9th GEOSS Asia-Pacific Symposium

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Tokyo International Exchange Center

Plaza Heisei,Tokyo, Japan

Flood and Drought EWS - Philippines

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PAGASA/DOST

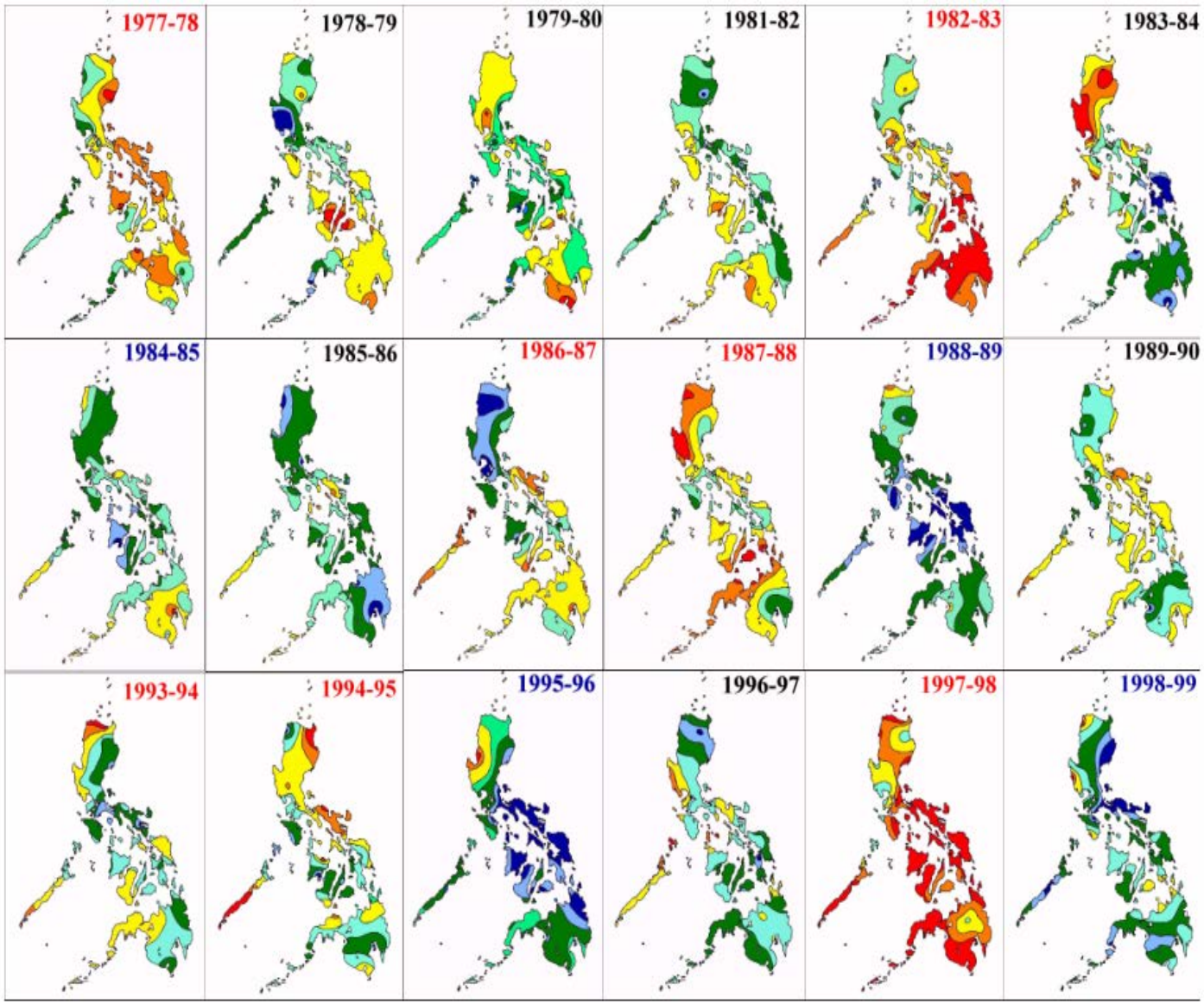
⇨ PAGASA: The nation's meteorological and hydrological service (NMHS)

➲ **To provide weather, flood, climate and astronomical products & services to promote the people's safety and well-being, and contribute to national development**

PAGASA – an attached agency of the Department of Science and Technology (DOST).

The Philippines, represented by PAGASA, is a Member of the World Meteorological Organization (WMO), a specialized body of the United Nations.

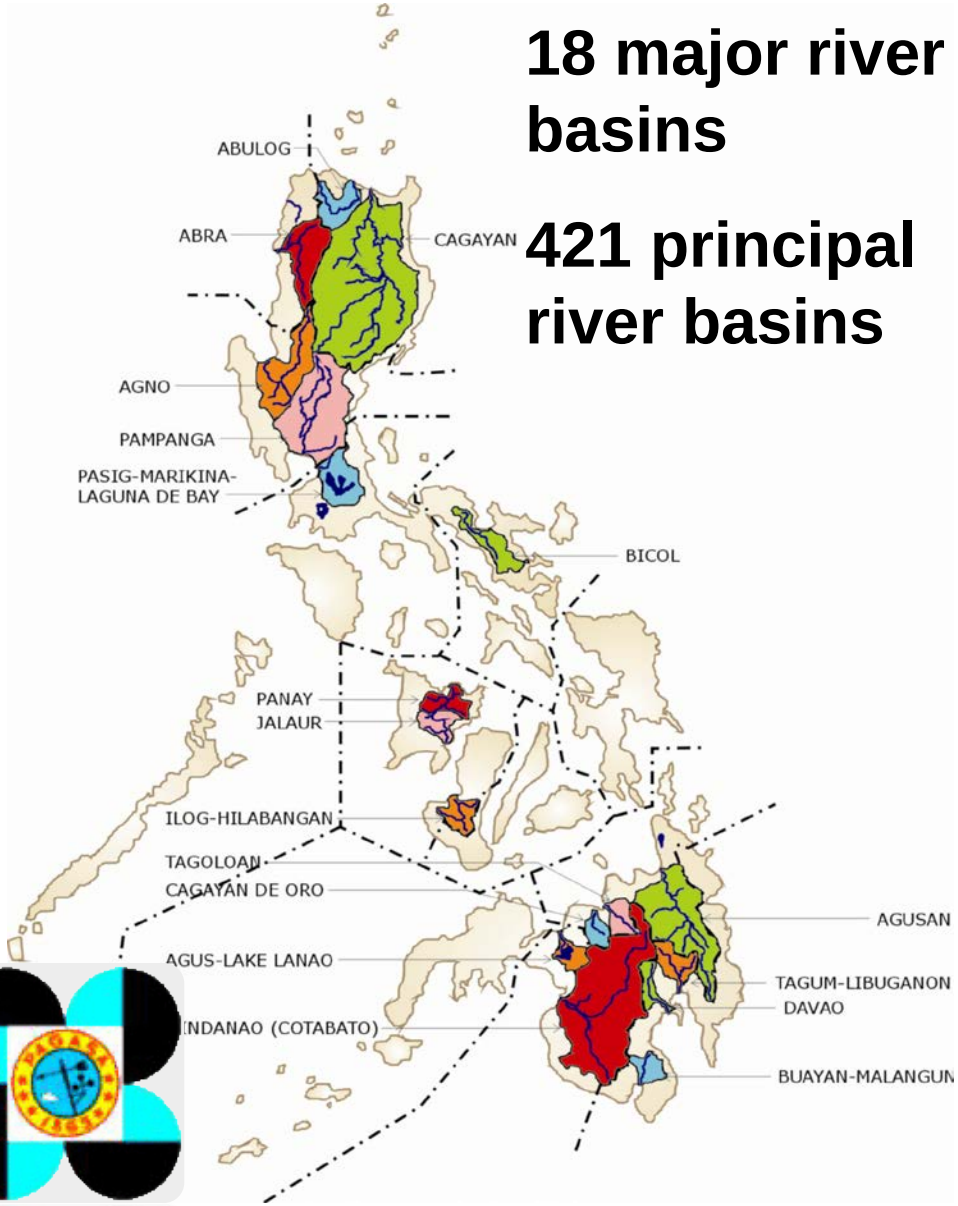
IMPACTS OF ENSO ON PHILIPPINE RAINFALL



Legend:

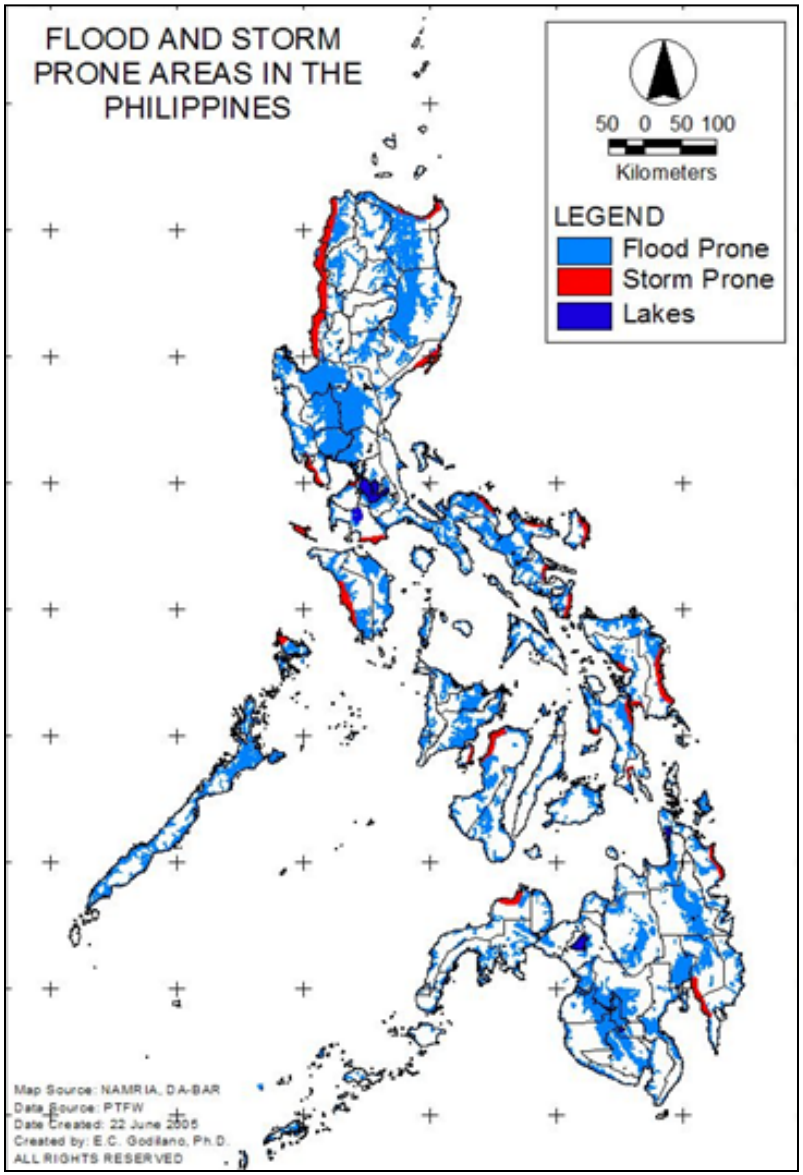
- **Severe drought impacts**
- **Drought impacts with major losses**
- **Moderate drought impacts**
- **Near normal to above normal condition**
- **Way above normal condition**
- **Potential for flood damage**
- **Severe flood damage**

RED colored years are EL NINO years, BLUE colored years are LA NINA years and BLACK colored years are NON ENSO years



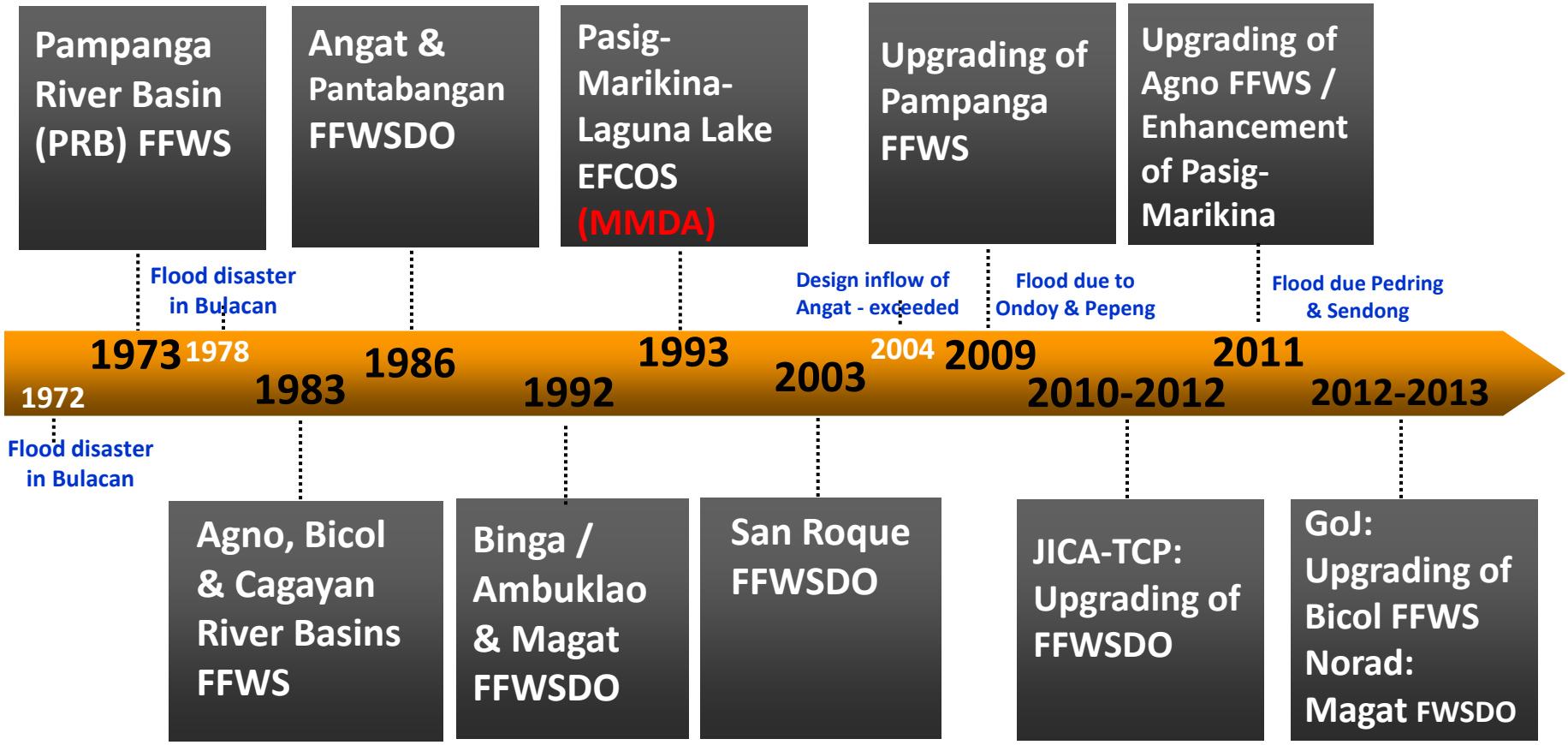
18 major river basins

421 principal river basins



The PAGASA and its Flood Early Warning System

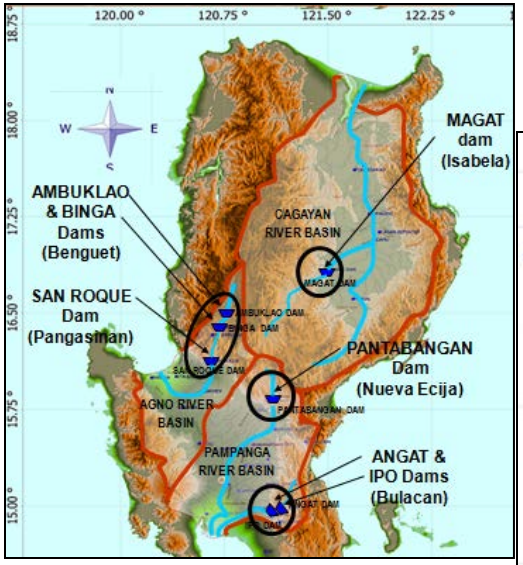
Evolution of FFWS and FFWSDO in the PH

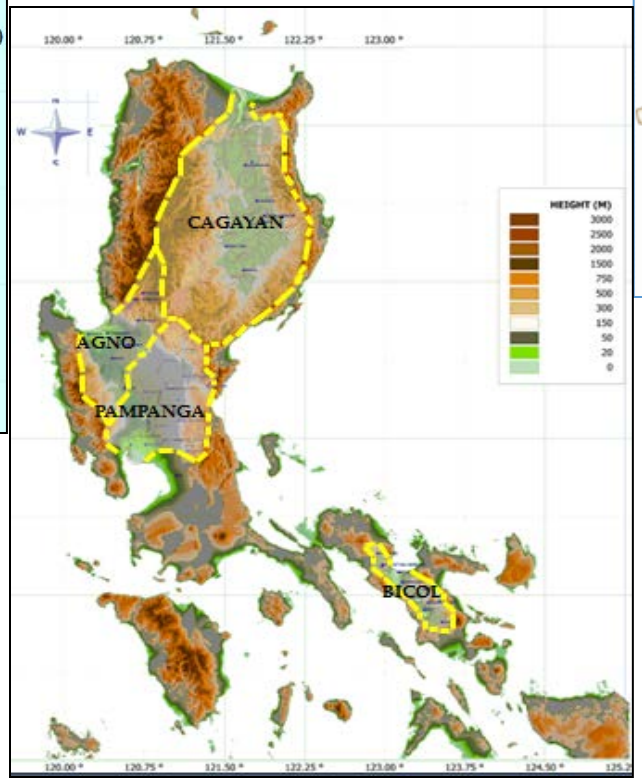


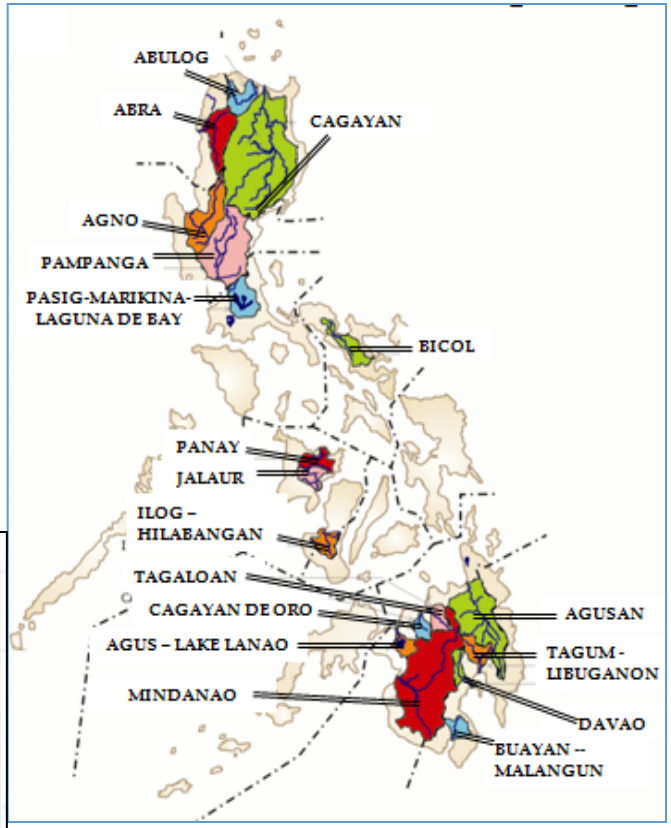
EO 2011 – Ipo telemetered FFWSDO - operational

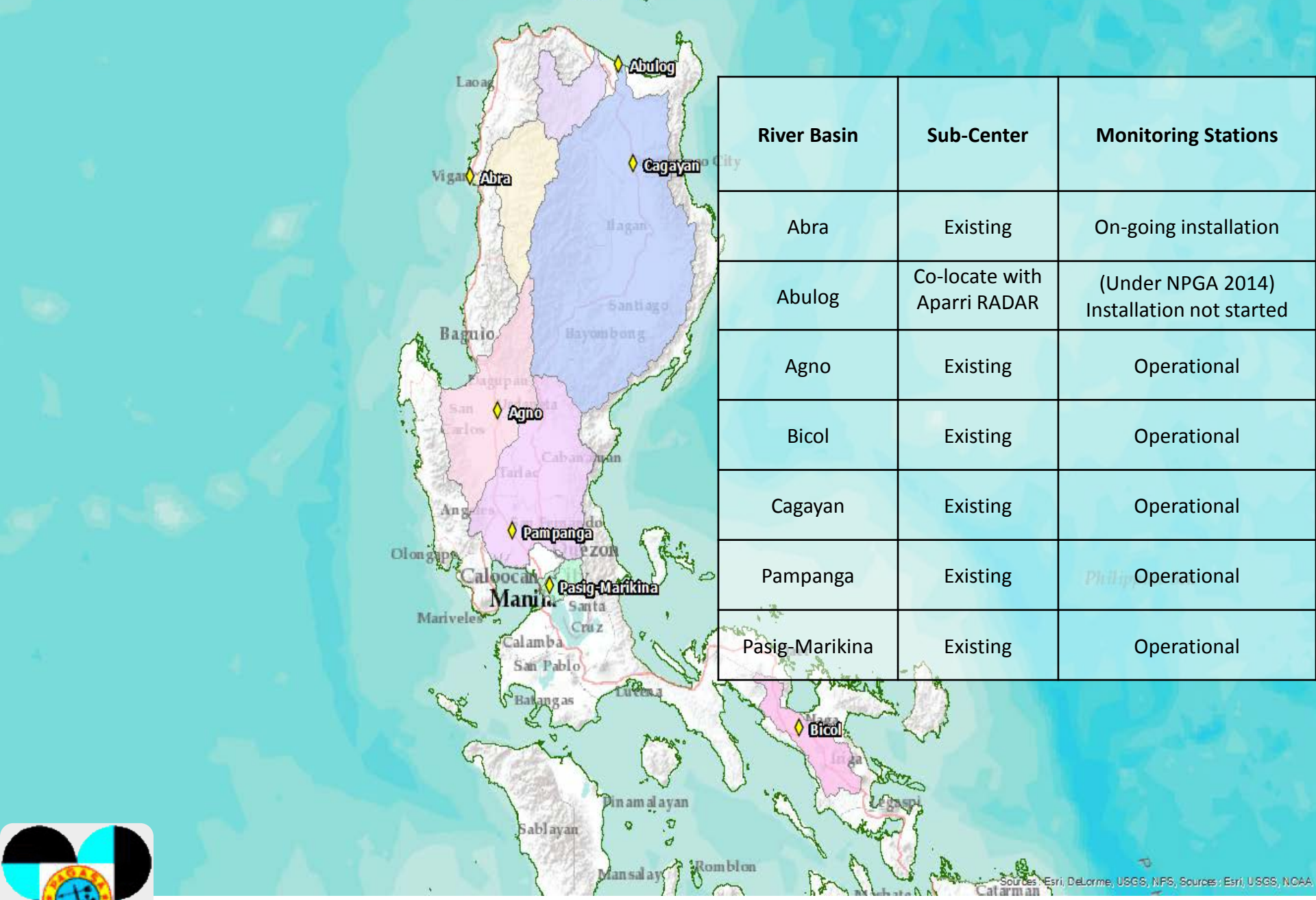
2012 – Caliraya FFWSDO will be operational

NETWORK of Existing PAGASA HYDROLOGICAL Stations (Telemetered major river basins and dams)

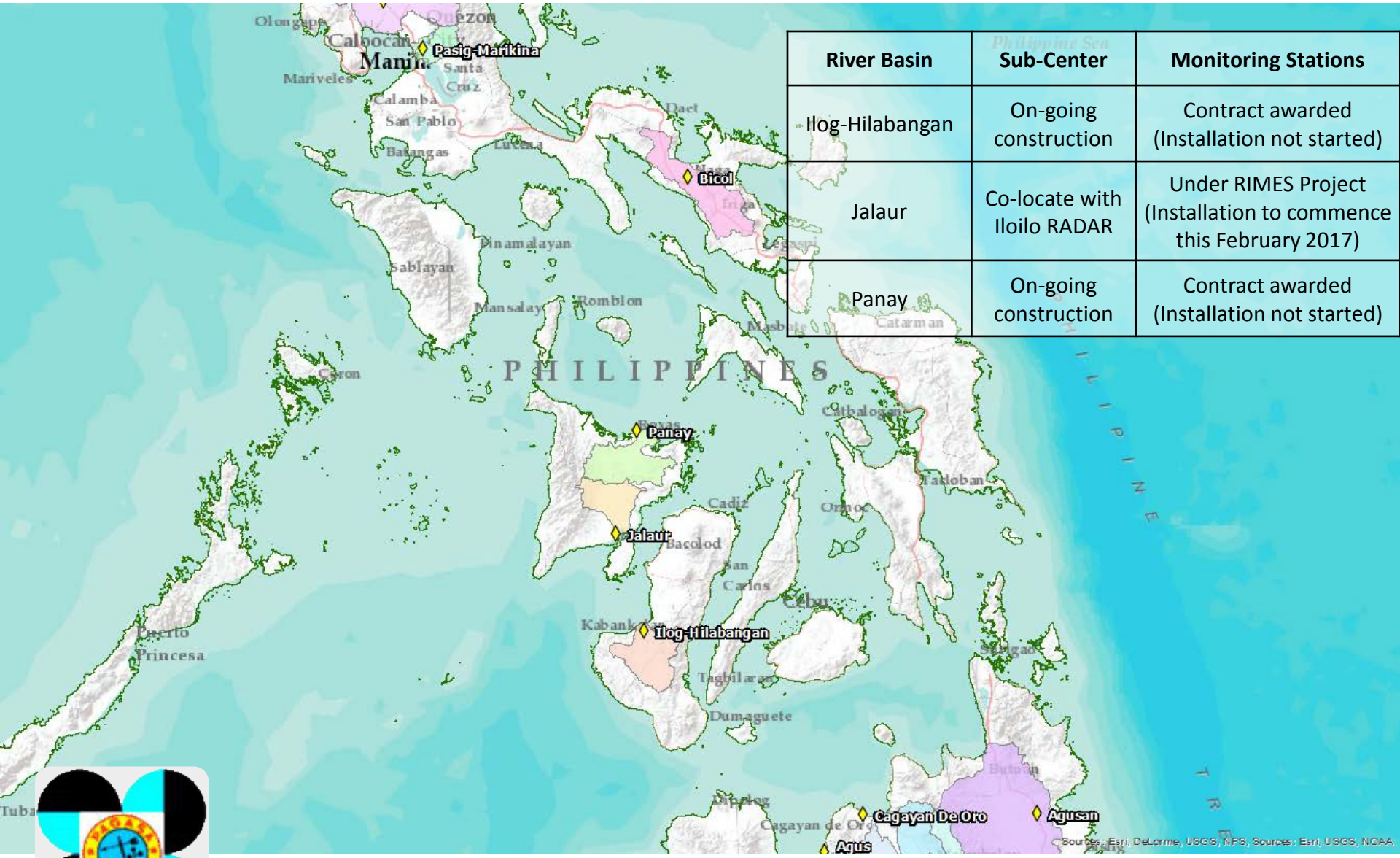




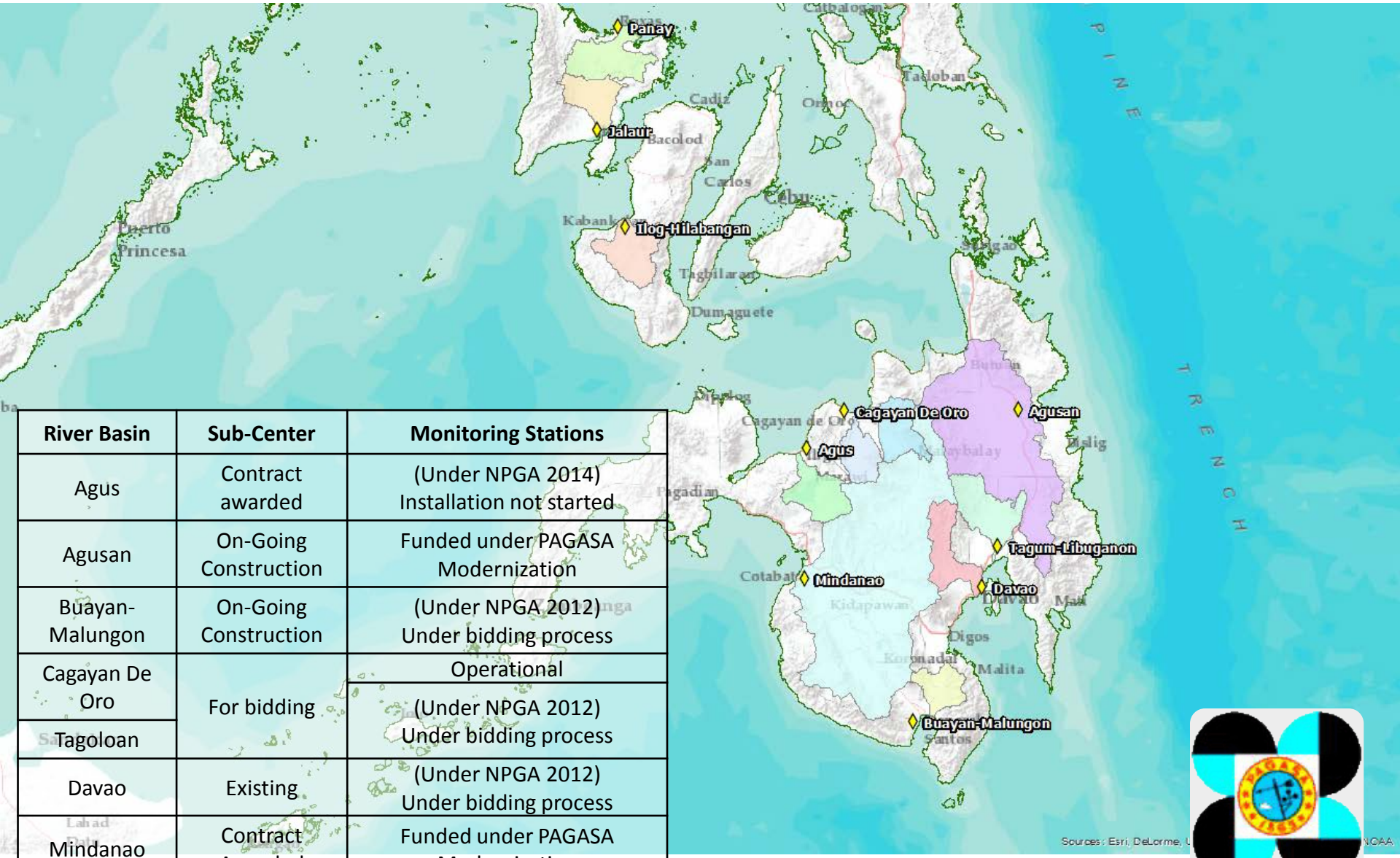




River Basin	Sub-Center	Monitoring Stations
Abra	Existing	On-going installation
Abulog	Co-locate with Aparri RADAR	(Under NPGA 2014) Installation not started
Agno	Existing	Operational
Bicol	Existing	Operational
Cagayan	Existing	Operational
Pampanga	Existing	Operational
Pasig-Marikina	Existing	Operational



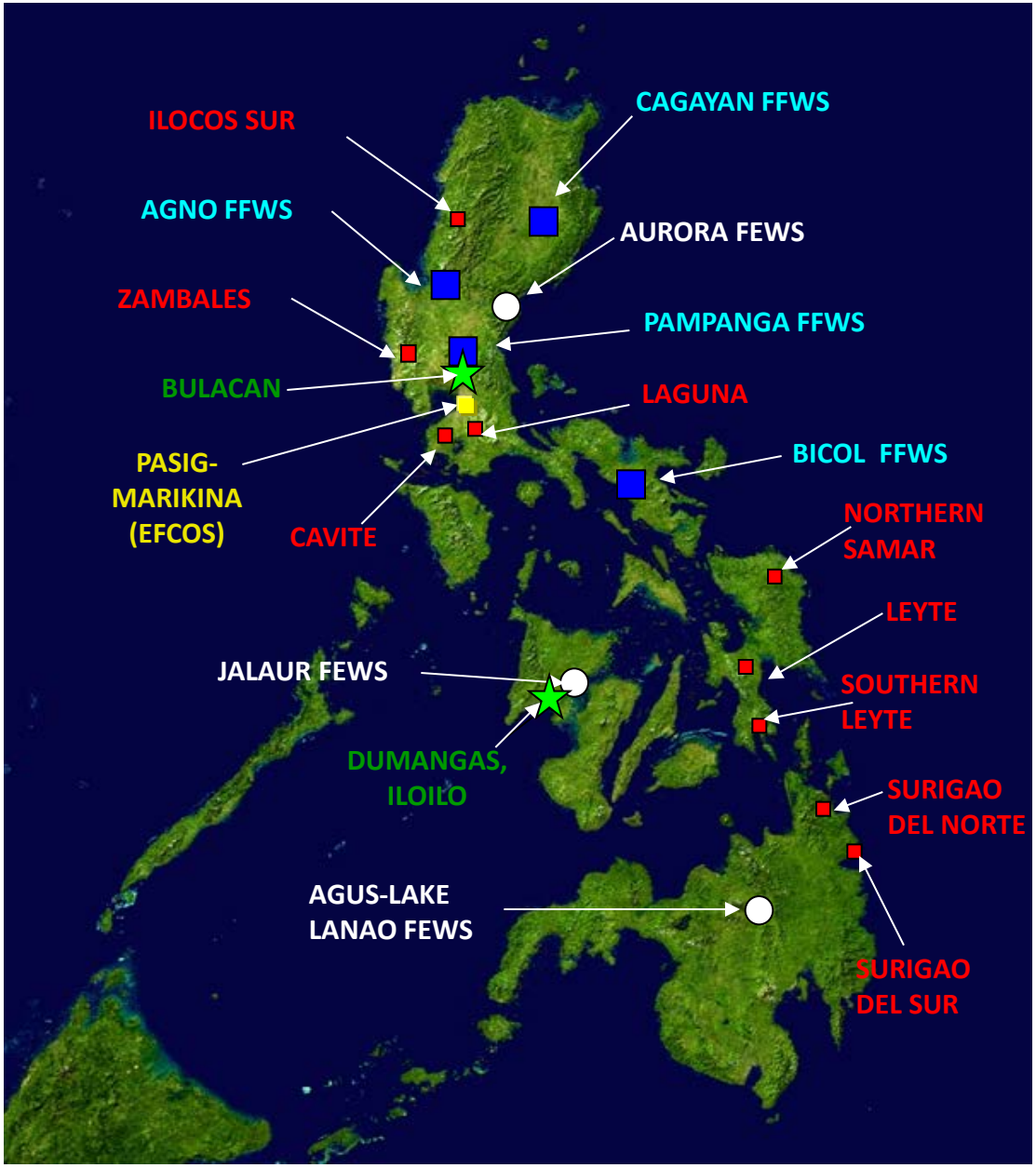
River Basin	Sub-Center	Monitoring Stations
Ilog-Hilabangan	On-going construction	Contract awarded (Installation not started)
Jalaur	Co-locate with Iloilo RADAR	Under RIMES Project (Installation to commence this February 2017)
Panay	On-going construction	Contract awarded (Installation not started)



River Basin	Sub-Center	Monitoring Stations
Agus	Contract awarded	(Under NPGA 2014) Installation not started
Agusan	On-Going Construction	Funded under PAGASA Modernization
Buayan-Malungon	On-Going Construction	(Under NPGA 2012) Under bidding process
Cagayan De Oro	For bidding	Operational
Tagoloan		(Under NPGA 2012) Under bidding process
Davao	Existing	(Under NPGA 2012) Under bidding process
Mindanao	Contract Awarded	Funded under PAGASA Modernization
Tagum-Libuganon	Existing	Operational

Community Based Flood Early Warning System (CBFEWS)

Community-based Flood Early Warning System (CBFEWS)



- GOVT. OF JAPAN (TELEMETERED)
- GOVT. OF JAPAN (TELEMETERED) (UNDER MMDA)
- GOVT. OF KOREA (TELEMETERED)
- UNDP- AusAID Community based
- LGU INITIATIVE

Flood Warning Protocol (Batingaw)

Warning Signal/ Info	Water level at the monitoring station	Meaning
1 bell or 1-second of brief siren for every 2 seconds for 30 seconds	Water level has reached **Alert Level**	**READY** – People are made **aware** of an impending flood.
2 bells or two 1-second siren for every 2 seconds for 30 seconds.	The **Alert Level** reached the **Alarm Level** in **30 minutes or less**	**GET SET** – People are advised to **prepare** for a possible flood.
Continuous ringing of bells or siren for 20 to 30 seconds.	Water level at the monitoring station reached **Critical Level**	**GO** – People are advised to **respond/ evacuate** for an expected flood.

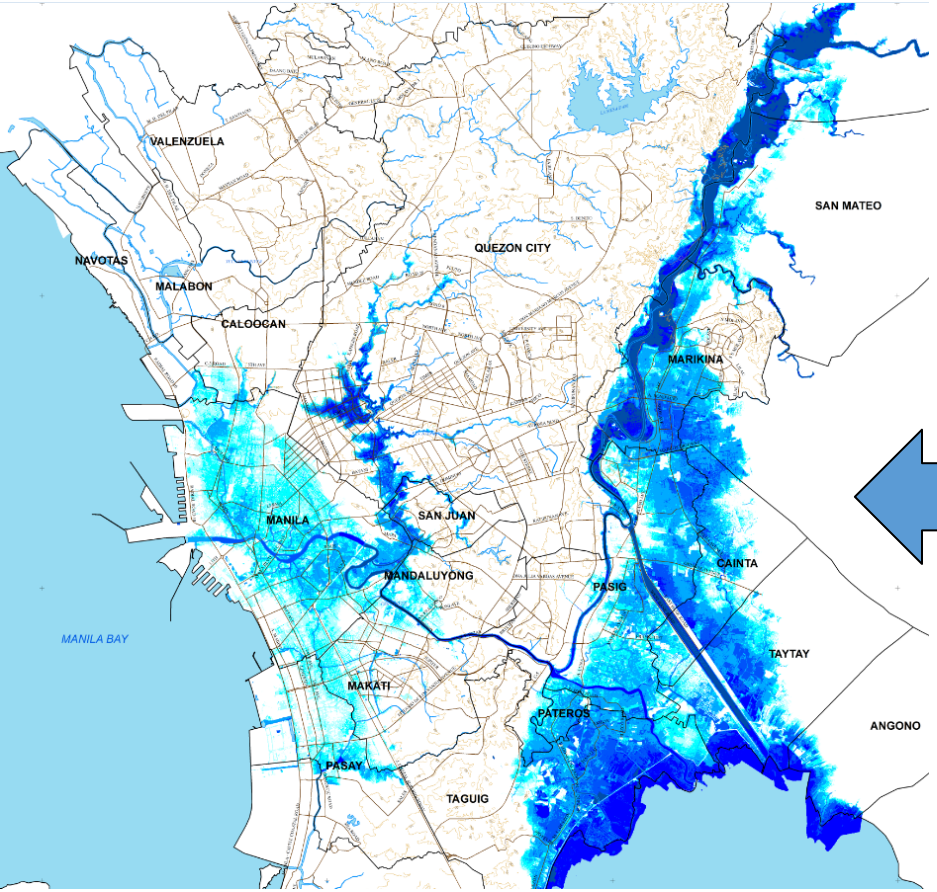
HANDA+LIGTAS+PANATAG

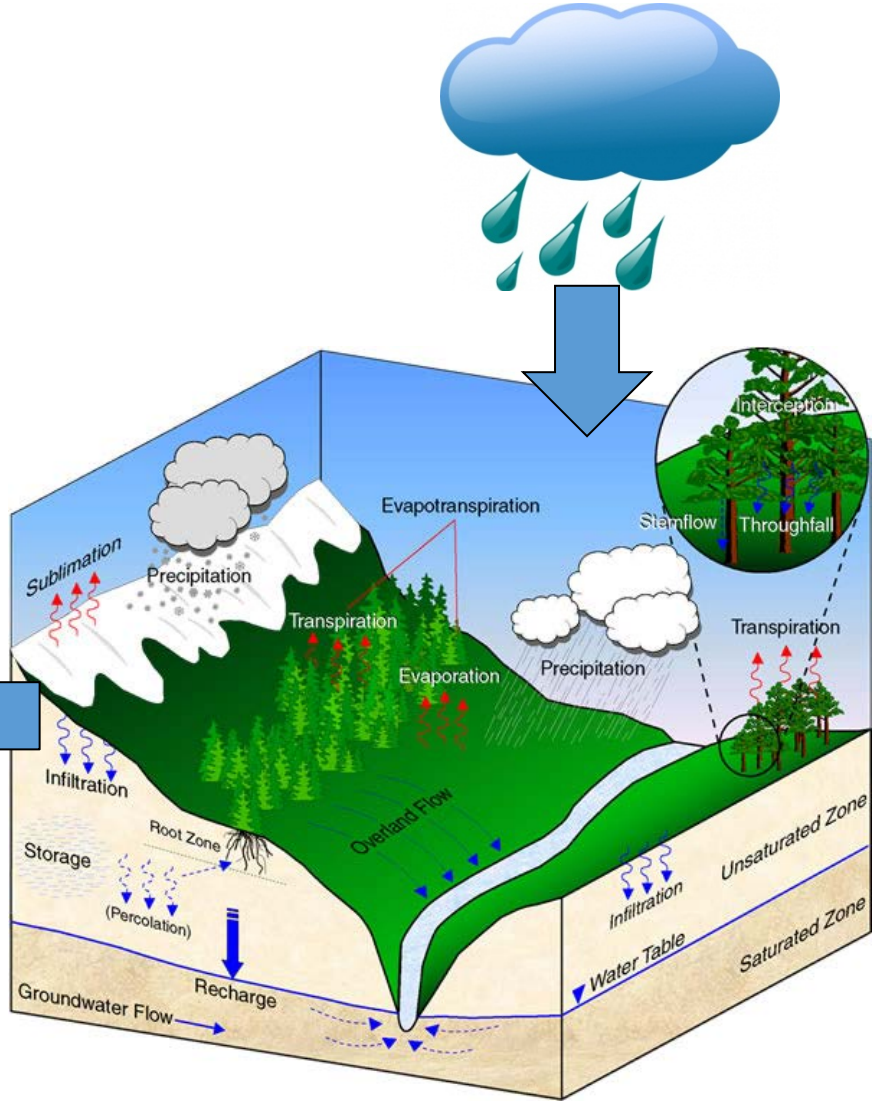
FLOOD RISK MODELLING

PASIG-MARIKINA RIVER BASIN (FLOOD)

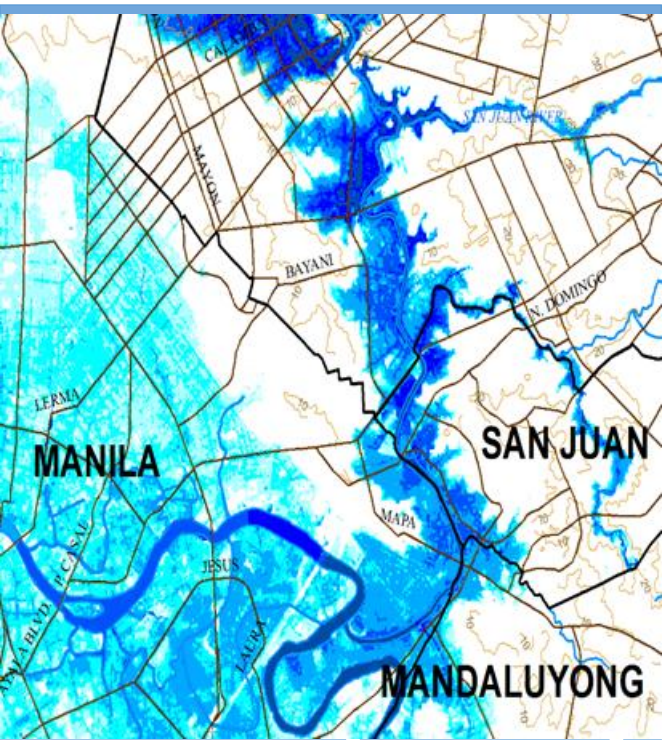
FLOOD MODELS TYPICALLY CONSIST OF

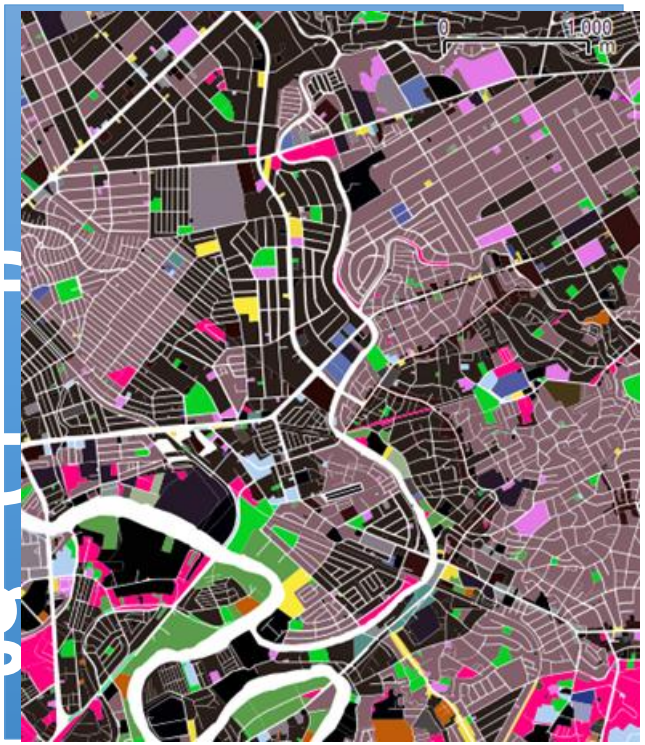
1. Rainfall-runoff model
2. Hydraulic model

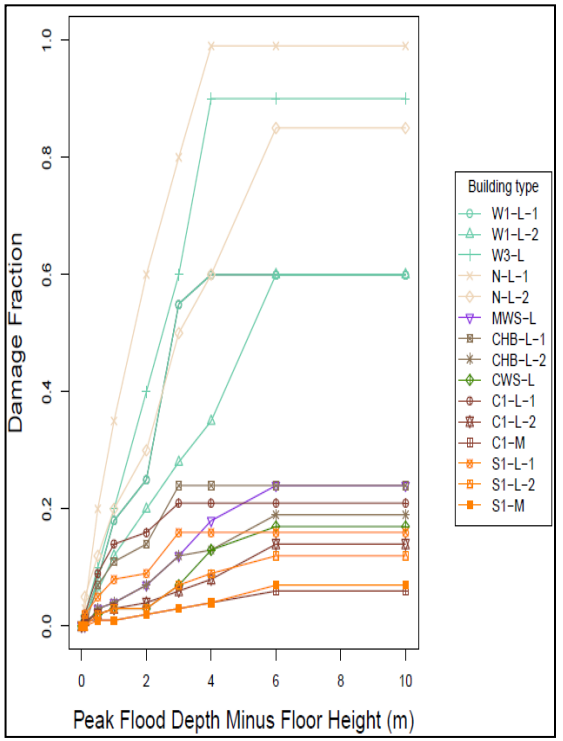




FLOOD RISK MODELLING







HAZARD

EXPOSURE

VULNERABILITY

RISK

DAMAGE MEASURES FOR EACH AEP

Damaged Floor Area Equivalent (ha)

- e.g. 20 ha of building floor area with 50% damage = 10 ha 'damaged floor area equivalent'
- Measures damage, not ₱₱ value

Building Damage Cost (Peso)

- 'Damaged floor area equivalent' x 'building replacement cost'
- Measures damage considering ₱₱ value

Number of People with Inundated Homes

- 'Inundated floor area' x 'Population per floor area'

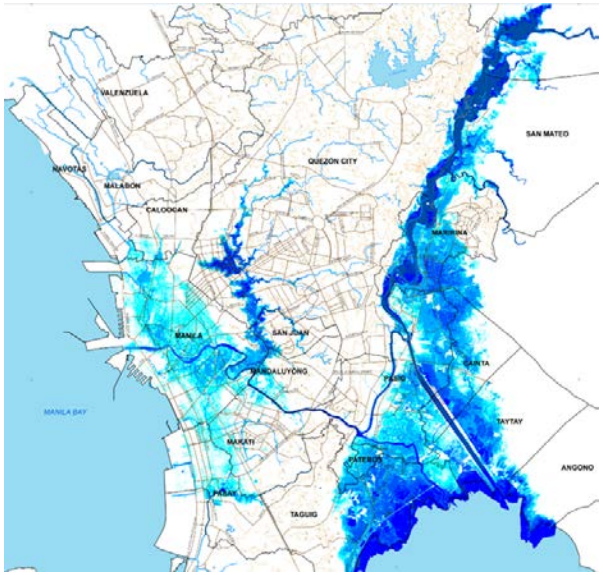
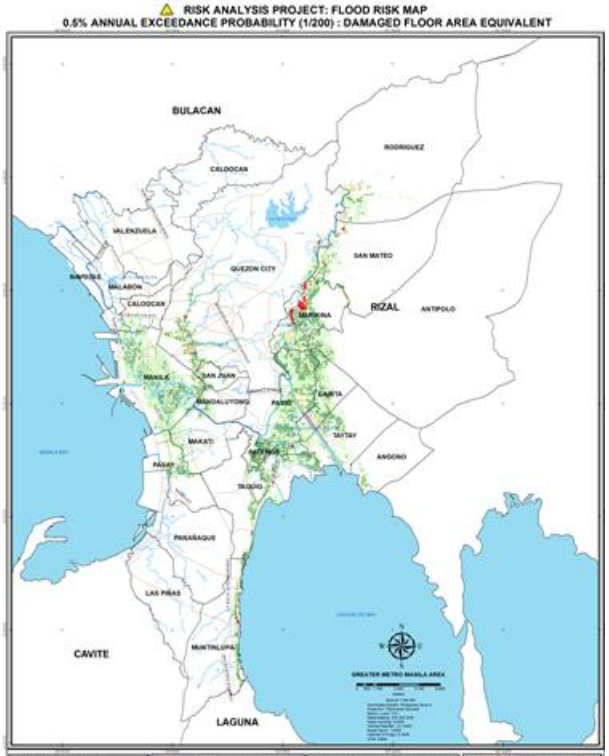
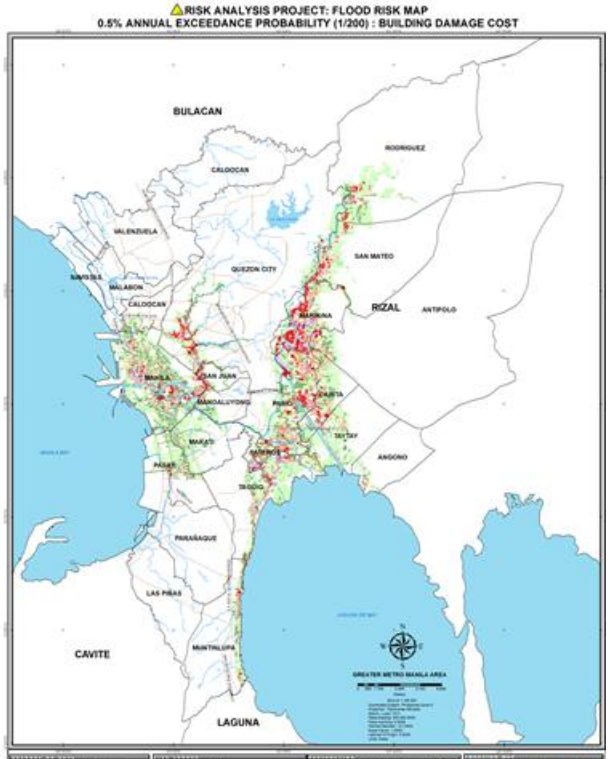
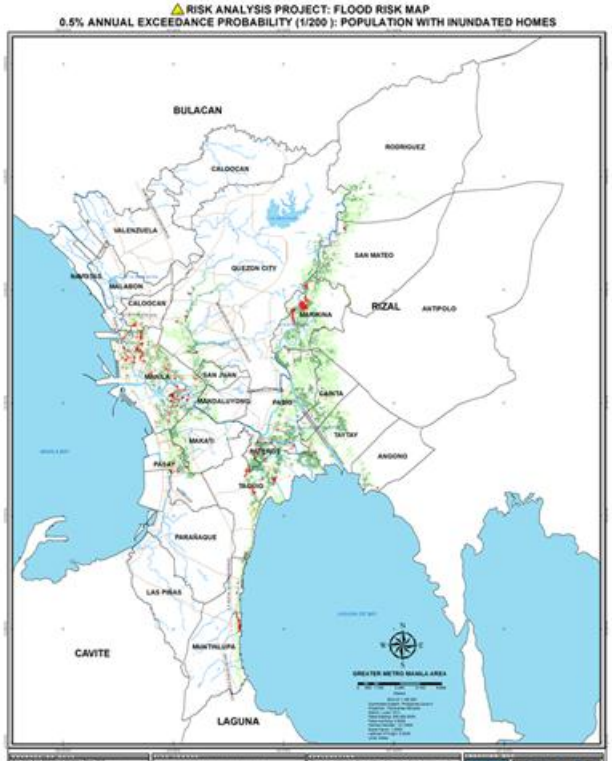


Table 7: Total damages estimated for each of the design flood scenarios, and Typhoon Ondoy

AEP / Damage Metric	1/5	1/10	1/25	1/50	1/100	1/200	*Ondoy*
Building damaged floor area equivalent (ha)	125	193	303	411	538	651	446
Building damage cost (million Pesos)	10682	16299	26431	36713	48596	59064	41097
Number of people with inundated homes (thousand people)	705	967	1349	1665	1958	2164	1756







Drought Monitoring

Simplified version

PAYONG PAGASA

Seasonal Climate Outlook

PAGASA

Issued: January 8, 2015

RAINFALL CONDITION

January to March 2015

Gradual weakening of the Northeast monsoon may begin during the early part of March.

Most parts of the country

WAY BELOW NORMAL
*Greater than 60% reduction from the normal**

to

BELOW NORMAL
20%-60% reduction from the normal

Sorsogon, Masbate, most parts of Central Visayas and Caraga Region

NEAR NORMAL
+20% or -20% from the normal

**Most parts of the country*

April to June 2015

Normal onset of the rainy season is expected during the latter part of May or early part of June.

Most parts of the country
(except areas in Cagayan and Isabela, provinces of Samar, Southern Leyte, Davao Oriental, Agusan del Norte and Surigao)

NEAR NORMAL
+20% or -20% from the normal

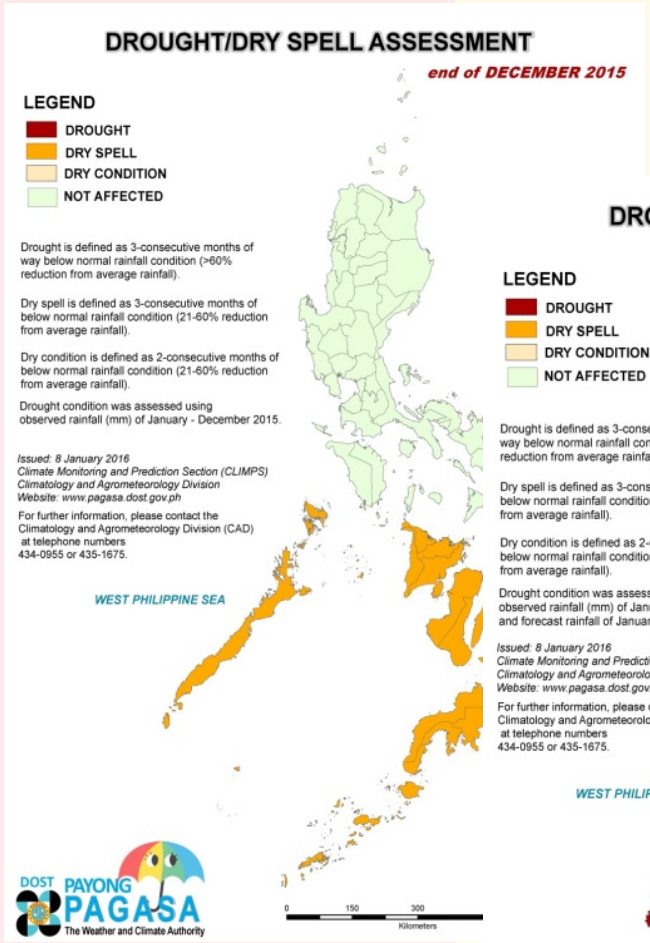
to

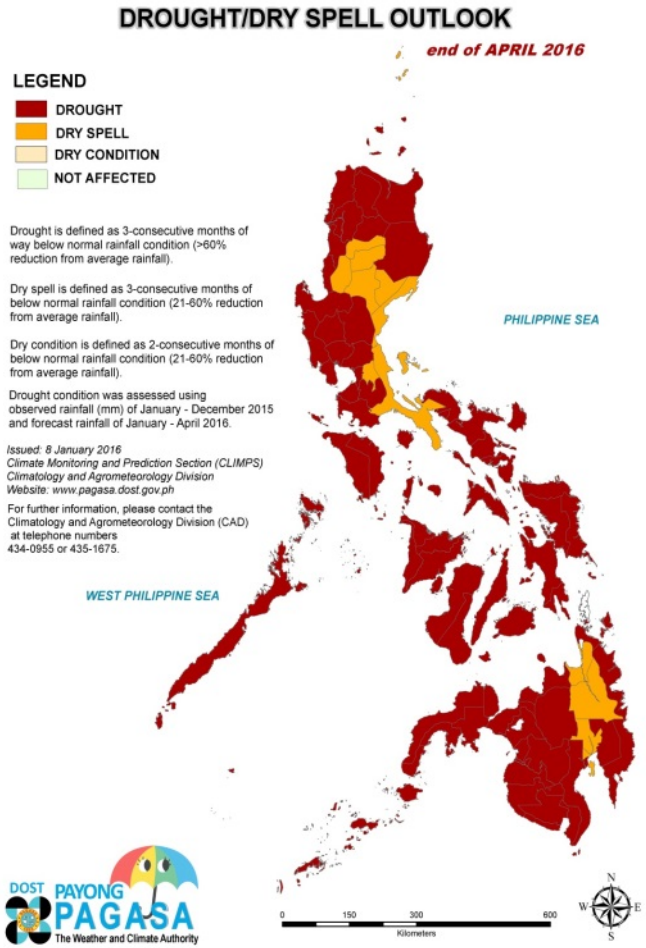
ABOVE NORMAL
120% greater than the normal

**Normal - refers to 30-year average rainfall*

For further information, please contact the Climatology and Agrometeorology Division (CAD) at telephone numbers (02) 434-0955 or (02) 435-1675.

DROUGHT/DRY CONDITION MAPS & ADVISORY





REPUBLIC OF THE PHILIPPINES
Department of Science and Technology
Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)
Science Garden, Agham Road, Diliman, Quezon City 1100

Press Statement
Quezon City, 28 November 2014

DRY CONDITION ADVISORY

PAGASA has been continuously monitoring the possible development of an El Nino event since May 2014. El Niño is characterized by unusually warm sea surface temperatures (SSTs) at the central and eastern equatorial Pacific (CEEP). The established threshold of SST anomaly for an El Niño condition is +0.5°C or higher persisting for five consecutive overlapping three months.

Current status of El Niño Southern Oscillation (ENSO) is still at neutral state. However, since August-September-October season, PAGASA has noted the occurrence of dry condition in some areas of the country as a result of anomalous atmospheric conditions associated with the continuous warming of the SST over the CEEP.

During the month of October and up to the remaining days of November, some parts of the country have experienced drier than normal rainfall conditions particularly over northern Luzon.

With these developments, and considering indications obtained from climate forecast generated from computer models, a general increase in the number of dry days is expected in the coming months. This may lead to possible occurrence of dry spell in some areas affecting irrigation and household water supplies. Dry spell is described as three (3) consecutive months of below normal (41%-80%) rainfall condition.

PAGASA will continue to closely monitor this event and will issue climate outlook in areas where dry spell will likely develop and/or intensify, as appropriate.

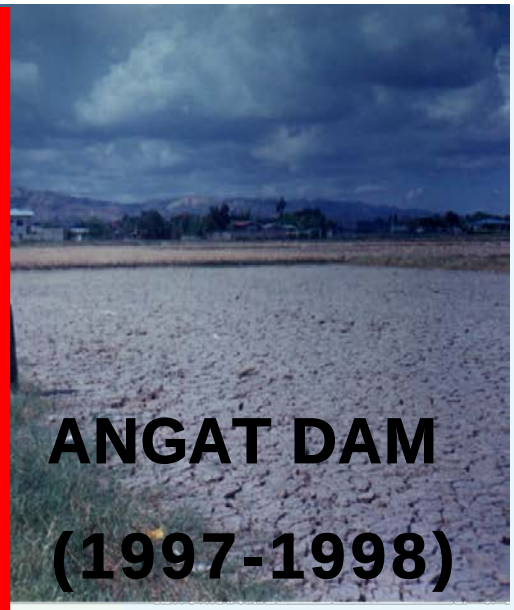
Meanwhile, all concerned government agencies are advised to take precautionary measures to mitigate the potential impacts of this phenomenon and follow PAGASA advisory update as necessary.

VICENTE B. MALANO, PhD
Acting Administrator

"tracking the sky… helping the country"

Postal Address: P.O. Box 3278 Manila Tel No. (63-2) 929-4865 (w/Fax) 434-9040

EL NIÑO
Manifestations



Current Initiatives on Drought Monitoring

- **Specialized Precipitation Index (SPI)**

- **The use of satellite derived indices (NDVI)**

THANK YOU!

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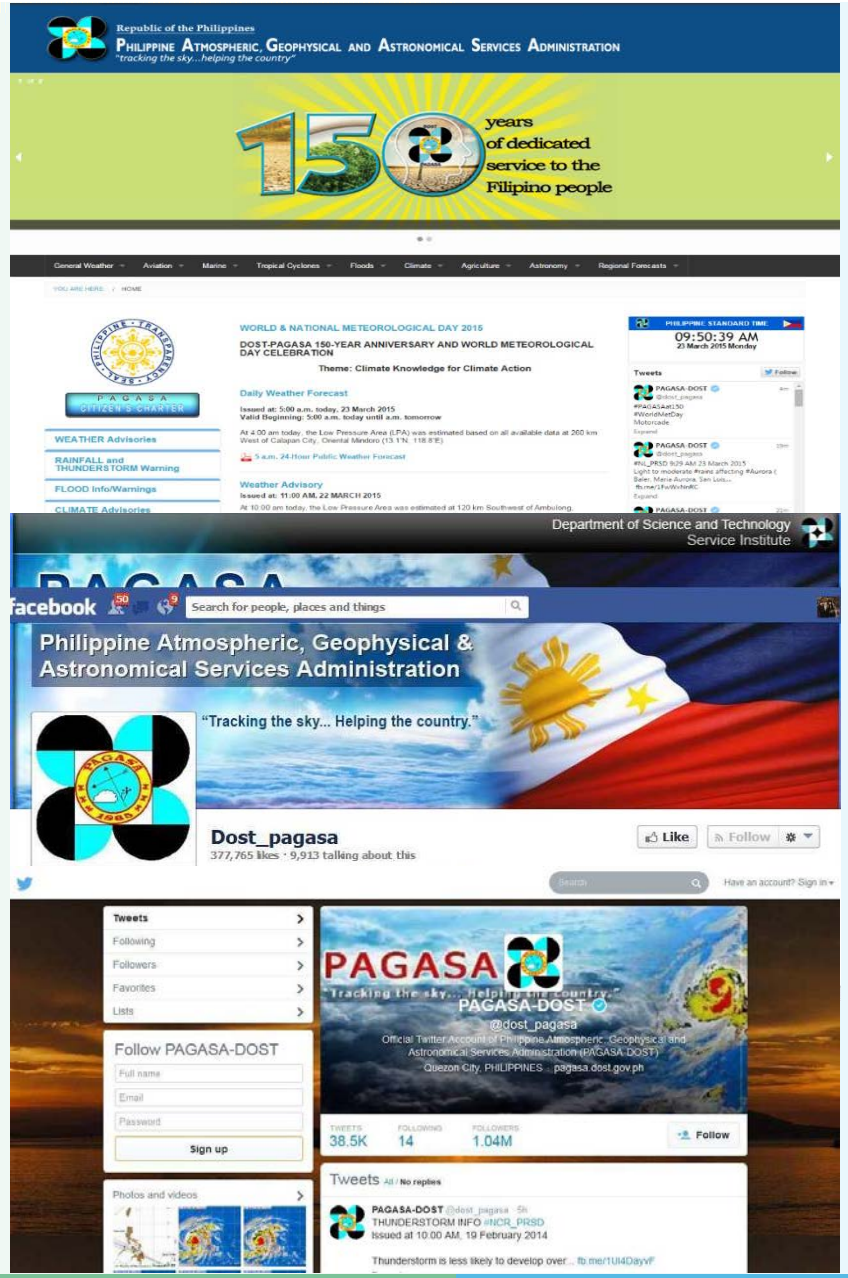
Typhoon	Flood
+632-9271541	+632-9266970
+632-9271335	+632-9204052
Climate	**IEC**
+632-4351675	+632-4342696
+632-4340955	+632-9279308



PAGASA
The Weather and Climate Authority

Payong PAGASA