

PRFFWC IN YEAR 2020

(Programs, Activities, Events and Accomplishments)

Year 2020 can be described as one stressful year for PRFFWC. Stressful not only because there were 7 successive tropical cyclones – tropical disturbance events monitored and covered by the center during the last quarter of the year but because it was also a time when, not only the Philippines, almost the whole world was in a pandemic state.

The emergence of COVID-19 in the first quarter of 2020 has made significant changes in our way of life bringing us into the so-called "new normal" mode. A nationwide lockdown as a response to the pandemic was a complete reversal to many individuals as businesses, commercial and almost all daily outside activities were literally brought to a standstill. Even PAGASA's field service stations were caught off-guard as strict movements were implemented. The PRFFWC, as with many other government services, was also practically affected by this situation causing an eventual changed in its operational hydrological monitoring for a few months. The challenges brought about by the COVID19 pandemic was too much for one office, such as PRFFWC, to handle on its own.

The imposition of the lockdown and movement restrictions has caused some issues that practically affected the services of many river basin centers such as the PRFFWC:

- Longer duty shifts for the only readily available personnel who were on hand at the river basin center as a result of the imposed restricted movements; there were also no available public transportation during the lockdown – ECQ-MECQ-GCQ situations;
- 2. Streamgaging activities and on-site data (particularly water level) validation were curtailed due to the varying inter-LGU area movement containment measures; and
- 3. Regular maintenance and services, including emergency trips, of monitoring stations were not carriedout on time resulting to substantial data transmission downtimes.

The ongoing pandemic situation are still far from over and may likely last for a few years, or **hopefully** less than that, regardless whether vaccines have already been developed. Apparently, while we are continually reeling in this seemingly surreal environment, the threat of a resurgence of the virus and that of natural hazards (particularly hydrometeorological) still remains. With the current pandemic situation, many of the local communities have become even more vulnerable to potential disasters especially those relating to hydrometeorological hazards.

Considering the limitations in movement arising from the existing situation, the PRFFWC was still able to perform its 24/7 public service responsibilities, including its continued guidance as the lead and pilot flood forecasting & warning center in the country to other river basin centers of PAGASA.

This annual report gives a summary of the significant activities and accomplishments of the PRFFWC during the year 2020.

Highlights for the year:

Regular Operational Functions:

- Issued 28 and 35 Flood Advisories (FAs) and Flood Bulletins (FBs), respectively, for 9 flood-related events that affected the Pampanga River Basin;
- A Year-round 366 days daily updating of hydrological forecasts and the status of the rainfall and water levels within PRB in the center's website (prffwc.synthasite.com); e-mailed and posted in the center's social network accounts Facebook and Twitter;
- There were some 7 streamgaging activities undertaken by PRFFWC, 4 of which are at forecasting points in the basin (Sapang Buho, Zaragoza, Arayat, and Peñaranda) and 3 additional river cross-section measurements as per requested and supported by the Pampanga-PDRRMO (Gugu Bridge, Arayat at San Agustin Bridge on the upstream side, and Sulipan Bridge) This is to establish the assessment levels in the said river channels;
- Hydrological monitoring enhancement activities that included repainting of staff gages at Candaba, clearing of mud and debris covering the Sulipan and Sapang Buho WL gages; and painted the lower staff gage portion of Zaragoza streamgaging site;
- Conducted quarterly maintenance of all telemetry stations by the center's technician team; 10 telemetry
 emergency works; 32 resets and transfer of A/C units at San Rafael Repeater station including cleaning of

said A/C units; at least 3 fieldworks on the recommissioning of several OPTI-based stations within the PRB;

- Assisted and supported HMTS of HMD in the repair and operationalization of Candaba WL sensor;
- Participated in several (about 29 occasions) regional and local undertakings related to DRRM and CCA issues;
- Lectures and Presentations conducted in around 42 occasions (mostly via Video Teleconference or VTC) with estimated participants / attendees of about 2,115 persons; lectures and presentations included weather and basin updates / outlooks in several Pre-Disaster Risk Assessment (PDRA) meetings;
- Continuing development of simple appropriate models for flood forecasting and also the "on-and-off" calibration of the RRI model
- Validated, appended and collated telemetry supervisory systems' hydrological data as follows:
 - o 766 WL station-months / 1,538 RR station-months (from years 2009 to 2016)
 - o 218 WL station-months / 108 RR station-months (year 2020)
- Encoded and summarized 12 station-months of center rainfall observations (January to December 2020);
- Build-up of Annual Hydrological Summary Reports (initial drafts from 2009 to 2019);
- Scanned some 21 various documents (technical papers, reports, etc.) as part of the center's on-going electronic filing system management;
- 6 Media related interviews (Regional Radio, TV, phone, Social Media recorded and live streaming) particularly during flood-weather events affecting the basin;
- Accommodated the needs of some 140 center walk-in clients from various sectors during the whole year; and Issued 2 data certifications to project contractors

Exceptional Activities during the year:

PRFFWC initiated the only VTC / Webinar for PAGASA River Basin Flood Forecasting & Warning Centers
for the year with a titled theme "Operational River Basin Center Flood Forecasting & Warning Services
under the New Normal" on December 03, 2020. The event topics included issues relating to center
activities under the new normal set-ups, public service continuity plans, health and safety protocols in
the workplace, enhancements of flood information and warnings, and sustaining center programs and
activities while the basin remains under various levels of community quarantine scenarios. The event was
a collaborative activity worked-out by the PRFFWC through its division NCR-PRSD and with the assistance
of the organizational capacity and support of the Training Section of RDTD. proceedings related link:

http://prffwc.synthasite.com/resources/Proceedings-VTC%20for%20River%20basin%20centers-2020.pdf;



- The PRFFWC was able to finalize the request of PAGASA via the NCR-PRSD for a Synoptic station lot with the Municipality of San Ildefonso in the Province of Bulacan; a Memorandum of Agreement (MOA) had been signed by both parties in August 2020;
- Actively participated and a main contributor in the update of the Regional Contingency Plan for Hydromet Hazards for the RDRRMC-3 (November 2020);
- Developed, and made available in Poster-sized, two (2) "Geopictorial Maps" (also known as Panoramic or Illustrated maps) of Elevation and Flood Susceptibility of the Pampanga River Basin; the maps are more user-friendly and had already been distributed to several LGUs within the basin; to resume distribution in the first quarter of 2021 for the other stakeholders within the PRB;
- Hosted the 128th Regional-Provincial Climate Outlook Forum for Region 3 as per coordinated efforts with the Climatology and Agrometeorology Division (CAD) through the National Capital Region of PAGASA Regional Services Division (NCR-PRSD) (September 30, 2020).

Related Link: https://www.facebook.com/prffwc/videos/654595865486578



The "Geopictorial" maps (top left: Elevation map; top right: Flood Susceptibility map) project by PRFFWC as a major output for year 2020 had initially been distributed to several LGUs within the basin on the last month of year 2020. Continuing distribution will continue in the 1st quarter of year 2021.



Distribution of geopictorial maps to various LDRRMOs already started last December 2020: (L to R) Cabanatuan CDRRMO; Masantol MDRRMO in Pampanga; San Leonardo MDRRMO in Nueva Ecija.

- Total improvement of the access perimeter road at the back of the center as an alternate entrance route to PRFFWC during non-office hours;
- Post-Flood Survey of Pampanga River Basin after the passage of Typhoon Ulysses; Final draft report to be presented within the 1st quarter of year 2021



 Incorporated COVID19-related measures such as several health measure signage within the building premises, physical arrangements within work area to maintain at least a meter of physical distance between employees work station, and a wash basin with liquid soap near the main entrance of the center (see picture on the left)

I. Operational Activities

1.1 Flood Monitoring and Warning Activities

There were nine flood-related events monitored and given appropriate warnings within the PRB for the year.

2020 Events	Period	FA issued	FB issued
Typhoon Ambo (Vongfong)	May 14-17	6	
Tropical Depression Butchoy (Nuri)	June 11-13	3	
Southwest Monsoon as enhanced by Tropical Cyclone Nika	October 11-13	2	4
(Nangka)			
Tropical Depression Ofel	October 14-16	4	
Tropical Storm Pepito (Soudel)	October 19-23	2	6
Typhoon Quinta (Molave)	October 25-30	2	7
Super Typhoon Rolly (Goni)	October 30 to	2	5
	November 03		
Typhoon Ulysses (Vamco)	November 10-17	3	13
Combined effects of Tail-end of Frontal System (Shear Line)	December 20-23	4	
and Tropical Depression Vicky			
	Total	28	35

A new format of Flood Advisory and Flood Bulletin was started late in the 2020 events as per situations arising from stakeholders and target community needs, and including center data issues. It was also during the year that a Filipino translated flood information / warning was re-initiated (again) and will now remain as a standard part of center's flood information issuances.



FLOOD ADVISORY # 3

Republic of the Philippines DEPARTMENT OF SCIENCE AND TECHNOLOGY Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

PAMPANGA RIVER BASIN FLOOD FORECASTING & WARNING CENTER (PRFFWC) 🏶 DMGC, Bgy. Maimpis, City of San Fernando, Pampanga 2000, Tel. (045) 455-1701; CP: 0999 336 641



DEPARTMENT OF SCIENCE AND TECHNOLOGY Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

POSSIBLE DISTRIBUTION OF HAZARDS ASSOCIATED WITH TROPICAL STORM ULYSSES WITHIN THE PAMPANGA RIVER BASIN BEGINNING WEDNESDAY NIGHT (NOVEMBER 11, 2020)





The new FA format is shown above. The FA above was issued during Typhoon Ulysses event. The FA is accompanied by the basin map showing possible hazards that are likely to occur as a result of the oncoming tropical disturbance. This format further enhances the information details to communities and stakeholders on what to expect and prepare in their area of concern within the basin. The incorporation of the illustrative map was more appreciated by netizens than just a worded info/warning.

Republic of the Philippines DEPARTMENT OF SCIENCE & TECHNOLOGY opine Atmospheric, Geophysical & Astro omical Services Administration (PAGASA) 6 Pampanga River Basin Flood Forecasting and Warning Center, Brov Maimpis, City of San Fernando, Pampanga, http://prffwc.svnthasite.com; Tel (045) 455-1701 / CP: 0999 336 6416 FLOOD BULLETIN # 11 - PAMPANGA RIVER BASIN AND ALLIED RIVER SYSTEM EXPECTED FLOOD **P** = POSSIBLE 0 =OCCUR ISSUED AT 5:00 PM, 16 NOVEMBER 2020 Valid until the next issuance at 5:30 AM tomorrow unless an intermediate bulletin will be issued AVERAGE BASIN RAINFALL AS OF 5:00 PM TODAY: T -THREATENING F -PERSIST SITUATION FORECAST 24-HR = isolated light rains PAST 24-HR = less than 3 mm BASIN'S LIKELY RESPONSE FOR THE NEXT 12-HOURS: Tributary Rio Chico River at Zaragoza station: Now at 3.42 m (above 2.5 m Alert WL) / very slow recession to continue and likely to reach below Alert WL tomorrow. Remnants of Floodwaters to persist until late today in the low-lying areas of Concepcion, La Paz, Zaragoza, San Antonio, portions of Licab, Aliaga, Quezon, Sto Domingo, Middle Main Pampanga River at Arayat station: Now at 6.80 m (Above 6.0 m Alarm WL) / maintained its slow recession and likely to reach below Alarm WL between tonight until tomorrow morning. Flooding to persist for several days at the low-lying riverside areas and flat lands of San Isidro, Jaen, Cabiao, Arayat, Candaba, San Luis, San Simon Cabiao, Arayat, Candaba, San Luis, San Simon Cabiao, Arayat, Candaba, San Luis, San Simon Candaba Swamp area: Now at 5.83 m (above 5.0 m Critical WL) / very slow recession to continue further; to remain above Critical WL until tomorrow. Slow retreating floodwaters to persist from several days to weeks in the low-lying areas of Candaba, San Luis, San Simon, and portions of the adjacent towns of San Miguel, San Ildefonso, San Rafael, Pullian, Baliuag Lower Main Pampanga River at Sulipan station: Now at 3.63 m (above 3.2 m Alarm WL) / very slow recession to continue; likely to reach below Alarm WL between tonight until tomorrow noon. Flooding (merged riverine flood (fluvia), accumulated rainwater (pluvia) and tide induced flood) to persist from several days to at least a week in the low-lying riverside areas and flat lands of Apalit, Calumpit, Hagonoy, Macabebe, Masantol, portions of Paombong, portions of Malolos Remnants of floodwaters to persist at the low-lying areas / riverside areas along rivers - tributaries within the Pasac-Guagua sub-basin (Abacan, Pasig-Potrero, Porac-Gumain and all other waterways) until later today. Portions of San Fernando, Mexico, Bacolor, Guagua, Sasmuan, Minalin, Lubao, Sto. Tomas, Sta. Rita, Sta. Ana, Mabalacat, Magalang, Angeles City (High Tide tomorrow, 17 Nov., between 12nn to 3pm) (a FINAL Message) F

Other areas affected by floods:

 Flooding remains at the low-lying riverside areas along Angat River: Norzagaray, Angat, Bustos, Baliuag, San Rafael, Pulilan, Plaridel, Calumpit, Hagonoy, Paombong

The public and Local Disaster Risk Reduction & Management Councils (LDRRMCs) concerned are advised to continue undertaking the necessary appropriate actions mitigate the adverse impacts of hazards mentioned above in their respective areas of concern; to continue monitoring possible thunderstorm advisories issued PAGASA Regional Services Division of the National Capital Region; latest weather updates of the Weather Division of PAGASA.... and to stay safe always. advisories issued by

PRFFWC: HTH / NBN / PTH / JCL



Republic of the Philippines DEPARTMENT OF SCIENCE & TECHNOLOGY Philippine Atmospheric, Geophysical & Astronomical Services Administration (PAGASA)

Pampanga River Basin Flood Forecasting and Warning Center, Brgy. Maimpis, City of San Fernando, Pampanga, http://prffwc.synthasite.com; Tel (045) 455-1701 / CP: 0999 336 64 16

ULAT SA BAHA BILANG 11 - PAMPANGA RIVER BASIN AND ALLIED RIVER SYSTEM

SITWASYON NG BAHA: P = POSIBLE O = MANGYAYARI IPINALABAS NGAYON 5:00 NG HAPON (NH), 16 NOVEWBER 2020 (May bisa hanggang sa susunod na ulat bukas 5:30 NG UMAGA maliban lamang kung may makabuluhang pagitang F = MANANATILI T = NAGBABANTA pag-ulat na kailangan ilabas) LAKAS NA PA-ULAN SA BASIN BATAY SA 5:00 NG HAPON NGAYON: as na 24 oras = mas mababa sa 3 mm / Pagtaya sa susunod na 24-oras = pulo-pulong mahinang pag-ulan MGA MAARING TUGON NG BASIN SA SUSUNOD NA 12-ORAS Tributary Rio Chico River sa Zaragoza station: Ngayon nasa 3.42 m (nasa taas ng 2.5 m antas ng Alert WL) / sadyang mabagal na pagbaba ng ilog; malamang aabot sa baba ng antas ng Alert WL bukas. Mga natitirang pagbaha ay mananatili hanggang sa magdamag ngayon araw sa mga mababang lugar ng Concepcion, La Paz, Zaragoza, San Antonio, Ilan bahagi ng Licab, Aliaga, Quezon, Sko Domingo. Gitnang bahagi ng kabuuang Pampanga River sa Arayat station: Ngayon nasa 6.80 m (nasa taas ng 6.0 m antas ng Alarm WL) / patuloy ang mabagal na pagbaba ng ilog; malamang umabot sa baba ng antas ng Alarm WL putaloy ang mabagal na pagbaba ng ilog; malamang umabot sa baba ng antas ng Alarm WL mula ngayon gabi hanggang bukas ng umaga. Pagbaha ay mananatili ng mga ilan araw sa mga mabada (nasa (nasa (nasa casa casa)) a sa laidon.

- mga mababa / patag na lugar sa tabing-ilog ng San Isidro, Jaen, Cabiao, Árayat, Candaba, San Luis, San
- Candaba Swamp area: Ngayon nasa 5.83 m (nasa taas ng 5.0 m antas ng Critical WL) / sadyang mabaga na pagbaba ay magpapatuloy at mananatili sa taas ng atta sing so in antas ng ofincial WL hanggang bukas. Mabagai na pag-atras ng tubig baha na mananatili ng ilan araw hanggang ilan linggo sa mga mababa at patag na lugar ng Candaba, San Luis, San Simon, at mga bahagi ng katabing bayan San Miguel, San Ildefonso, San Rafael, Pulilan, Baliuag
- Kataei, Pullian, Bailulag Lower Main Pampanga River sa Sulipan station: Ngayon nasa at 3.63 m (nasa taas ng 3.2 m antas ng Alarm WL) / sadyang mabagal na pagbaba ng ilog; malamang umabot sa baba ng antas ng Alarm WL mula ngayon gabi hanggang bukas ng tanghali. Mga pagbaha (pinagsanib na baha mula sa ilog at baha na naiwan ng ulan at baha dala ng high tide) ay mananatili ng ilan araw hanggang isang iinggo sa mababa / patag na lugar sa tabing-ilog ng Apalit, Calumpit, Hagonoy, Macabebe, Masantol, portions of Paombong, ortions of Malolos
- portions of Malolos Mga natitirang pulo-pulong pagbaha sa mga mababa / tabing-ilog na lugar ng kailugan ng Pasac-Guagua sub-basin (ilog ng Abacan, Pasig-Potrero, Porac-Gumain at lahat ng iba pang daluyan ng tubig) mananatili hanggang ngayon araw na ito. Ilan bahagi ng San Fernando, Mexico, Bacolor, Guagua, Sasmuan, Minalin, Lubao, Sto. Tomas, Sta. Rita, Sta. Ana, Mabalacat, Magalang, Angeles City. (High Tide bukas, Nov. 17, mula 12:00 ng tanghali hanggang 3:00 ng hapon) (ito ang Panghuling Mensahe para sa mga lucar bito). mga lugar na ito)



Mga iba pang lugar na apektado ng baha: Mga iba pang lugar na apektado ng baha: Nananatili ang baha sa mga mababang lugar sa tabing-ilog ng Angat River: Norzagaray, Angat, Bustos, Baliuag, San Rafael, Pulilan, Plaridel, Calumpit, Hagonoy, Paombong

Ang mamamayan at mga Local Disaster Risk Reduction & Management Councils (LDRRMOs) na nakatalaga sa mga lugar na nabanggit ay patuloy na pinapayuhan magsagawa ng mga kaukulang aksyon at mga aktibidad na angkop sa pagpapagaan ng masamang epekto na dala ng mga peligrong (hazards) nabanggit sa kani-kanilang lugar na nasasakupan; Patuloy sa pag-antabay ng mga payo / babala ng PAGASA Regional Services Division - NCR ukol sa mga biglaang pag-ulan, pagkulog at pagkidiat; Sa pinakabagong ulat ng Weather Division ng PAGASA sa panahon... at manatiling ligtas palagi / sa anumang oras.

Above are the forms for Flood Bulletin No. 11 issued during the event relating to Typhoon Ulysses in both English (top) and in Filipino (bottom). Translation of flood info / warnings in Filipino was in response to the clamor of several netizens in the center's Facebook account and even through text messages.

PAMPANGA RIVER BASIN ASSESSMENT LEVELS (meters)	(as of Jan 2021)
	(40 01 0411 2021)

color code	YELLOW	ORANGE	RED
STATION	ALERT	ALARM	CRITICAL
Sapang Buho	3.70	4.50	6.50
Мауаруар	11		
Zaragoza	2.50	3.50	4.50
Penaranda	2.50 **	3.50 **	4.00 *
San Isidro	3.20	4.50	6.00
Arayat	5.00	6.00	8.50
Candaba	3.50	4.50	5.00
Mexico	2.00 **	2.50 **	3.00 *
Sasmuan			3.00
Sulipan	2.60	3.20	3.80

* Based on past observations from various flood events (still to be validated) ** Initial value (for validation) **Update on Forecasting Point Assessment Levels:** The effects of the recent flood events (during year 2020) resulted in further adjustments and changes of river assessment levels at several forecasting points in the basin. These adjustments shall take effect immediately in year 2021.

Some levels are still for validation purposes and will be change as soon as new information comes in.

1.2 Daily Hydrological Forecast / other related info

As always, the center's was able to issue 366 daily hydrological forecast updates during the year 2020. Afternoon updates of status of basin rainfall and water level were likewise started around mid-year of 2020. This is to provide a regular updated info of the latest basin's status to local DRRMOs who had been following the website and Facebook pages of PRFFWC.

Another additional change in the daily sharing of the basin's status was the inclusion of available Optimization-based rainfall and water level stations and the MDSI rainfall stations maintained by PAGASA. Further, water level status as to the respective assessment levels were also included and presented in color-coded highlight as to below alert WL (green), above alert WL (yellow), above alarm WL (orange), and above critical WL (red). A view of the present hydroforecast format and status of basin rainfall and water level is shown below as per presented and shared to various entities via e-mail and as posted in the center's Facebook page:

6 1		1/2	1 3 1	
88	<u>چ</u>		1 14	-0,
MPANGA RIVER E DROLOGICAL FC cember 29, 202 te Update: 5:30	BASIN AND ALLIED RIVE RECAST 0) AM (LST)	R BASIN OF PASAC-GUA	GUA	
IASIN SUB-AREA	GENERAL WEATHER CONDITION (FORECAST)	PRESENT RIVER STATUS	FORECAST RIVER TREND	POSSIBLE IMPACTS / RIVER FORECAST
Ipper Iampanga River Iasin (Coronel- iantor, Digmala, Penaranda, Rio Ihico River)	Partly cloudy to cloudy skies with isolated rainshowers. (Bahagyang maulap na uppawinin na maulap na uppawinin na may pulu-pulong mga pag- ulan.)	BELOW ALERT LEVEL (Nasa baba na antas ng Alert level ang kailugan)	Slow recession in river level (Mabagal na pagbaba ng tubig ng kalugan)	No significant adverse hydrological impact
ower ampanga River lasin Candaba swamp rea, Pampanga lelta, Angat liver)	Partly cloudy to cloudy skies with isolated rainshowers. (Bahagyang maulap hanggang sa maulap na papawirin na may pulu-pulong mga pag- ulan.)	Generally BELOW ALERT LEVEL (Nasa baba na antas ng Alert level ang kailugan) Candaba Swamp to remain ABOVE ALERT LEVEL for a few days	Slow recession in river level (Mabagal na pagbaba ng tubig ng kalugan)	No significant adverse hydrological impact
lasac- Guagua Allied Sub- asin (Abacan, Porac-Gumain, Pasig-Potrero Rivers)	Partly cloudy to cloudy skies with isolated rainshowers. (Bahagyang maulap nanggang sa maulap na papawitin na may pulu-pulong mga pag- ulan.)	BELOW ALERT LEVEL (Nasa baba na antas ng Alert level ang kailugan)	Slight changes in river level (Bahagyang pagbabago sa antas ng kailugan)	No significant adverse hydrological impact
coastal Areas Hagonoy, Paombong, Ialolos, Ilacabebe, Ilasantol, Lubao,	Partly cloudy to cloudy skies with isolated rainshowers. (Bahagyang maulap hanggang sa maulap na papawirin na may pulu-pulong mga pag-	HIGH TIDE TODAY Pagkati ngayong araw: 11:57 AM / 0.34 m. / 1.12 ft.		Slight flooding at riverside & coastal areas due to high tide (Bahagyang pagbaha sa baybayyng dagat dala ng high tide)

ATE: Dece	mber 29,						
TE: Dece ME UPDA	mber 29,					at le	
oserved Va ast 24-hr R Istantaneo	TE: 5:30 lues ainfall Enc us Water L	2020 AM (LST ling at 5:0 evel Data	「) 0 AM (LST) at 5:00 AM	i) (LST)			
PRFFWC Te	lemetry St	ations		Optimization &	other PAGA	ASA station	ns within PRB system
Station	Rainfall (mm)	WL (m)	WL Status	Station	Rainfall (mm)	WL (m)	Remarks
Muñoz	0			Vega Grande			(Opti) NE of UPR.
Sapang Buho	1	**	Below	Singalat		**	(Opti) Palayan City
Calaanan	0			Talavera			(Opti) Talavera R.
fayapyap	0	**		Ilog Baliwag			(Opti) NW Rio Chico
abaldon	0			Sta Rosa Bridge		**	(Opti) La Fuente, Sta. Rosa
Palali	1			Cong Dadong Dam		**	(Opti) Arayat
Zaragoza	0	1.86	Below	San Luis		2.38	(Opti) 30 kms d/s of Arayat
Peñaranda	1	0		Matictic Bridge		**	(Opti) Norzagaray
San Isidro	0	*	Below	Sto. Nino- Caniogan		- 43	(Opti) Bagbag R., Calumptt
Sibul Spring	0			Guimba	**		(Opti) NW wiln PRB
Arayat	0	3.86	Below	Llanera	**		(Opti) Mid-NE with PRB
Candaba	0	3.80	Above	Sapang Bato	**		(Opti) Angeles City
Porac	0			Mabalacat	22		(Opti) RB side from Sacobia R.
Mexico	0	0	Below	Floridablanca	0.5		(MDSI) SW with Pasac- Guagua SB
San Rafael	1			Mabalacat	0		(MDSI) LB of Sacobla R.
asmuan	0	2.62	Tide- affected	Masantol	0		(MDSI) d/e Pamp. R.
3ulipan	0	2.50	Below	DRT	0		(MDSI) ESE win PRB
RFFWC	0			Akle	0		(MDSI) Sn Ildefonso, sul

When it comes to FFWSDO (Flood Forecasting & Warning System for Dam Operations) for Angat and Pantabangan dams, PRFFWC acts as a redundant and a forwarding point of information relating to dam operational flood-related activities. As per warning information network schematic, HMD will be directly providing the info to the center. Lately, just in the recent 1 or 2 events in the basin in late part of 2020 has HMD, once again, started sharing dam information and just hoping that this procedure will continue as per existing dam information dissemination protocol.

1.3 Flood Modeling Related Activities



An informal in-house training on the application of the RRI model was conducted by personnel of the center in the last quarter of the year 2020. A simple run of the model using sample data of TC Ambo was carried-out by several center personnel. This was initially done to familiarize center personnel in running the model. At the moment, calibration of the model using several event scenarios is still being considered. This is to possibly adopt to the various basin responses based on the prevailing inclement weather affecting the PRB. Further, updating the stage-to-stage correlation method for the basin is also being considered which has shown some promising results in its part-applications during the events of 2020.

Rainfall summary of PRFFWC stations for year 2020 Total Total Max 24 PRB Station for the Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec rain hr rain days vear Muňoz Sapang Buho Gabaldon Zaragoza Mayapyap Peňaranda Calaanan Palali San Isidro Arayat Candaba Sibul Spring Sasmuan Sulipan Mexico Porac San Rafael 186.2 PRFFWC 104.4 182.6 304.5 246.6 183.1 94.5 1483.9 117.1 0.0 13.5 153.9 5.3 9.1

1.4 PRB station data summary

* red value indicates incomplete data (to be updated)





The initial annual distribution of rainfall (Top L) and estimated rainfall days (Top R) of Pampanga River Basin for the year 2020





PRFFW Center Monthly Average Rainfall

Above shows the monthly rainfall totals for 2020 (left) and monthly average distribution (right) for the PRFFW Center, CSFP.

Station	Max WL observed for the year	Time / Day of Max WL	Remarks (event of maximum				
	(meters) *		WL for the year)				
Sapang Buho	5.89 (Above Alarm)	1600H / 12 Nov	Ty. Ulysses				
Zaragoza	4.32 (Above Alarm)	1900H / 25 Oct	Ty. Quinta				
Мауаруар							
Peñaranda	4.02 (Above Critical)	0500H / 12 Nov	Ty. Ulysses				
San Isidro							
Arayat	8.81 (Above Critical)	0600H / 14 Nov	Ty. Ulysses				
Candaba	6.34 (Above Critical)	0800H / 14 Nov	Ty. Ulysses				
Sasmuan	3.39 (Above Critical)	2100H / 04 Jan					
Sulipan	3.52 (Above Alarm)	1200H / 15 Nov	Ty. Ulysses				
Mexico	2.27 (Above Alert)	1100H / 12 Nov	Ty. Ulysses				

Peak Water Level observed during the Year 2020

*As per available received data

Initial draft of Annual Hydrological Data Summary Report for years covering 2009 to 2019 had been started within 2020 and hoping to be completed by 2021. These report summaries will present quality-controlled output of the available hydrological data of the PRFFWC for the said years.

1.5 Telemetry System and Station Physical Maintenance:

River Basin Flood Forecasting and Warning Centers rely heavily on its regular hourly data received especially during inclement weather conditions affecting the basin. It is important that the received telemetry data be adequate (quantity) and valid (quality) in order for center to be able to issue timely and, as much as possible, accurate hydrological information. **PRFFWC hydrological telemetry data downtimes for the year 2020 were 25.5% and 41.3% for rainfall and water level, respectively.** The downtimes never accounted for erroneous observations, particularly for water levels received from Arayat, Candaba, and Sapang Buho stations. Further, Mayapyap and San Isidro WL remained downed for year 2020.

Other problems that plague the center's hydrological data reception and quality during the year included as follows:

- Intermittent transmission interferences affecting San Rafael Repeater station
- Telemetry network system failure also at San Rafael station (1900H, March 12)
- Intermittent downtimes of Cabanatuan Repeater station
- San Rafael Repeater station power surge (Jun 19-20)
- Accidental cutting of Arayat WL cables due to ongoing Bridge expansion at the site (0830H, July 02)
- Sasmuan RR-WL telemetry station is being obstructed by peddlers' stalls and electrical wires just before the station's stair entrance
- San Isidro WL remained down during the year due to the rehabilitation of the bridge adjacent to the station
- Candaba WL sensor transmitting erroneous readings at times (starting around 0600H, Aug 06)
- Erroneous / doubtful readings of Porac and Mayapyap rainfall (Sept-Oct)
- Erroneous readings of Sapang Buho WL sensor (started 1900H, Nov 30 after Ty. Ulysses event)

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(Above pictures, L to R) The cable line of the WL sensor (see arrow) that was accidentally cut during the ongoing construction of bridge widening of San Agustin bridge at Arayat; A view of the present Arayat telemetry station with the ongoing bridge construction adjacent to it; A view of San Isidro-Jaen bridge that has yet to be completed before San Isidro WL can be recommissioned;

(Bottom left) A view of the Sasmuan Telemetry station surrounded by vendor stalls and the dangers posed by electrical wires near the station's gate entrance

A graph summarizing the hydrological data downtimes of PRFFWC for the year 2020 is shown on the right. Note that whole month of April the downtimes were at a 100% for both rainfall and water level. This was attributed to the telemetry network system failure at San Rafael Repeater station that occurred on March 12, 2020. It can be recalled that March and April was actually an enhanced community quarantine (ECQ) status in many of areas within Region 3. There were limited movements that time and therefore no restoration maintenance were conducted during that period.

PRFFWC Telemetry Data Percentage Downtimes (2020)



The PRFFW system will be 12 years in operation by March 2021 since it was last rehabilitated and transferred its based operations at City of San Fernando, Pampanga. Serious system operational problems are now being experienced at the center with more frequent data reception downtimes. Telemetry system and station preventive maintenance are carried-out by the PRFFWC technician team on a quarterly basis. The HMTS group is requested whenever the PRFFWC technician team are unable to address the system related problems. Quarterly preventive maintenance of all telemetry stations during the year 2020 were carried out by the PRFFWC technician team on the following periods: Mar 01-06; Jun 11-16; Oct 27 to Nov 01; and Dec 17-22.

For PRFFWC, there were a total of 32 A/C changes-resets for San Rafael Repeater station; about 10 emergency trips covering various system / telemetry repair, resets and maintenance. Several RR-WL validation checks particularly during flood events as part of data verification and for data quality-control.

A major rehabilitation works carried-out for the PRFFWC area was the development of the access perimeter road at the back of the center's lot. The said road will serve as an alternate entrance to PRFFWC during "off" office hours particularly during night time and holidays.



(Above pictures, L to R) The access perimeter road before the development; during development stage of said access road; (last 2 pictures) a graded and gravel overlaid road is shown after completion of the said project.

There were also 3 Optimization Project station related repairs and maintenance carried-out by Optimization-based Job Orders and supported by PRFFWC technician team. Optimization station related repairs and maintenance included:

- Checked & cleaned 2 ARGs within CSFP, at Bgy. Sindalan & CSF Motor pool. The former needs to be relocated due to surrounding obstructions; Restored 2 WLMS at La Fuente in Sta. Rosa and Cong Dadong Dam in Arayat (Repair / maintenance dates: Jun 17 & 18, respectively)
- Recommissioned 4 WLMS as follows: Talavera Bridge, Ilog Baliwag, Vega Grande, and Singalat stations; Repaired / Tested WLMS at La Fuente in Sta. Rosa. (Fieldwork dates: Jul 23- 27)
- Reattached and realigned WL sensor at La Fuente in Sta. Rosa after it was damaged by Ty. Ulysses (Dec)



Various preventive maintenance activities by PRFFWC technician team as follows (Above from top to bottom and from L to R): cleaning the rain gauge of Porac station; check of Candaba station; resets and maintenance inside the San Rafael Repeater station; Testing of cleaned rain gauge at Gabaldon station; measurement of communication parameters inside one of the telemetry station; testing of telemetry panel in the newly installed rainfall station inside the NIA-UPRIIS compound in Cabanatuan City; clearing of mud and debris covering the staff gage and station steps of Sulipan station; cleaning of solar cell panels in one to the telemetry stations; clearing of grasses surrounding the San Rafael Repeater station; (last 3 bottom pictures from L to R) Repair / replacement of water level sensors of Optimization Project stations at Singalat (first 2 pics) and Vega Grande stations (last pic)

1.6 Streamgaging and other hydrological measurement related activities

There were few streamgaging activities carried-out in year 2020. Obviously this was due to various area restrictions and movements imposed by LGUs covering most of the PRFFWC streamgaging sites. River velocity and cross-section measurements were carried-out prior to area lockdowns at the following streamgaging stations of PRFFWC:

- Sapang Buho (Feb 13)
- Zaragoza (Feb 20)
- Arayat (Feb 27)
- Peñaranda (Mar 12)

Hydrological monitoring enhancements were also conducted at 2 other PRFFWC streamgaging sites:

- Repainted the staff gages of Candaba (Mar 11)
- Painted the lower portion of staff gage (3 meters) at Zaragoza (December)

Other streamgaging activities, in particular river cross-section measurements, were also undertaken at other river channels other than PRFFWC streamgaging sites (except for one) upon request of Pampanga PDRRMO to establish river assessment levels for their monitored river channels:

- Gugu Bridge (Gugu River) at Cabalantian, Bacolor (Nov 25)
- Upstream side of San Agustin Bridge (Pampanga River), Arayat (Nov 26)
- Sulipan Bridge (Pampanga River cut-off channel), Apalit (Nov 27)



Top pictures (L-R): Streamgaging activities at Sapang Buho, Zaragoza, and at Arayat stations.



Above pictures: Painting of staff gages at Candaba station (left and middle), and at Zaragoza station (right).



(Above pictures from left to right) Coordination meeting with Pampanga PDRRMO on scheduling of river cross-section measurements at selected river channels in Pampanga; river sounding of Pampanga River Cut-off channel at Sulipan Bridge in Apalit; Levelling activities at Gugu Bridge in Cabalatian, Bacolor.





Top Left: The resulting river cross-section of Pampanga River at upstream side of San Agustin Bridge in Arayat; Top Right: River sounding by combined personnel of PRFFWC and Pampanga PDRRMO at San Agustin Bridge in Arayat.

II. Public Information, Data provision, Trainings and other related Center Functions

2.1 Presentations & lectures in events, various occasions and functions

Highlights of IEC activities of the center during year 2020 are as follows:

- The center was able to conduct 42 presentations / lectures / information sharing during the year;
- Of the said 42 occasions, 34 were conducted via VTC;
- An estimated total of 2,115 individuals from various sectors were provided with hydrometeorological climatological related information;
- Regular topics presented included as follows:
 - Hydrometeorological Hazards Awareness and Mitigation
 - Latest Climate Outlook
 - o Latest weather forecasts
 - o Updates on Prevailing Tropical Cyclones most likely to affect Region 3







(Top pictures) PRFFWC personnel as resource person on the topic on Hydrometeorological Hazards Awareness & Mitigation during the One-day Basic DRRM training organized by RDRRMC-3 and led by OCD-3 (from L to R) Basic Sector (Jan 22); Local Disaster Risk reduction & Management Officers (Jan 23); Single Parent & Women Senior Citizens sector (Feb 24)

(Bottom left picture) Resource person on Latest Climate Outlook and Status of the Pampanga River Basin in the 1st Quarter full council meeting of Pampanga PDRRMC (Mar 04)

- Special topics presented in other events are as follows:
 - Presentation of PRFFWC concept program entitled "School Hydrological Information Network" or SHINe (GAWAD PAGASA Best Innovation Award for 2019) in the Philippine Meteorological Society Annual Convention 2020 (Jul 22)
 - Special Topic on "Natural Disinfectant" in the 128th Regional-Provincial Climate Outlook Forum hosted by PRFFWC and with the NCR-PRSD in coordination with CAD (Sept 30)
 - Presentation on "Flood Information / Warning: Formulation of Flood Advisory / Flood Bulletin (a suggestion)" and "Capacitating / Enhancing (and Sustaining) River Basin Flood Forecasting & Warning Center Services under the New Normal (a suggestion)" in the PRFFWC conceptualized VTC / Webinar for PAGASA River Basin Flood Forecasting & Warning Centers with a titled theme "Operational River Basin Center Flood Forecasting & Warning Services under the New Normal". The said webinar was worked-out through the NCR-PRSD and with the organizational support of the Training Division of RDTD (Dec 03)
 - Presentation on "La Niña (El Niño); Rainfall Observation using Digital Rain Gauge and Homemade Rain Gauge" in the SHINe Reorientation Webinar for SHINe school recipients in the Province of Bulacan. The event was in coordination with the Provincial Government of Bulacan through its PDRRMO, the Provincial Department of Education (DepEd) of Bulacan, various LDRRMOs within the province and Save the Children Inc. (SCI) (Dec. 15)



(Top from L to R) A publication material for Day 2 activities of the Philippine Meteorological Society Annual Convention 2020 (Jul 22); A screen shot of the VTC during the 128th Regional-Provincial Climate Outlook Forum that was hosted by PRFFWC (Sept 30); A screen shot of the VTC on Pre-Disaster Risk Assessment meeting by RDRRMC-3 during TC Pepito (Oct 19) ; (bottom left) Finally, another screen shot of a VTC presentation during the SHINe reorientation of beneficiaries held last Dec 15.



- PRFFWC participated as resource person on topics relating to updates of prevailing Tropical Cyclones likely to affect Region 3 in at least 7 Pre-Disaster Risk Assessment (PDRA) meetings organized by Regional and Provincial DRRMCs
- Resource person in all the Quarterly Regional DRRM Full Council Meetings (Region 3) and Provincial DDRM Council meetings (Pampanga Province) during the whole year of 2020.

2.2 Public Information and Briefings (Multi-media)

Media briefings and interview interactions for the year 2020 were mostly during flood events affecting the Pampanga River basin.

- Pre-recorded interview via VTC by Paulo Santos (CLTV 36) on the status of PRB during the enhanced SW monsoon TC Nika event (Oct 12)
- Live interview via VTC in the CLTV 36 program "Bagong Hamon sa Central Luzon" by program host Jennifer Salenga on status of Pampanga River and Dams within the basin during the passage of TC Ofel (Oct 15)
- Live interview via VTC by Paulo Santos (CLTV 36) on updates of PRB during TC Pepito event (Oct 20)
- Pre-recorded vlog interview by Paulo Gee Santos (CLTV 36) on status of PRB as per TC Rolly event (Nov 01)
- Live FB streaming interview by Paulo Santos (CLTV 36) on the ongoing effects of TC Ulysses in the PRB (Nov 14)
- Phone interview by Gracie Rutao (ABS-CBN Pampanga field reporter / PIO Pampanga) on situations of PRB as per effects of previous Tropical Cyclones (Nov 22)



(Top from L to R) Live online streaming interview during the CLTV36 program Bagong Hamon sa Central Luzon with host Jennifer Salenga (Oct 15); Online interview with Paulo G. Santos (CLTV36) on the updates on TC Pepito (Oct 20); Pre-recorded vlog interview by Paulo G. Santos during TC Rolly event (Nov. 01)

III. Interaction, Participation in various events, occasions & other undertakings (meetings, seminars, workshops, conferences, etc.) with other agencies, LGUs within the Basin

In spite of the pandemic related situations existing within the basin for most time of the year 2020, PRFFWC was still able to participate in many hydrometeorological and DRRM related activities. Joint undertakings with regional, local agencies and LGUs have always been a priority of the center as part of strengthening its relationship with partner entities. Providing technical expertise has also benefitted quite a number of LGUs in their DRRM project undertakings.

- There were more than 70 events and occasions that the center had participated during the year 2020
- About 40 of these events were related to pre-disaster risk assessment (PDRA) meetings and LDRRM regular quarterly meetings (mostly via VTC)
- The rest of the meetings that the center participated in were focused mainly on COVID19 (participation in the Regional Task Force (RTF) on COVID 19) as per request / invitation by the chairman of the RTF (all via VTC)
 - The center attended several webinars (online) some of which are as follows:
 - "StaySafe.PH: Tracking & Responding to LGU level" (May 21)
 - o *"DatosPh" (Jun 26)*
 - "Echo Seminar on Modern Weather Forecast Technologies" (Jun 26)
 - "Safe Spaces: Operationalizing the Prevent-Detect-Isolate-Treat-Reintegrate (PDITR) Mainstream in the workplace" (Sept 01)
 - "Orientation on Public Service Continuity Planning" (Sept 03-04)
 - *"Infection Prevention & Control of COVID19 in Workplace" (Sept 18)*
 - "RQ-30 (Radar Discharge)" (Oct 12-15)
- Other than the webinars attended above there was 1 actual training (prior to the national quarantine implementation) participated by 3 center personnel and that is the ASTI training for Maintenance and Troubleshooting of Hydromet Sensors and Warning Stations (Feb 18 to 28)
- The center participated also in 1 Flag Raising ceremony and in 1 CLARO/DMGC (Central Luzon Association of Regional Offices / Diosdado Macapagal Government Center) meeting (Jan 20)
- Installed an AWS in the Paniqui Municipal Hall in Tarlac as per request by the Municipal Agriculture Office for their related agricultute programs (Jan 30)
- Coordinated and supported the Consultants of NCC (New Clark City) Project Disaster Management Team on their proposed DRRM programs in the said area (January and in July)

- Coordinated and worked-out with San Ildefonso Municipal Government the PAGASA request for a synoptic station lot in the said municipality; by August of 2020, both parties have already signed the MOA. This was the second requested lot worked-out by the PRFFWC for a synoptic station of PAGASA in the Region.
- Coordinated and supported the request of Pampanga PDRRMO for river cross-sectioning activities for the establishment of assessment levels of selected river channels within the province of Pampanga (November)
- Distributed the PRB Geopictorial maps to several LGUs in the last month of year 2020



(Top from L to R) Coordination meeting with consultants of NCC Project – Disaster Management Team (Jan 16); During the emergency meeting re: Taal Volcano eruption called for by RDRRMC-3 (Jan 13); Installation of AWS in the municipality of Paniqui, Tarlac (Jan 30); Site inspection of the requested lot from the Municipality of San Ildefonso for the proposed synoptic station in the Province of Bulacan (Aug 12)

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



An initial draft report entitled "Annual Hydrological Data Summary of the Pampanga River Basin Flood Forecasting & Warning Center, Yearbook 2019" was started in 2020. The report is a summary account of the rainfall and water levels (hydrological data) of the PRFFWC for 2019. The report, however, will undergo some revisions as new records from the data loggers were recently received augmenting the 2019 data set.

PRFFWC plans to come-out with other annual data summary reports of the other previous years starting from year 2009 following PRFFWC's total systems rehabilitation and its transfer of operations centers' to the City of San Fernando, Pampanga in March 2009.

PRFFWC also came out with the Event Proceedings of the VTC / Webinar for PAGASA River Basin Flood Forecasting & Warning Centers with a titled theme "Operational River Basin Center Flood Forecasting & Warning Services under the New Normal". The said proceedings can be accessed in the PRFFWC website as follows: http://prffwc.synthasite.com/resources/Proceedings-VTC%20for%20River%20basin%20centers-2020.pdf



PRFFWC production 2020 Previous annual reports available at the following link: http://prffwc.synthasite.com/annual-reports.php

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