



**Mekong River Commission**

# **Weekly Wet Season Situation Report in the Lower Mekong River Basin 16 – 22 July 2024**

Prepared by  
The Regional Flood and Drought Management Centre  
23 July 2024

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# Key Messages

**Key messages for this weekly report are presented below.**

## **Rainfall monitoring and forecast**

- In the period of 16 – 22 July 2024, light to heavy rainfall has been observed over the LMB. Especially, heavy to very heavy rainfall has been observed over the LMB including Nong Khai, Muong Mai, Paksane, Khong Chiam, Saravanne, Kratie...
- From 23 – 29 July 2024, the accumulated rainfall over the entire Lower Mekong Basin is distributed with light to heavy rain. Moderate rainfall is expected in the central parts of the LMB, the northeastern part of Cambodia, and the 3S Basin of Sekong, Sesan, and Srepok. Heavy rainfall is likely to occur in certain areas such as Paksane, Thakhek, and Pakse (Lao PDR); and the upper part of the 3S Basin (Sekong Basin).

## **Water level monitoring and forecast**

- At 22 key monitoring stations along the Mekong mainstream from 16 – 22 July 2024, water levels are normal, and the flow threshold (PMFM 6C) are under normal conditions. It is also the same condition for Tan Chau and Chau Doc monitoring stations, which are significantly influenced by sea tidal fluctuation.
- In the period of 23 – 27 July 2024, Water levels at all station are forecasted to be increasing. At Tan Chau and Chau Doc stations, the water levels are predicted to be also fluctuated, resulting from the influence of sea tidal patterns. Almost all stations from Vientiane stations downward are expected to reach above their long-term average (LTAs).

## **Drought condition and forecast**

- During 16-22 July 2024, the LMB was generally normal in all parts of the region. No significant impact of drought was detected for the current work.
- From July to September 2024, it is expected to bring drought conditions to certain areas of the LMB. In July, eastern Cambodia, 3S area, and northern Lao PDR are the most severe areas. In August, severe and exceptional droughts are forecasted for the upper part of the LMB. Other areas are likely normal or wet. In September, moderate to severe drought is forecasted for the northern Cambodia and 3S area, while other areas are likely normal or wet.

# 1 Introduction

This Weekly Wet Season Situation Report presents a preliminary analysis of the weekly hydrological situation in the Lower Mekong River Basin (LMB) for **16 – 22 July 2024**. The trend and outlook for water levels are also presented.

This analysis is based on the daily hydro-meteorological data provided by the Mekong River Commission (MRC) Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – and on satellite data. The water level indicated in this report refers to an above zero gauge of each station.

The report covers the following topics that are updated weekly:

- General weather patterns, including rainfall patterns over the LMB.
- Water levels in the LMB, including in the Tonle Sap Lake.
- Flash flood and drought situation in the LMB.
- Weather, water level and flash flood forecast, and
- Possible implications.

Mekong River water levels are updated daily and can be accessed from:

<http://ffw.mrcmekong.org/bulletin.php>.

Drought monitoring and forecasting information is available at:

<http://droughtforecast.mrcmekong.org>

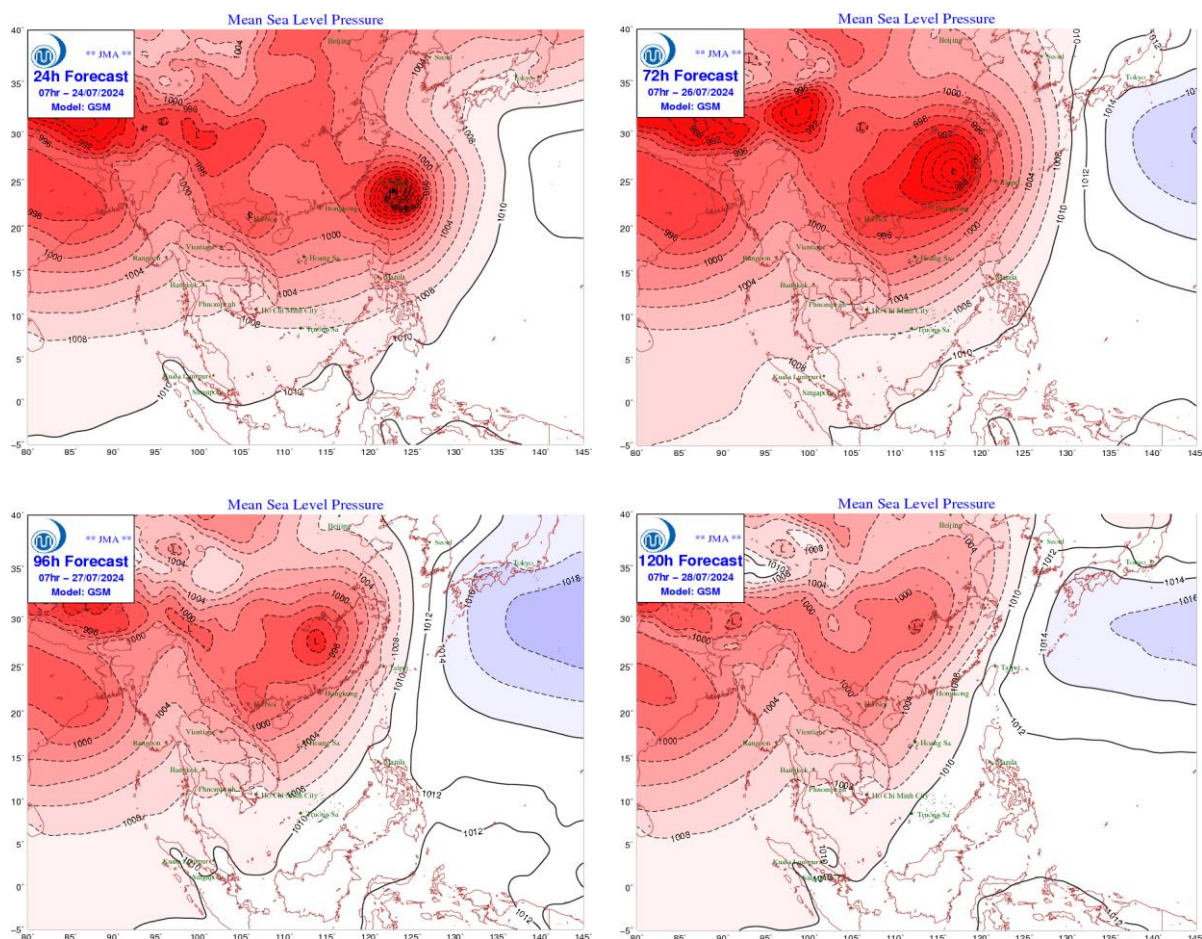
Flash flood information is accessible at: <http://ffw.mrcmekong.org/ffg.php>



## 2 General Weather Patterns

During the last week, from 19 July, the tropical depression formed in the East Sea and strengthened into a tropical storm (namely, **Prapiroon**), moved toward the west-northwest direction, then gradually weakened after entering the Vietnam-China border area. However, the LMB was not directly impacted by this tropical storm. During 16 – 22 July 2024, light to heavy rainfall has been observed over the LMB. Especially, heavy to very heavy rainfall has been observed over the LMB including Nong Khai, Muong Mai, Paksane, Khong Chiam, Saravanne, Kratie...

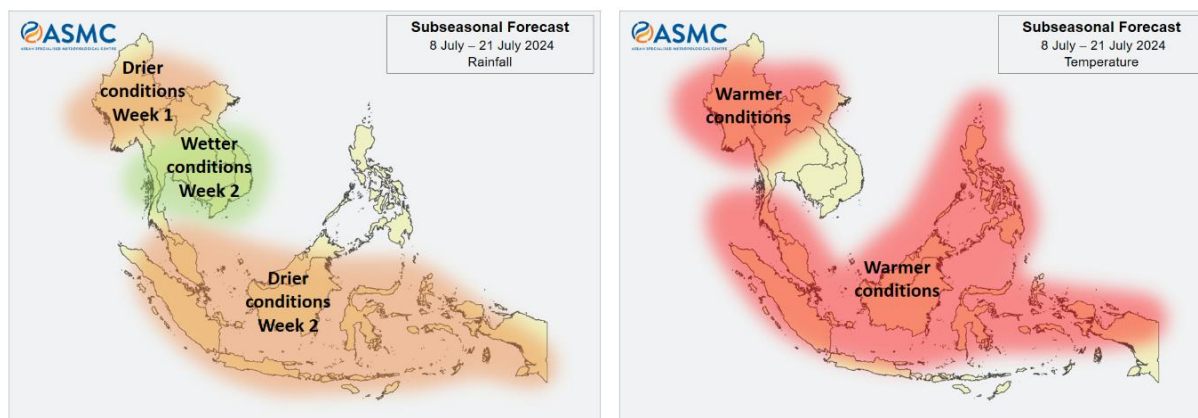
**Figure 1** presents the mean sea level pressure over the region. It is forecasted that the moderate southwest monsoon and the low pressure will be impacted on the Lower Mekong Basin from 23 - 29 July. Therefore, in the upcoming seven days, the Lower Mekong Basin is expected to experience light to heavy rainfall, especially the isolated heavy rainfall that may occur in Bolikhamxai, Khammuane, and Champasak (Laos); and the upper part of 3S Basin (Sekong basin).



**Figure 1: Weather conditions over the LMB**

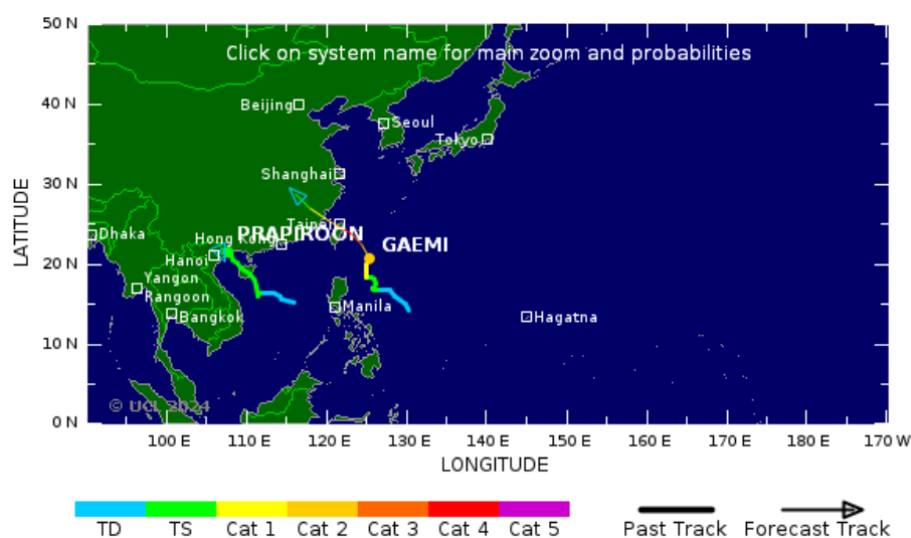
According to the ASEAN Specialised Meteorological Centre (ASMC, <http://asmc.asean.org/home/>), the subseasonal weather outlook (08 – 21 July 2024) indicates that entire Lower

Mekong Basin (LMB) is likely in in drier conditions in the upper part for 1<sup>st</sup> week and followed by wetter condition at the lower part for 2<sup>nd</sup> week. The warmer conditions will be expected in the upper part of LMB during abovementioned period. **Figure 2** shows the outlook of weather condition from 08 – 21 July 2024 in Southeast Asia based on results from the NCEP model (National Centres for Environmental Prediction).



**Figure 2: Outlook of wet and dry conditions over the Asian countries by ASMC.**

Based on the tropical storm risk (TS) (<https://www.tropicalstormrisk.com/>), there are two active NW pacific system as of 22 July 2024 as displayed in **Figure 3**.



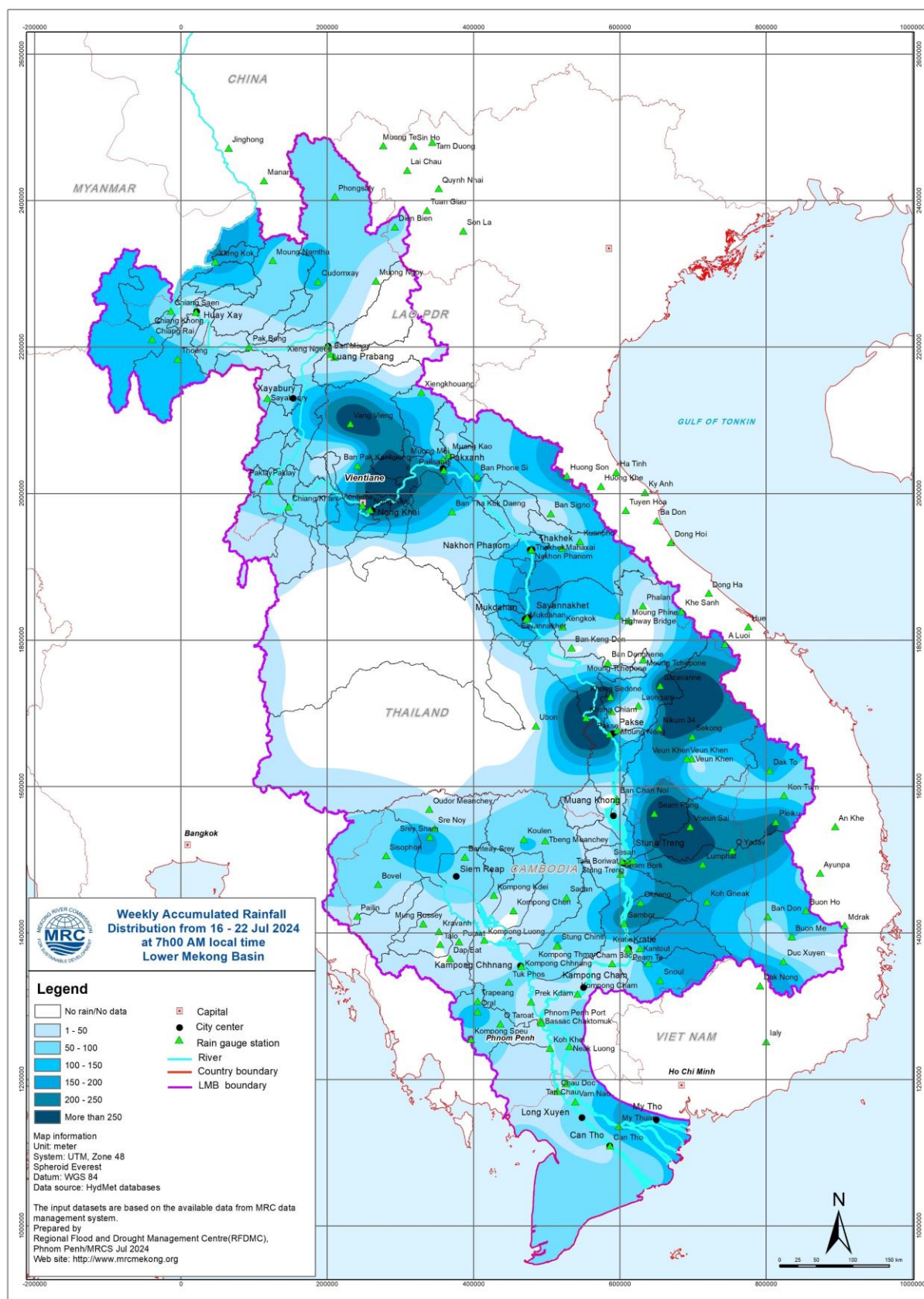
**Figure 3: One tropical storm risk observed on 22 July 2024**

### 3. Rainfall and Water Level Monitoring

#### 3.1. Rainfall monitoring

The weekly accumulated rainfall is based on the observed data provided by the MRC Member Countries – Cambodia, Lao PDR, Thailand, and Viet Nam – from 16 - 22 July 2024 (**Figure 4**). Light to heavy rainfall has been observed over the LMB. Especially, due to the impact from the

low pressure, heavy to very heavy rainfall has been observed over the LMB including Vientiane, Paksane, Khong Chiam, Pakse and the 3S basins.



**Figure 4: Weekly rainfall distribution over the LMB during 16 – 22 July 2024**



### 3.2. Water level monitoring

The hydrological regimes of the Mekong mainstream are illustrated by recorded water levels and flows at key mainstream stations: at Chiang Saen to capture mainstream flows entering from the Upper Mekong Basin (UMB); at Vientiane to present flows generated by climate conditions in the upper part of the LMB; at Pakse to investigate flows influenced by inflows from the larger Mekong tributaries; at Kratie in Cambodia to capture overall flows of the Mekong Basin; and at Viet Nam's Tan Chau and Chau Doc to monitor flows to the Delta.

The key stations along the LMB and their respective model application for River Flood Forecasting during the wet season from June to October and River Monitoring during the dry season from November to May are presented in **Figure 5**. The hydrograph for each key station is available from the MRC's River Flood Forecasting: <http://ffw.mrcmekong.org/overview.php>.

During 16 – 22 July 2024, the observed water level (WL) at Jinghong hydrological station<sup>1</sup>, was almost constant and ranges between 536.42 m and 536.48 m, which are corresponding to the outflow between 1,690.00 m<sup>3</sup>/s to 1,730.00 m<sup>3</sup>/s (recorded on 7:00 am), respectively (**Figure 6**). The water level in Chiang Saen station also indicated a slight fluctuation ranging from 3.56 m to 3.70 m. At the same period, the water level in Luang Prabang station also slightly increased with an approximate value of 0.24 m from 9.9 m to 10.14 m as compared to the previous week.

During the same period, the water levels observed at all monitoring stations have significantly increased due to high rainfall in the entire basin. At Chiang Khan, Vientiane, Nongkhai, Paksane, Nakhon Phanom, Thakhek, Mukdahan, Savannakhet, Khong Chiam, and Pakse, water level have 6.31 m to 7.54 m, 4.1 m to 5.36 m, 3.65 m to 5.2 m, 6.52 m to 7.72 m, 6.03 m to 7.03 m, 7.13 m, to 8.0 m, 3.85 m to 5.2 m, 6.06 m to 9.25 m and 4.61 m to 8.12 m, respectively. In addition, moving downward, water levels at Stung Treng, Kratie, kampong Cham Phnom Penh Bassac, Phnom Penh Port, Koh Khel, Neak Luong and Prek Kdam have also increased significantly from 5.55 m to 8.12 m, 13.12 m to 17.37 m, 6.75 m to 10.1 m, 3.66 m to 5.8 m, 2.53 m to 4.7 m, 3.54 m to 5.35 m, 2.5 m to 3.9 m, and 2.74 m to 4.62 m, respectively.

Similar to the previous week, the water levels from 16 to 22 July 2024 at Viet Nam's Tan Chau and Chau Doc fluctuated between their LTA values due to daily tidal effects from the sea. At the Tan Chau station, the water levels varied between 0.51 m and 1.59 m, while at the Chau Doc station, they ranged from 0.77 m to 1.54 m.

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<sup>1</sup> Near-real time data of hydro-meteorological monitoring at the Jinghong hydrological station is available at <https://portal.mrcmekong.org/monitoring/river-monitoring-telemetry>.

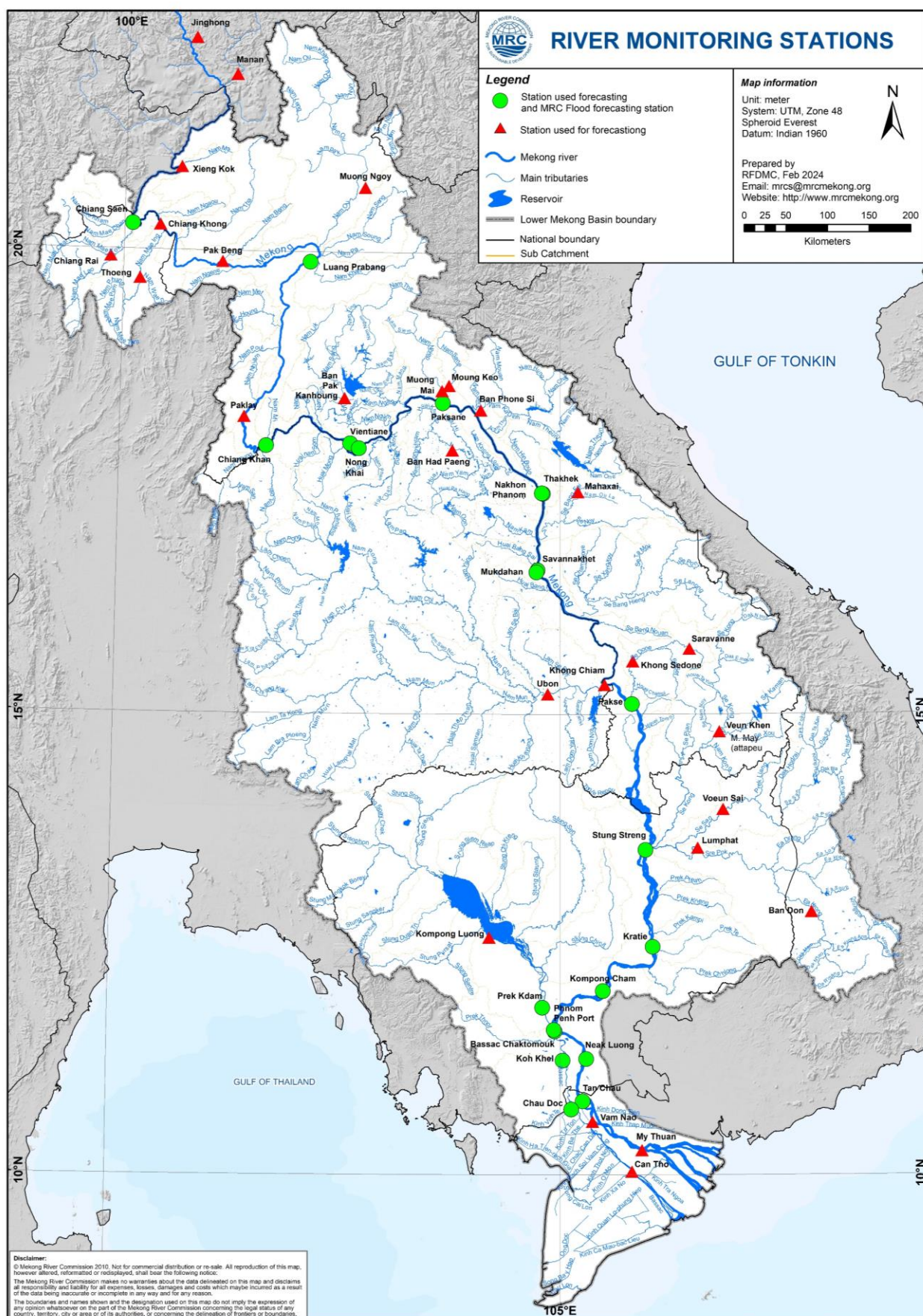
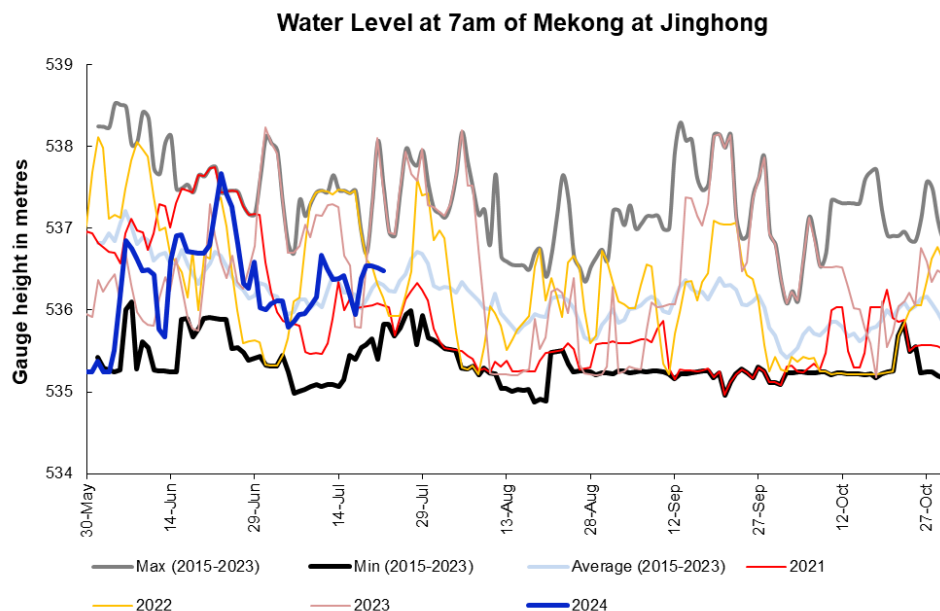


Figure 5: The key stations along LMB for river flood forecasting

The water levels in key monitoring stations on 22 July 2024 are below their long-term averages (LTAs) except for the Luang Prabang station. Moreover, all stations with available PMFM (Article 6C) thresholds are in normal conditions. The graphics of water level monitoring in all key stations are presented in **Annex A** and the weekly water levels and rainfall at each key station are summarised in **Annex B**.



**Figure 6. Water level at the Jinghong hydrological station up to 22 July 2024.**

At the end of the wet season, when water levels along the Mekong River subside, the outflow of the Tonle Sap Lake (TSL) returns to the Mekong River and then to the Delta. This phenomenon normally takes place between September and October. Based on flow observation at Prek Kdam monitoring station, the inflow/reverse of the Tonle Sap Lake took place since 29 June 2024.

The outflow flow is calculated based on a formula of rating-curves using by difference of water levels at Kompong Luong and Phnom Penh Port stations for slop and Prek Kdam as cross-section of the Lake. The formula of flow is as follows:

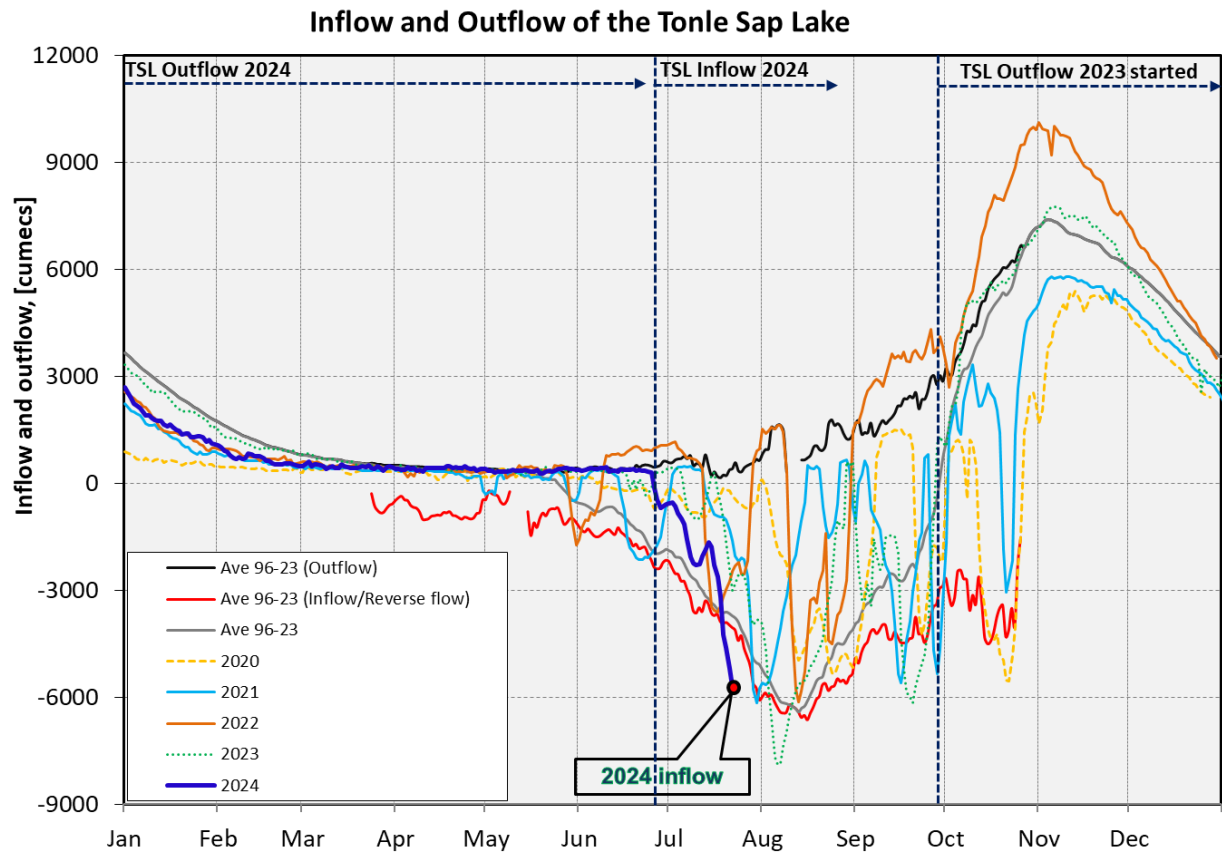
$$Flow = WL_{Prek\ Kdam}^{1.2} \times \sqrt{|WL_{Phnom\ Penh\ Port} - WL_{Kompong\ Luong}|}$$

Where, WL is water level in m (msl).

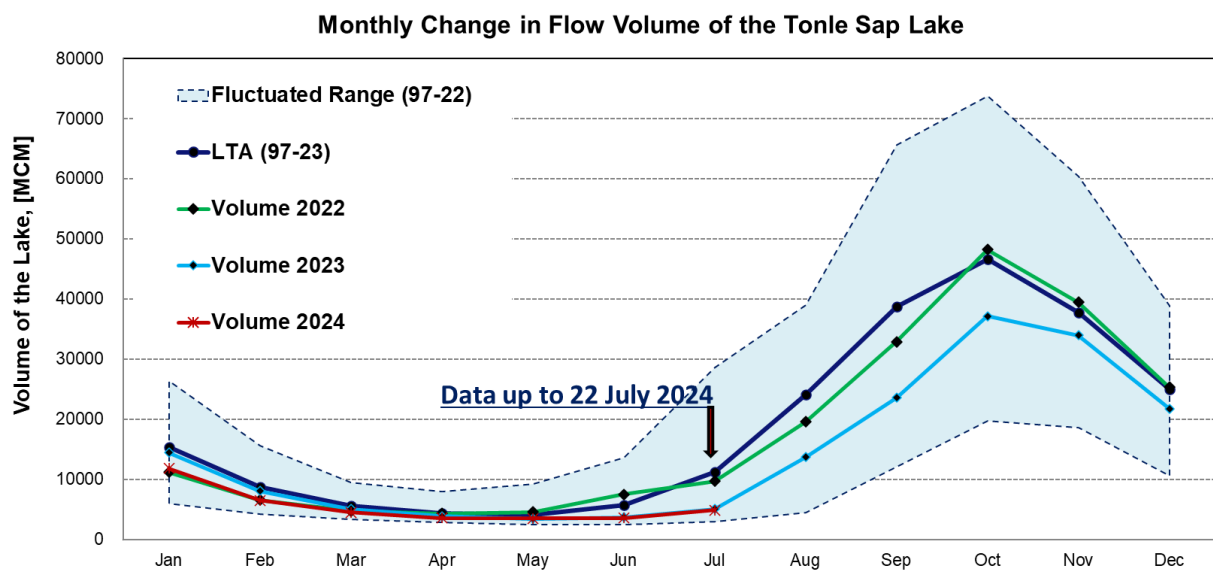
The seasonal changes of the inflow/reverse flow and the outflow of the TSL at Prek Kdam in comparison with the flows of 2020, 2021 and 2022, 2023 and their LTA level (1997-2023) are illustrated in **Figure 8**. Up to 22 July 2024, it was observed that the main outflow to Tonle Sap Lake decreased due to limited rainfall and less inflows from upstream (**Figure 8**). This decreased outflow of Tonle Sap Lake was most likely caused by low inflows from its tributaries.



The seasonal changes in monthly flow volumes up to 22 July 2024 for the TSL compared with that in 2020, 2021, 2022, 2023 and their LTAs, and the fluctuation levels (1997–2023) are presented in **Table 8**. The mean monthly water volume of the Tonle Sap Lake in June 2024 is lower than its LTA (about 62.92 %), 2023 and 2022 but higher than that in 2019, and 2020 during the same period (**Figure 8 and Table 1**).



**Figure 7: Seasonal change of inflows and outflows of Tonle Sap Lake.**



**Figure 8. The seasonal change in monthly flow volume of Tonle Sap Lake.**

**Table 1. The monthly change in the flow volume of Tonle Sap Lake.**

Month	LTA (97-22) [MCM]	Max Volume [MCM]	Min Volume [MCM]	Volume 2019 [MCM]	Volume 2020 [MCM]	Volume 2021 [MCM]	Volume 2022 [MCM]	Volume 2023 [MCM]	Volume 2024 [MCM]	Volume in 2024 [%], compared with its LTA
Jan	15322.86	26357.53	5906.80	10285.31	5906.80	9923.80	11214.32	14422.11	11824.86	77.17
Feb	8723.39	15596.22	4198.60	6019.30	4264.19	5832.97	6558.79	8069.29	6505.88	74.58
Mar	5602.68	9438.24	3347.07	4354.62	3553.99	4264.88	4736.52	5080.64	4488.23	80.11
Apr	4327.36	8009.14	2866.91	3667.47	2992.61	3556.68	4288.31	3884.16	3569.01	82.48
May	4027.82	9176.93	2417.81	3266.43	2594.92	3240.78	4556.83	3438.66	3517.79	87.34
Jun	5699.50	13635.01	2468.70	3517.06	2641.88	3798.29	7489.04	3689.97	3586.07	62.92
Jul	11188.79	28599.56	2925.86	4001.99	2925.86	5346.73	9703.79	5062.21	4842.27	43.28
Aug	24070.98	39015.12	4433.46	7622.71	5941.07	10547.80	19554.70	13694.57		
Sep	38787.47	65632.35	12105.31	24194.19	12105.31	16382.34	32860.34	23550.60		
Oct	46562.09	73757.23	19705.50	30358.38	20799.13	27318.21	48199.12	37141.40		
Nov	37739.30	60367.33	18534.61	19112.65	27546.80	28982.93	39452.53	33929.52		
Dec	25009.52	38888.95	10563.49	10577.29	18251.65	20170.76	25346.65	21757.70		
	Critical situation: lower than long-term minimum values (LTMIN)									
	Normal condition: within the range of long-term min (LTMIN) and max (LTMAX) values									
	Low volume situation: lower than long-term average (LTA)									
Unit: Million Cubic Meter (1 MCM= 0.001 Km <sup>3</sup> )										

**Remarks:** the volume of Tonle Sap Lake in 2024 is updated until 22 July 2024.

## 4. Flash Flood in the Lower Mekong Basin

During the weekly monitoring period from 16 – 22 July, the LMB received light to very heavy rain and thunderstorms in some areas.

According to the Southeast Asian Flash Flood Guidance System (SEAFFGS) and analysis, flash flood guidance was detected high level in the next 1, 3, and 6 hours in some areas of Cambodia, Lao PDR, and Viet Nam during this period, the reporting period as shown in [Figure 14](#) and [Table 2](#).

**Table 2. Detected low-risk flash flood in the LMB on 22 July**

FLASH FLOOD GUIDANCE IN THE LOWER MEKONG BASIN								
In the next 01 hour			In the next 03 hour			In the next 06 hour		
Province	District	Level of FFG	Province	District	Level of FFG	Province	District	Level of FFG
Kampong Cham	Stueng Trang	moderate	Kampong Cham	Stueng Trang	moderate	Kampong Cham	Stueng Trang	moderate
Kampong Cham	Chamkaar Leu	moderate	Kampong Cham	Prey Chhor	moderate	Kampong Cham	Prey Chhor	moderate
Kampong Cham	Prey Chhor	moderate	Kampong Cham	Chamkaar Leu	moderate	Kampong Cham	Chamkaar Leu	moderate
Kampong Chhnang	Chol Kiri	moderate	Kampong Cham	Kampong Siem	moderate	Kampong Cham	Kampong Siem	moderate
Kampong Chhnang	Kampong Tralach	moderate			moderate			moderate



FLASH FLOOD GUIDANCE IN THE LOWER MEKONG BASIN								
In the next 01 hour			In the next 03 hour			In the next 06 hour		
Province	District	Level of FFG	Province	District	Level of FFG	Province	District	Level of FFG
Kratie	Sambour	moderate	Kratie	Preaek Prasab	moderate	Kratie	Preaek Prasab	moderate
Kratie	Snuol	moderate	Kratie	Snuol	high	Kratie	Snuol	high
Kratie	Chhloung	moderate	Kratie	Sambour	moderate	Kratie	Sambour	moderate
Mondul Kiri	Kaoh Nheak	moderate	Mondul Kiri	Kaoh Nheak	moderate	Mondul Kiri	Kaoh Nheak	moderate
Mondul Kiri	Pechr Chenda	moderate	Mondul Kiri	Pechr Chenda	moderate	Mondul Kiri	Pechr Chenda	moderate
Mondul Kiri	Ou Reang	moderate	Mondul Kiri	Ou Reang	moderate	Mondul Kiri	Ou Reang	moderate
Mondul Kiri	Kaev Seima	moderate	Mondul Kiri	Kaev Seima	moderate	Mondul Kiri	Kaev Seima	moderate
Ratana Kiri	Ta Veang	high	Ratana Kiri	Ta Veang	moderate	Ratana Kiri	Ta Veang	high
Ratana Kiri	Veun Sai	moderate	Ratana Kiri	Veun Sai	moderate	Ratana Kiri	Veun Sai	high
Ratana Kiri	Andoung Meas	moderate	Ratana Kiri	Andoung Meas	moderate	Ratana Kiri	Andoung Meas	moderate
Ratana Kiri	Ou Chum	high	Ratana Kiri	Ou Chum	moderate	Ratana Kiri	Ou Chum	high
Ratana Kiri	Koun Mom	moderate	Ratana Kiri	Koun Mom	moderate	Ratana Kiri	Koun Mom	moderate
Ratana Kiri	Ou Ya Dav	high	Ratana Kiri	Ou Ya Dav	moderate	Ratana Kiri	Ou Ya Dav	high
Ratana Kiri	Lumphat	high	Ratana Kiri	Lumphat	moderate	Ratana Kiri	Lumphat	high
Stung Treng	Siem Pang	moderate	Stung Treng	Siem Pang	moderate	Stung Treng	Siem Pang	moderate
Stung Treng	Sesan	high	Stung Treng	Sesan	moderate	Stung Treng	Sesan	moderate

FLASH FLOOD GUIDANCE IN THE LOWER MEKONG BASIN								
In the next 01 hour			In the next 03 hour			In the next 06 hour		
Province	District	Level of FFG	Province	District	Level of FFG	Province	District	Level of FFG
Attapeu	Sanxay	moderate	Attapeu	Sanxay	high	Attapeu	Sanxay	high
Attapeu	Sanamxay	high	Attapeu	Sanamxay	high	Attapeu	Sanamxay	high
Attapeu	Phouvong	moderate	Attapeu	Xaysetha	moderate	Champasak	Sanasombo	moderate
Bokeo	Pha Oudo	moderate	Champasak	Sanasombo	moderate	Champasak	Phonthong	moderate
Bolikhamxay	Viengthong	moderate	Champasak	Phonthong	moderate	Champasak	Paksong	high
Bolikhamxay	Bolikhanh	moderate	Champasak	Paksong	high	Champasak	Champasac	moderate
Bolikhamxay	Pakkading	moderate	Champasak	Champasac	moderate	Champasak	Sukuma	moderate
Champasak	Sanasombo	moderate	Champasak	Sukuma	moderate	Champasak	Moonlapam	moderate
Champasak	Phonthong	moderate	Champasak	Moonlapam	moderate	Khammuane	Nakai	high
Champasak	Bachiangc	moderate	Khammuane	Nakai	moderate	Khammuane	Bualapha	moderate
Champasak	Pathoomph	moderate	Khammuane	Nhommalat	moderate	Luangprabang	Ngoi	moderate
Champasak	Paksong	moderate	Khammuane	Bualapha	moderate	Saravane	Vapy	moderate
Champasak	Phonthong	moderate	Khammuane	Mahaxay	moderate	Saravane	Lakhoneph	moderate
Champasak	Moonlapam	moderate	Luangprabang	Ngoi	moderate	Saravane	Khongxedo	moderate
Khammuane	Nakai	moderate	Saravane	Ta oi	moderate	Savannakhet	Vilabuly	moderate
Khammuane	Bualapha	moderate	Saravane	Vapy	moderate	Savannakhet	Phine	moderate
Khammuane	Nhommalat	moderate	Saravane	Lakhoneph	moderate	Xayaboury	Paklai	high
Khammuane	Mahaxay	moderate	Saravane	Khongxedo	moderate	Xiengkhuang	Morkmay	moderate
Khammuane	Xaybouath	moderate	Saravane	Saravane	moderate			
Luangprabang	Ngoi	moderate	Savannakhet	Vilabuly	moderate			
Saravane	Toomlarn	moderate	Savannakhet	Phine	moderate			
Saravane	Ta oi	moderate	Savannakhet	Thapangth	moderate			
Saravane	Lakhoneph	moderate	Vientiane	Keo oudom	moderate			
Saravane	Vapy	moderate	Vientiane	Xanakham	moderate			
Saravane	Khongxedo	moderate	Xayaboury	Phieng	moderate			
Saravane	Saravane	moderate	Xayaboury	Paklai	moderate			
Savannakhet	Vilabuly	moderate	Xiengkhuang	Morkmay	moderate			
Savannakhet	Phine	moderate						
Savannakhet	Champhone	moderate						
Savannakhet	Thapangth	moderate						
Vientiane	Kasy	moderate						
Vientiane	Vangvieng	moderate						
Vientiane	Keo oudom	moderate						
Vientiane	Xanakham	moderate						
Xayaboury	Phieng	moderate						
Xayaboury	Paklai	high						
Xaysomboun	Phoun	moderate						

FLASH FLOOD GUIDANCE IN THE LOWER MEKONG BASIN								
In the next 01 hour			In the next 03 hour			In the next 06 hour		
Province	District	Level of FFG	Province	District	Level of FFG	Province	District	Level of FFG
Xiengkhuang	Pek	moderate						
Xiengkhuang	Souy	moderate						
Xiengkhuang	Morkmay	moderate						

FLASH FLOOD GUIDANCE IN THE LOWER MEKONG BASIN								
In the next 01 hour			In the next 03 hour			In the next 06 hour		
Province	District	Level of FFG	Province	District	Level of FFG	Province	District	Level of FFG
Kon Tum	Dak To	moderate	Kon Tum	Dak To	moderate	Kon Tum	Dak To	moderate
Kon Tum	Sa Thay	high	Kon Tum	Sa Thay	high	Kon Tum	Sa Thay	high
Kon Tum	Dak Glei	moderate	Gia Lai	Chu Pah	moderate	Gia Lai	Chu Pah	high
Gia Lai	Mang Yang	moderate	Gia Lai	Ia Grai	moderate	Gia Lai	Ia Grai	moderate
Gia Lai	Chu Pah	moderate	Gia Lai	Mang Yang	moderate	Gia Lai	Mang Yang	moderate
Gia Lai	Duc Co	moderate	Gia Lai	Duc Co	high	Gia Lai	Duc Co	high
Gia Lai	Chu Prong	high	Gia Lai	Chu Prong	moderate	Gia Lai	Chu Prong	moderate
Gia Lai	Chu Se	moderate	Dak Lak	Ea Sup	moderate	Dak Lak	Krong A Na	moderate
Gia Lai	Ia Grai	high	Dak Lak	Buon Don	moderate			
Dak Lak	Ea Sup	moderate	Dak Lak	Krong A Na	moderate			
Dak Lak	Buon Don	moderate						
Dak Lak	Cu M'Gar	moderate						
Dak Lak	TX. Buon Ma Thuot	moderate						
Dak Lak	Dak Mil	moderate						
Dak Lak	Krong A Na	moderate						

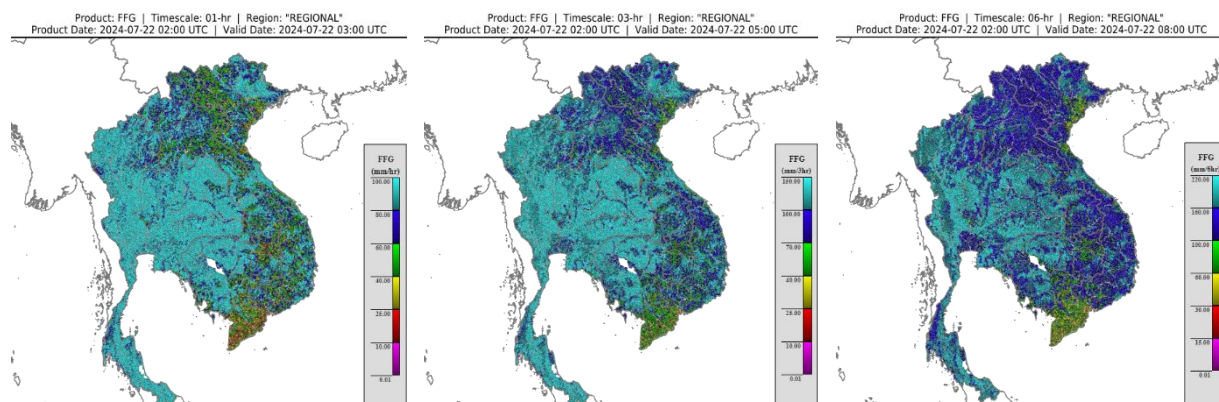


Figure 9. Flash Flood Guidance for the next 1-hr, 3-hr, and 6-hr on 22 July

## 5. Drought Monitoring in the Lower Mekong Basin

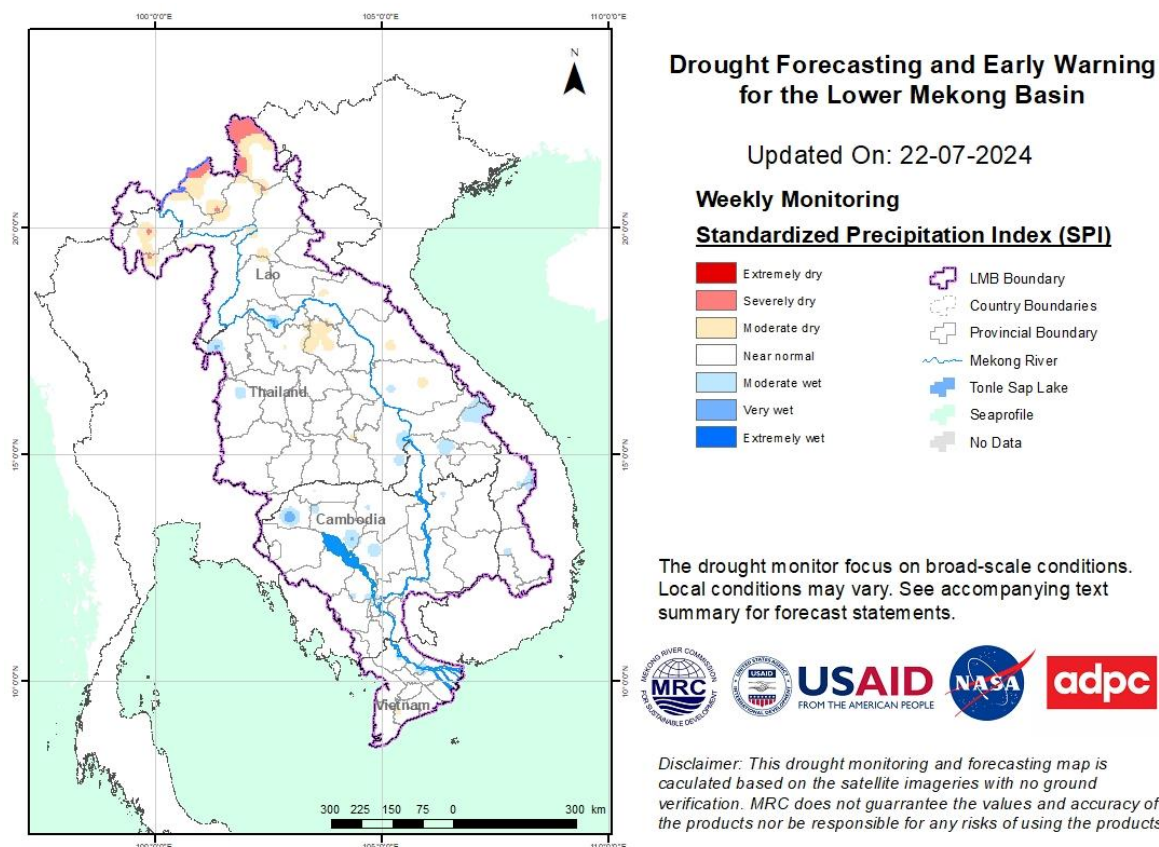
### 5.2. Weekly drought monitoring from 16 to 22 July 2024

Drought monitoring data for 2024 are available from Monday to Sunday every week; thus, the reporting period is normally delayed by one day compared to Flood and Flash Flood reports.

We adopt the Index of Soil Water Fraction (ISWF) data obtained from FFGS to represent soil moisture of agricultural indicator for both dry and wet seasons.

- **Weekly Standardised Precipitation Index (SPI1)**

As indicated in **Figure 10** below, during July 16 to 22, the LMB was facing some moderate and severe meteorological droughts in the northern and middle parts. Severe meteorological drought was taking place in Phongsaly and Louangnamtha of Lao PDR.

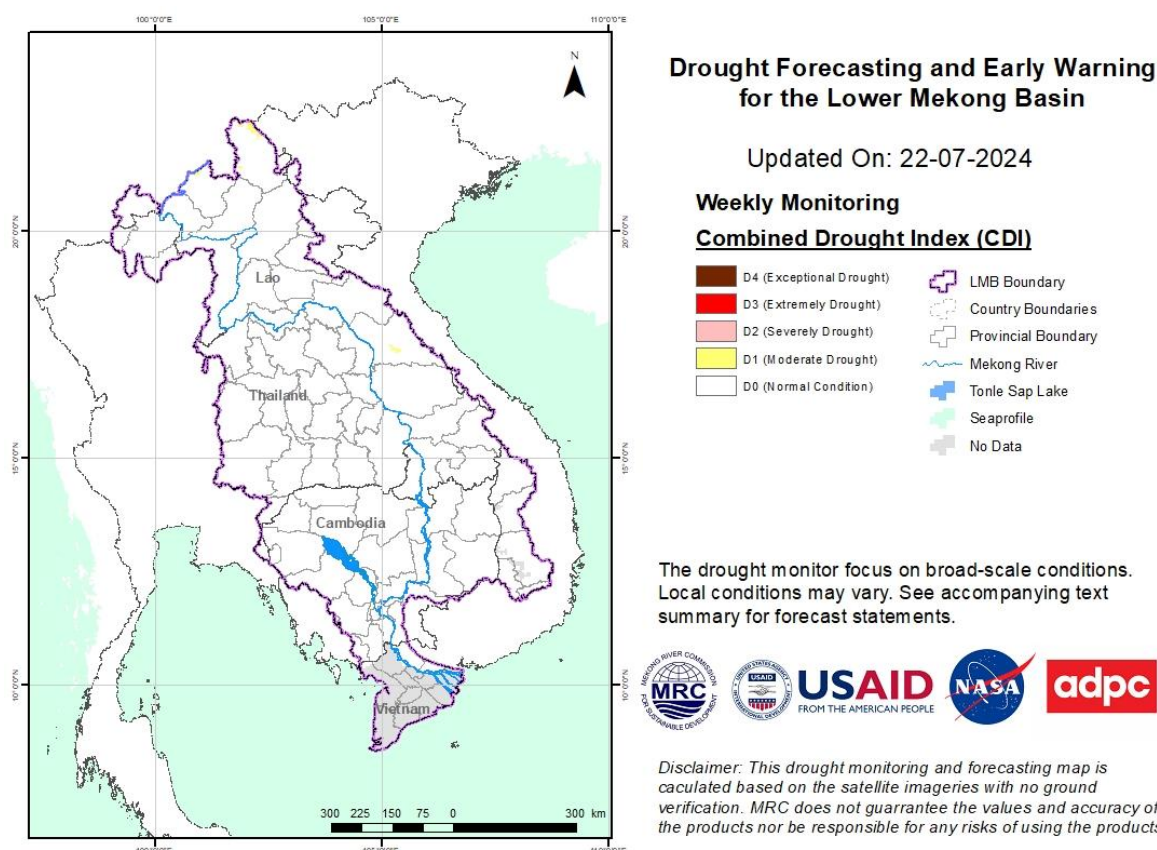


**Figure 10: Weekly standardized precipitation index from July 16 to 22.**

- **Weekly Index of Soil Water Fraction (ISWF)**

There was no agricultural drought taking place during the monitoring week from 16 to 22 July, see **Figure 10**.





**Figure 12: Weekly Combined Drought Index from July 16 to 22.**

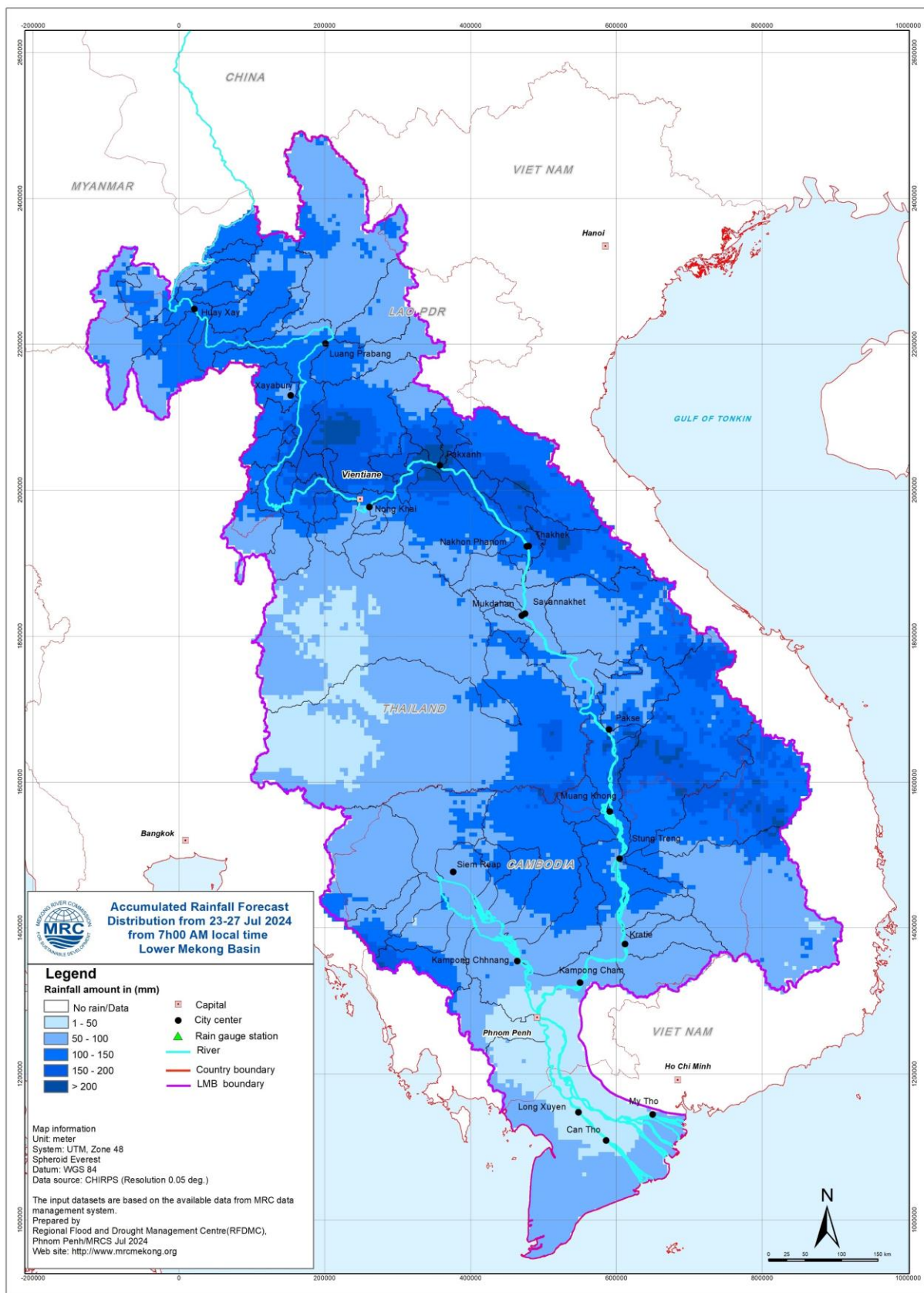
More information on Drought Forecasting and Early Warning (DFEW) as well as the explanation is available here: <http://droughtforecast.mrcmekong.org/templates/view/our-product>. DFEW provides not only weekly monitoring and forecasting information but also a three-month forecast of drought indicators with seasonal outlook which are updated every month based on international weather forecast models. Details on drought forecast are described in section 6.4 of this report.

## 6 Weather and Water Level Forecast and Flash Flood information

### 6.1 Rainfall forecast

From 23 to 27 July 2024, the accumulated rainfall over the entire Lower Mekong Basin is distributed with light to heavy rain based on CHIRPS-GFS (**Figure 12**). Moderate rainfall is expected to occur in most parts of the LMB. The isolated heavy rainfall may occur in the central parts of the LMB including Paksane, Khong Chiam (Thailand); and Pakse (Laos); the 3S Basins of Sekong, Sesan, and Srepok.





**Figure 13: Accumulated rainfall forecast from CHIRPS-GFS (23 – 27 July 2024)**

## 6.2 Water level forecast

In Chiang Saen monitoring station, the water level is expected to be fluctuated over the forecasting period of 23 – 27 July 2024. However, it will slightly increase from 3.70 m to 3.79 m. The water levels in Luang Prabang affected by backwater is likely increasing approximately 0.43 m.

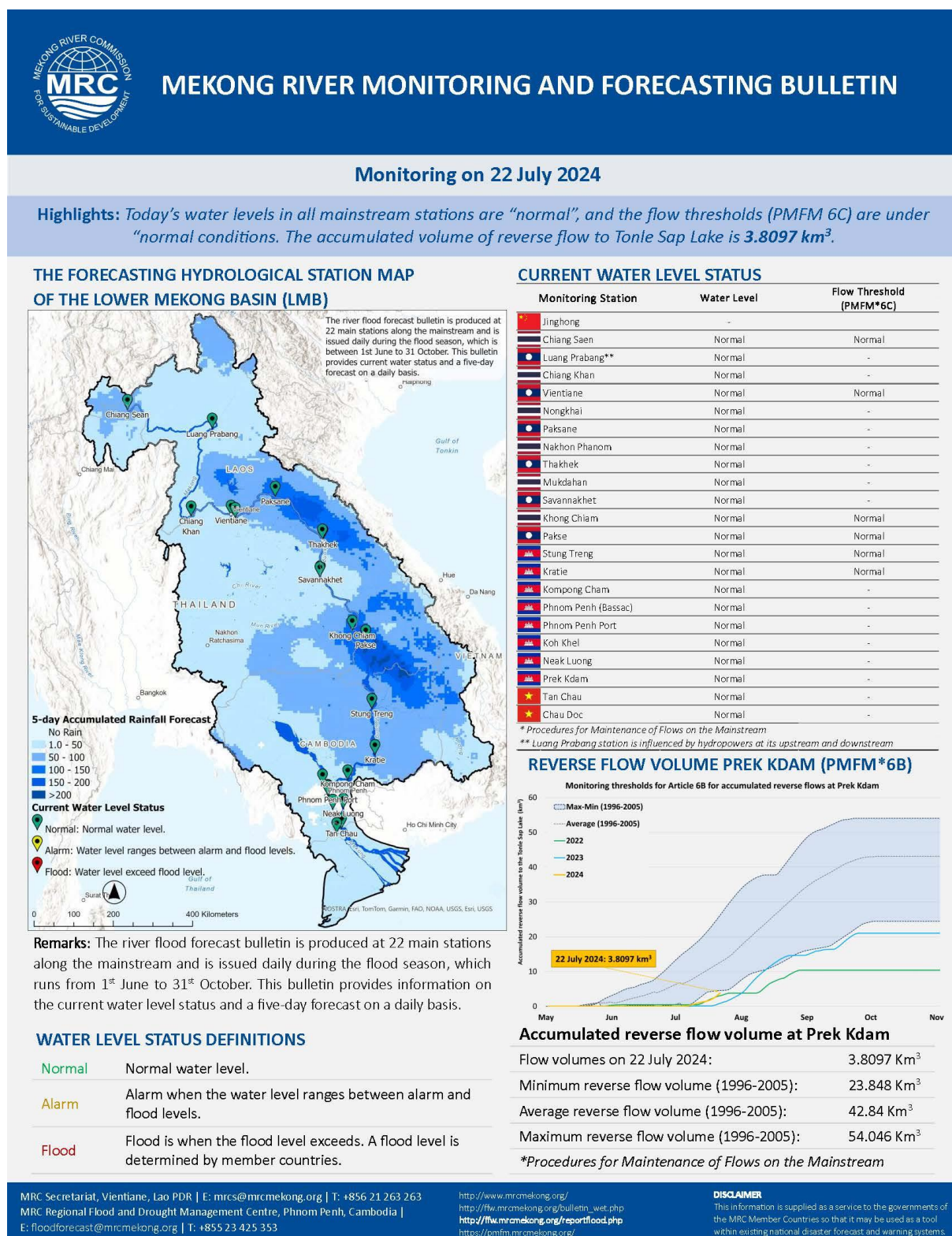
Along the Mekong mainstream, the water levels at all forecasting stations are expected to increase. At Chiang Khan, Vientiane, Nongkhai, Paksane, Nakhon Phanom, Thakhek, Mukdahan, Savannakhet, Khong Chiam, and Pakse stations, water levels are expected to increase approximately 0.76 m, 0.94 m, 1.09 m, 0.90 m, 0.64 m, 0.77 m, 0.80 m, 0.72 m, 0.87 m and 0.80 m, respectively. At stations located from Stung Treng to Prek Kdam stations, water levels are also likely increasing. At Stung Treng, Kratie, Kompong Cham, Phnom Penh (Bassac), Phnom Penh Port, Koh Khel, Neak Luong and Prek Kdam, water level is likely rise with approximated value of 0.87 m, 2.25 m, 2.07 m, 1.41 m, 0.55 m, 1.05 m, 0.88 m, and 1.15 m, respectively as compared to the previous week.

For the Tan Chau station on the Mekong River and Chau Doc station on the Bassac River, water levels will be fluctuating approximately ranging from 1.59 to 0.45 m and 1.54 to 0.50 m, respectively, following daily tidal effects from the sea.

The water levels at key stations are forecasted to be below their LTAs from 23 to 27 July 2024.

The weekly River Monitoring Bulletin and forecasting issued on 22 July 2024 can be found in **Table 2**. Results of the weekly river monitoring and forecasting bulletin are also available at <http://ffw.mrcmekong.org/bulletin.php>

Table 3. River Monitoring and Forecasting Bulletin



MRC Secretariat, Vientiane, Lao PDR | E: [mrcs@mrcmekong.org](mailto:mrcs@mrcmekong.org) | T: +856 21 263 263

MRC Regional Flood and Drought Management Centre, Phnom Penh, Cambodia | E: [floodforecast@mrcmekong.org](mailto:floodforecast@mrcmekong.org) | T: +855 23 425 353
























<http://www.mrcmekong.org/>  
[http://flw.mrcmekong.org/bulletin\\_wet.php](http://flw.mrcmekong.org/bulletin_wet.php)  
<http://flw.mrcmekong.org/reportflood.php>  
<https://pmfm.mrcmekong.org/>

**DISCLAIMER**  
This information is supplied as a service to the governments of the MRC Member Countries so that it may be used as a tool within existing national disaster forecast and warning systems.



## Forecasting from 23 to 27 July 2024

**Highlights:** In the next five days, it is forecasted that water levels at all the mainstream stations will not reach the “alarm” levels.

Forecasting Station	24 h Observed Rainfall (mm)	Zero gauge above M.S.L (m)	Observed Water Level against zero gauge (m)		Forecasted Water Level (m)					Alarm Level (m)	Flood Level (m)	Forecasted Water Levels Change in 5 days (m)	Max. Water levels change within next 5 days (m)	Min. distance to alarm level within next 5 days (m)	Min. distance to flood level within next 5 days (m)
	21-Jul		21-Jul	22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul						
 Jinghong	27.0	-	536.52	↓ 536.48	-	-	-	-	-	-	-	-	-	-	-
 Chiang Saen	3.2	357.110	3.53	↑ 3.70	↑ 3.86	↓ 3.72	↓ 3.58	→ 3.58	↑ 3.79	11.50	12.80	→ 0.09	0.16	7.64	8.94
 Luang Prabang	1.2	267.195	9.78	↑ 10.14	↑ 10.57	↑ 10.77	→ 10.84	↓ 10.72	↓ 10.57	17.50	18.00	↑ 0.43	0.70	6.66	7.16
 Chiang Khan	1.3	194.118	7.59	↓ 7.54	↑ 7.66	↑ 7.96	↑ 8.18	→ 8.26	→ 8.30	14.50	16.00	↑ 0.76	0.76	6.20	7.70
 Vientiane	1.0	158.040	5.63	↓ 5.36	↓ 5.24	→ 5.31	↑ 5.75	↑ 6.14	↑ 6.30	11.50	12.50	↑ 0.94	0.94	5.20	6.20
 Nongkhai	4.9	153.648	5.45	↓ 4.93	→ 4.92	→ 4.95	↑ 5.42	↑ 5.90	↑ 6.02	11.40	12.20	↑ 1.09	1.09	5.38	6.18
 Paksane	38.8	142.125	7.58	↑ 7.72	↑ 7.85	→ 7.76	↑ 7.86	↑ 8.47	↑ 8.62	13.50	14.50	↑ 0.90	0.90	4.88	5.88
 Nakhon Phanom	12.1	130.961	6.59	↑ 7.08	↑ 7.38	→ 7.42	→ 7.35	↑ 7.50	↑ 7.72	11.50	12.00	↑ 0.64	0.64	3.78	4.28
 Thakhek	14.5	129.629	7.60	↑ 8.00	↑ 8.36	→ 8.42	→ 8.38	↑ 8.52	↑ 8.77	13.00	14.00	↑ 0.77	0.77	4.23	5.23
 Mukdahan	5.8	124.219	6.45	↑ 6.85	↑ 7.04	↑ 7.22	→ 7.29	→ 7.38	↑ 7.65	12.00	12.50	↑ 0.80	0.80	4.35	4.85
 Savannakhet	7.4	124.219	4.80	↑ 5.20	→ 5.28	↑ 5.41	→ 5.46	↑ 5.58	↑ 5.92	12.00	13.00	↑ 0.72	0.72	6.09	7.09
 Khong Chiam	44.0	89.030	8.58	↑ 9.25	↑ 9.66	→ 9.72	→ 9.76	↑ 9.88	↑ 10.12	13.50	14.50	↑ 0.87	0.87	3.38	4.38
 Pakse	43.2	86.490	7.22	↑ 8.12	↑ 8.38	↑ 8.52	↑ 8.65	→ 8.70	↑ 8.92	11.00	12.00	↑ 0.80	0.80	2.08	3.08
 Stung Treng	5.0	36.790	7.24	↑ 8.12	↑ 8.51	↑ 8.79	↑ 8.87	↑ 8.92	↑ 8.99	10.70	12.00	↑ 0.87	0.87	1.71	3.01
 Kratie	0.7	-0.101	16.45	↑ 17.37	↑ 18.54	↑ 18.96	↑ 19.35	↑ 19.51	↑ 19.62	22.00	23.00	↑ 2.25	2.25	2.38	3.38
 Kompong Cham	3.5	-0.930	9.60	↑ 10.10	↑ 10.84	↑ 11.48	↑ 11.83	↑ 12.05	↑ 12.17	15.20	16.20	↑ 2.07	2.07	3.03	4.03
 Phnom Penh (Bassac)	0.0	-1.020	5.48	↑ 5.80	↑ 6.25	↑ 6.57	↑ 6.90	↑ 7.10	↑ 7.21	10.50	12.00	↑ 1.41	1.41	3.29	4.79
 Phnom Penh Port	nr	0.070	4.26	↑ 5.70	↓ 5.06	↑ 5.65	↑ 5.94	↑ 6.14	↑ 6.25	9.50	11.00	↑ 0.55	0.55	3.25	4.75
 Koh Khel	0.0	-1.000	5.20	↑ 5.35	↑ 5.54	↑ 5.89	↑ 6.13	↑ 6.29	↑ 6.40	7.90	8.40	↑ 1.05	1.05	1.50	2.00
 Neak Luong	0.0	-0.330	3.72	↑ 3.90	↑ 4.07	↑ 4.29	↑ 4.52	↑ 4.67	↑ 4.78	7.50	8.00	↑ 0.88	0.88	2.72	3.22
 Prek Kdam	0.0	0.080	4.42	↑ 4.62	↑ 4.81	↑ 5.23	↑ 5.48	↑ 5.67	↑ 5.77	9.50	10.00	↑ 1.15	1.15	3.73	4.23
 Tan Chau	0.0	0.000	1.65	↓ 1.59	↓ 1.35	↓ 1.10	↓ 0.88	↓ 0.62	↓ 0.45	3.50	4.50	↓ -1.14	-1.14	2.15	3.15
 Chau Doc	0.3	0.000	1.75	↓ 1.54	↓ 1.40	↓ 1.15	↓ 0.93	↓ 0.68	↓ 0.50	3.00	4.00	↓ -1.04	-1.04	1.60	2.60

### WATER LEVEL FORECASTING DEFINITIONS

↑	Rising water level.
→	Stable water level: stable water level is defined as a daily change of less than 10cm from Chaing Saen to Savannakhet; less than 5cm at Pakse and Stung Treng; and no more than 3cm from Kratie downstream.
↓	Falling water level.
X	No data available.
Alarm stage	Alarm stage is when the water level ranges between alarm and flood levels.
Flood stage	Flood stage is when the flood level exceeds. A flood level is determined by member countries.

### NOTES

- On **22 July**, water levels at all stations are in normal conditions, which do not reach alarm and flood levels. However, water levels at most of stations from Khong Chiam downward has reached above their LTAs. The **accumulated volume of the reverse flow to Tonle Sap Lake is 3.8097 Km<sup>3</sup>**.
- During **23-27 July**, moderate rainfall is expected to occur from central to eastern parts of the LMB including Lao PDR and north-eastern part of Cambodia and the 3S basins. However, heavy rainfall is likely occurring in areas such as Paksane, Pakse and the 3S basin (Sekong basin).
- For **23-27 July**, water levels at all stations along Mekong mainstream are expected to increase. Water levels at most of stations are expected to continue to be above their long-term averages (LTAs), particularly the stations at the downstream parts of the LMB.
- Water levels at Tan Chau and Chau Doc are forecasted to fluctuate due to tidal influence.

#### DISCLAIMER

### 6.3 Flash Flood Information

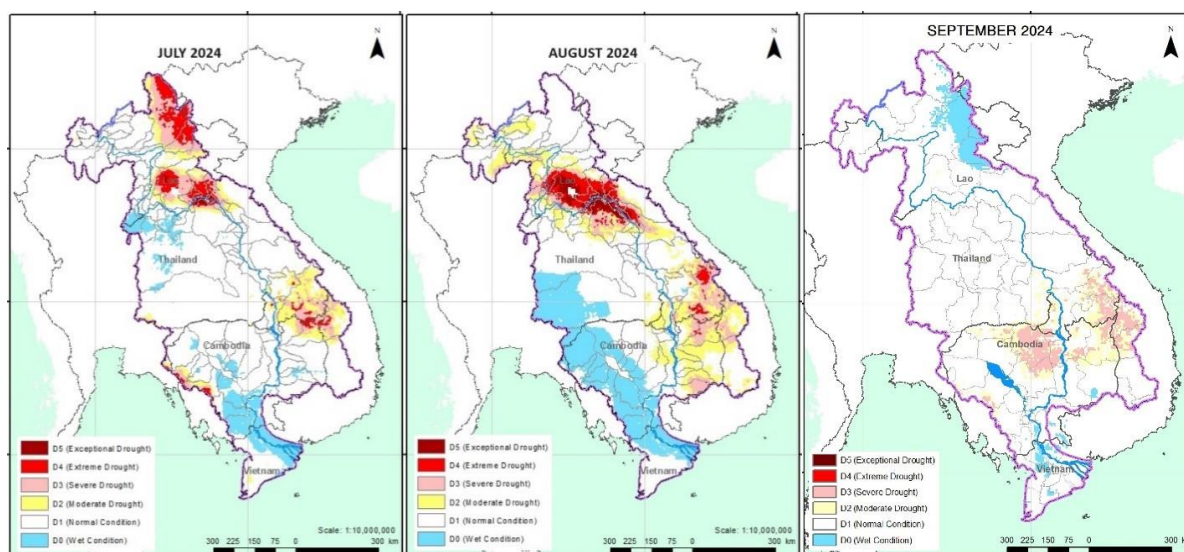
With the predicted rainfall for the coming week, flash floods might be detected in some areas in the LMB. Local heavy rain in a short period of time is possible with unpredictable short flash floods.

Further detailed information on Flash Flood Guidance Information, as well as its explanation, is available for download [here](#).

### 6.4 Drought forecast

There are several climate-prediction models with different scenarios in the upcoming months. The MRC's DFEWS adopts the global scale of North America Multi-Model Ensemble (NMME) with downscaled 5km combined drought indicator.

**Figure 13** below shows the monthly drought forecast for July, August and September 2024 over the LMB area.



**Figure 14. Monthly drought forecast for July, August, and September 2024.**

From July to September 2024, it is expected to bring drought conditions to certain areas of the LMB (**Figure 13**). In July, eastern Cambodia, 3S area, and northern Lao PDR are the most severe areas. In August, severe and exceptional droughts are forecasted for the upper part of the LMB. Other areas are likely normal or wet. In September, moderate to severe drought is forecasted for the northern Cambodia and 3S area, while other areas are likely normal or wet. Severe drought is likely taking place in some areas of Otdar Meanchey, Preah Vihear, Stung Treng, Ratanakiri, and Kampong Thom of Cambodia, Xekong and Attapu of Lao PDR and Kon Tum and Gia Lai of Viet Nam.

## **7 Summary and Possible Implications**

### **7.1. Rainfall and its forecast**

In the period of 16 – 22 July 2024, light to heavy rainfall has been observed over the LMB. Especially, heavy to very heavy rainfall has been observed over the LMB including Nong Khai, Muong Mai, Paksane, Khong Chiam, Saravanne, Kratie...

From 23 – 29 July 2024, the accumulated rainfall over the entire Lower Mekong Basin is distributed with light to heavy rain. Moderate rainfall is expected in the central parts of the LMB, the northeastern part of Cambodia, and the 3S Basin of Sekong, Sesan, and Srepok. Heavy rainfall is likely to occur in certain areas such as Paksane, Thakhek, and Pakse (Lao PDR); and the upper part of the 3S Basin (Sekong Basin).

### **7.2. Water level and its forecast**

At 22 key monitoring stations along the Mekong mainstream from 16 – 22 July 2024, water levels are normal, and the flow threshold (PMFM 6C) are under normal conditions. It is also the same condition for Tan Chau and Chau Doc monitoring stations, which are significantly influenced by sea tidal fluctuation.

In the period of 23 – 27 July 2024, Water levels at all station are forecasted to be increasing. At Tan Chau and Chau Doc stations, the water levels are predicted to be also fluctuated, resulting from the influence of sea tidal patterns. Almost all stations from Vientiane stations downward are expected to reach above their long-term average (LTAs).

### **7.3. Flash flood and its trends**

No flash flood events have occurred in the Lower Mekong Basin during last week.

With the predicted of rainfall for the coming week as mentioned earlier in part 2, the flash flood guidance at a low to high level will likely be detected in some areas of the LMB.

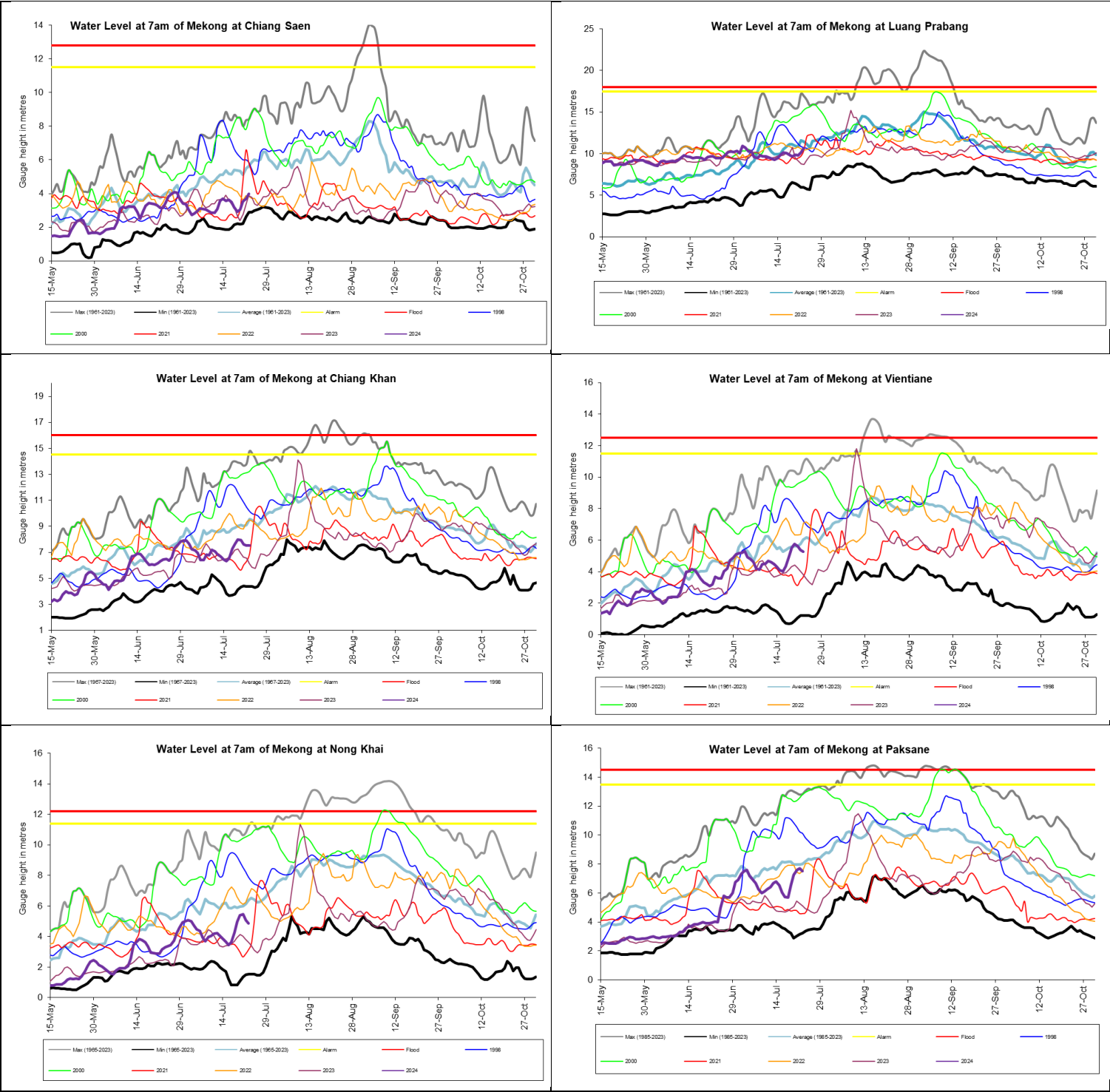
### **7.4. Drought condition and its forecast**

During 16-22 July 2024, the LMB was generally normal in all parts of the region. No significant impact of drought was detected for the current work.

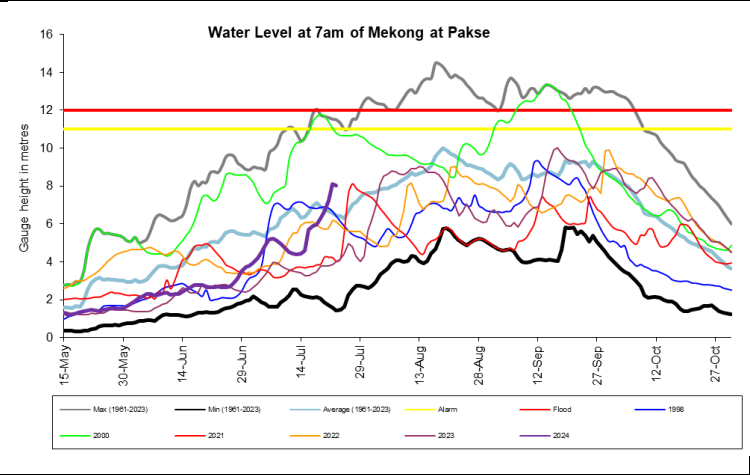
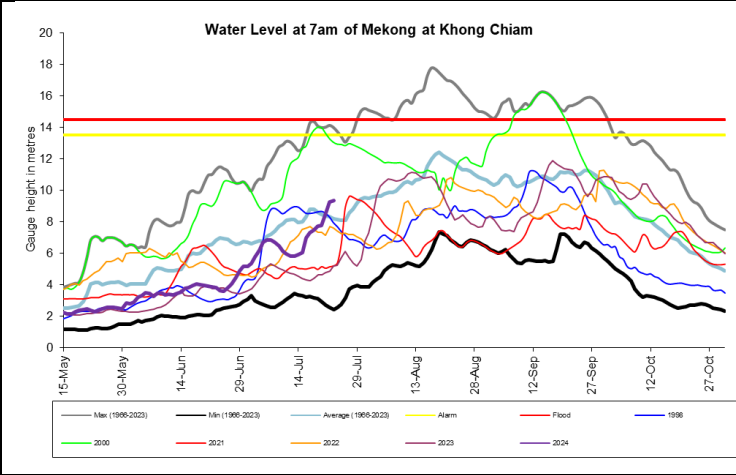
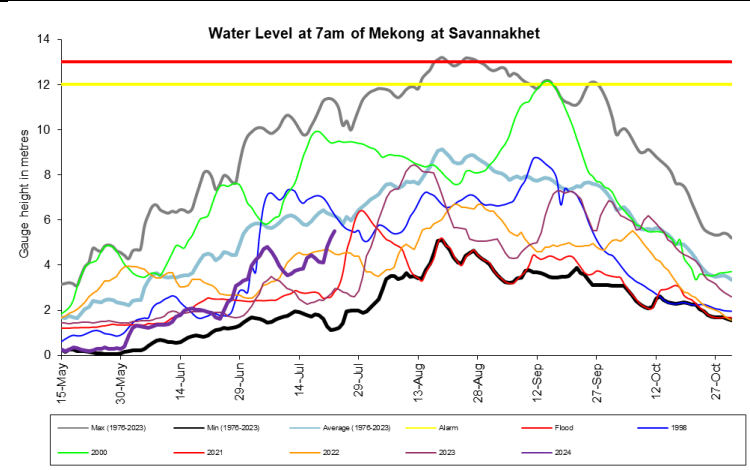
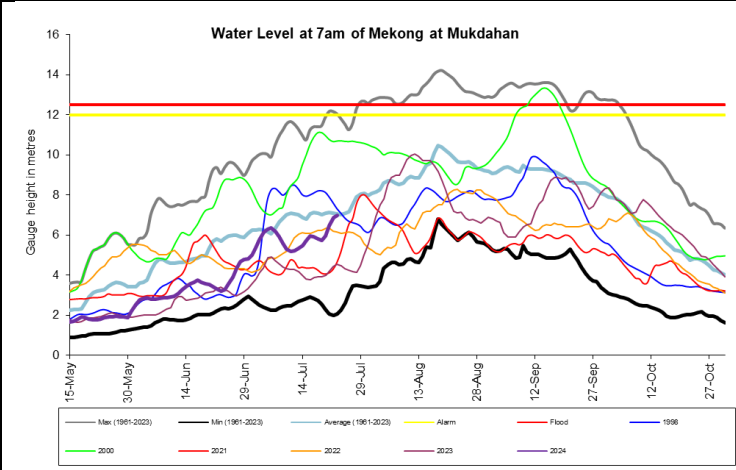
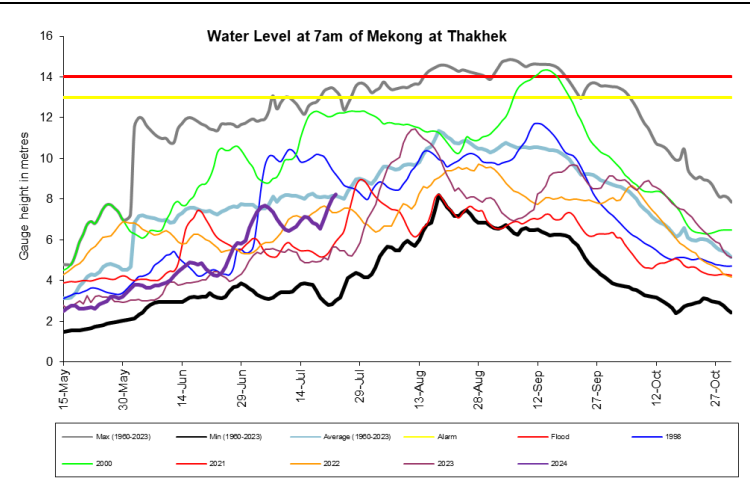
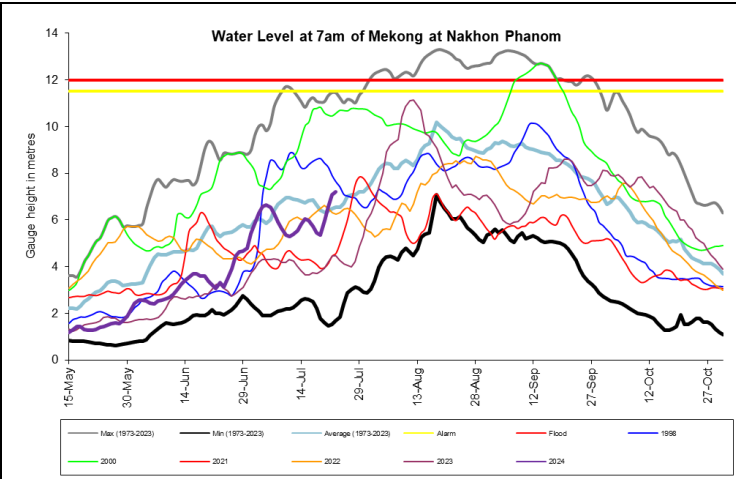
From July to September 2024, it is expected to bring drought conditions to certain areas of the LMB. In July, eastern Cambodia, 3S area, and northern Lao PDR are the most severe areas. In August, severe and exceptional droughts are forecasted for the upper part of the LMB. Other

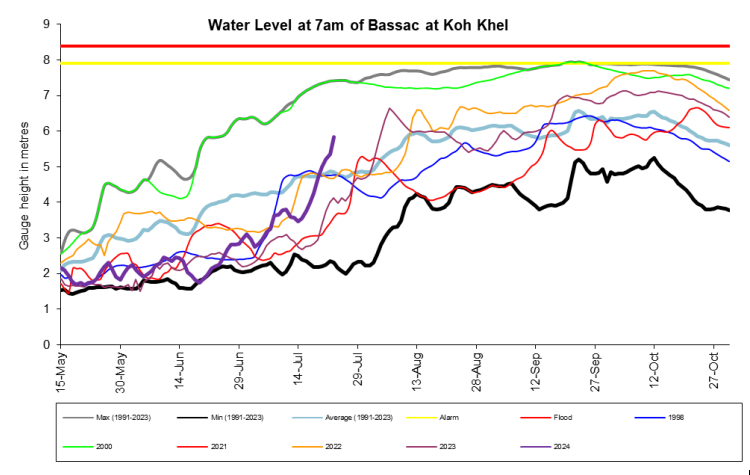
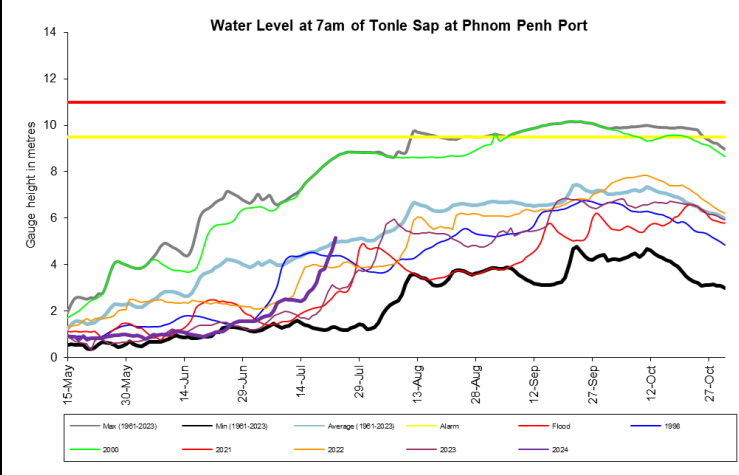
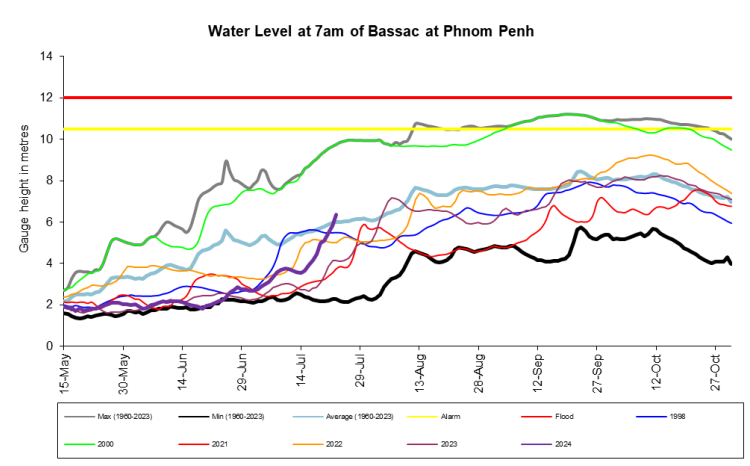
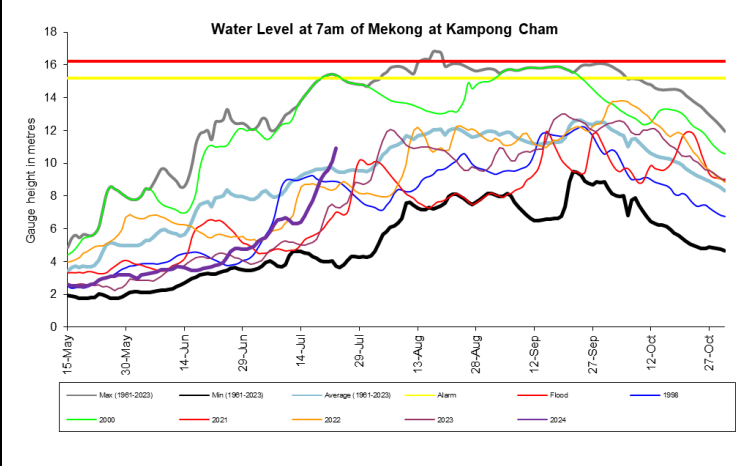
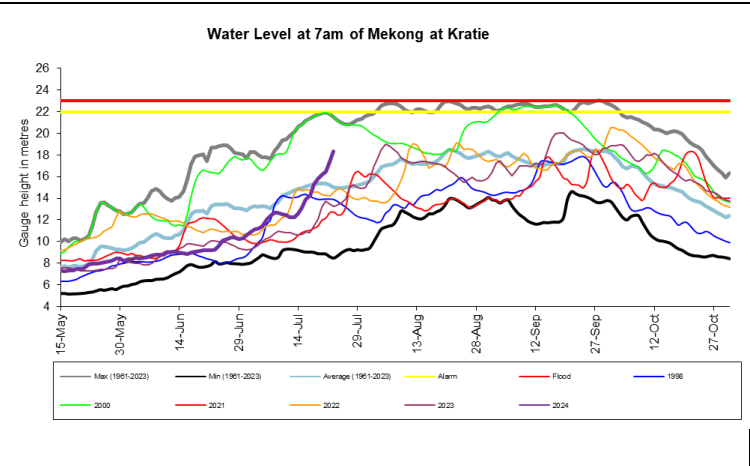
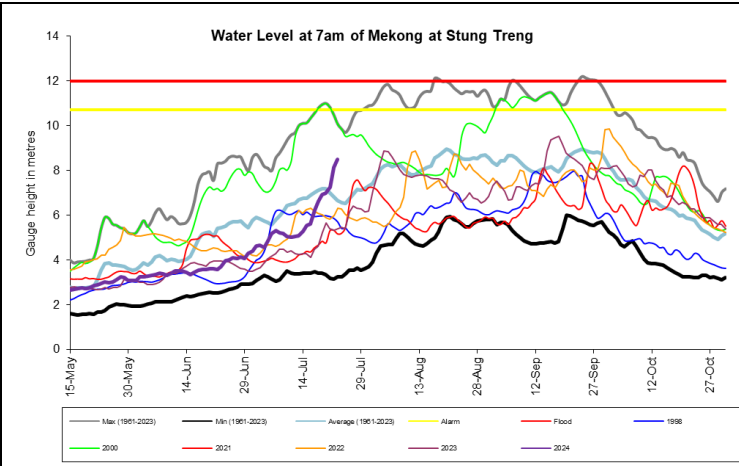
areas are likely normal or wet. In September, moderate to severe drought is forecasted for the northern Cambodia and 3S area, while other areas are likely normal or wet. Severe drought is likely taking place in some areas of Otdar Meanchey, Preah Vihear, Stung Treng, Ratanakiri, and Kampong Thom of Cambodia, Xekong and Attapu of Lao PDR and Kon Tum and Gia Lai of Viet Nam

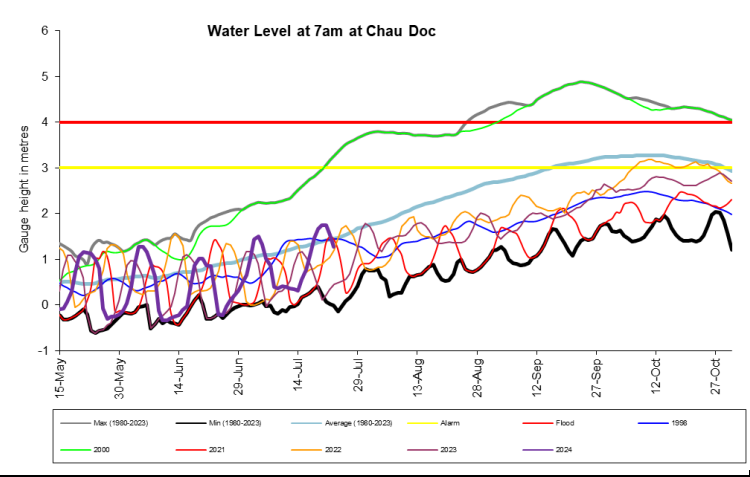
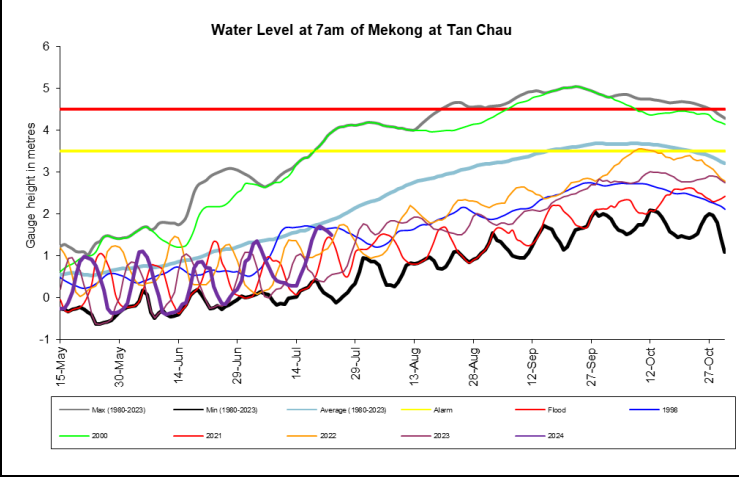
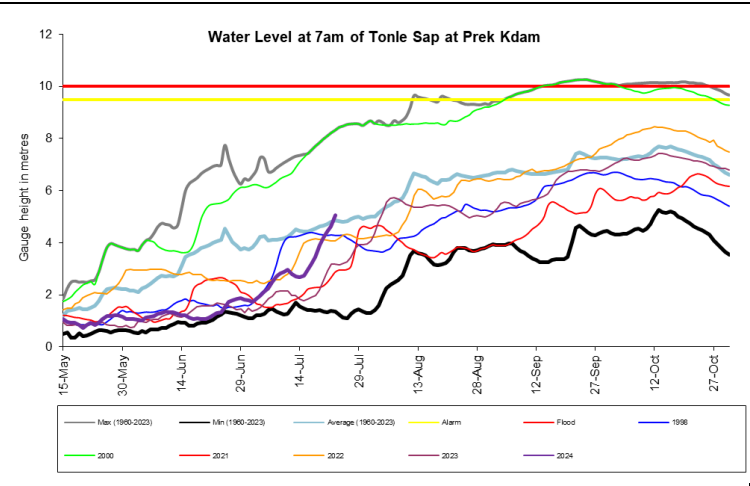
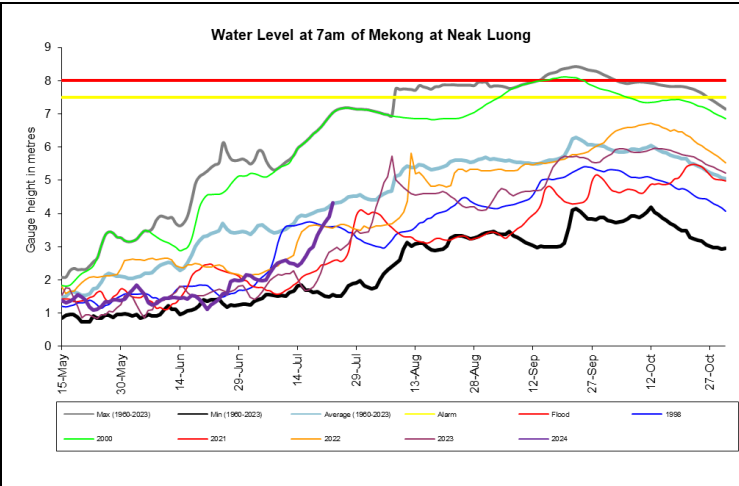
# Annex A: Weekly water level monitoring at the 22 key stations













## Annex B: Tables for weekly updated water levels and rainfall at the Key Stations

Table A1: Weekly observed water levels

2024	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
16-07-2024	536.20	3.62	10.12	6.51	4.03	3.45	6.02	5.97	7.08	5.94	4.32	6.98	5.70	5.60	13.89	7.30	3.90	2.79	3.76	2.70	2.97	0.75	0.77
17-07-2024	535.95	3.49	10.08	7.26	4.34	3.62	5.74	5.72	6.84	5.91	4.45	7.30	5.90	6.21	14.23	7.70	4.15	2.95	3.98	2.90	3.19	1.03	1.08
18-07-2024	536.39	3.18	9.90	7.66	4.97	4.26	5.71	5.45	6.78	5.81	4.30	7.50	5.96	6.61	15.31	8.30	4.46	3.20	4.26	3.00	3.46	1.38	1.47
19-07-2024	536.54	2.92	9.70	7.98	5.51	4.98	6.54	5.36	6.55	5.73	4.15	7.72	6.30	6.91	15.80	8.98	4.98	3.72	4.70	3.34	3.92	1.63	1.67
20-07-2024	536.54	3.04	9.90	7.94	5.75	5.38	7.26	5.98	7.10	5.95	4.12	7.78	6.66	6.99	16.20	9.38	5.10	3.82	5.00	3.54	4.19	1.71	1.74
21-07-2024	536.52	3.53	9.78	7.59	5.63	5.45	7.58	6.59	7.60	6.45	4.80	8.58	7.22	7.24	16.45	9.60	5.48	4.26	5.20	3.72	4.42	1.65	1.75
22-07-2024	536.48	3.70	10.14	7.54	5.36	5.08	7.72	7.08	8.00	6.85	5.20	9.25	8.12	8.12	17.37	10.10	5.80	4.60	5.35	3.90	4.62	1.59	1.54
Flood level		12.80	18.00	16.00	12.50	12.00	14.50	12.50	14.00	12.50	13.00	14.50	12.00	12.00	23.00	16.20	12.00	11.00	7.90	8.00	10.00	4.50	4.00

Table A2: Weekly observed rainfall

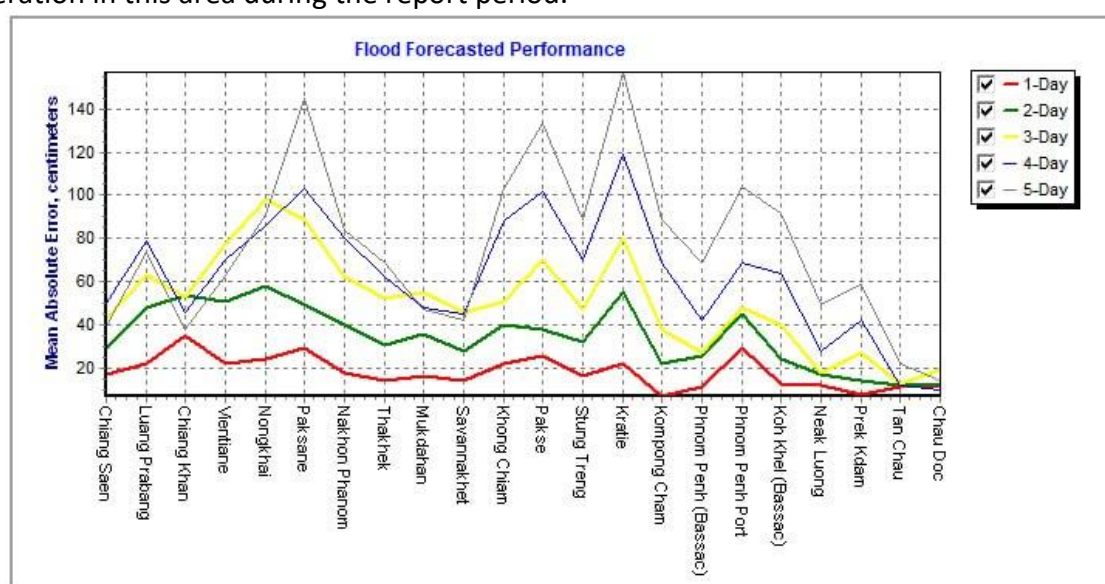
2024	Jinghong	Chiang Saen	Luang Prabang	Chiang Khan	Vientiane	Nongkhai	Paksane	Nakhon Phanom	Thakhek	Mukdahan	Savannakhet	Khong Chiam	Pakse	Stung Treng	Kratie	Kompong Cham	Phnom Penh (Bassac)	Phnom Penh Port	Koh Khel	Neak Luong	Prek Kdam	Tan Chau	Chau Doc
16-07-2024	2	1.8	4.2	14.6	98.7	11.2	9.3	43.6	40.4	72.8	66.6	57.5	97.4	0	0	0	29.7		0	34.1	14.2	21.6	2.3
17-07-2024	1.5	0	10.8	14.2	23.7	17	0.3	0	0	37.5	36	18.8	10.8	49	0	0	0		0	1.1	0	0.5	0.5
18-07-2024	0	0.2	6.4	15	64.1	122	9.6	38.9	28.3	47.6	57.4	35.4	0.3	15	0	15	6.8		27.8	24.9	0	8.3	3.5
19-07-2024	6.5	16.8	2.8	12.6	25.4	135	75.3	14.7	26.7	13.6	9.8	49	47.8	6.5	0.7	0	9.7		16.1	13.6	0	4.1	23
20-07-2024	44.5	37.2	3.6	1.3	0.3	2.5	58.2	13.1	14	9.5	9.4	4.8	20	1	0	10	0		0	8.2	0	0.3	3
21-07-2024	51.5	7	7.8	0	0	0	7.6	7.8	10.1	0	0	158.2	92	27.5	47.5	19.5	0		0	0	14.2	0	3.3
22-07-2024	27	3.2	1.2	1.3	1		38.8	12.1	14.5	5.8	7.4	44	43.2	5	0.7	3.5	0		0	0	0	0	0.3
Sum	133.0	66.2	36.8	59.0	213.2	286.9	199.1	130.2	134.0	186.8	186.6	367.7	311.5	104.0	48.9	48.0	46.2	0.0	43.9	81.9	28.4	34.8	35.9

## Annex C: Performance of the weekly flood forecasting

“Accuracy” here refers to the state where data recorded in the MRC’s Mekong River Flood Forecasting System are cleaned and verified.

The adjustment of flood forecasting outcomes from the flood forecasting system requires flood forecasters to have extensive knowledge in hydrology and statistical modelling for estimating the relationships between stations upstream and downstream in the Mekong River Basin. Flood forecasting performance presented in the graph below shows the average flood forecasting accuracy at each key station along the Mekong mainstream from 16 to 22 July 2024.

The forecasting values from 16 to 22 July 2024 show that the overall accuracy is fair for a four-day to five-day forecast in lead time (less than 250 cm) for all of the stations from the upper to the lower parts of the Mekong River with combine information of rainfall and reservoirs' operation in this area during the report period.



**Note:** The higher percentage of flood forecasting accuracy is due to several key factors as follows:

- Missing rainfall in Cambodia (DOM) data and data input are not sufficient to be used for inputting into the flood forecasting model system.
- Chiang Saen station is influenced by hydropower upstream operation from China.
- Luang Prabang to Chiang Khan and Paksane to Stung Treng to Kratie have been influenced by hydropower operations upstream, tributaries inflows.
- The influence of heavy rainfall caused by storms and hydropower operations from upstream, tributaries inflows and the lower part of the Mekong floodplain, including the 3S (Stung Treng and Kratie).
- Fluctuations of the water levels at Tan Chau and Chau Doc stations were due to daily tidal effects of the sea in the Mekong Delta.
- Satellite rainfall data were not representative of the actual rainfall at ground stations in some areas of the Mekong region.



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