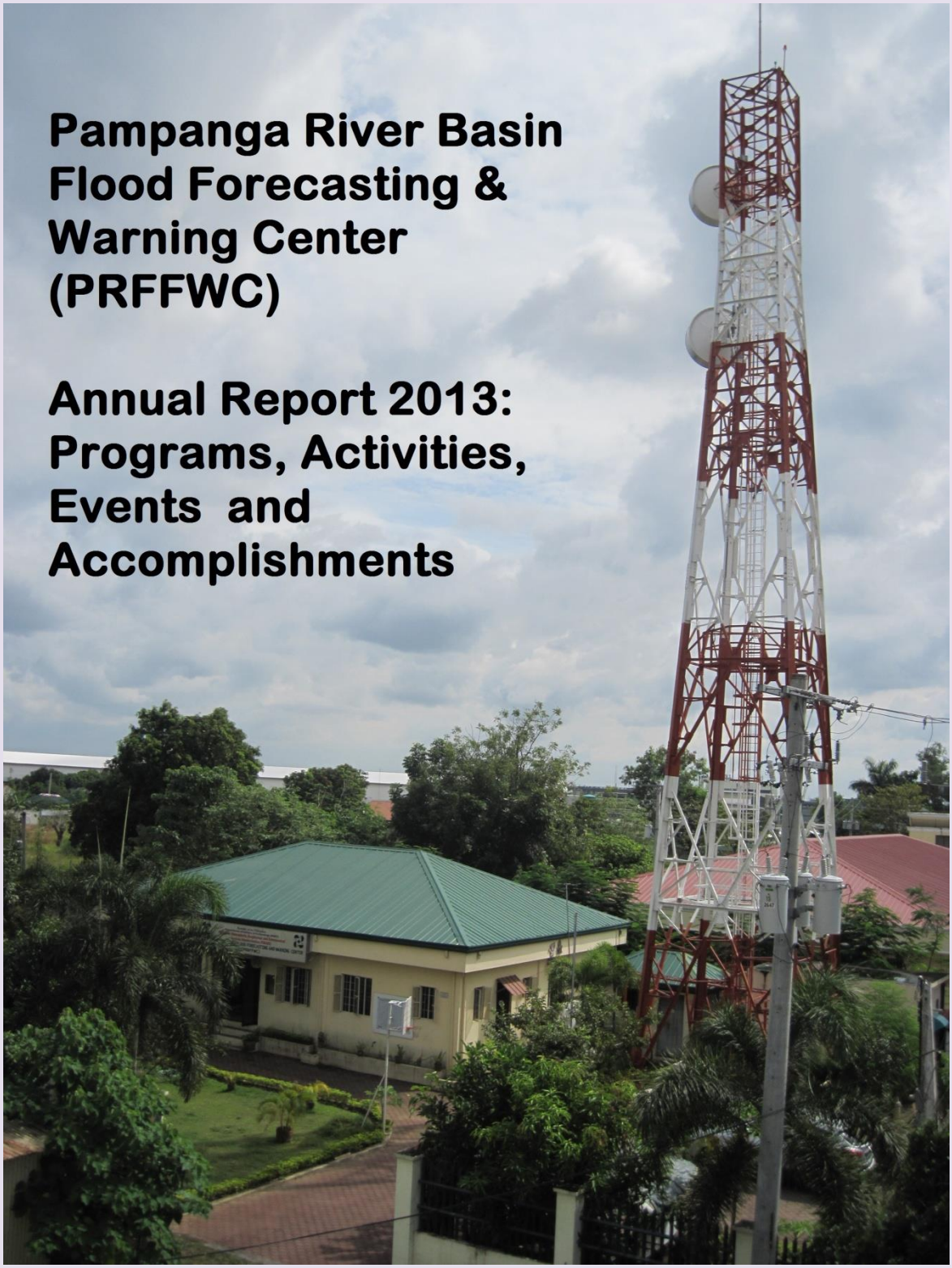

Pampanga River Basin Flood Forecasting & Warning Center (PRFFWC)

Annual Report 2013: Programs, Activities, Events and Accomplishments

Pampanga River Basin Flood Forecasting & Warning Center (PRFFWC)
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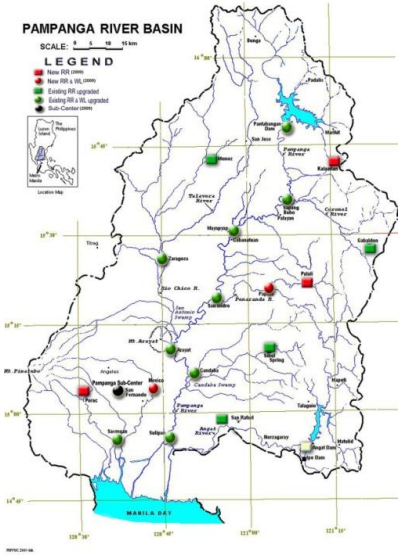
I. Background

The Pampanga River Basin Flood Forecasting and Warning Center (PRFFWC) is the pilot river basin flood forecasting and warning center of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) and has remained as the lead river basin center of the agency. It is responsible in issuing flood related information and warnings (flood advisories and bulletins) to flood-prone communities within the Pampanga River Basin and its allied river system, the Pasac-Guagua River Basin.

PRFFWC started its operations in 1973 and was based in Quezon City. It was relocated to San Fernando, Pampanga in 2009 in view of the need to be much closer to target areas and be able to establish better rapport and close collaboration with concerned communities, local government units, and agencies within the basin. The center has been regarded, most of the time, as the regional office of PAGASA in Region 3 and most of the time called upon for information-presentations and participation in region-wide activities.

(L to R) PRFFWC building frontage; Radio multiplex panels; lobby and conference hall



The PRFFWC system covers the main basin of Pampanga River and the allied river system of Pasac-Guagua covering roughly 10,434 km^2 of catchment area. The system network is composed of several strategically situated unmanned telemetry rainfall (RR) and water level (WL) stations within the basin. At present, there are 17 RR stations and 10 WL stations in all. A manually observed digital rain gauge is also being maintained at the center and complements the system. The telemetry system employs a 7.5 Ghz multiplex microwave (MW) radio frequency (RF) communication equipment and the main link for the network system is located inside the roughly 120 m^2 PRFFW center building in the government center in San Fernando, Pampanga. The center's operations room has six (6) active telemetry monitoring and maintenance computers that are continuously running 24/7 for a year-round operational flood monitoring and warning activities.

The year 2013 marks the 40 years, "Ruby" (1973 to 2013), of operational flood forecasting and warning service in the Philippines and that is in the Pampanga River Basin (PRB)*. Today, other than mainly providing flood forecasts and warnings to its objective area, the PRFFWC has led and complemented the PAGASA in terms of its other activities on community-based flood warning programs and public information drives not only within the PRB but in other areas around the country as well.

* related report: http://prffwc.synthasite.com/resources/PRFFWC%20Historical%20feature.pdf

II. 2013: PRFFWC and a brief of the year that was…

Year 2013 had been a memorable one for the Philippines in terms of disasters as both natural and man-made events made a significant blotch in the country's catastrophic history. Highlights of disaster events included man-made crisis of armed conflict in Zamboanga late in the third quarter of the year; a 7.2 magnitude earthquake that rocked Bohol island in October; and a world record of the strongest land falling tropical cyclone ever yet, Super Typhoon "Yolanda" (Haiyan), that barreled through the central Visayas Region in November 8 and will definitely be a distinct episode in the country's disaster history.

The Pampanga River basin has had its share of disasters as several flood events affected the basin during the year as well though not on a basin wide scale. There were six (6) events covered during the year. Of these six events that were monitored, four somehow made an impact to parts of the basin. Flood warnings in the form of flood bulletins were issued to four of the events while flood advisories were generally provided to the two other events which included the passage of Super Typhoon "Yolanda" (Haiyan).

The center was able to deliver a high-level of public service through its continuous hydrological basin monitoring during the year. The 5-man 24/7 shifting duty of the center was able to provide flood information / warnings in 6 flood events covered and were able to undertake post-flood investigation in one of the said flood events. The year was also quite eventful for the center as numerous presentations and information sharing were conducted within and outside the basin of concern. Public information has continued to occupy a bulk of the center's activities for the year. Several center personnel had also undergone some training and on the other hand had also provided trainings in several occasions. The center has been an active partner by the various DRRMOs, NGOs and NGAs not only within the basin but also within Region 3 and even outside the said region.

This annual report highlights the various programs, events, activities and accomplishments of the center during its operational year 2013. This report is generally dedicated to the communities, LGUs, entities, and related agencies who had been served by the center and has also played a big part in the center's development.

(above) View of the PRFFWC compound area.

III. Operational Activities

1. Flood Monitoring and Warning Activities

There were 6 (combinational) events covered by the center during the year. A total of 8 flood advisories (FAs) and 32 flood bulletins (FBs) were issued for the six events covering the year 2013. Breakdown of FAs and FBs issued per event are given as follows:

Event	Period	FA issued	FB issued
Tropical Storm Gorio (Rumbia)	June 29 - 30	1	2
Typhoon Labuyo (Utor), SW monsoon	August 12 - 14	1	6
SW monsoon enhanced by Tropical Storm Maring (Trami)	August 18 - 27	2	16
Typhoon Santi (Nari)	October 11 - 14	1	8
Typhoon Vinta (Krosa)	October 31	1	
Typhoon Yolanda (Haiyan)	Nov. 8 & 10	2	
	Total	8	32

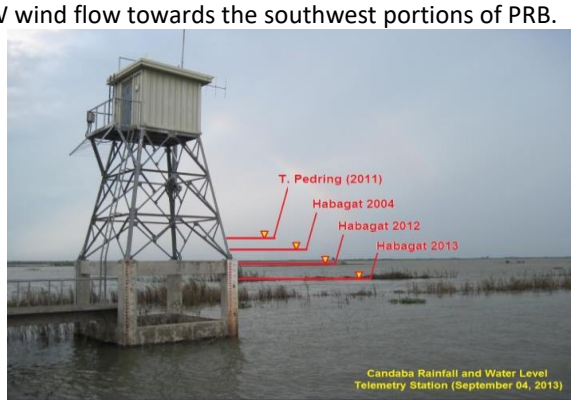
Flood Advisory (FA) is hydrological information in its simplest form. It is basically for flood awareness and

preparedness purposes. It is initialized anytime at start of flood watch period to flood prone areas within a basin, when the rivers and streams are generally likely to be affected by a relatively high streamflow or flooding or flash flooding. FA oftentimes precedes FB unless otherwise the situation warrants that a bulletin should be issued immediately.

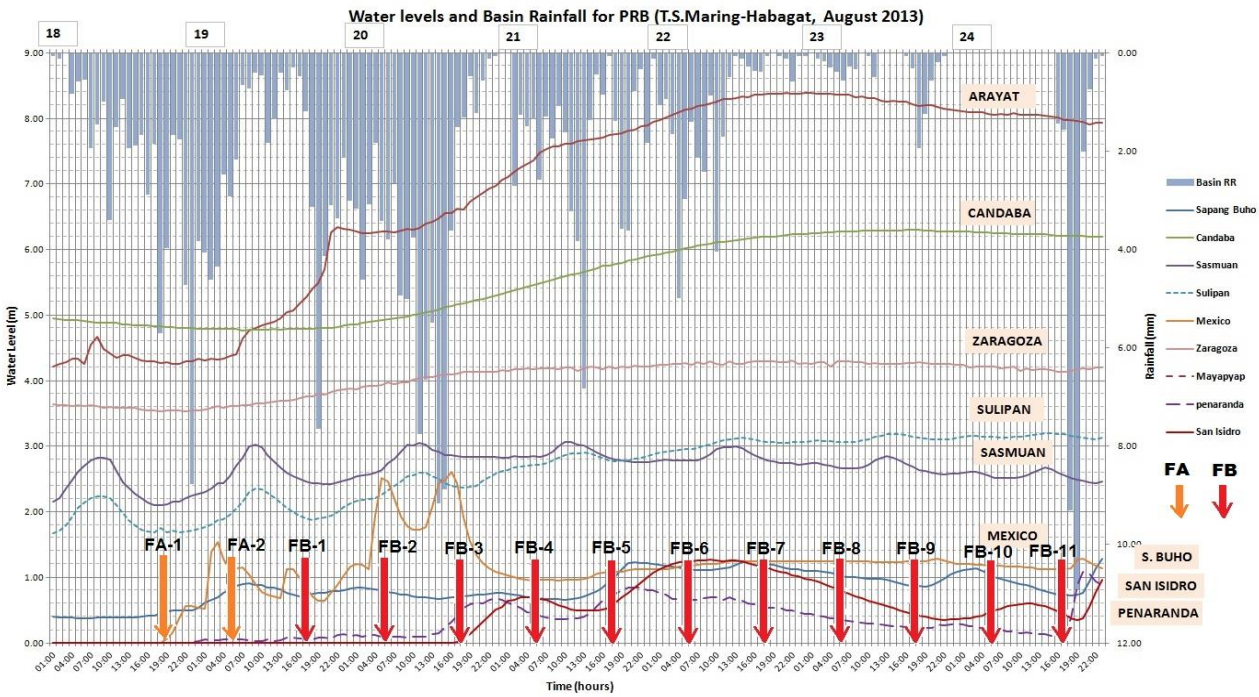
Flood Bulletins (FB) are more specific flood information issued whether or not it is being preceded by a general flood advisory (depending on the situation) during flood watch monitoring period. It can also be initialized anytime and issued at regular intervals by the FFWCs thereafter until being finalized when floodwaters have generally subsided or no significant increases in the present situation is expected further. FB is more near specific as to river level changes at forecasting points, in terms of its rising and falling trends including the possible areas (towns/cities) to be affected. Intermediate issuance can also be made when situations warrants it.

During the year 2013, the first four events that were monitored by the center have affected the PRB either partly or portions of the basin only. Two of the events, Typhoon Labuyo and Tropical Storm Maring, had basin flood episodes mainly from inducing the southwest (SW) monsoon or "Habagat". Labuyo crossed the island of Luzon at north of the PRB while "Maring" did not landfall but rather enhanced the SW wind flow towards the southwest portions of PRB.

Maring caused prolonged flooding at the lower sections of the PRB including the Candaba swamp area. It was also during Maring that the basin issued the most number of FBs for all events covered during the year. Meanwhile, Typhoon Santi crossed the basin across the provinces of Nueva Ecija and Tarlac and did major damage within these said provinces. Santi also caused flash floods along the tributaries Peñaranda River, San Miguel, Bulu and Maasin Rivers. Picture on the right shows maximum stage comparison of four flood events in the Candaba telemetry station.



At the moment, development of simpler flood forecasting and warning models is being explored in the center. Related to this are the analyses of the river cross-sections taken in 2012 which have been partly reviewed and evaluated. Compilation of peak river stages attained during various flood events had also been carried-out for comparison purposes.



Above shows the station hydrographs and basin hyetograph including issuance of FAs and FBs during the flood event T.S. Maring enhanced SW Monsoon or Habagat (August 18 to 24).

Department of Science and Technology
PHILIPPINE ATMOSPHERIC, GEOPHYSICAL AND ASTRONOMICAL SERVICES ADMINISTRATION (PAGASA)
Pampanga River Flood Forecasting and Warning Center, Hydro-Meteorology Division/NCR-PRSD
Brgy.Maimpis, San Fernando, Pampanga (Government Center) http://www.prffwc.webs.com

FLOOD BULLETIN NO. 5 – PAMPANGA RIVER BASIN AND ALLIED RIVERS
ISSUED AT: 5:00 PM, 21 AUGUST 2013
VALID UNTIL THE NEXT ISSUANCE AT 5:00 AM TOMORROW UNLESS THERE IS AN INTERMEDIATE BULLETIN

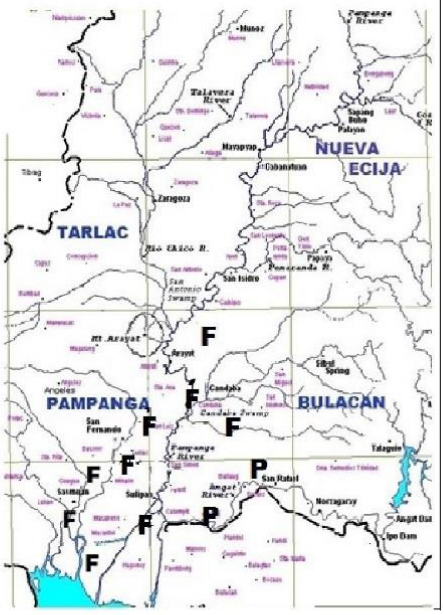
BASIN RAINFALL AS OF 4:00 PM TODAY:
PAST 24-HR = 33.7 MM FORECAST 24-HR = LESS THAN 50 MM

BASIN EXPECTED RESPONSE:

WATER LEVEL STATION (STN)	RIVER/ SWAMP WATER LEVEL (WL) TREND AT STATION	FLOOD SITUATION MESSAGE	PARTICULAR LOW-LYING AREAS
ARAYAT STN., PAMPANGA RIVER	NOW AT 7.71 M / SLOW RISE TO CONTINUE ABOVE 7.0 M (CRITICAL WL IS 8.5 M)	FLOODING TO PERSIST	RIVERSIDE AREAS OF ARAYAT, SAN LUIS, SAN SIMON
CANDABA STN., CANDABA SWAMP	NOW AT 5.75 M / VERY SLOW RISE TO CONTINUE (CRITICAL WL IS 5.0 M)	FLOODING TO PERSIST	CANDABA SWAMP AREA, PORTIONS OF SAN LUIS, SAN SIMON, APALIT
SULIPAN STN., PAMPANGA RIVER	NOW AT 2.83 M / SLOW RISE BUT TO REMAIN BELOW THE 3.60 M ALERT WL	FLOODING TO PERSIST	APALIT, CALUMPIT, HAGONOY
MEXICO STN., ABACAN RIVER	NOW AT 1.07 M / TO FLUCTUATE BELOW 3.0 M	FLOODING TO PERSIST	MEXICO, SAN FERNANDO,STA.ANA,STO. TOMAS, MINALIN
SASMUAN STN., GUAGUA RIVER	NOW AT 2.87 M / TO FLUCTUATE SLOWLY BELOW THE 3.2 M LEVEL (TIDE INFLUENCED)	FLOODING TO PERSIST FOR SEVERAL DAYS	SASMUAN, LUBAO, GUAGUA
ANGAT RIVER		FLOODING IS POSSIBLE	RIVERSIDE AREAS OF BUSTOS, BALIUAG, PLARIDEL, PULILAN, CALUMPIT, HAGONOY
COASTAL FLOODING IN THE LOW-LYING AREAS (TIDE INFLUENCED AREAS)			HAGONOY, PAOMBONG, MACABEBE, MASANTOL

THE RESIDENTS AND THE LOCAL DISASTER RISK REDUCTION & MANAGEMENT COUNCILS (LDRRMCs) CONCERNED ARE ADVISED TO TAKE APPROPRIATE ACTIONS.

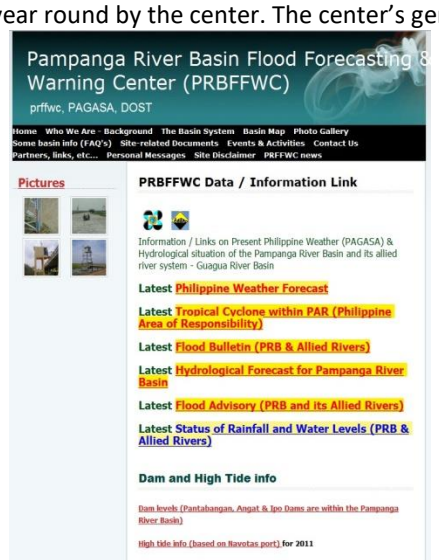
EXPECTED FLOOD SITUATION: P =POSSIBLE T =THREATENING O =OCCUR F =PERSIST

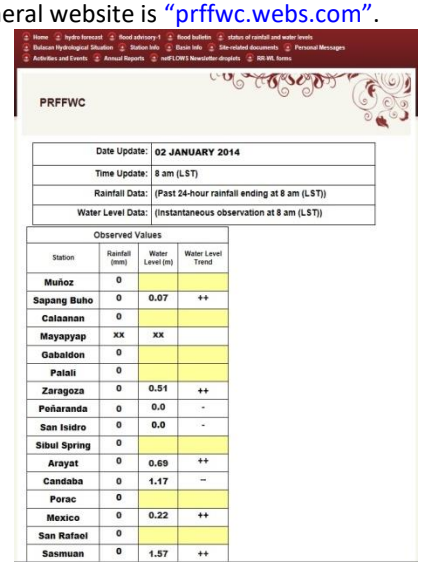


HTH / RPY / JRD / RFD

A sample flood bulletin issued during the SW monsoon enhanced by Tropical Storm Maring event as shown above.

All advisories and bulletins, once produced, are immediately sent thru fax to the local disaster risk reduction and management offices (DRRMOs) – National (NDRRMO), Regional (RDRRMO), and Provincial (PDRRMOs) within the basin. It also shares its information to the HMD and to the NCR-PRSD of PAGASA. Info sharing is sustained by uploading the said information in the center's maintained website. Further, information are shared thru e-mails and uploaded thru social media accounts – Facebook and Twitter. Regular updates on the daily status of RR and WL data have been a much sought after information by many of the LGUs within the basin. The website is updated daily whole year round by the center. The center's general website is "prffwc.webs.com".





Far right shows a part of the main page which links to the main PAGASA website and other meteorological and hydrological info-related sites. Right picture shows a part of the daily generated and updated RR and WL status of all stations within the basin. This status page, at times when information is provided, includes the past 24-hour RR observation at the Cabanatuan synoptic station.

2. Data Maintenance and Analysis

Typhoon Santi crossed the province of Nueva Ecija in the 2nd week of October and created problems in the PRFFW telemetry system, in particular affecting the antenna of the Cabanatuan repeater station and toppling down the

telemetry antenna pole of Mayapyap station. Prior to this event, Mayapyap station already had problems with its WL observations due to station vandalism. These problems produced considerable data downtimes during the year.

A total of 140,438 station-hours of rainfall data and 80,705 station-hours of water level data were received during the year. Downtimes for rainfall observations were at 8,482 station-hours or 5.7%, an increase of more than 5% from last year. Water level downtimes were at 6,895 station-hours or 7.9%, an increase of more than 6% compared to last year. There were higher downtimes for water level which can be attributed to Mayapyap water level station having no observations for almost half of the year. Hydrological data received at the center is also available at the MOC-HMD in WFFC in Diliman, Quezon City. Quality-control of dataset and working-out data gaps (downtimes) is continuously being undertaken by the center. Rainfall observations at the center using a digital-read tipping-bucket type gauge had been made possible through the center's initiatives. This data is not available in the WFFC-HMD operations center.

Summary stats for RR and WL stations within the basin are as follows:
PRB Rainfall Stations

Station	Total RR for the year (mm)	Maximum 24-hr RR (mm) Met day	Date of 24-hr Max RR (Met day)	Number of RR days	Maximum 1-hr RR (mm)
Muñoz	1,796	102	August 11	111	67
Sapang Buho	1,453	107	October 11	109	43
Gabaldon	2,925	249	October 11	151	42
Zaragoza	1,738	94	August 24	110	55
Mayapyap	(1,311)*	(103)*	(August 11)*	(92)*	(62)*
Peñaranda	1,944	178	October 11	132	59
Calaanan	1,840	162	August 11	117	41
Palali	2,256	166	October 11	131	54
San Isidro	1,581	140	October 11	116	60
Arayat	1,763	221	October 11	117	90
Candaba	1,440	118	October 11	117	52
Sibul Spring	2,597	216	October 11	147	66
Sasmuan	2,170	233	August 18	109	33
Sulipan	1,847	133	August 20	121	43
Mexico	1,624	109	August 20	115	45
Porac	2,325	227	August 18	125	67
San Rafael	1,968	122	October 11	129	61
San Fernando	1,661	105.9	October 11	141	**

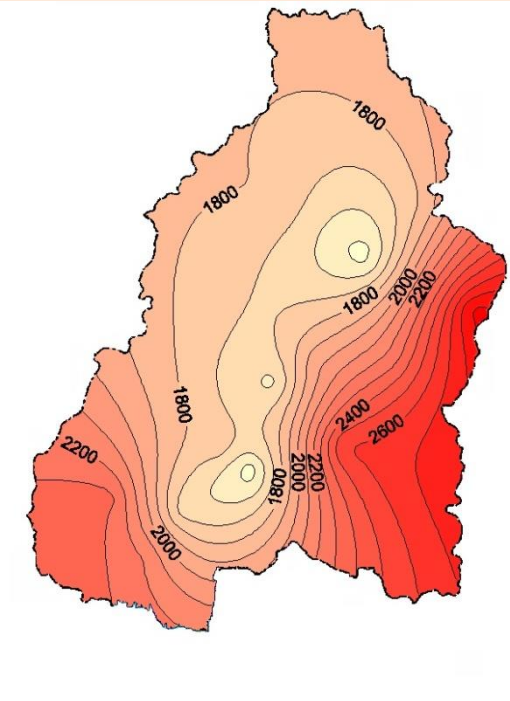
*(many data gaps); ** n/a
PRB Water Level Stations

Staion	Max WL for the year (meters)	Time / Day of Max WL	Remarks
Sapang Buho	5.26	0700H / October 12	Typhoon Santi
Zaragoza	4.32	2000H / August 14	Typhoon Labuyo – SW Monsoon
Mayapyap	**	**	WL sensor out of order: 2300H / July 19
Peñaranda	6.69	0400H / October 12	Typhoon Santi
San Isidro	6.57	0800H / October 12	Typhoon Santi
Arayat	8.78	0600H / October 13	Typhoon Santi
Candaba	6.48	2000H / October 13	Typhoon Santi
Sasmuan	3.06	1000H / August 21	T.S. Maring enhanced SW Monsoon
Sulipan	3.26	0600H / August 25	T.S. Maring enhanced SW Monsoon
Mexico	3.11	0500H / October 12	Typhoon Santi

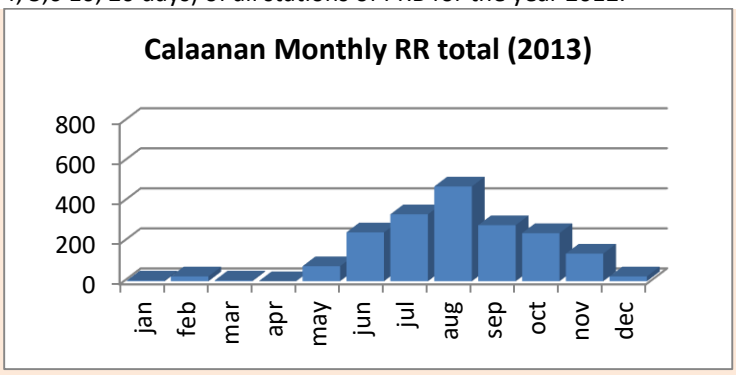
The continuing activity of updating the center's database had the following activities worked-out on the telemetered rainfall (RR) and water level (WL) observations:

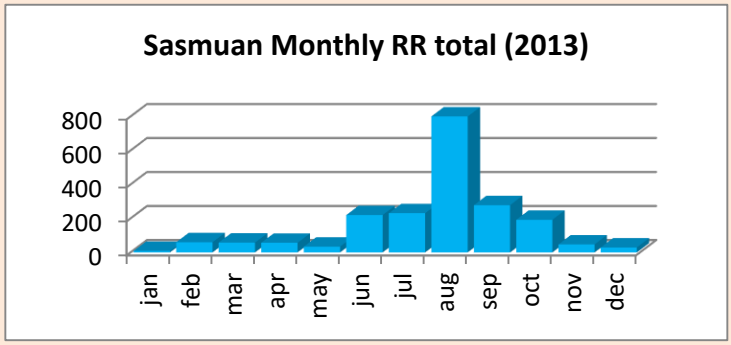
- Encoded and fill-in data gaps and did some quality control on some 1,215 station-hours of RR data and about 1,005 station-hours of WL data (estimates only); fill-in on WL data gaps employed a simple eye-fit method or simple linear fit, that is, for short duration gaps only; as for fill-ins for RR data gaps, simple distribution on the missing hours were done based on available accumulated total which is the only possible alternative at the moment. All fill-in data are colored red in the center's monthly data excel form.

- Processed center database as to total for the year (available data only); maximum 24-hr (meteorological day), date of maximum 24-hr RR, number of RR days, etc.
- Encoded and processed 12 station-months of RR data for San Fernando Station; processed information from the encoded data which includes monthly RR, maximum 24-hour RR, day of occurrence of maximum 24-hour RR, and the number of RR days for each month.
- Encoded 2 station-months of manually observed water level data by part-time observer in the Zaragoza streamgauging station in Nueva Ecija. (Months of February and March 2013 were only received)
- Determined, based on a 1-hour sliding time period, the maximum rainfall totals for various durations (2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 18, 24 hours; 2, 3, 4, 5,6 10, 20 days) of all stations of PRB for the year 2012.



PRB Annual Rainfall Distribution for 2013





Sample of monthly RR totals for Calaanan (Northeast side most station) and Sasmuan (Southwest side most station) in the PRB

3. Telemetry Systems and Station Physical Maintenance:

Systems and station problems encountered during year included the usual vandalism / theft of telemetry cables and its extended parts, damaged and disoriented antenna poles due to the strong winds brought by Typhoon Santi. Mayapyap station had the most number of station-hours downtimes during the year and has yet to be rehabilitated. Water level observations of Mayapyap station ceased on the evening of July 19. Telemetry cables and other outside the station extended parts were also reportedly missing from possible theft. Quite a number of the upper Pampanga River basin stations had occasional downtimes after the passage of Santi.

There were no physical maintenance of telemetry station housings and its surroundings including streamgauging sites undertaken by the center during the year. Lack of manpower and no available vehicle still hounds the center. However, minor preventive maintenance and some major repair of center facilities and construction works were carried-out during the period. Construction of an outside toilet/bath room area within the center compound was completed during the year. This additional service facility will supplement the present single comfort room of the center. The construction of the service facility was taken from the honorariums received as resource person during most of the presentations / lectures provided by the center personnel in various occasions.

The PRFFW network system is mainly maintained by the HMTSS-HMD (Hydromet Telecom Services Section of the Hydromet Division). The PRFFWC assigned telemetry technician participated and provided support on several occasions in the telemetry systems and station maintenance of the HMTS during the year. Only 3 maintenance trips

were carried-out and supported by the center during the year as follows: March 4 to 11, July 11 to 17 and on October 24 to 31.

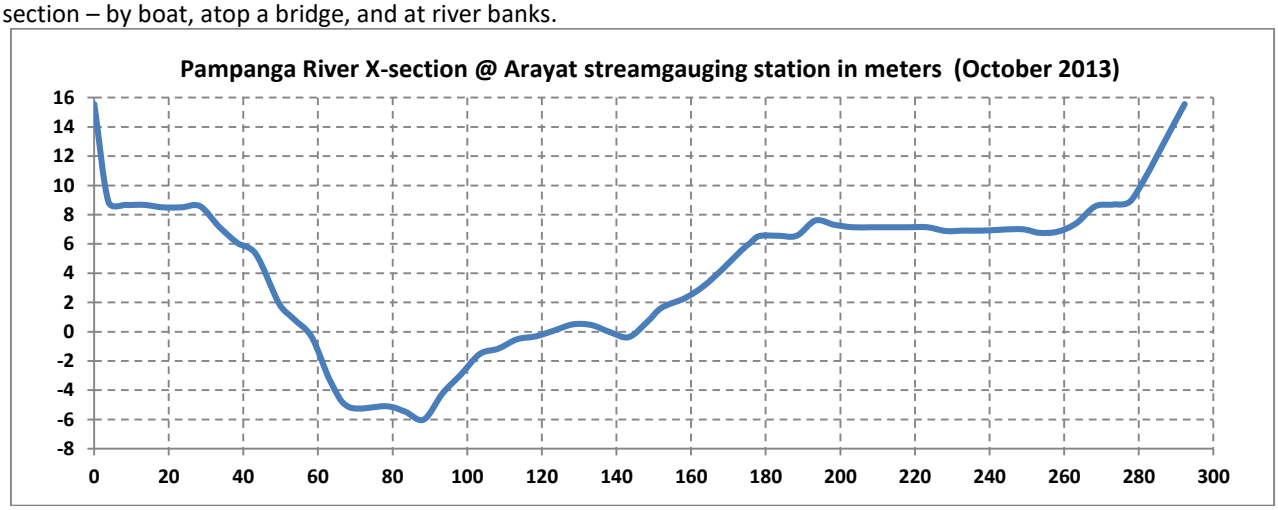
Telemetry system and station's physical maintenance are important and necessary regular activities in the continued operational function of an FFWS services.

4. Streamgaging and hydrological related activities

Streamgaging and hydrological activities are part of the responsibilities of a river basin center. These include river cross-sectioning, river discharge measurements, update of elevation of zero level of staff gauges, post-flood surveys, , flood extent mapping, etc. A river cross-section condition is very dynamic and constantly changing, hence, should be surveyed at least once every year or after a significant flood event has occurred. Discharge measurements, on the other hand, are also relatively important in updating the assessment flood levels and for flood modeling purposes. These activities are regular basic activities required in the improvement and the enhancement of flood forecasting and warning operational activities of every river center.

River cross-sectioning and discharge measurement activity set were undertaken at one station, at Arayat streamgauging station last October 16 to 24, as part of the Hydrologist Training Course (HTC) field orientation and practical engagement program. This activity was in part a coordinated activity with PAGASA training division and with some of the FFWS-HMD staff. Two of the center's personnel were on hand to give direct lectures and hands-on training to the 32 trainees of the said course. The trainees were oriented to four methods of measuring river velocity and were shown practical approaches of carrying-out hydrographic works during flood events.

HTC trainees were subjected to several methods and means of taking river velocity measurements and river cross-section – by boat, atop a bridge, and at river banks.

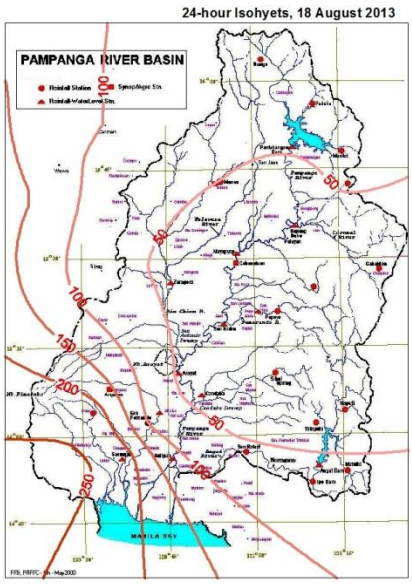


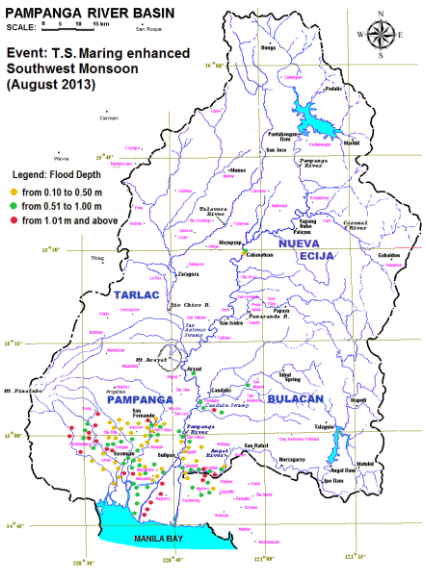
Pampanga River cross-section at Arayat streamgauging station taken by the HTC trainees last October.

The center provided assistance to the ICHARM (International Center for Water Hazard and Risk Management, under auspices of UNESCO) study team from Tsukuba, Japan in their project "SOUSEI", particularly field survey of river systems within the PRB and data/info collection at different provincial and regional agencies of Region 3 (June 17 to 21). Picture on left shows the team being oriented in the PRFFW Center.

The center had also assisted the Department of Science and Technology (DOST) region 3 in the hydrological assessment and identification of locations for setting-up of automatic rain gauges (ARGs) and water level monitoring sensors (WLMS) within the basin (March 25-26).

Only one post-flood survey was carried-out during the year. A limited three-day (September 04 to 06) trip was carried out in selected areas only several days after T.S. Maring enhanced Southwest monsoon affected areas within the PRB. There were no actual on-site flood situation surveys carried-out during events affecting the basin. Actual on-site surveys, while the area is still flooded, are necessary for validating forecasts, warnings and flood extent. The center still has no service vehicle and has limited personnel, therefore, is hindered to carry-out such activities on time. A draft of the post-flood report for the said event can be downloaded at http://prffwc.synthasite.com/site-related-documents.php.

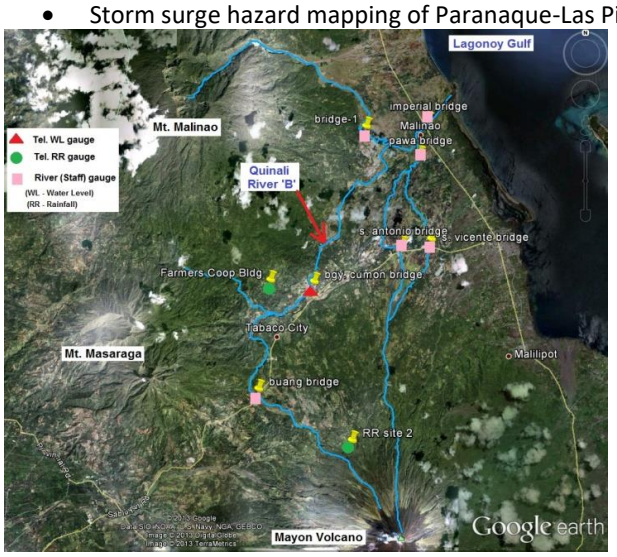


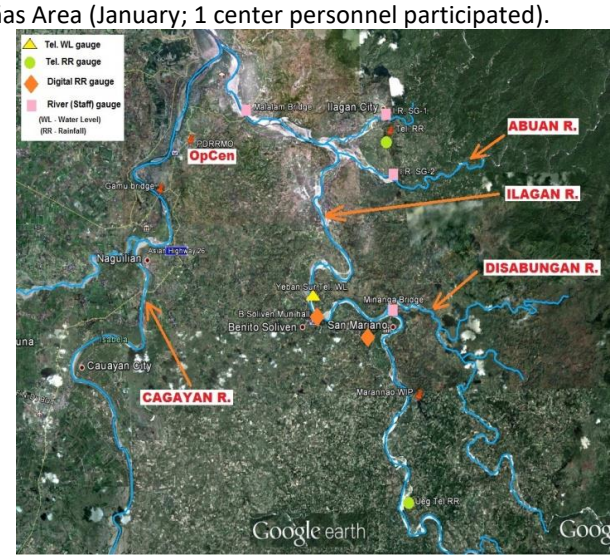


(left to right) Dried grasses cling to the staff gauge and water level sensor steel support of Mexico streamgauging station more than a week after T.S. Maring enhanced SW monsoon affected the area. The 24-hour isohyetal map for 18 August and the estimated event point flood map of the basin (T.S. Maring enhanced SW Monsoon flood event).

The center has also been active in other outside the basin streamgaging / hydrological surveys mostly those related to the establishment of local flood early warning systems (LFEWS) and storm surge hazard mappings with GIZ-DRM (German Society for International Cooperation) and the UNDP-READY projects, respectively. These programs are mainly related to disaster risk reduction and management (DRRM) activities. Some activities included as follows:

- Storm surge hazard mapping of Paranaque-Las Piñas Area (January; 1 center personnel participated).





Proposed LFEWS set-up maps for Malinao-Quinali Rivers in Albay (left) and Ilagan River in Isabela (right) are some of the outputs of the center's involvement in setting-up LFEWS outside the PRB.

- Hydrological survey of the Sta. Maria River Basin system in Bulacan in connection with the setting-up of LFEWS through the GMMA-READY program (February 7-10; 3 center personnel involved).
- Hydrological survey / study of Bucayao-Mag-Asawang Tubig Rivers in Oriental Mindoro in 2 occasions in connection with the setting-up of LFEWS for the said area (February 18-19 and April 15-16; 1 center personnel involved).
- Hydrological survey / study of the Cadacan (Sorsogon) and Quinali 'B' (Albay) Rivers in connection with the setting-up of LFEWS in the area (March 13-14; 1 center personnel involved).
- Hydrological survey / study of the Pinacanauan de Ilagan River downstream watershed in Ilagan, Isabela in connection with the setting-up of LFEWS for the said area (April 29-30; 1 center personnel involved).
- Conducted Storm Surge Survey in the Province of Bulacan and adjacent areas as per GMMA-READY project (May 08-19 and June 24-July 04; 1 center personnel participated)
- Storm surge hazard mapping validation survey of the Province of Cavite as per GMMA-READY project (August 12-22; 1 center personnel participated)

IV. Public Information, Data / Info provision, Trainings and other related Center Functions

1. Presentations and lectures in various events, occasions and functions

Public information has continued to occupy a bulk of the center's activity for the year 2013. The center is strategically situated in the regional center of Region 3 and hence has been a point of requests and invitations for most of the PAGASA-related information. All requests and invitations for presentations and lectures either as a resource person or as a particular topic speaker / lecturer were 100% accommodated by center. This included requests from various entities (LGUs, NGAs, NGOs, academe, etc.) within and outside the basin.

About 5,168 persons from various LGUs, institutions, organizations, agencies and similar entities were provided with presentations and lectures covering a whole range of topics that included the usual presentations on "Tropical Cyclone / Flood Hazards Awareness and Mitigation", "Flood Early Warning Systems" and other subjects such as "Hydroinformatics and Data generation". This covered more than 60 events / occasions for the whole year.

Following is the list of topics presented / lectured on events and occasions during year 2013:

- "Climate Projection and Present Condition of the PRB" in the Provincial Disaster Risk Reduction & Management Consultation of the Humanitarian Response Consortium (HRC) led by Peoples Disaster Risk Response Network (PDRRN) in partnership with Department of Interior and Local Government, Reg. 3, and PDRRMO-Pampanga. (January 25; Pampanga Provincial Capital; around 70 persons attended)

- "Rainfall Distribution in the Pampanga River Basin" to a center visit by a group from Holy Angel University (HAU) in Angeles, Pampanga (January 31; 7 students and 2 faculty advisers)
- "School Hydrological Information Network (SHINe) Orientation" to several elementary and secondary students within the towns of Calumpit and Hagonoy in coordination with PDRRMO-Bulacan and the NGO Save the Children as part of the latter's AUSAid program entitled "Enhancing Community Resilience to Disasters in Bulacan (ENCORE)" as follows:
    - February 8 – Sta. Lucia H.S., Sta. Monica H.S., and Frances H.S. (60 students and 6 teachers)
    - February 12 – F. Mendoza E.S., Frances E.S., and A. Santos E.S. (60 students and 6 teachers)
    - February 13 – Hagonoy East Central E.S., San Agustin E.S., and Sta. Monica E.S. (60 students and 6 teachers)

In connection with this activity, the PRFFWC provided 8 manual rain gauges (which were personally donated by SMART communications to the center as per previous undertakings) to Save the Children and PDRRMO-Bulacan for installation at 8 of the schools that were provided with SHINe orientation.

- "Community-based Flood Early Warning System (Trends, Opportunities and Challenges)" in the 8th Philippine Meteorological-Hydrological Convention by the Philippine Meteorological Society. (February 21; OSH Ctr., Q.C.; around 80 persons attended)

- "Kaalaman at Mga Pamamaraan sa mga Panganib na dala ng Bagyo at Baha" in the Disaster Risk Management Workshop sponsored by Philippine Normal University in cooperation with CDAP, UniFELD, FCED and GIZ for Barangay 843, Zone 92, District 6, Pandacan, Manila. (April 27; Barangay Basketball Court)
- "Hydromet hazards awareness & mitigation" and "The PRB and PRFFWC" to DOST Region 3 staff and Provincial Science & Technology Officers of the 7 provinces of Reg. 3. (May 10; Conference room DOST-3; 20 persons attended including the DOST-3 Regional Director and Asst. Regional Director)
- "Flood: Early Warning System" and "Understanding Hydrological Hazards" in the dry-run activities of the DILG-3 Training for LGUs under the program Understanding Multi-hazard Maps, their Usage and Application to Development Planning. (May 23; Calumpit, Bulacan, 30 LGU personnel)
- "Early Warning System" and "Flood Hazard Awareness and Mitigation" in the DILG-3 program on Training for LGUs on Understanding Multi-Hazard Maps their Usage and Application in Local Development Planning" as follows:
    - June 05 – Norcor Bldg., Calumpit; 43 barangays in Bulacan; 121 barangay & municipal officials attended
    - June 06 – Norcor Bldg., Calumpit; 48 barangays in Bulacan; 135 barangay & municipal officials attended
    - June 10 – Heroes hall, CSFP; 60 barangays in Pampanga; 142 barangay & municipal officials attended
    - June 11 – Heroes hall, CSFP, 64 barangays in Pampanga; 141 barangay & municipal officials attended
    - June 13 – Heroes hall, CSFP, 63 barangays in Pampanga; 155 barangay & municipal officials attended
    - June 14 – Heroes hall, CSFP, 110 barangay and municipal officials from Bataan and Tarlac Provinces attended
    - June 17 – Heroes Hall, CSFP, 124 barangay and municipal officials from the province of Nueva Ecija attended
    - July 10 – Angeles City, 35 LGU officers coming from various towns in the region attended
- "The PRB and PRFFWC" orientation to a visiting JICA group (Mr. Nakamura and Mr. Kusakabe) to the sub-center. (June 13)
- "Climate Outlook" in the following occasions:
    - June 17 - Bulacan PDRRMC meeting in preparation for the onset of the rainy season. (Hiyas Convention, Bulacan; 120 council members attended)
    - June 25 – RDRRMC-3 press conference and meeting in preparation for the onset of rainy season (OCD-3 conference room; 100 members of various council agencies & media attended)
- "Flood Hazard Awareness and Mitigation / Climate Change Impacts" in the people's forum on DRRM and Preparedness organized by the Angeles City DRRMO. (July 18; Angeles City; around 300 persons mostly from communities living along the Abacan River attended the forum)
- "SHINe orientation/workshop" in coordination with Save the Children and PDRRMO-Bulacan, for 2 Hagonoy schools, Ramona Trillana National High School and Hagonoy West Central Elementary school. (August 16; Calumpit; 50 students and 4 teachers participated)
- "SHINe orientation/workshop" as a replication program in coordination with DILG GO-FAR project, the Municipality of Baggao, Cagayan and PDRRMO-Bulacan for 7 secondary and 4 elementary schools of the Municipality of Baggao. (August 20; 110 students and 11 teachers participated)

- "The PRB and PRBFFWC" orientation to visiting NWRB and Korean organizations KICT & GEO representatives. (August 30; one representative each from NWRB, KICT & GEO)
- Briefing on :Storm surge hazard maps" in connection with the READY project as follows:
    - August 7-8 for participants of Ilocos Sur and Ilocos Norte Provinces
    - September 17-20 for participants of Nueva Vizcaya, Quirino, Isabela and Cagayan Provinces
    - October 3-4 for participants of Iloilo and Antique Provinces
    - December 10 for Virac, Catanduanes area
- "Streamgauging issues" to the Hydrologist Training Course 2013 (September 2-3; 32 trainees)
- "Hydromet Hazards Awareness and Mitigation / Climate Change" in the Symposium on Understanding Typhoon organized by the Claro M Recto ITC High School and the Angeles City DRRMO (September 13; CMRICTHS auditorium; Angeles City; 150 grade 8 students attended)
- "Climate Outlook for Central Luzon and Early Warning System" in the Central Luzon's Summit on DRRM for Local Chief Executives (September 23-24; Heroes Hall mini convention, CSFP; more than 250 LCEs and DRRMO officers attended)
- "Hydroinformatics and Data Generation" in the Cross-Visit Workshop of Personnel of LFEWS areas supported by GIZ as follows:
    - September 18; 19 participants from various GIZ supported LFEWS areas in the Philippines attended the occasion
    - October 24; 13 participants from various GIZ supported LFEWS areas in the Philippines attended the occasion

- "Hydromet Hazards Awareness and Mitigation" in the Contingency Planning and ICS workshop of the Norzagaray MDRRMC (September 30; Norzagaray; 40 MDRRMC personnel attended)
- "Effects of Typhoon Santi" in the emergency meeting called for by Gov. Pineda and PDRRM council of Pampanga (October 14, Provincial Capitol, 150 DRRM officers attended)
- "Hydrographic / Hydrologic Works and Activities" to the Hydrologist Training Course 2013 on the subject matter on Streamgauging (November 4-5, PAGASA Training Room, 32 participants)
- "School Hydrological Information Network SHINe Updates" in the revisits to various schools within the Province of Bulacan (total of 495 students & teachers from 12 schools) as follows:
    - November 11 - JJRHS, San Miguel; 38 students & teachers
    - November 12 - Norzagaray and Tibagan HS; 42 & 43 students & teachers, respectively
    - November 13 - Binagbag HS; 41 students & teachers / SRNTS; 47 students & teachers
    - November 14 - Taboc HS; 42 students & teachers
    - November 15 - SJDMNHS; 42 students & teachers / F.Halili HS; 45 students & teachers
    - November 18 - DRTHS; 46 students & teachers / Akle HS; 46 students & teachers
    - November 19 - Vedasto HS; 36 students & teachers / Sta. Lucia HS; 27 students & teachers
- "Early Warning System and Understanding Hydromet Hazards" to barangay officials of 4 towns of Bulacan and 5 towns of Pampanga as initiated by DILG-3. (about 269 barangay officials attended the event) as follows:
    - November 12; 51 barangay officials from Baliuag and San Ildefonso (Bulacan)
    - November 13; 62 barangay officials from Bustos and San Miguel (Bulacan)
    - November 14; 100 barangay officials from Guagua and San Fernando City (Pampanga)
    - November 15; 56 barangay officials from Candaba, Arayat and Porac (Pampanga)
- "Flood Events in the PRB" as presented in the meeting on Rehab Plan for Region 3 to Central Luzon Bloc Congressmen. (November 20; Batasan Complex; 2 center personnel attended; more than 30 persons, including 8 congressmen, were present during the briefing)

- "SHINe updates" in 4th SHINe Annual Conference in Bulacan together with various activity partners, PDRRMO-Bulacan, Save the Children, DepEd-Bulacan, etc. (November 29; Club Royale, Malolos; 150 students and teachers from about 16 elementary and secondary schools within the Province participated)
  (related link: www.bulacanshine.webs.com)
- "Understanding Climate & Weather in the Philippines" in the Climate Change Consciousness Week Celebration of the Baliuag University as part of their Green Talk Series Program (November 27; Baliuag University; more than 70 students and teachers attended)

- "Early Warning Systems and Hydromet Hazards Awareness and Mitigation" in the DILG-3 workshop / training entitled "Levelling-Up Community-based Disaster Risk Reduction and Management" at Oxford Hotel, Clark Freeport Zone to newly-elected and re-elected barangay officials in various areas within the region as follows:
  - December 04 - La Paz, Concepcion & Victoria in Tarlac; Dinalupihan and Hermosa in Bataan; 77 barangay officials attended
  - December 05 - Cabiao, Zaragoza, San Isidro, Licab, Jaen, San Antonio & Aliaga in Nueva Ecija; 118 barangay officials attended
  - December 10 - Mexico, Sasmuan, Minalin, San Luis & Masantol in Pampanga; 165 barangay officials attended
  - December 11 - Arayat, Lubao, Sta. Ana & San Simon in Pampanga; 187 barangay officials attended
  - December 12 - Bocaue, Calumpit & Hagonoy in Bulacan; 148 barangay officials attended
  - December 13 - Obando, Marilao, Paombong, Meycauayan, Bulakan, Pulilan, Balagtas & Malolos in Bulacan; 153 barangay officials attended
  - December 16 - Apalit, Candaba, Guagua, Macabebe & Magalang in Pampanga; 202 barangay officials attended

- "Storm Surge issues" in the Media Seminar / Forum as follows:
  - December 6-8 conducted by PAGASA at Subic, Zambales
  - December 17 conducted by STII and PCIERD at La Breza Hotel
- "Hydromet Hazards Awareness and the Science of Climate Change" in the DILG-3 activity on Local Climate Change Action Plan formulation workshop. (December 10; Oxford Hotel, Clark Freeport Zone; 55 participants from various LGUs of the 12 component cities and Provincial officials in Region 3 attended)

2. Public information through Radio, TV and Newsprint interviews

The center has been in the forefront, and committed, in providing always its latest information on flood information with regards to situations of Pampanga River basin to the concerned public. It actively supported the various media practitioners in the region not only during times of disasters (flood events) but also during normal weather and hydrological conditions in the basin. Radio and TV station interviews and talk show programs have been a normal part of the center's "end to end" public information drive.

- Radio guest interviews at the following programs:
  - July 02 - On Flood disaster awareness and mitigation during the PDRRMC-Bulacan hour at Radyo Bulacan 95.9 FM (Malolos, Bulacan) (left picture below)

- July 03 - On disaster mitigation and prevention with co-guests, the regional director of DOST, DENR and MGB representatives during the station's program "Talakayan Ngayon"; 95.1 DWRW-FM (San Fernando, Pampanga) (right picture below)

- Various Radio and Regional Television interviews by CLTV-36, ABS-CBN Pampanga, UNTV, and 95.1 GV-FM during the following events that affected the PRB,
  - T. Labuyo – SW monsoon
  - T.S. Maring enhanced SW monsoon
- Documentary interview by CLTV 36, regional television station in CSFP on the topic "Ngitngit ng Habagat 2013" aired in the documentary program "ISAPUBLIKO" (September)
- TV and Radio interviews by NET25, DZRH, TV5, Radyo ng Bayan and DZMM on "Storm Surge Hazard Mapping" to one center personnel involved in hazard mapping of the READY Project (November & December)
- Documentary interview for a video production on "Local Flood Early Warning System" to be produced by GIZ-DRM (December)

- Regular basin condition updates provided through the radio station GV-AM 792 Khz.

3. Participation in international, national, regional and local undertakings (meetings, seminars, workshops, conferences and other activities)

The center maintained its active involvement and has supported many undertakings related primarily to hydrological situation and monitoring, information and operational activities in the PRB, as well as extra-curricular activities throughout the year considering its limited logistical and personnel capacity. Participation in local, regional, national and international undertakings is a major social commitment of the center. It has also actively shared its hydrological information to various entities as part of the center's regular activities. These efforts has benefitted quite a number of groups who have been, in one way or another, a partner in the center's several successful programs and projects.

- Attended a meeting on organizing SHINe program in schools and conduct of flood drills in the communities covered by Project ENCORE (Enhancing Community Resilience to Disasters in Bulacan) of Save the Children (SCI) and the PDRRMO-Bulacan (January 22; Bulacan Provincial Capitol; 1 center personnel attended)
- Attended and participated in the Final Workshop on Supporting Investments in Water-Related Disaster Management for the ADB/ICHARM/APWF Project. (February 04; ADB, Mandaluyong City; 1 center personnel attended)
- Attended and participated the NRCP Div. 12 meetings for the year on the following occasions: February 12, March 13, July 15; 1 center personnel attended
- Participated (as a choir member) in the Leadership Program of AUSAID-MNDP Closing Ceremonies (February 13; PAGASA Central Office; 1 center personnel participated)
- Attended the Broadcasting & GAD Seminar (February 22-23; Los Baños, Laguna, 1 center personnel attended)
- Attended and participated in the Kick-Off meeting for the JICA "Data Collection Survey on Situation of Nationwide Flood Forecasting & Warning System". (March 12; Science Garden, Q.C.; 1 center personnel attended)

- Participated in the Celebration of WMO Day in Science Garden, PAGASA (March 21; 1 center personnel participated); similar celebration was also conducted in the center on the same day. Several students from the International School of Technology and Skills Development in Angeles City visited the center.

- Attended and Participated as per invitation by Civil Service Commission Reg. 3 in the FGD on the implementation of CSC Programs in the PAHRODF partner agencies. (March 7; CSC Reg. 3 seminar room; 2 center personnel participated)
- Actively participated in the Pantabangan Dam Flood drills in coordination with FFWS-HMD, RDRRMC-3, PDRRMO-Nueva Ecija, and the FFWSDO of said Dam (April 04-05)
- Attended and participated in the meeting on Component Projects in the Proposed Integrated Water Resources Management (IWRM) Strategy for the Pampanga River Basin led by NEDA-3. (April 09; CSFP; 1 center personnel participated)
- Attended and participated in the activities of the JICA project entitled "Data Collection Survey on Situation of Nationwide FFWS". (April 10-12; Tuguegarao, Cagayan; 1 center personnel participated)
- Attended and participated in the JICA meeting on Interim Report for the project: "Data Collection Survey on Situation of Nationwide FFWS". (April 26; Amihan Conference Room, Q.C.; 1 center personnel participated)
- Attended and participated in the following RDRRMC meeting regarding formulation of RDRRMC Plan of Region 3 (DOST is the vice chair of Prevention and Mitigation aspect and PRFFWC-PAGASA is a warning agency under the department) as follows:
    - May 03 – coordination meeting of focal agencies of the 4 thematic areas (OCD-3 conference room; 13 persons in attendance; 1 center personnel participated)
    - May 15 – TWG meeting (OCD-3 conference room; 10 persons in attendance; 1 center personnel participated)
    - May 20 – Pre-workshop TWG meeting (OCD-3 conference room; 12 persons in attendance; 1 center personnel participated)
- Attended and actively participated in the joint workshop / writeshop activity for the drafting of the RDRRM Plan for Reg. 3 (May 21-22; SACOP EPHATHA development center; CSFP, 100 persons attended; 1 center personnel participated)
- Participated and part host, together with DOST-3 and CHED-3, in the Unified Flag Raising Ceremonies in the DM Govt. Center (May 6; DOST-3 grounds; 300 persons including the Regional Directors from various regional government agencies of Reg. 3 attended)
- Attended the Inter-Agency Meeting on Resource Inventory and Preliminary Appraisal for the PRB organized by NEDA through the Pampanga River Basin Committee and PRFFWC being a TWG member of the said committee. (May 30; Clark Freeport Zone; 50 persons attended; 1 center personnel participated)

- Attended and participated as a co-resource speaker with a GIZ partner on the topic "Community involvement and local flood early warning with low-tech approaches for small rivers in the Philippines" in the Flood Risk Management and Urban Resilience Workshop II organized by NEMA, WB and GDFRR. (May 28-29; COEX Center, Seoul, South Korea; around 70 persons in attendance; 1 center personnel participated)
- 1 center personnel attended the Peer Reviews on GMMA-READY Project on the following occasions as follows: May 02. June 20, and July 10.
- Attended and participated in the RDRRMC-3 meeting called for by the council's Chairperson (OCD-3 Regional Director) in connection with the "Preparations for the Rainy Season". (June 03; OCD-3 Conference Room; 18 RDRRMC member agencies attended)
    - Participated, as agency player for men, in the 2013 DOST Bowling Tournament held in Starmall, Alabang, Muntinlupa. PAGASA men's team had been a Champion in the said tournament for 3 consecutive years now.

- Attended and actively participated in the evaluation of outputs of the recently concluded write shop for the drafting of the RDRRM plan for Reg. 3, specifically for thematic area-1 which is disaster prevention and mitigation. DOST is the vice-chair for the said thematic area and PRFFWC-PAGASA is a member of the RDRRMC-3. (June 14; OCD-3 Conf. rm.; 1 center personnel participated)

- Attended the RDMMC-3 meeting re: presentation of outputs of the various thematic areas in the preparation for the RDRRMP for the region. (June 21; OCD-3 conference room; 1 center personnel attended)
- Attended the "Lessons Learned Review Workshop" and the Partnership Summit of the Project "ENCORE" of Save the Children. (June 27-28, St. Agatha Resort, Guiguinto, Bulacan; 60 school children and parents attended)
- Provided basin and other related data/information to OCD-3 as per needs in the formulation of the RDRRM-3 Plan for the period 2013 to 2016.

- Participated in the International Flood Forum organized by ADPC (Asian Disaster Preparedness Center). (July 25; Bangkok, Thailand; 1 center personnel attended)
- Attended the RDRRMC-3 meeting called for by OCD-3 to assess the effects and damages caused by T.S. Maring and Habagat 2013 in Region 3. (August 28; OCD Conference room; representatives from 11 member regional agencies attended)
- Attended and participated in the dry-run meeting on the Rehab Plan to be presented to the representatives of the Central Luzon Bloc – 16th Congress (November 19; OCD Conference room; 15 persons representing various regional agencies attended; 2 center personnel participated)
- Participated as part organizer in the 4th SHINe Annual Conference in Bulacan together with various activity partners, PDRRMO-Bulacan, Save the Children, DepEd-Bulacan, etc. (November 29; Club Royale, Malolos; 150 students and teachers from about 16 elementary and secondary schools within the Province attended)

A group photo of student delegates and advisers in the 4th SHINe Conference held in Club Royale, Malolos, Bulacan last November 29. On the right is a sample of the backside of the commemorative shirts given during the event courtesy of Save the Children Organization.
(Related link: http://bulacanshine.yolasite.com/4th-shine-conf-2013.php)

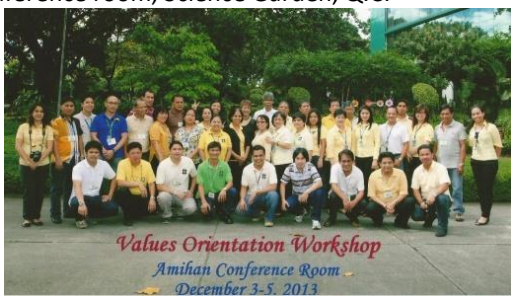
- Attended in the formulation of a seminar-workshop on Local Climate Change Action Plan with other regional agencies and with DILG-3 as lead agency. (November 21, 1 center personnel attended)
- Attended the Disaster Management Forum on "Introduction to Threat Management" as hosted by the Police Regional Office-3 (December 02; Camp Olivas, Pampanga; 1 center personnel attended)
- Attended the Disaster Management Forum on "Understanding the Economic and Financial Impacts of Natural and Man-made Disasters' as hosted by Pampanga Chamber of Commerce (December 12; Max's Villa del Sol, Pampanga; 1 center personnel attended)
- Represented PRFFWC-PAGASA in the Joint RDRRMC-3 and DRRM Year-End Meeting organized by the OCD-3 (December 23; OCD-3 Conference room; 2 center personnel attended)

4. Personnel Trainings

There were few trainings and enrichment programs undertaken by some of the center personnel during the year:

- "Training / Workshop in Rainfall Warning System" by PAGASA. (January 16-19, Amihan Conference Room, Science Garden, Q.C.; 1 center personnel participated)
- "Refresher Course on Meteorological Observations, Practices and Procedures for NCR-PRSD" by PAGASA (May 2-4; Training Room, Science Garden, Q.C.; 1 center personnel participated)
- "Flood Modeling and Lidar Analysis" by ITC and GIZ. (May 20-31; WFFC, Q.C.; 1 center personnel participated)

- "Orientation Course and intensive training on adopting IFAS and GSMap technologies" organized by ADB, ICHARM, JAXA, etc. (October 7 to 11, ADB Conference room., 1 center participated)
- "Government Radio Operators Certification" (December 03-06; Science Garden, Q.C., 1 center personnel participated and passed the training)
- One center personnel attended the "Values Orientation Workshop" from December 03-05 at the Amihan Conference room, Science Garden, Q.C.

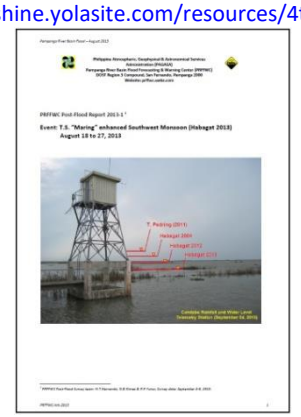


While there were few trainings and enrichment programs participated by center personnel during the year, it eventually played host and a lead training facility in the Hydrologist Training Course (HTC 2013) on streamgauging measurement activities. Two center personnel became part of the staff of lecturers in sharing and guiding the 32 trainees in their conduct of actual hydrographic works (October 2013).

5. Published Reports (In-house), features and other hydrological-related materials

Some reports / materials produced by the center during the year are listed below. All materials are available upon request at the center although some materials are available through the respective links.

1. Brief on the proposed Local Flood Early Warning Systems (LFEWS) as follows:
    - Establishment of an Operational Community-based Flood Warning System for Sta. Maria River Basin in Bulacan Province
    - Quinali 'B' River LFEWS, Malinao, Albay (March 2013)
    - Cadacan River Basin LFEWS, Sorsogon (March 2013)
    - Ilagan River LFEWS, Ilagan, Isabela (April 2013)
    - Bucayao-Mag-asawang Tubig Rivers, Oriental Mindoro (April 2013)
2. Post-Flood draft report on event T.S. Maring enhanced SW Monsoon (Habagat 2013)
   Related link: http://prffwc.synthasite.com/resources/PRB%20flood-aug2013-maring-SW.pdf
   http://prffwc.synthasite.com/site-related-documents.php
3. Proceedings on the 4th School Hydrological Information Network (SHINe) Conference, November 2012
   http://bulacanshine.yolasite.com/resources/4th%20SHINe%20Conference-Proceedings%28Nov2013%29.pdf



6. Recognitions given in 2013

Certificates of appreciation as resource speaker / lecturer were mainly the recognitions received by several personnel of the center in various events within and outside the PRB. There were no special awards received for the year. Nonetheless, it is worth noting that the center has done quite a lot throughout the year considering its limitations in both personnel and logistics.

PRFFWC production 2013
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