

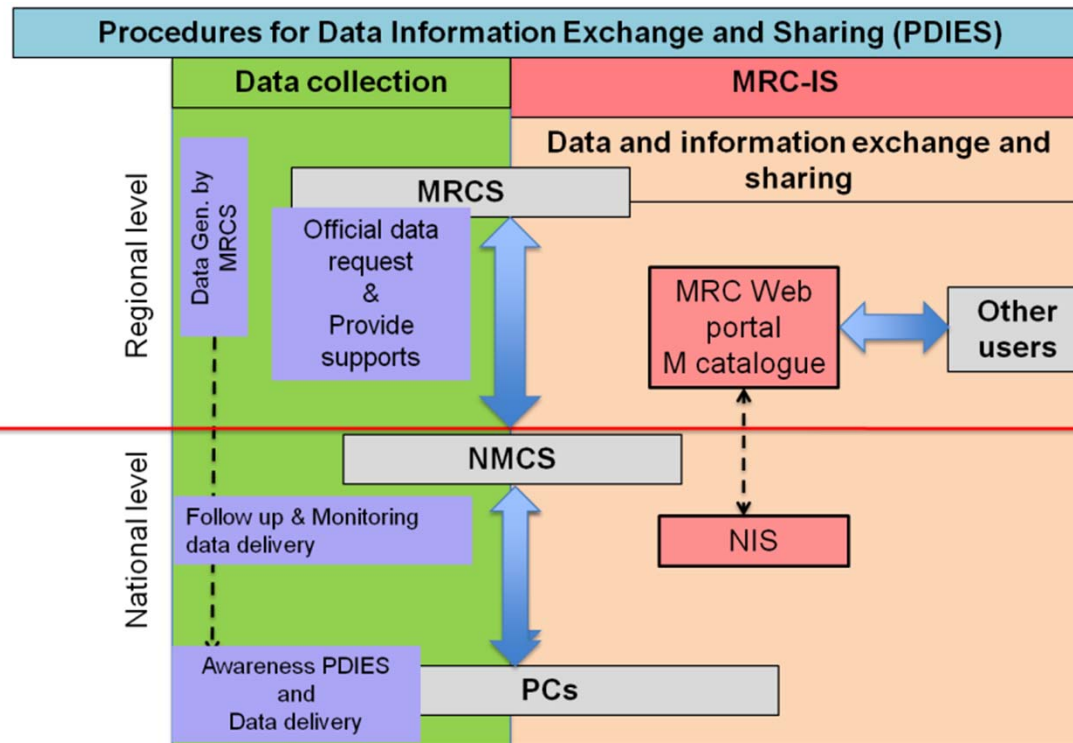
AN OVERVIEW ON MRC-INFORMATION SYSTEM (MRC-IS) AND REGIONAL DATA SHARING

THE 2019 MEKONG RESEARCH SYMPOSIUM
SESSION 8: INTEGRATING PRIORITIES FOR INFORMED DECISION SUPPORT
16-19 DECEMBER, HANOI, VIET NAM

Dr. Janejira Chuthong, Chief Hydrologist, MRC Secretariat



Procedures for Data and Information Exchange and Sharing (PDIES)



Reference : Final report PDIES_2015_14-10-15

Procedures for Data and Information Exchange and Sharing (PDIES) affirming the imperative for operationalizing and effective, reliable and accessible data and information system for the Mekong River Commission (MRC) and its Member Countries.

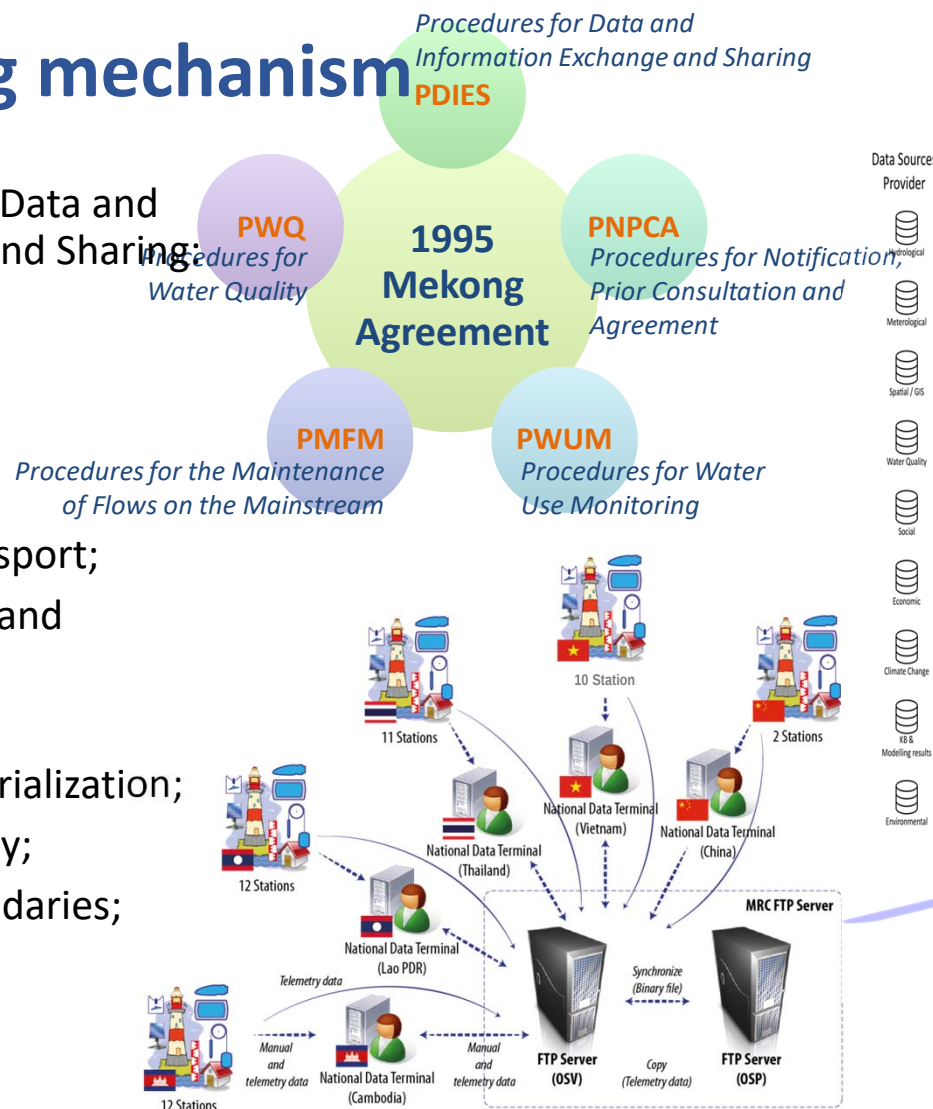
The PDIES addresses general data and information gathering, entering into the MRC Information System, and sharing amongst the Member Countries (MC) and access by other parties. The objectives of the PDIES are to:

- Operationalize the data and information exchange among the four MCs;
- Make available, upon request, basic data and information for public access as determined by the NMCs concerned; and
-

Data sharing mechanism

PDIES – Procedures for Data and Information Exchange and Sharing:

1. Water Resources;
2. Topography;
3. Natural resources;
4. Agriculture;
5. Navigation and Transport;
6. Flood management and mitigation;
7. Infrastructure;
8. Urbanization/Industrialization;
9. Environment/Ecology;
10. Administrative boundaries;
11. Socio-economy; and
12. Tourism



Mekong River Commission - Master Data Information System

Data sharing via MRC Information System (MRC-IS)

■ MRC Information System

- MRC integrated database called **Master Catalogue** contains both information and data (including meta data and quality assured data), model and other tools

■ Access of data

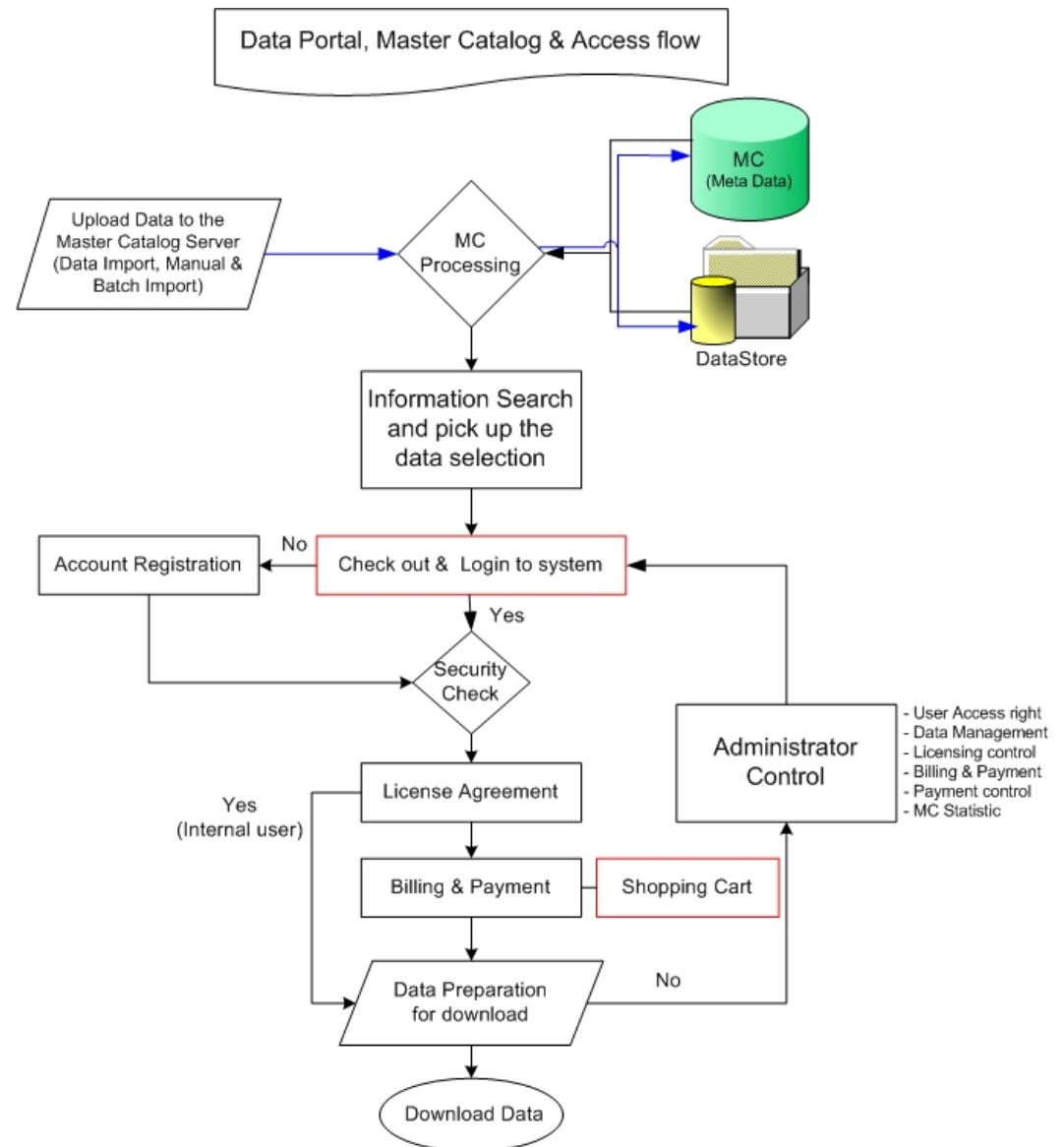
- **Internal Data Users** (MRCS, NMCs and Line Agencies): Access to data is without license data agreement.
- **Commercial Data Users**: Access to data needs the Commercial License Agreement
- **Other Data and Information users**: Commercial Data and Information Users ,Research/academic or civil society Data and Information users and Public Data and Information users: Access to data needs the Non Commercial License Agreement

■ User register and data download are processed online.

<http://portal.mrcmekong.org>

MRC IS

- Data imported through the import module of MRC Portal
- Data store in Folder as zip file and the dataset store in Database system
- Access data through search Engine
- Registration required to get data
- Non payment or Approval need Internal, member countries
- Automatic download link



Dataset in the MRCS

- Time series dataset and field campaign
 - hydro-meteorological data :This data includes hydro-meteorological data both historical and near real-time (water level, discharge, rainfall, temperature, humidity,...)
 - geometric data (cross-section, longitudinal profile of a river)
 - water quality data (sediment, salinity, turbidity, concentration, water temperature)
- Spatial dataset
 - digital maps, aerial photos, satellite imageries, soil moisture, soil type, digital elevation model (DEM)
- Document management system: collaboration, sharing, reporting, version control
- Sectoral Datasets including CS
 - **Water Quality**
 - **Hydropower Database** by Initiative for Sustainable Hydropower (ISH)
 - **Irrigation Database** by Agriculture and Irrigation Programme (AIP)
 - **Socio-economics Database**/Website by Basin Development Plan (BDP)
 - **Climate Change Database** by Climate Change Adaptation Initiative (CCAI)
 - **Modelling datasets** including the MRC **Council Study**

Data management, modelling and forecasting system

■ Timeseries Data management

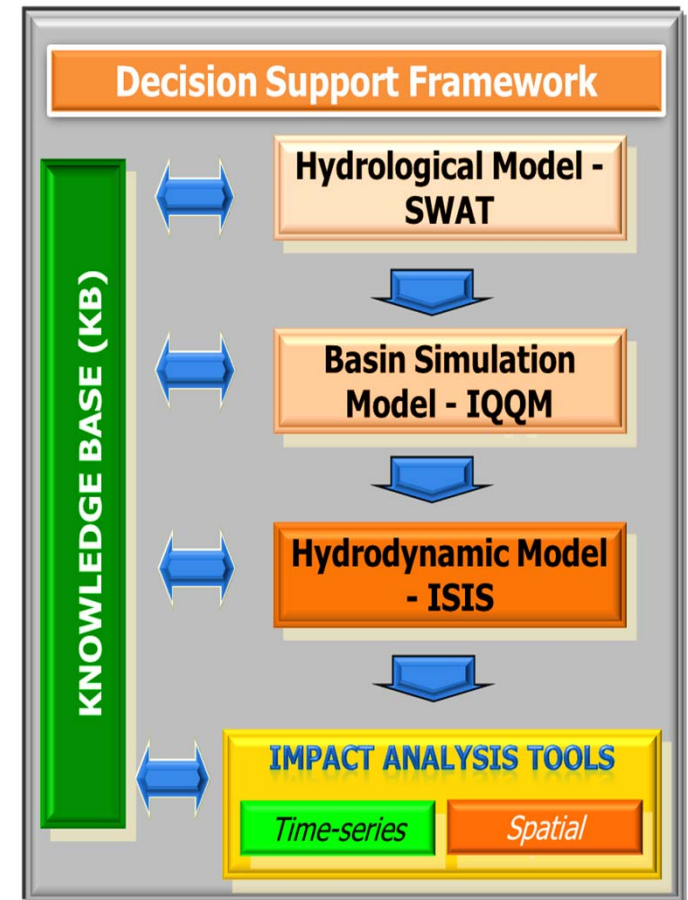
- **HYMOS** for their historical hydro-meteorological time-series data management for 600+ hydro-meteorological stations
- **HydMet** and **HYCOS** tools (Online, Trigger and QA – own made) for receiving near real time data and basic QA/QC processes for 58 telemetry stations
- Migration to **AQUARIUS** (historical and near-real time)

■ Decision Support Framework (DSF)

- Developed in 2001-2005 under the former Water Utilization Programme (WUP) funded by the World Bank – **SWAT-IQQM-ISIS** with currently updated to 1985-2008
- Engaged with **eWater Source** for basin simulation
- Supplemented by **WUP-FIN** models (IWRM and 3D Hydrodynamics)

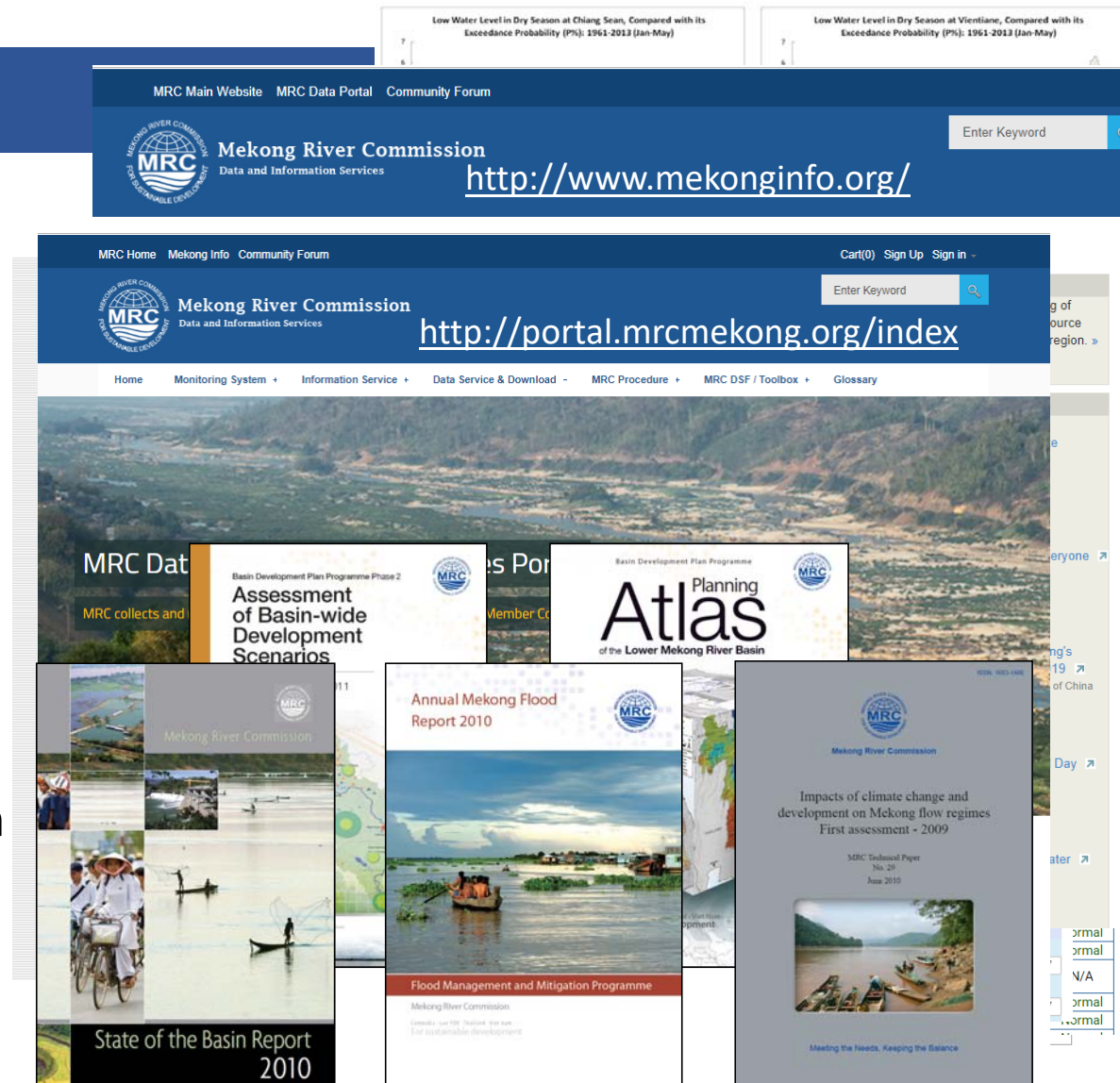
■ River Flood and Flash forecasting

- **FEWS**, **URBS**, **ISIS** and regression models
- **FFGS** – WMO, USAID and HRC



Products and services

- Data sharing (web portal)
- Basin monitoring, status and trends of change (state of basin report)
- Flood and drought monitoring and forecasting
- Basin planning (basin development strategy)
- Climate change
- MRC Procedures implementation – water diplomacy (flow, quality, use)
- Knowledge dissemination

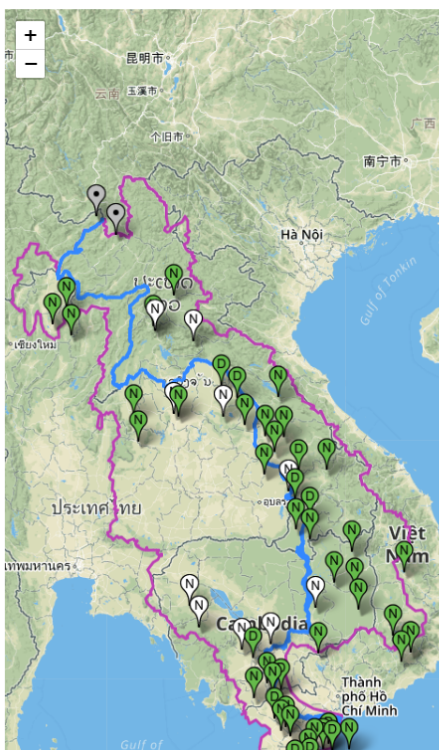


Mekong-HYCOS Network (15-min)



Near Real-time Hydrometeorological Monitoring

Click on station name on the map or on the list to see water level charts.



Click on station name on the map or on the list to see water level charts.

No.	Station	River	Code	Country	Type	Status
1	Jinghong	Mekong	092600	China	Normal	N/A
2	Manan	Manan	092980	China	Normal	N/A
No.	Station	River	Code	Country	Type	Status
3	Ban Kengdane	Se Bang Hieng	350101	Lao PDR	Normal	N/A
4	Ban Mixai	Nam Khan	120101	Lao PDR	Normal	N/A
5	Ban Nape	Nam Phao	270502	Lao PDR	Normal	Normal
6	Ban Sebangnoulane	Sebangnoulane	360106	Lao PDR	Drought	Normal
7	Ban Veunkhen	Se Kong	430106	Lao PDR	Normal	Normal
8	Khongsedone	Nam Sedone	390102	Lao PDR	Drought	Normal
9	Luang Prabang	Mekong	011201	Lao PDR	Normal	Normal
10	Mahaxai	Se Bang Fai	320107	Lao PDR	Normal	Normal
11	Muang Kao	Nam Sane	260101	Lao PDR	Drought	Normal
12	Muang Ngoy	Nam Ou	100102	Lao PDR	Normal	Normal
13	Pakse	Mekong	013901	Lao PDR	Normal	Normal
14	Phalane	Se Sangsoy	350102	Lao PDR	Drought	Normal
15	Phiangluang	Nam Ngum	230113	Lao PDR	Normal	N/A
16	Phonsey	Nam Ca Ding	270101	Lao PDR	Drought	Normal
17	Se Bangfai	Se Bang Fai	320101	Lao PDR	Normal	Normal
18	Sopnam	Se Bang Hieng	350105	Lao PDR	Normal	Normal
19	Vientiane KM4	Mekong	011901	Lao PDR	Normal	N/A
No.	Station	River	Code	Country	Type	Status
20	Ban Doi Hang	Nam Mae Kok	050106	Thailand	Normal	Normal
21	Ban Had Paeng	Nam Sonkhran	290113	Thailand	Normal	Normal
22	Ban Tha Kok Doeng	Nam Sonkhran	290102	Thailand	Normal	N/A
23	Chiang Khan	Mekong	011903	Thailand	Normal	Normal
24	Chiang Saen	Mekong	010501	Thailand	Normal	Normal
25	Khong Chiam	Mekong	013801	Thailand	Normal	Normal
26	Mukdahan	Mekong	013402	Thailand	Normal	Normal
27	Nakhon Phanom	Mekong	013101	Thailand	Normal	Normal
28	Nong Khai	Mekong	012001	Thailand	Normal	Normal
29	Thoeng	Nam Mae Ing	070103	Thailand	Normal	Normal
30	Wang Saphung	Nam Loel	150101	Thailand	Normal	Normal
No.	Station	River	Code	Country	Type	Status
31	Angkorborey	Stung Angkor Borey	680103	Cambodia	Drought	Normal
32	Battambang	Sankar	550102	Cambodia	Normal	N/A
33	Boribo	Stung Boribo	590101	Cambodia	Drought	Normal
34	Chaktomuk	Bassac	033401	Cambodia	Normal	Normal
35	Kampong Ampil	Tonle Touch	019905	Cambodia	Drought	Normal
36	Kompong Luong	Tonlesap	020106	Cambodia	Normal	N/A
37	Kompong Speu	Prek Thnot	640102	Cambodia	Normal	Normal



Near Real-time Hydrometeorological Monitoring

Chiang Khan

Station code: 011903
Country: Thailand
River: Mekong
Zero gauge (MSL): 194.118 m
Water level sensor 1): ☒
Rainfall sensor 2): ☒
Alarm level: 14.5 m
Flood level: 16 m

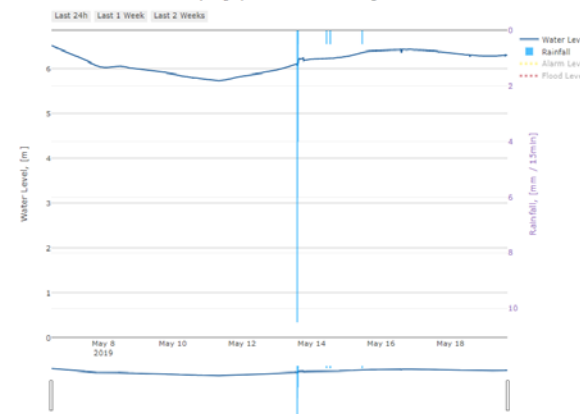
Date: May 19, 2019
Time: 3:15:00 PM
Latest water level: 6.3 m
Rainfall last 1 hour: 0 mm
Rainfall last 6 hours: 0 mm
Rainfall last 12 hours: 0 mm
Rainfall last 24 hours: 0 mm
Rainfall 7 am to 7 am: 0 mm

Select country to change station table
Thailand

- 1) Checked if water level sensor is installed at this station
- 2) Checked if rainfall sensor is installed at this station
- 3) No alarm and flood level defined for this station

No.	Station	River	Code	Country	Type	Status
1	Ban Doi Hang	Nam Mae Kok	050106	Thailand	Normal	Normal
2	Ban Had Paeng	Nam Sonkhran	290113	Thailand	Normal	Normal
3	Ban Tha Kok Doeng	Nam Sonkhran	290102	Thailand	Normal	N/A
4	Chiang Khan	Mekong	011903	Thailand	Normal	Normal
5	Chiang Saen	Mekong	010501	Thailand	Normal	Normal
6	Khong Chiam	Mekong	013801	Thailand	Normal	Normal
7	Mukdahan	Mekong	013402	Thailand	Normal	Normal
8	Nakhon Phanom	Mekong	013101	Thailand	Normal	Normal
9	Nong Khai	Mekong	012001	Thailand	Normal	Normal
10	Thoeng	Nam Mae Ing	070103	Thailand	Normal	Normal
11	Wang Saphung	Nam Loel	150101	Thailand	Normal	Normal

Hydrograph and Rainfall at Chiang Khan



Instructions:

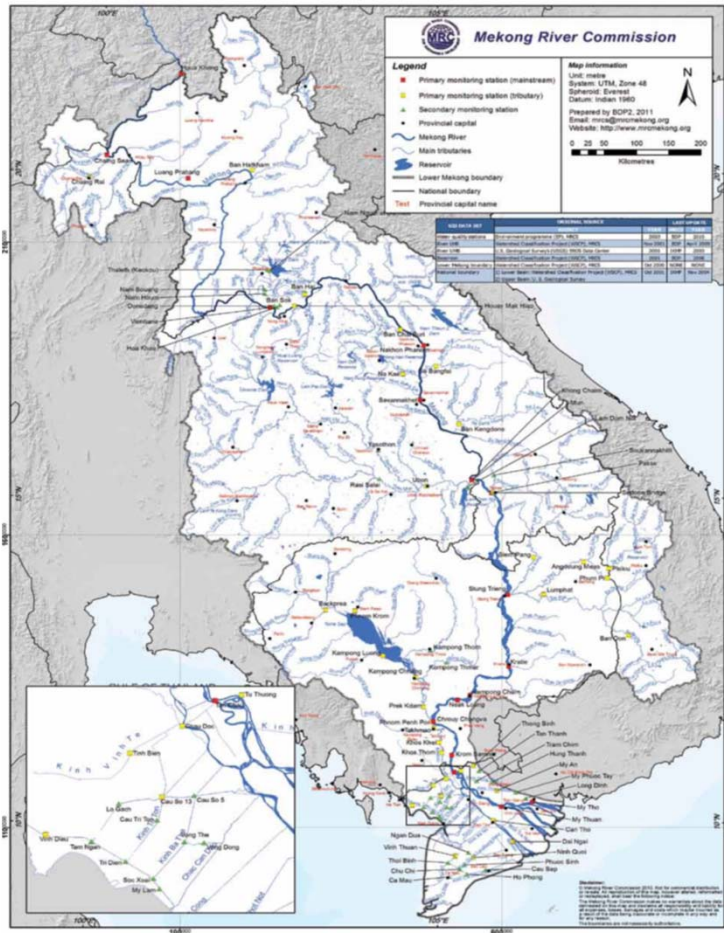
- This chart shows the hydrograph of the last 14 days. For stations which do measure rainfall, the rainfall is also displayed. Stations which have alarm and flood levels defined, additional horizontal alarm (orange) and flood (red) levels are displayed.
- To zoom in, either click on one of the "Last 24h", "Last 1 Week" buttons or select the date period in the chart itself with your mouse. While zoomed in, the small bottom overview chart gives you the period which is not shown.
- To zoom out, either click on the "Last 2 Weeks" button or double-click/tap on the chart.
- You can export and download the current plot as an image by clicking the small camera icon above the chart.

Discharge and Sediment Monitoring



- Discharge & sediment monitoring at 17 sites
 - 11 river sites: Chiang Saen to Kratie
 - 2 tidal sites in Mekong
 - 2 tidal sites in Bassac
 - 1 site in Tonle Sap
 - 1 tributary (3S)
- Started 2009 at Thai-Lao sites, Remaining sites began 2011 and 3S added in 2012
- Parameters: Discharge, Suspended Solid Concentration (SSC), Suspended Grain Size Analysis (SGSA) and Bedload.

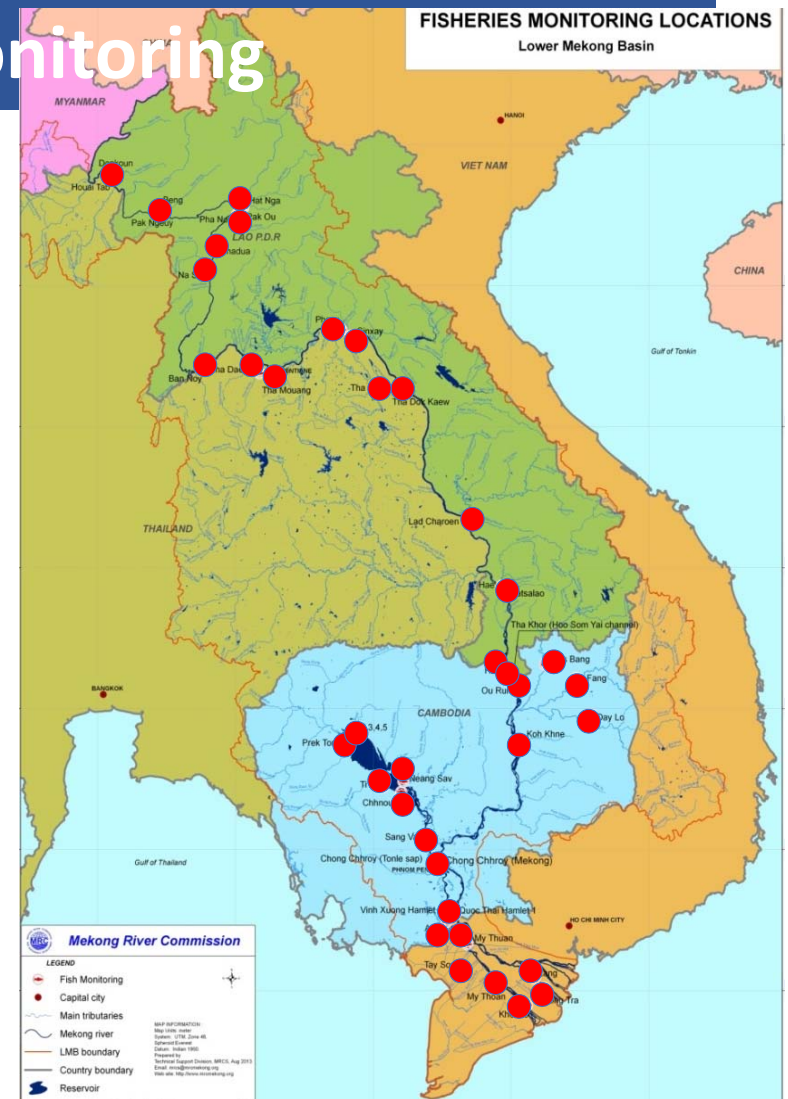
Water Quality Monitoring



- Since 1985
- Monthly measurement of 19 physical-chemical water parameters at 48 stations in the LMB
 - 19 stations in Cambodia,
 - 11 stations in Lao PDR,
 - 8 stations in Thailand, and
 - 10 stations in Viet Nam.
- Three types of WQI: (1) protection of aquatic life, (2) protection of human health, (3) agricultural use

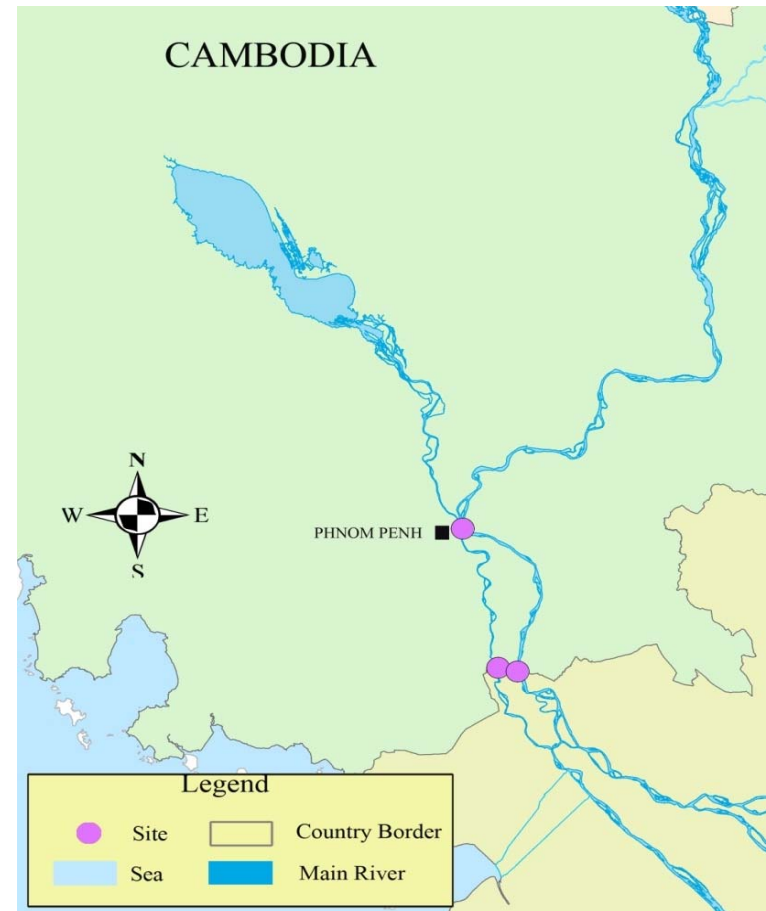
Fish Abundance and Diversity Monitoring

- Since 2003
- Location/site: LMB – Mekong Mainstream and major tributaries- 38 locations
 - 15 locations in Lao PDR
 - 11 locations in Cambodia
 - 5 locations in Thailand
 - 7 locations in Viet Nam
- Season of fishing: daily for all year round
- Data collection by fishers supervised by researchers: fish abundance (number and catch), fish species diversity (richness and composition) and total length



Fish larvae drift and juvenile monitoring

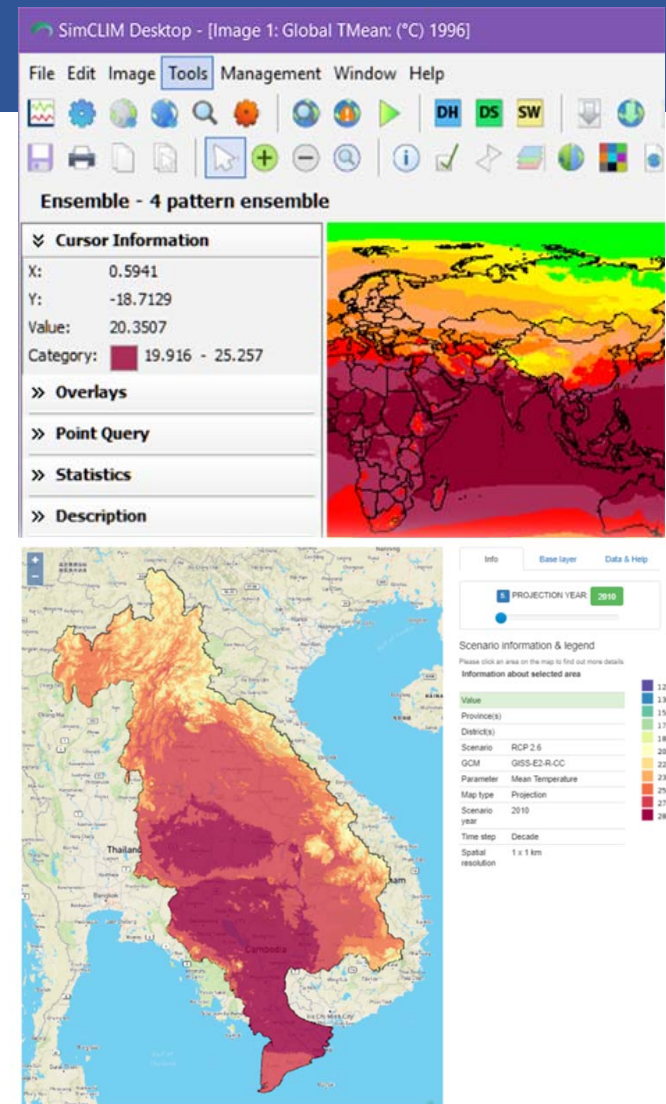
- Since 2002
- Location: Mekong and Tonle Sap Rivers in Phnom Penh, Cambodia; Mekong and Bassac River Dong Thap and An Giang provinces in Viet Nam
- Monitoring season: Daily from June to September
- Data collected by researcher
- Monitoring parameters: fish species diversity and fish larvae density (no. of larvae per 1,000 m³)



Climate Change



- **SimCLIM 4.0** using the latest CMIP5 climate data was installed in the MRCS and Member Countries in March 2017.
- Maps, graphs and charts of various aspects of climate change can be generated spatially and for sites.



MRC Flood Forecasting Service

☐ **Wet season:**

Daily Flood Forecast - 01 June - 31 Oct
(Lead time: 5 Days)

☐ **Dry season:**

Weekly River Monitoring - 01 Nov - 31
May (Lead time: 7 Days)

Products

***1.Monthly Rainfall
distribution Map***

2.Bulletin

***2.Weekly Report (Wet and Dry
Seasons)***

3.Abnomal Flow Situation

22 Forecast stations in the mainstream



URBS

1. Chiang Saen
2. Luang Prabang
3. Chiang Khan
4. Vientiane
5. Nong Khai
6. Paksane
7. Nakhon Phanom
8. Thakhek
9. Mukdahan
10. Savannakhet
11. Khong Chiam
12. Pakse
13. Stung Treng

ISIS+Regression

14. Kratie
15. Kampong Cham
16. Phnom Penh Bassac
17. Phnom Penh Port
18. Prek Kdam
19. Koh Khel
20. Neak Leung
21. Tan Chau
22. Chau Doc

Bulletin Dissemination

Daily flood forecast bulletin during flood season (1 Jun - 31 Oct)

River monitoring bulletin during dry season (1 Nov - 31 May)

Mekong Bulletin

MRC Secretariat

P.O. Box 523107, National Road 62, Chai Angkor Khum, Meeanchey, Phnom Penh, Cambodia

Tel: (855-23) 425351, Fax: (855-23) 425353, Email: foor@rcamc.org

Forecast period from: 30 October to 03 November 2018

Date: 29 October 2018

LOCATION	24-hr Observed Rainfall (mm)	Zero gauge above M.S.L. (m)	Flood risk level (m)	Alarm level (m)	Observed W. level against zero gauge (m)		Forecasted Water Levels (m)								There is currently no flood warning in any monitored area on the Mekong					
							28-Oct	29-Oct	30-Oct	31-Oct	01-Nov	02-Nov	03-Nov	28	30	31	01	02	03	
Jinghong	-				536.05	536.92											X	X	X	X
Chiang Saen	0.0	357.110	13.85	11.50	4.64	4.46	4.51	4.42	4.32											*
Luang Prabang	0.0	267.195	18.80	17.50	10.69	10.69	10.57	10.68	10.52	10.63	10.43									*
Chiang Khua	0.0	194.115	18.80	16.50	9.71	9.54	9.93	8.97	8.85											*
Udonkhan	0.0	155.040	13.30	11.50	4.54	5.03	5.19	5.31	5.37	5.21	5.30									*
Nonhkhong	0.0	192.645	12.30	11.45	5.64	5.76	5.83	6.05	6.12											*
Paksane	0.0	142.125	14.30	13.50	6.98	6.95	6.95	6.95	7.01	7.04	6.96									*
Nakhon Phanom	0.0	130.981	13.30	11.50	4.61	4.55	4.50	5.53	4.56											*
Thakhek	0.0	129.629	13.80	13.00	5.83	5.79	5.73	5.77	5.83	5.88	5.91									*
Mukdahan	0.0	124.219	13.30	12.00	4.50	4.53	4.51	4.48	4.40											*
Savannakhet	0.0	125.410	13.30	12.00	4.47	4.40	4.38	4.36	4.34	4.36	4.38									*
Khong Chiame	0.0	89.930	14.30	13.50	5.12	5.04	4.91	4.74	4.54											*
Paksie	0.0	26.490	12.30	11.00	3.77	3.68	3.57	4.27	3.35	3.27	3.31									*
Stung Treng	0.0	36.790	12.60	10.70	4.47	4.40	4.31	4.24	4.19	4.11	4.03									*
Kratie	0.0	-5.101	23.60	22.00	11.48	11.25	11.12	11.02	10.84	10.67	10.75									*
Compong Cham	0.0	-9.930	16.20	15.20	7.53	7.41	7.27	7.16	7.08	6.96	6.03									*
Phnom Penh (Bassac)	0.0	-1.020	12.60	10.50	6.40	6.32	6.23	6.17	6.12	6.07	6.02									*
Phnom Penh Port	-	0.070	11.60	9.50	5.41	5.31	5.24	5.14	5.07	5.02	4.96									*
Koh Khet	0.0	-1.000	7.70	7.40	5.67	5.56	5.51	5.47	5.42	5.37	5.32									*
Neak Luong	0.0	-0.330	8.60	7.50	4.76	4.71	4.64	4.59	4.54	4.45	4.40									*
Prek Kdam	0.0	0.000	15.60	9.50	6.61	6.55	6.50	6.45	6.41	6.35	6.29									*
Tan Chau	0.0	0.000	4.50	3.50	2.29	2.22	2.16	2.13	2.09	2.04	1.99									*
Chau Doc	nr	0.000	4.80	3.80	2.21	2.12	2.05	2.03	1.99	1.95	1.91									*

REMARKS:

- nr: not available.

- nr: no rain.

LEGEND

rising water level

stable water level

falling water level

alarm stage

alarm situation

flood stage

no data available

As supplied by Thailand, forecasted values are not displayed
pending further improvement of the system

Note: stable water level is defined as a daily change of less than 10 cm
from Chiang Saen to Savannakhet, less than 5 cm at Pakse and Stung
Treng and no more than 3 cm from Kratie downstream.
Flood stage is when the flood level is exceeded; the flood level is
determined by the member states.
Alarm stage is defined of water levels range between alarm and flood
levels.
Alarm situation is defined as a situation when water level is forecasted
to reach flood stage within the next three days.

Mekong Bulletin

MRC Secretariat

P.O. Box 6101 Vientiane 21000/Lao PDR Tel: +855-21-253233 Fax: +855-21-253234 Email: mrc@mrcmekong.org

RIVER MONITORING

Forecast period from: 15 May to 21 May 2018

Date: 14 May 2018

LOCATION	Observed Rainfall (mm)	Zero gauge above M.S.L (m)	Min water level zero gauge (m)	Observed W. level against zero gauge (m)		Forecasted Water Levels (m)						
	13-May			13-May	14-May	15-May	16-May	17-May	18-May	19-May	20-May	21-May
Jinhong	-	-	-	-	-	-	-	-	-	-	-	-
Chieng Saen	0.0	397.110	0.00	3.79	3.76	3.72	3.68	3.58	3.49	3.39	3.30	3.22
Luang Prabang	0.6	297.195	2.53	6.86	6.84	6.84	6.83	6.74	6.65	6.51	6.37	6.22
Chiang Khan	2.6	194.115	1.91	7.27	7.28	7.30	7.30	7.29	7.23	7.11	6.97	6.81
Vientiane	0.8	158.542	-2.26	-	-	-	-	-	-	-	-	-
Nongkhai	1.1	153.645	0.33	4.47	4.33	4.20	4.18	4.18	4.21	4.17	4.09	3.97
Paksane	0.0	142.105	0.10	5.96	6.01	6.03	5.96	6.04	6.14	6.21	6.19	6.08
Nakhon Phanom	0.0	130.951	0.15	3.46	3.54	3.60	3.60	3.56	3.61	3.64	3.66	3.62
Thakhek	0.0	129.628	1.35	-	-	-	-	-	-	-	-	-
Mukdahan	0.0	124.215	0.72	3.46	3.54	3.60	3.64	3.59	3.61	3.65	3.67	3.66
Savannakhet	0.0	135.410	-0.95	-	-	-	-	-	-	-	-	-
Khong Chiam	0.0	85.039	-1.02	3.69	3.74	3.75	3.79	3.82	3.78	3.82	3.88	3.92
Pakse	0.0	86.495	0.03	2.48	2.55	2.58	2.62	2.66	2.62	2.65	2.70	2.74
Stung Treng	0.0	36.769	0.32	3.47	3.51	3.51	3.54	3.56	3.59	3.61	3.61	3.63
Kratie	nr	-1.085	0.06	9.02	9.06	9.10	9.15	9.17	9.20	9.18	9.17	9.15
Kompong Cham	0.0	-0.935	0.05	3.97	3.98	4.02	4.07	4.10	4.11	4.13	4.15	4.14
Phnom Penh (Bassac)	nr	-1.029	1.55	2.33	2.31	2.35	2.37	2.39	2.37	2.35	2.33	2.34
Phnom Penh Port	-	0.050	1.14	1.37	1.25	1.30	1.32	1.30	1.28	1.30	1.32	1.34
Koh Khe	nr	-1.000	1.52	2.21	2.28	2.30	2.32	2.33	2.34	2.35	2.36	2.37
Neak Luang	nr	-0.330	0.81	1.82	1.78	1.75	1.74	1.73	1.74	1.75	1.76	1.77
Prek Kdam	nr	0.050	0.58	1.38	1.44	1.45	1.47	1.49	1.51	1.53	1.55	1.56
Tan Chau	0.0	0.050	-0.37	1.00	0.94	0.85	0.77	0.71	0.68	0.67	0.67	0.68
Chau Doc	nr	0.050	-0.60	1.11	1.18	1.06	0.89	0.73	0.72	0.69	0.69	0.69

REMARKS:

:- not available.

*: reference stations without forecast.

nr: no rain.

Signature

Nguyen Quoc Anh

Flood Forecaster

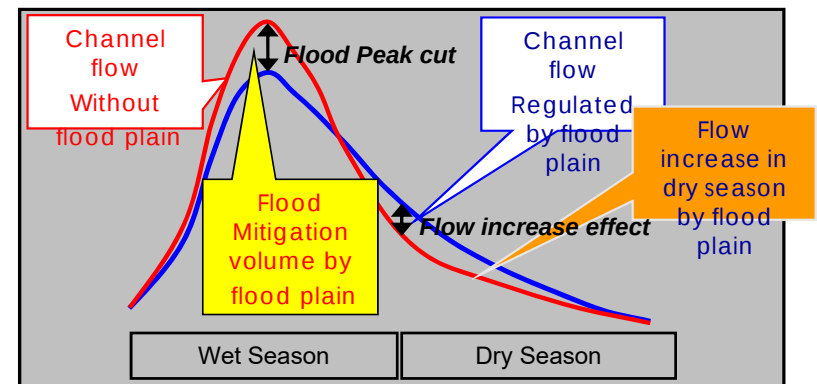
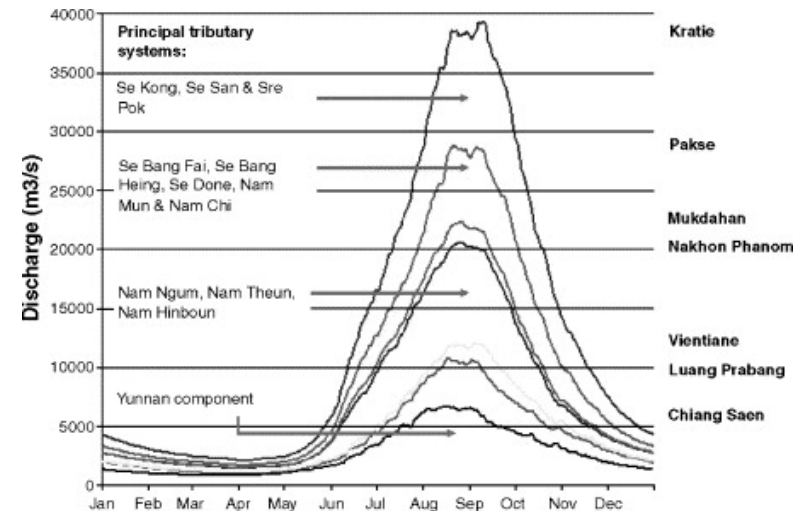
- Uploaded into the MRC web page <http://ffw.mrcmekong.org/>

Example: Abnormal Flow Note

The abnormal flow situations note/report focused on:

1. The rapid changes of water level at each key station suggest that the water level could be influenced by human activities (if there was no associated rainfall)
2. The unseasonably high flow and the rapid drop in water level at the upper Mekong may be determined by water releases of the cascade reservoirs on the Mekong/Lancang for energy production and possibly navigation purposes.

"How water level rise or drop and how long it will stay in the region?", "Is the current situation normal or possible potential cause of the incident?", and "How might the regional high/low flows situation change in the coming few days or months?".





THANK YOU

One Mekong. One Spirit.