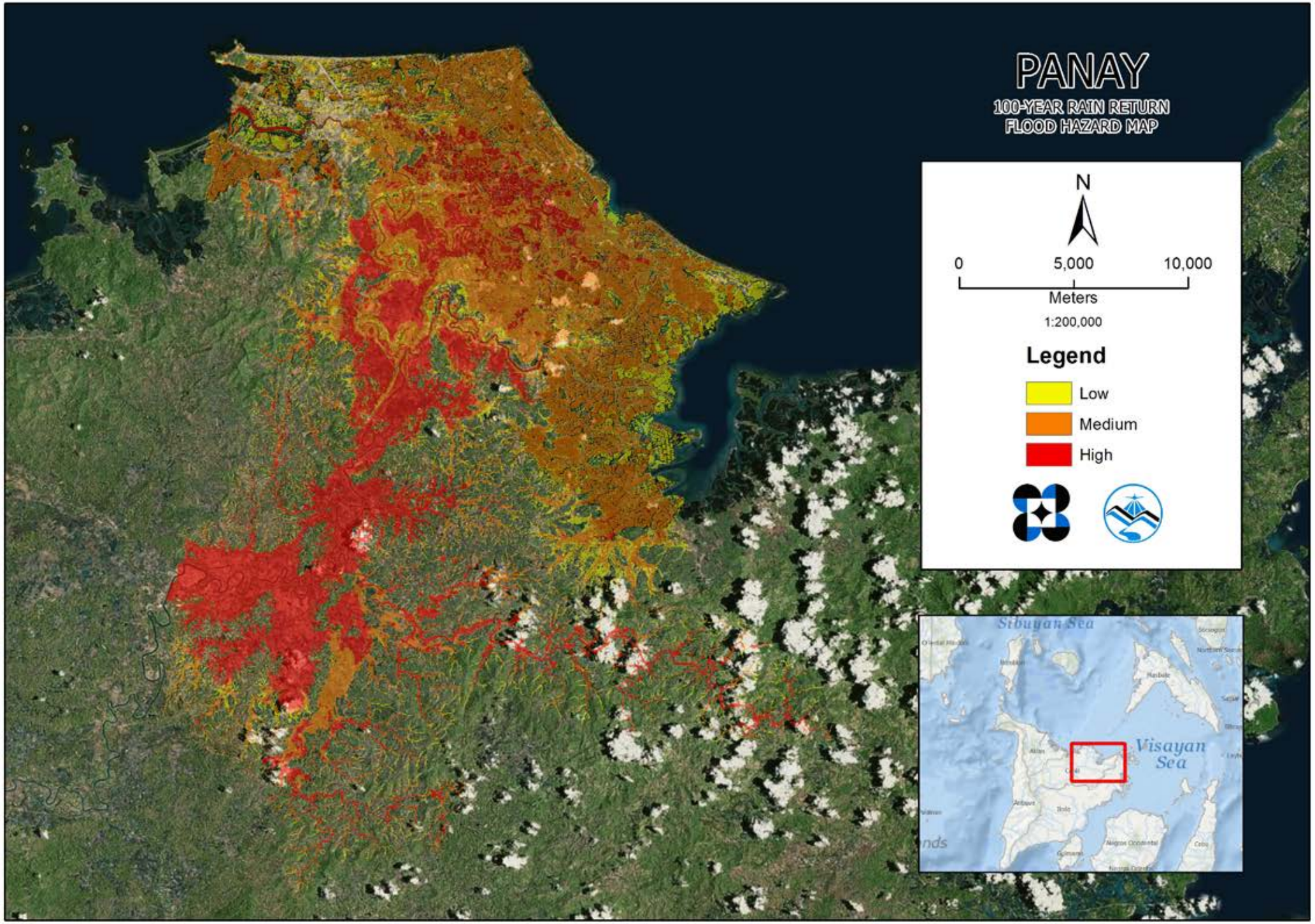

JALAUR
100-YEAR RAIN RETURN
HAZARD MAP
N
0
6,000
12,000
Meters
1:200,000
Legend
Low
Medium
High
Visayan
Sea
Panay
Antique
Iloilo
Bacolod
Negros Occidental

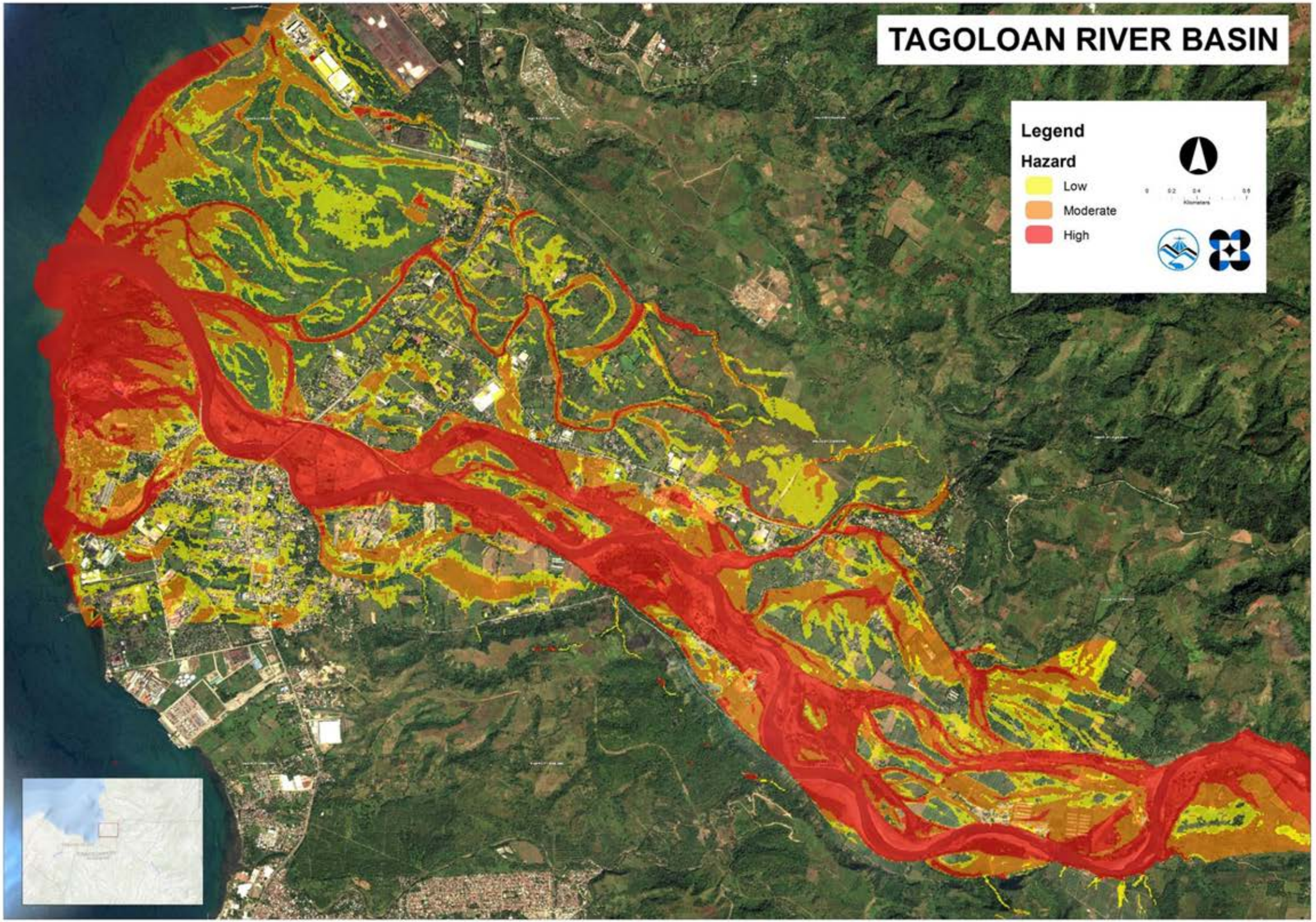

LUCENA RIVER BASIN
Pagbilao
Lucena City
Rizal
Laguna
Camarines Norte
Camarines Norte
Quezon
Batangas
Marinduque
Legend
FloodPlain
Municipal Boundary
Hazard
Low
Medium
High
0 250 500 1,000 1,500 2,000
m

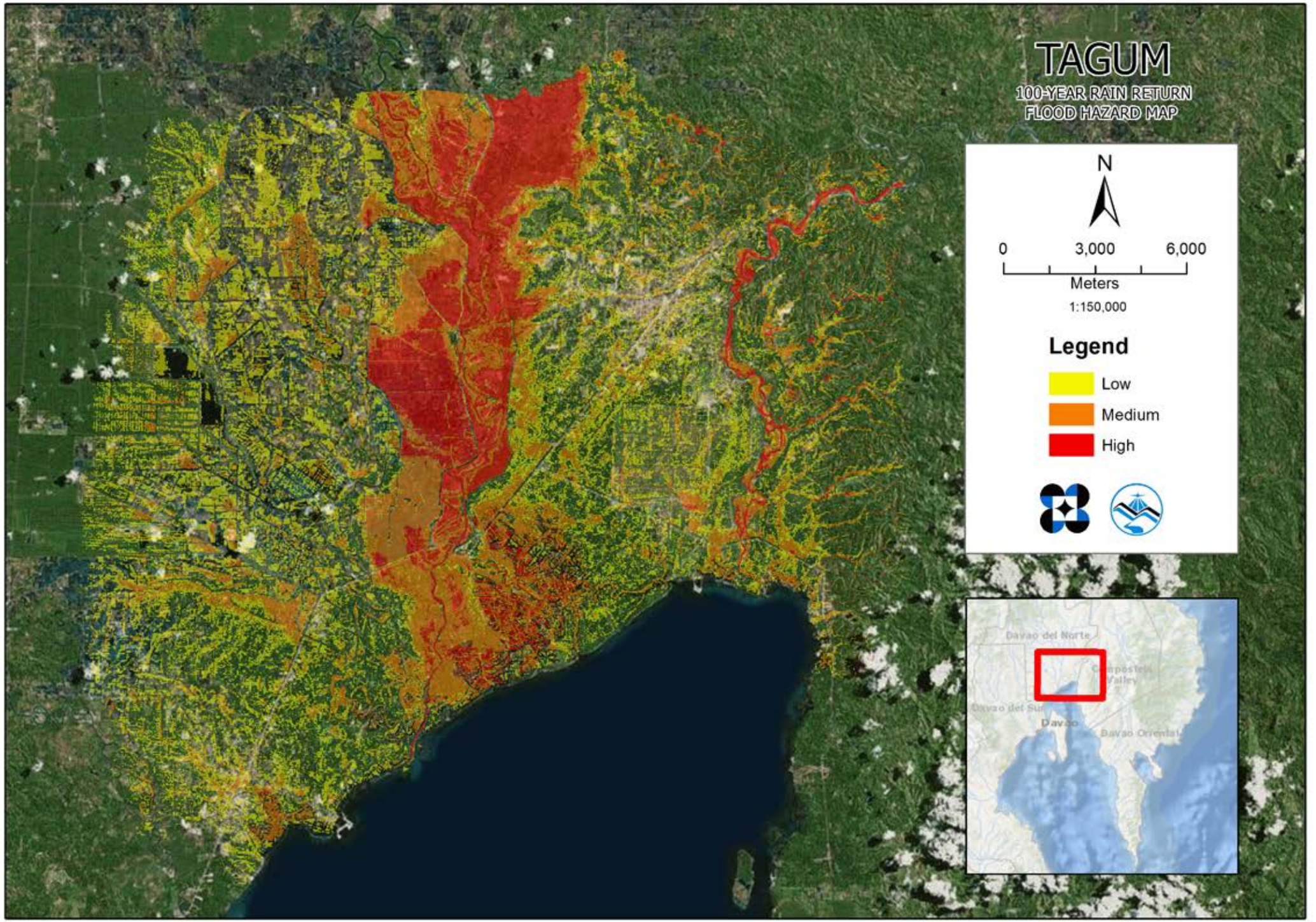

MANDULOG
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
500
1,000
Meters
1:30,000
Legend
Low
Medium
High
Misamis
Occidental
Lanao
del Norte


MAG-ASAWANG TUBIG
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
3,500
7,000
Meters
1:190,000
Legend
Low
Medium
High
Batangas
Batangas
Oriental Mindoro
Occidental Mindoro
Mindoro
Romblon


PAMPANGA RIVER BASIN
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
Nueva Ecija
Pampanga
Bulacan
Bataan
Metropolitan Manila
Rizal
Pangasinan
Nueva Vizcaya
Aurora
Nueva Ecija
Tarlac
Zambales
Pampanga
Bulacan
Quezon
Bataan
Rizal
Metropolitan Manila
Cavite
Batangas
Laguna
Legend
Provincial Boundary
Municipal Boundary
Low
Medium
High


PANAY
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
5,000
10,000
Meters
1:200,000
Legend
Low
Medium
High
Sibuyan Sea
Visayan Sea


TAGOLOAN RIVER BASIN
Legend
Hazard
Low
Moderate
High


TAGUM
100-YEAR RAIN RETURN
FLOOD HAZARD MAP
N
0
3,000
6,000
Meters
1:150,000
Legend
Low
Medium
High
Davao del Norte
Davao del Sur
Davao
Davao Oriental

SURVIVAL KIT

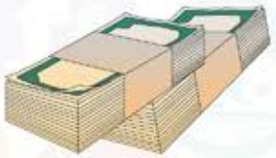

waterproof bag


transistor radio and batteries


canned food


flashlight and batteries

first aid kit

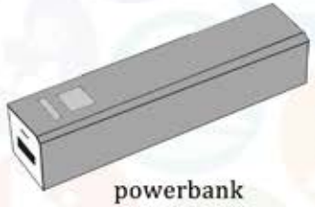

money


pocket knife


matches


whistle


lighter


powerbank


15-meter rope


cellphone


extra clothes


sanitary napkin


watch


blanket


important documents


drinking water

EMERGENCY HOTLINE NUMBERS

BUREAU OF FIRE PROTECTION (NCR)
Direct Line: (632) 426-0219,
(632) 426-3812, (632) 426-0246
Office of Regional Director:
(632) 407-1230

CAINTA TRAFFIC
(632) 646-0044, (632) 248-1743

CAVITEX
(632) 825- 4004
Call & Text Hotline: 0942-822-8489

CIVIL AERONAUTICS BOARD (CAB)
(632) 542-5234, (632) 853-6762 local 118

CIVIL AVIATION AUTHORITY OF THE PHILIPPINES (CAAP)
Operations: (632) 879-9112,
(632) 879-9110

CLARK INTERNATIONAL AIRPORT CORPORATION (CIAC)
Trunkline: (045) 499-1468,
(632) 499-1464
(632) 599-2888 local 119 & 133

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)
165-02
Trunkline: (632) 304-3000
Road Repair/Maintenance:
(632) 304-3713, (632) 304-3904

DEPARTMENT OF SOCIAL WELFARE AND DEVELOPMENT (DSWD)
Text Hotline: 0918-912-2813
Trunkline: (632) 931-8101 to 07
Disaster Response Unit: (632) 856-3665,
(632) 852-8081

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS (DOTC)
Central Hotline: (632) 727-7960 to 69
Public Assistance Center: 7890

DISASTER MANAGEMENT OFFICE
134 (Staff), 132 (Manager),
133 (Radio Room)
Fax: (632) 527-0864

LAND TRANSPORTATION FRANCHISING AND REGULATORY BOARD (LTFRB)
24/7 hotline: (632) 459-2129
Public Assistance Office: (632) 426-2515
Admin Div: (632) 426-2501
Tel No: (632) 492 5736 or 37,
(632) 929-6789, (632) 929-7366,
(632) 926-6346
Chairman: (632) 426-2505

LAND TRANSPORTATION OFFICE (LTO)
Text LTO Hotline: Text LTOHELP to 2600
(all networks)
Hotline: (632) 922-9061 to 66

LAS PIÑAS TRAFFIC
Hotline: (632) 874-5756
Investigations: (632) 874-3927
Traffic: (632) 874-5754

LIGHT RAIL TRANSIT AUTHORITY (LRTA)
Pasay: (632) 853-0041 to 60
Santolan: (632) 647-3479 to 91

MACTAN-CEBU INTERNATIONAL AIRPORT (MCIAA)
Operations: (032) 340-2486 local 1560

MAKATI PUBLIC SAFETY DEPARTMENT
Command Control Center/C3
(632) 870-1940, (632) 870-1942
Traffic/Radio Room/Public Safety Department
(632) 844-3146, (632) 819-3270 to 71

MANDALUYONG TRAFFIC HOTLINE
Traffic: (632) 534-2993
Command Control Center/C3:
(632) 533-2225
Emergency: (632) 588-2200, 588-2299

MANILA INTERNATIONAL AIRPORT AUTHORITY (MIAA)
Text Hotline: 0917-8396242 (TEXNAIA)
Terminals 1, 2, and 4:
(632) 877-1109 local 2444
Terminal 3: (632) 877-7888 local 8046

MANILA TRAFFIC HOTLINE
Front Desk: (632) 527-3087
Traffic Investigation: (632) 527-3088
Trunkline: (632) 527-3065

MANILA WATER
Hotline: 1627
Trunklines: (632) 917-5900,
(632) 981-8100

MARIKINA STATION TACTICAL OPERATIONS CENTER (STOC)
Hotline: 161
PNP: (632) 646-1631, (632) 646-1651
Traffic: (632) 646-1633

MARITIME INDUSTRY AUTHORITY (MARINA)
Enforcement Office: (632) 524-9126,
(632) 523-9078, (632) 526-0971,
(632) 524-2895
Call & Text Hotline: 0917-SUMBONG
(7862664)

METRO MANILA DEVELOPMENT AUTHORITY (MMDA)
Hotline: 136
(632) 882-4154 to 74
(Metrobase) 255
(Road Safety) 319
(Public Safety) 374
(Road Emergency) 320
(632) 882-0925 (Flood Control)

METRO RAIL TRANSIT (DOTC-MRT3)
Control Center:(632) 920-6683,
(632) 924-0054, (632) 924-0052
Trunkline: (632) 929-5347 to 57 local 4405

NATIONAL DISASTER RISK REDUCTION AND MANAGEMENT COUNCIL (NDRRMC)
Trunklines: (632) 911-5061 to 65
Operations Center: (632) 911-1406,
(632) 912-2665, (632) 912-5668

NAVOTAS RESCUE
(632) 281-8602, (632) 281-4174

NORTH LUZON EXPRESSWAY (NLEx)
Hotlines: (632) 3-500 (Customer Service)
(632) 580-8900, (632) 479-3000

OFFICE FOR TRANSPORTATION SECURITY (OTS)
(632) 854-5083, (632) 855-2435,
0919-999-9687

PASIG CITY RESCUE
(632) 833-8512, (632) 551-7777

PASIG TRAFFIC
Traffic: (632) 641-1907
Command Control Center/C3:
(632) 643-0000
Trunkline: (632) 643-1111

PATEROS/PASIG RESCUE
(632) 641-6373, (632) 631-0999

PARAÑAQUE RESCUE
(632) 923-2499

PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION (PAGASA)
Weather Forecasting (24/7)
Tel. No: (632) 927-2877, 632) 926-4258

Public Information
Tel. No: (632) 927-9308, (632) 434-2696,
(632) 433-ULAN
(recorded weather information system)

Aviation Weather
Tel. No: (632) 832-3023

PHILIPPINE COAST GUARD
Trunkline: (632) 527-8481 to 89
Action Center: (632) 527-3877
0917-PCG-DOTC
0917-724-3682 (Globe)
0918-967-4697 (Smart)

PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY (PHIVOLCS)
Earthquake and Tsunami Monitoring (24/7)
Tel No: (632) 929-9254 /
(632) 426-1468 to 79 local 124 – 125
Fax No: (632) 927-1087

Volcano Monitoring (24/7)
Tel No: (632) 426-1468 to 79 local 127
Fax No: (632) 927-1095

PHILIPPINE NATIONAL POLICE (PNP) HOTLINE PATROL
Hotline: 117, (632) 723-0401,
Community Relations Group:
(632) 722-0654 loc 4252
Text Hotline: 0917-847-5757
Text: PNP (space) (message) send to 2920

PHILIPPINE NATIONAL RAILWAYS (PNR)
Control Division: (632) 319-0044

PHILIPPINE RED CROSS
Hotline: 143
Trunkline: (632) 527-0000

QUEZON CITY RESCUE
(632) 927-5914

SAN JUAN RESCUE
(632) 468-1697, (632) 722-9952

SKYWAY SYSTEM HOTLINE
Hotline: (632) 824-2282
Toll Road Assistance: (632) 776-7777
Globe: 0917- 539-8762
Smart: 0999-886-0893
Sun: 0932-854-6980

SOUTH LUZON EXPRESSWAY (SLEx)
Hotline: (632) 824-2282, (632) 776-3909
Laguna: (049) 508-7539, (632) 592-8956
Manila: (632) 584-4389, 0917-687-75390

CUSTOMER ASSISTANCE
Landline: (632) 888-8787
Globe: 0915-625-6231 (text only)
Smart: 0939-500-6910 (text only)
Sun: 0923-597-6105 (text only)

SOUTHERN TAGALOG ARTERIAL ROAD (S.T.A.R Tollway)
(043) 756- 7870, (043) 757-2277

SUBIC-CLARK-TARLAC EXPRESSWAY (SCTEX)
HOTLINES
Traffic Control:
0920-96-SCTEX (72839)
Trunkline: (632) 362-2246 /
(632) 362-9997

TAGUIG TRAFFIC
(632) 838-4301 local 7112

VALENZUELA RESCUE
(632) 292-1405, (632) 291-8231

Source: Official Gazette

NDRRMC MEMBER AGENCIES DIRECTORY

ARMED FORCES OF THE PHILIPPINES (AFP)
Camp Gen. Emilio Aguinaldo,
Quezon City
Tel No. 911-6001 local 6021
911-6436
Fax No. 911-6436, 911-8149
Website: http://www.afp.mil.ph

BUREAU OF FIRE PROTECTION (BFP)
145 Union Square Condominium,
15th Ave., Cubao, Quezon City
Tel No. 911-7085, 911-9985
Website: http://www.bfp.gov.ph

CLIMATE CHANGE COMMISSION (CCC)
Room 238 Mabini Hall, Malacañang Compound
Manila
Tel No. 735-3069
Fax No. 735-3144
Website: http://www.climate.gov.ph

COMMMISSION ON HIGHER EDUCATION (CHED)
CHED Building, C.P. Garcia Ave., Diliman,
Quezon City
Tel No. 441-1177 / 441-1256
Fax No. 441-1177
Website: http://www.ched.gov.ph

DEPARTMENT OF AGRARIAN REFORM (DAR)
Elliptical Road, Diliman, Quezon City
Tel No. 928-7031 to 39, 928-3979
Fax No. 925-1148
Website: http://www.dar.gov.ph

DEPARTMENT OF AGRICULTURE (DA)
Elliptical Road, Quezon City
Tel No. 928-8762 to 65
920-4658 / 920-3979
Fax No. 920-3986, 926-6426 or 929-8182
Website: http://www.da.gov.ph

DEPARTMENT OF BUDGET AND MANAGEMENT (DBM)
Gen. Solano St., San Miguel, Manila
Tel No. 490-1000
Fax No. 735-4875
Website: http://www.dbm.gov.ph

DEPARTMENT OF EDUCATION (DepEd)
DepEd Complex, Meralco Ave., Pasig City
Tel No. 632-1361 to 71
633-7208, 633-7228
Fax No. 637-6209
Website: http://www.deped.gov.ph

DEPARTMENT OF ENERGY (DOE)
Energy Center, Merritt Road,
Fort Bonifacio, Taguig City
Tel No. 479-2900, 840-2080,
840-2184
Fax No. 812-6194
Website: http://www.doe.gov.ph

DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES (DENR)
DENR Bldg., Visayas Ave., Quezon City
Tel No. 929-6626 to 29, 925-2329
Fax No. 920-4301
Website: http://www.denr.gov.ph

DEPARTMENT OF FINANCE (DOF)
6th Floor DOF Bldg., Roxas Blvd., cor.
Pablo Ocampo St., Manila
Tel No. 523-9911 to 14
523-6051, 523-9215, 523-4255
Fax No. 526-8474
Website: http://www.dof.gov.ph

DEPARTMENT OF FOREIGN AFFAIRS (DFA)
DFA Bldg., 2330 Roxas Blvd., Pasay City
Tel No. 834-4000, 551-0357, 551-0090
Fax No. 832-1597
Website: http://www.dfa.gov.ph

DEPARTMENT OF HEALTH (DOH)
San Lazaro Compound, Rizal Ave.,
Sta. Cruz, Manila
Tel No. 651-7800, 743-6393, 711-9502
Fax No. 743-1829
Website: http://www.doh.gov.ph

DEPARTMENT OF INTERIOR AND LOCAL GOVERNMENT (DILG)
Francisco Gold Condominium II, EDSA cor.
Mapagmahal St., Diliman, Quezon City
Tel No. 925-0330, 925-0320, 925-8888
Fax No. 925-0332
Website: http://www.dilg.gov.ph

DEPARTMENT OF JUSTICE (DOJ)
DOJ Bldg., Padre Faura St., Ermita, Manila
Tel No. 523-8481 to 98
521-3721, 521-8348
Fax No. 523-9548
Website: http://www.doj.gov.ph

DEPARTMENT OF LABOR AND EMPLOYMENT (DOLE)
DOLE Bldg., Muralla cor. Gen. Luna Sts.,
Intramuros, Manila
Tel No. 527-3000, 527-2116, 527-5523
Fax No. 527-3494
Website: http://www.dole.gov.ph

DEPARTMENT OF NATIONAL DEFENSE (DND)
Camp General Emilio Aguinaldo, Quezon City
Tel No. 982-5600 / 911-6193
Fax No. 911-6213
Website: http://www.dnd.gov.ph

DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)
Bonifacio Drive, Port Area, Manila
Tel No. 304-3000, 304-3201, 304-3302
Fax No. 304-3020
Website: http://www.dpwh.gov.ph

DEPARTMENT OF SCIENCE AND TECHNOLOGY (DOST)
Gen. Santos Ave., Bicutan, Taguig City
Tel No. 837-2071 to 82, 837-3171 to 09
837-2939
Fax No. 837-2937
Website: http://www.dost.gov.ph

DEPARTMENT OF SOCIAL WELFARE AND DEVELOPMENT (DSWD)
Batasang Pambansa Complex,
Constitution Hills, Quezon City
Tel No. 931-8101 to 07
931-7916 or 931-8068
Fax No. 931-8191
Website: http://www.dswd.gov.ph

DEPARTMENT OF TOURISM (DOT)
DOT Bldg., T.M. Kalaw St., Agrifica Circle,
Rizal Park, Manila
Tel No. 523-8411, 525-4102
Fax No. 521-7371
Website: http://www.dot.gov.ph

DEPARTMENT OF TRADE AND INDUSTRY (DTI)
Industry and Investments Bldg.,
385 Sen. Gil Puyat Ave., Makati City
Tel No. 899-7450
899-5518
Fax No. 896-1166
Website: http://www.dti.gov.ph

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS (DOTC)
The Columbia Tower, Ortigas Ave.,
Mandaluyong City
Tel No. 727-7960, 726-7104
727-7109 local 307/309
Fax No. 726-7104
Website: http://www.dotc.gov.ph

DISASTER RISK REDUCTION NETWORK PHILIPPINES (DRRNET PHILS)
Tel No. 374-7618 local 405
Website: http://www.preventionweb.net

GOVERNMENT SERVICE INSURANCE SYSTEM (GSIS)
Financial Center, Roxas Blvd., Pasay City
Tel No. 976-4900, 479-3645, 479-3600
Website: http://www.gsis.gov.ph

HOUSING AND LAND USE REGULATORY BOARD (HLURB)
Kalayaan Ave., Diliman, Quezon City
Tel No. 924-3384, 924-3378
Fax No. 924-3378
Website: http://www.hlurb.gov.ph

HOUSING AND URBAN DEVELOPMENT COORDINATING COUNCIL (HUDCC)
BDO Plaza, Paseo De Roxas, Makati City
Tel No. 812-8870, 811-4159, 811-4168
Fax No. 814-4158
Website: http://www.hudcc.gov.ph

LEAGUE OF CITIES OF THE PHILIPPINES (LCP)
Unit K & J 7th Floor Cyber I Bldg.,
Eastwood City, Bagumbayan, Quezon City
Tel No. 470-6813, 470-6843, 470-6837
Fax No. 470-7210
Website: http://www.lcp.org.ph

LEAGUE OF MUNICIPALITIES OF THE PHILIPPINES (LMP)
2nd Floor LMP Bldg., 265 Ermin Garcia St.,
Cubao, Quezon City
Tel No. 913-5737 to 38
Website: http://www.lmp.org.ph

LEAGUE OF PROVINCES OF THE PHILIPPINES (LPP)
Unit 1510 West Tower, Philippine Stock
Exchange Tower, Ortigas Center, Pasig City
Tel No. 687-5399, 631-0170, 631-0197
Fax No. 687-4048
Website: http://www.lpp.gov.ph

LIGA NG MGA BARANGAY SA PILIPINAS (LNB)
1401 Prestige Tower Condominium,
F. Ortigas Ave., Ortigas Center, Pasig City
Tel No. 632-0710 to 12
310-5442, 324-5299
Fax No. 632-0409, 288-5716

METRO MANILA DEVELOPMENT AUTHORITY (MMDA)
MMDA Bldg., EDSA cor. Orense St.,
Guadalupe, Makati City
Tel No. 136, 882-4154 to 74
Fax No. 882-0859
Website: http://www.mmda.gov.ph

NATIONAL ANTI-POVERTY COMMISSION (NAPC-VDC/PDCRN)
3rd Floor ATI Bldg., Elliptical Road,
Diliman, Quezon City
Tel No. 927-9816, 426-3652,
426-5249 local 141, 127, 148
Fax No. 426-5249 local 127, 148, 141
Website: http://www.napc.gov.ph

NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY (NEDA)
NEDA sa Pasig, Escriva Drive, Ortigas Center,
Pasig City
Tel No. 631-0945 to 56
631-3716, 631-3702
Fax No. 631-3747
Website: http://www.neda.gov.ph

NATIONAL DEFENSE COLLEGE OF THE PHILIPPINES (NDCP)
Camp General Emilio Aguinaldo,
Quezon City
Tel No. 911-8469, 911-7995
Fax No. 911-8469
Website: http://www.ndcp.edu.ph

NATIONAL FOOD AUTHORITY (NFA)
Philippine Sugar Center Bldg., North Ave.,
Diliman, Quezon City
Tel No. 453-3900, 981-3800, 928-1634
Fax No. 453-3900, 922-2058
Website: http://www.nfa.gov.ph

NATIONAL MAPPING AND RESOURCE INFORMATION AUTHORITY (NAMRIA)
Lawton Ave., Fort Bonifacio, Taguig City
Tel No. 810-4831 to 34, 887-5466
Website: http://www.namria.gov.ph

OFFICE OF THE EXECUTIVE SECRETARY (OES)
4th Floor New Executive Bldg.,
Malacañang Compound, Manila
Tel No. (632) 725-5359, 736-1076,
736-6201
Fax No. 735-1010, 733-7472

PHILIPPINE HEALTH INSURANCE CORPORATION (PHILHEALTH)
Citystate Centre, 709 Shaw Blvd., Pasig City
Tel No. 441-7444 local 7642/43, 441-7442
Fax No. 637-6451
Website: http://www.philhealth.gov.ph

PHILIPPINE INFORMATION AGENCY (PIA)
Media Center Bldg., Visayas Ave.,
Diliman, Quezon City
Tel No. 920-1224
928-6917
Fax No. 928-6917
Website: http://www.pia.gov.ph

PHILIPPINE NATIONAL POLICE (PNP)
Camp Crame, Quezon City
Tel No. 117, 723-0441, 725-3178
Fax No. 724-8763
Website: http://www.pnp.gov.ph

PHILIPPINE RED CROSS (PRC)
Bonifacio Drive, Port Area, Manila
Tel No. 143
527-0000
Fax No. 527-0857
Website: http://www.redcross.org.ph

PRESIDENTIAL ADVISER ON THE PEACE PROCESS (OPAPP)
6th Floor Agustin I Bldg., F. Ortigas Jr. Ave.,
Ortigas Center, Pasig City
Tel No. 637-6083
636-0701 to 07 local 806
Fax No. 638-2216
Website: http://www.opapp.gov.ph

PRESIDENTIAL COMMUNICATIONS OPERATIONS OFFICE (PCOO)
3rd Floor New Executive Bldg.,
Malacañang Compound, Manila
Tel No. 735-3538, 559-9274, 732-6005
Fax No. 735-6167, 734-5883
Website: http://www.pcoo.gov.ph

PRESIDENTIAL MANAGEMENT STAFF (PMS)
4th Floor New Executive Bldg.,
Malacañang Compound, Manila
Tel No. 734-2094, 735-4847
735-8929
Fax No. 733-4936
Website: http://www.pms.gov.ph

SOCIAL SECURITY SYSTEM (SSS)
SSS Bldg., East Ave., Diliman, Quezon City
Tel No. 920-6401, 920-6446 to 55
Fax No. 920-6446
Website: http://www.sss.gov.ph

TECHNICAL EDUCATION AND SKILLS DEVELOPMENT AUTHORITY (TESDA)
East Service Road, South Superhighway,
Taguig City
Tel No. 887-7777
Website: http://www.tesda.gov.ph

UNION OF LOCAL AUTHORITIES OF THE PHILIPPINES (ULAP)
Unit 601-A, 2803 Summit One Towers,
530 Shaw Blvd., Mandaluyong City
Tel No. 718-1812, 534-6787
Fax No. 717-1810
Website: http://www.ulap.gov.ph

OFFICE OF CIVIL DEFENSE REGIONAL OFFICES

NCR
RBA Building, #81 15th Avenue, Murphy,
Cubao, Quezon City, 1109
Area Code: 02
Tel No. 913-2786
Fax No. 421-1918, 913-2786
Mobile No. 0999-883-7908

REGION CAR
Old Puso Building, DPS Compound
Baguio City 2600
Area Code: 074
Tel No. 619-0986, 304-2256
Fax No. 444-5298, 304-2256
Mobile No. 0916-303-2153

REGION I
Camp Oscar Florendo, Parian,
San Fernando City, La Union 2500
Area Code: 072
Tel No. 607-6528, 700-4747
Fax No. 607-6528, 700-4747
Mobile No. 0917-544-9959

REGION II
Camp Adduru, Tuguegarao City,
Cagayan 3500
Area Code: 078
Tel No. 304-1630
Fax No. 304-1631
Mobile No. 0920-945-1369

REGION III
Diosdado Macapagal Government Center,
Barrio Maigpis, San Fernando City,
Pampanga 2000
Area Code: 045
Tel No. 455-1526
Fax No. 455-0033
Mobile No. 0917-507-1852

REGION IV-A CALABARZON
Camp Vicente Lim, Canlubang,
Calamba City, Laguna 4027
Area Code: 049
Tel No. 834-4244, 531-7279
Fax No. 531-7266
Mobile No. 0917-500-6174

REGION IV-B MIMAROPA
PEO Compound, Batangas City,
Batangas 4200
Area Code: 043
Tel No. 723-4248
Fax No. 723-4248
Mobile No. 0917-873-0400

REGION V
2nd Floor Solcom Bldg.,
Camp Simeon Ola, Legaspi City, Albay 4500
Area Code: 052
Tel No. 481-1656, 481-5031
Fax No. 481,1656, 481-5031
Mobile No. 0928-505-3861,
0917-574-7880

REGION VI
Camp Martin Delgado, Iloilo City,
Iloilo 5000
Area Code: 033
Tel No. 337-6671
Fax No. 336-9353, 509-8988
Mobile No. 0917-302-2239

REGION VII
Camp Sergio Osmeña Sr., Cebu City 6000
Area Code: 032
Tel No. 416-5025, 253-8730
Fax No. 253-6162, 253-8730
Mobile No. 0917-627-4714

PAGASA
REGIONAL DIVISION

REGION VIII
Camp Ruperto Kangleon, Palo, Leyte 6501
Area Code: 053
Tel No. 323-8453, 323-5301
Fax No. 323-5301
Mobile No. 0917-700-1121
0926-779-9677
0939-407-4433

REGION IX
Door #2 ESL Homes, Enerio St., Sto Niño District
Pagadian City
Area Code: 062
Tel No. 925-0458
Fax No. 925-0458, 925-0373
Mobile No. 0920-411-8711
0932-878-7356

Satellite Office: Door #1 Tiong Bldg.,
Savedra St., cor Maestra Vicente St., Sta. Maria,
Zamboanga City
Area Code: 062
Tel No. 911-6361, 911-3450
Fax No. 911-6361, 911-3450
Mobile No. 0917-500-1322

REGION X
Hayes St. cor Coralles St.,
Cagayan De Oro City 9000
Area Code: 088
Tel No. 857-3988, 857-3907
Fax No. 857-3988
Mobile No. 0917-526-4224
0939-915-1605

REGION XI
PNP Compound, Camp Catitipan,
Davao City 8000
Area Code: 082
Tel No. 233-0611
Fax No. 233-0295, 233-0611
Mobile No. 0920-858-5684

REGION XII
Camp Fermin Lira, Jr., General Santos City 9500
Area Code: 083
Tel No. 553-2994, 301-2994
Fax No. 553-2994, 301-2994
Mobile No. 0908-109-8921

CARAGA
T. Calo St., Butuan City 8600
Area Code: 085
Tel No. 342-8753, 341-8629
Fax No. 342-8753, 341-8629
Mobile No. 0927-449-9763
0920-858-5684
0939-202-6542

ARMM/MAGUINDANAO Satellite Office
Camp Gonzalo Cionco, Datu Odin Awang,
Sinsuat Maguindanao 9601
Area Code: 062
Tel No. 431-0547
Fax No. 431-0547
Mobile No. 0917-622-1430

BASULTA (BASILAN, SULU & TAWI TAWI)
Camp Arturo Enrile, Malagutay,
Zamboanga City 7000
Area Code: 062
Tel No. 983-0973
Fax No. 983-0973
Mobile No. 0920-928-8001
0927-211-7487
0947-896-5738

NCR
PAGASA Synoptic Station,
Science Garden Complex, Agham Road,
Diliman, Quezon City
Area Code: 02
Tel No. 927-5509

NORTHERN LUZON XII
Science Garden Complex, Agham Road,
Diliman, Quezon City
Area Code: 02
Tel No. 927-5343

Tuguegarao City, Cagayan
Area Code: 078
Tel No. 844-1994

SOUTHERN LUZON
PAGASA Weather Station
Airport 4500 Legazpi City
Area Code: 052
Tel No. 481-4471

VISAYAS
PAGASA Weather Station
Airport Road, Pusok, 6015 Lapu-Lapu City,
Mactan, Cebu
Area Code: 032
Tel No. 340-4143, 340-1868

MINDANAO
PAGASA Weather Station
Cagayan De Oro City
Area Code: 088
Tel No. 555-0485

PHIVOLCS SEISMIC STATIONS

SEISMIC STATIONS	OFFICE ADDRESS	CONTACT NO.
Antique (JAP)	Binirayan Hills, San Jose de Buenavista, Antique 5700	(036) 540-8166
Basco (BBP)	Basco, Batanes 3900	0939-198-0570
Baguio City (BCP)	Dairy Farm Compound, Sto. Tomas Road, Baguio City 2600	(074) 619-3071
Bislig (BIP)	Post I Tabon Hill, Top Forest Drive, Bislig City, Surigao Del Sur 8311	(086) 853-0468
Cotabato (CTB)	Old Capitol Site, PC Hill, Cotabato City, Maguindanao 9600	0921-440-8764
Cagayan de Oro (CGP)	Malasag, Cagayan de Oro City 9000	0920-442-0503
Callao (CVP)	Aggugadan, Peñablanca, Cagayan 3502	(078) 501-7118
Davao (DMP)	PSHS Compound, Brgy. Sto Niño, Tugbok District, Davao City 8000	(082) 293-0008
Dipolog (DCP)	Sicayab, Dipolog City, Zamboanga Del Norte 7100	(065) 212-2570
General Santos City (GSP)	MSU Tambler Campus, General Santos City 9500	(083) 553-8133
Guinayangan (GQP)	Calimpac, Guinayangan, Quezon 4319	(042) 303-4125
Kidapawan (KCP)	De Mazenoid St., Kidapawan City, North Cotabato 9400	0915-438-7982
Lapu-Lapu (LLP)	City Hall Compound, Lapu-Lapu City 6015	(032) 340-2951 (032) 495-5268

SEISMIC STATIONS	OFFICE ADDRESS	CONTACT NO.
Lucban (LQP)	Ayuti, Lucban, Quezon 4328	(042) 540-4888
Masbate (MMP)	Masbate City, Masbate 5400	(056) 333-2528 0928-787-1357
Palayan (PCP)	Singalat, Palayan City, Nueva Ecija 3132	(044) 940-5559 0907 826-3411
Palo (PLP)	Arado, Palo, Leyte 6501	(053) 323-3143
Pasuquin (PIP)	INAC, Pasuquin, Ilocos Norte 2917	(077) 775-0217
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GLOSSARY

A

active volcano
Volcano that erupted within historical times (withing the last 600 years), with accounts of these eruptions documented by man or erupted within the last 10,000 years based on analyses of datable materials.

atmospheric pressure
The amount of force exerted on a unit surface area. *(PAGASA)*

C

cold front
The forward edge of an advancing cold air mass which is displacing warmer air in its path. *(PAGASA)*

E

easterly wave
A migratory wave-like disturbance of the tropical easterlies. It is a wave within the broad easterly current and moves from east to west, generally more slowly than the current in which it is embedded. *(PAGASA)*

epicenter (of an earthquake)
Point on earth's surface located directly above the focus of an earthquake.

eye of the typhoon
A calm region at the center of a tropical cyclone or a break in the clouds marking its location accompanied by light winds, clear skies and temporary good weather. Its size varies and can range from below 10 km to over 200 km across, but most common are about 30 to 60 km in diameter.

eye wall
A roughly circular ring of thick clouds and thunderstorms. It is the area with highest surface winds and heavy rain in the typhoon.

F

fault
A fault is a fracture along which the blocks of crust on either side have moved relative to one another parallel to the fracture. *(USGS)*

fissure (fissuring)
An elongated fracture of crack at the surface from which lava erupts.

flash flood
Flooding caused bu a rapid rise in the water level of rivers, streams or lakes, usually as a result of heavy rains. *(PAGASA)*

flood
An overflow of water that submerges land which is usually dry. *(Wikipedia)*

focus (of an earthquake)
Actual location beneath the surface where the earthquake begins.

G

gale
An unusually strong wind, with speed of ranging from 28 to 47 knots (or 51 to 101 kph). *(PAGASA)*

gale warning
A warning indicating wind speeds in the range of 34 to 47 knots or wind force of 8 or 9 in the Beaufort scale (or 62 to 88 km/h). This is a warning on the occurrence or expected occurrence of gale force winds.

ground rupture
Deformation on the ground that marks the intersection of the fault plane with the earth's surface.

gust
A sudden, brief increase in the force of the wind. *(PAGASA)*

H

hale
Chunks of ice that may form in layers during thunderstorms. *(PAGASA)*

I

inactive volcano
Volcano with no record of eruptions and the physical form is beng changed by agents of weathering and erosion.

intensity (of an earthquake)
Strength of shaking produced by the earthquake at a certain location.

intertropical convergence zone (itcz)
Is the area encircling the earth near the equator where the northeast and southeast trade winds come together. The ITCZ appears as a band of clouds, usually thunderstorms, that circle the globe near the equator that can affect the weather. *(Wikipedia)*

L

lahar
Flowing mixtures of volcanic debris and water.

lava flow
Highly elongated mass of molten rock materials cascading downslope from an erupting wind.

lightning
An electrical discharge produced by a thunderstorm. *(PAGASA)*

liquefaction
Process where particles of loosely consolidated and water-saturated deposits of fine sand are rearranged into more compact state.

low pressure area
Is a region of the atmosphere in which the pressures are lower than those of the surrounding region at the same level that may bring bad weather. (*WMO)*

M

magnitude
Energy released at the source of an earthquake; determined by seismographs.

maximum sustained wind speed
Constant speed of wind for an average period of one (1) or (to) ten (10) minutes depending upon the regional practice.

monsoon
A wind that reverses its direction with the season; blowing more or less steadily from the interior of a continent toward the sea in winter and in the opposite direction during summer. *(PAGASA)*

monsoon rain
Precipitation (can be rain, snow or hail), usually heavy, associated with monsoon winds. *(WMO)*

monsoon trough
Trough over the Indian subcontinent during the summer monsoon, oriented northwest to southeast about 500 km southwest of the Himalayas. *(WMO)*

P

potentially active volcano
Morphologically young-looking volcano but with no historical records of eruption.

pyroclastic flow
Hot dry masses of fragmented volcanic materials that move along the slope and in contact with ground surface.

R

rain
Liquid precipitation with drops larger than .02 inch in diameter measured by the use of rain gauge. *(PAGASA)*

ridge
A relatively narrow extension of a high-pressure area as shown on a weather chart. *(PAGASA)*

S

seiche
Sloshing of a closed body of water from earthquake shaking.

storm surge
An abnormal rise of water generated by a storm's winds that can reach heights well over 20 feet and can stretch to hundreds of miles from the coastline. More intense and larger hurricanes (storms) can produce higher surge. In addition, shallower offshore waters contribute to higher storm surge inundation. Storm surge is by far the greatest threat to life and property along the immediate coast. *(NOAA)*

subsidence
Ground deformation resulting from the downward adjustment of surface materials to the voids caused by volcanic activity.

T

tectonic earthquake
Sudden displacements along faults in the solid and rigid layer of the earth.

thunderstorm
Weather disturbance that produces, aside from wind and rain,thunder and lightning. Thunderstorms occur locally, often as episodes of cyclones, and, in common with squalls, are marked by abrupt variations in pressure, temperature, and wind. *(PAGASA)*

tornado
A violently rotating column of air that reaches from the base of a cloud to the ground (in funnel shape). In other areas it is called a violent thundersquall that can blow off roofs, topple down trees and cause damage to light and poorly built houses. *(PAGASA)*

trade winds
Two belts of wind, one on either side of the equatorial doldrums in which the winds blow almost constantly from easterly quadrants. *(PAGASA)*

tropical cyclone
The general term for a cyclone that includes tropical depression, tropical storm, cyclones, hurricanes or typhoons that originate over the tropical oceans. *(PAGASA)*

tropical depression
Is a tropical cyclone with winds that do not exceed 63 kph. This may cause few trees to be uprooted or branches broken and roofs of houses made of cogon or light materials may be blown away while rice and corn plants in flowering stage may be adversely affected. *(PAGASA)*

tropical storm
The general term for a cyclone that includes tropical depression, tropical storm, cyclones, hurricanes or typhoons that originate over the tropical oceans. *(PAGASA)*

trough
The elongated area of low barometric pressure that generally stretches north and south. This is the line where the lowest readings of the barometer will be recorded.*(PAGASA)*

tsunami
Giant sea waves generated mostly by submarine earthquakes.

typhoon
Is a tropical cyclone with winds that exceed 118 kph. The name is applied to a severe tropical cyclone in the western Pacific. This may cause majority of the roofs of houses made of light materials to be blown away; inflict heavy damage to agricultural and industrial sectors and electrical and communication services may be interrupted. *(PAGASA)*

V

volcanic earthquake
Earthquake induced by rising lava or magma beneath active volcanoes.

W

wind direction
The direction from which the wind is blowing. *(PAGASA)*

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