

## WATER QUALITY FOR THE PROTECTION OF AQUATIC LIFE

Despite many stations being rated as either “impacted” or “severely impacted” by human activities, almost all 22 Mekong and Bassac stations were rated as “excellent” for the protection of aquatic life. The few exceptions were at My Thuan (16) and My Tho (17) in the Mekong River and Chau Doc (21) and Can Tho (22) in the Bassac River. The slight impairment at these stations were attributable to the elevated total phosphorus levels and salinity intrusion from the East Sea.

Station No	Station Names	Rivers	Countries	Class				
				2007	2008	2009	2010	2011
1	Houa Khong	Mekong	Lao PDR	A	A	A	A	A
2	Chaing Sean	Mekong	Thailand	A	A	A	A	A
3	Luang Prabang	Mekong	Lao PDR	A	A	A	A	A
4	Vientiane	Mekong	Lao PDR	A	A	A	A	A
5	Nakhon Phanom	Mekong	Thailand	A	A	A	A	A
6	Savannakhet	Mekong	Lao PDR	A	A	A	A	A
7	Khong Chaim	Mekong	Thailand	A	A	A	A	A
8	Pakse	Mekong	Lao PDR	A	A	A	A	A
9	Stung Trieng	Mekong	Cambodia	A	A	A	A	A
10	Kratie	Mekong	Cambodia	A	A	A	A	A
11	Kampong Cham	Mekong	Cambodia	A	A	A	A	A
12	Chrouy Changvar	Mekong	Cambodia	A	A	A	A	A
13	Neak Loung	Mekong	Cambodia	A	A	A	A	A
14	Krom Samnor	Mekong	Cambodia	A	A	A	A	A
15	Tan Chau	Mekong	Viet Nam	A	A	A	A	A
16	My Thuan	Mekong	Viet Nam	A	A	B	B	A
17	My Tho	Mekong	Viet Nam	B	B	B	B	B
18	Takhmao	Bassac	Cambodia	A	A	A	A	A
19	Khos Khel	Bassac	Cambodia	A	A	A	A	A
20	Khos Thom	Bassac	Cambodia	A	A	A	A	A
21	Chau Doc	Bassac	Viet Nam	A	A	B	B	A
22	Can Tho	Bassac	Viet Nam	A	A	B	B	B

## WATER QUALITY FOR AGRICULTURAL USE

The assessment of water quality for agricultural use at the 17 Mekong stations and 5 Bassac stations from 2007 to 2011 revealed that there is no restriction for any types of agricultural use. With most electrical conductivity measurement remaining within the threshold of 70 mS/m, it can be concluded that the Mekong and Bassac Rivers water quality are still suitable for general irrigation, paddy rice irrigation and paddy rice irrigation and livestock and poultry purposes.

Station No	Station Name	Rivers	Countries	Class				
				2007	2008	2009	2010	2011
1	Houa Khong	Mekong	Lao PDR	A	A	A	A	A
2	Chaing Sean	Mekong	Thailand	A	A	A	A	A
3	Luang Prabang	Mekong	Lao PDR	A	A	A	A	A
4	Vientiane	Mekong	Lao PDR	A	A	A	A	A
5	Nakhon Phanom	Mekong	Thailand	A	A	A	A	A
6	Savannakhet	Mekong	Lao PDR	A	A	A	A	A
7	Khong Chaim	Mekong	Thailand	A	A	A	A	A
8	Pakse	Mekong	Lao PDR	A	A	A	A	A
9	Stung Trieng	Mekong	Cambodia	A	A	A	A	A
10	Kratie	Mekong	Cambodia	A	A	A	A	A
11	Kampong Cham	Mekong	Cambodia	A	A	A	A	A
12	Chrouy Changvar	Mekong	Cambodia	A	A	A	A	A
13	Neak Loung	Mekong	Cambodia	A	A	A	A	A
14	Krom Samnor	Mekong	Cambodia	A	A	A	A	A
15	Tan Chau	Mekong	Viet Nam	A	A	A	A	A
16	My Thuan	Mekong	Viet Nam	A	A	A	A	A
17	My Tho	Mekong	Viet Nam	A	A	A	A	A
18	Takhmao	Bassac	Cambodia	A	A	A	A	A
19	Khos Khel	Bassac	Cambodia	A	A	A	A	A
20	Khos Thom	Bassac	Cambodia	A	A	A	A	A
21	Chau Doc	Bassac	Viet Nam	A	A	A	A	A
22	Can Tho	Bassac	Viet Nam	A	A	A	A	A

## NOTES AND OUTLOOKS

Recognising potential effects of development on water quality, the MRC Member Countries have adopted the Procedures for Water Quality (PWQ) with an objective of establishing a cooperation framework for the maintenance of acceptable/good water quality. The PWQ calls for Member Countries to monitor water quality of the Mekong River, taking into account emerging threats on water quality, including population growth, intensive agriculture and aquaculture, navigation, hydropower and industrialisation.

In this regard, future monitoring of water quality in the Lower Mekong Basin needs to consider the following aspects:

- Provision of timely data to ensure the currency and validity of data for the protection of aquatic life, human health and agricultural use;
- Allow for the assessment of the relationship between water quality conditions and land use within the basin;
- Include key heavy metals and persistent and non-persistent organic substances as defined in the Technical Guidelines for Implementing PWQ;
- Improve water quality risk assessment and methods for communicating results of the water quality monitoring, including a review of the adequacy and currency of the MRC Water Quality Indices.



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## BACKGROUND

The water resources of the Mekong River support the livelihoods of many of the 60 million people who live in the Lower Mekong Basin. Good water quality and a healthy environment of the Mekong River form the basis for these livelihoods. Therefore, the maintenance of good or acceptable water quality to promote the sustainable use of the Mekong River is of paramount concern basin wide.

This MRC Report Card on Water Quality provides an overview of water quality of the Mekong and Bassac Rivers based on data obtained by the MRC from 2007 to 2011. Water quality data used in this report card are taken from 22 sampling sites in the Mekong River (17) and Bassac River (5) and used to rate water quality according to various use requirements.

## RATING SYSTEMS

Water quality indices (WQI) were developed to rate water quality of the Mekong River for human impact, protection of aquatic life and agricultural use. The indices were developed based on a review of scientific literature and statistical characteristics of available data at the MRC Secretariat. Rating systems for each water quality index are shown in the table below.

Rating Score	Class
<b>Human Impact on Water Quality</b>	
10 ≥ WQI ≥ 9.5	A: Not Impacted
9.5 > WQI ≥ 8.5	B: Slightly Impacted
8.5 > WQI ≥ 7	C: Impacted
WQI < 7	D: Severely Impacted
<b>Protection of Aquatic Life</b>	
10 ≥ WQI ≥ 9	A: High Quality
9 > WQI ≥ 8	B: Good Quality
8 > WQI ≥ 7	C: Moderate Quality
WQI < 7	D: Poor Quality
<b>Agricultural Use</b>	
	<b>Degree of Restriction Based on Conductivity</b>
	<b>A: None      B: Some      C: Severe</b>
General Irrigation (EC <sub>mS/m</sub> )	< 70      70 - 300      > 300
Paddy Rice Irrigation (EC <sub>mS/m</sub> )	< 200      200 - 480      > 480
Livestock and Poultry (EC <sub>mS/m</sub> )	< 500      500 - 800      > 800

## THE MRC WQMN

The MRC Water Quality Monitoring Network (WQMN) was established in 1985 in Lao PDR, Thailand and Viet Nam (Cambodia later joined in 1993) to assist the MRC Member Countries monitor water quality of the Mekong River and take preventive and remedial action if water quality deteriorated.



In 2011, a total of 48 stations were monitored by the WQMN, of which 17 were located in the Mekong River and 5 were located in the Bassac River. The other 26 stations were located in the tributaries of the Mekong River.

## HUMAN IMPACT ON WATER QUALITY

Aside from a few stations, the degree of human impact on water quality at the 17 Mekong and 5 Bassac stations from 2007 to 2011 were mostly rated as “impacted” or “severely impacted”. All stations in the Bassac River (18-22) were rated as “severely impacted” at one time or another. In general, stations downstream of Phnom Penh (15-22) tend to be more impacted by human activities which may be attributable to high population densities and intensive agricultural activities. Stations in the Delta were also likely to be cumulatively impacted by human activities in the entire basin.

The degree of human impact on water quality improved slightly in 2011 compared to 2010 with eight stations showing less impact compared to the previous year. Nakhon Phanom (5), Savannakhet (6) and Chrouy Changvar (11) were the only stations reporting higher degree of human impact in 2011 compared to the previous year which was mainly caused by elevated total phosphorus levels.

It should be noted that the index measures the impact of human activity and not the ambient water quality. Hence, a site may be “impacted” and yet have good water quality.

Station No.	Station Name	Rivers	Countries	Class				
				2007	2008	2009	2010	2011
1	Houa Khong	Mekong	Lao PDR	C	B	B	C	B
2	Chaing Sean	Mekong	Thailand	B	C	C	C	C
3	Luang Prabang	Mekong	Lao PDR	B	C	B	C	B
4	Vientiane	Mekong	Lao PDR	C	C	B	C	A
5	Nakhon Phanom	Mekong	Thailand	D	D	C	C	D
6	Savannakhet	Mekong	Lao PDR	C	C	C	B	C
7	Khong Chaim	Mekong	Thailand	C	C	B	C	B
8	Pakse	Mekong	Lao PDR	B	B	B	C	A
9	Stung Trieng	Mekong	Cambodia	C	C	C	C	C
10	Kratie	Mekong	Cambodia	C	C	C	C	C
11	Kampong Cham	Mekong	Cambodia	C	C	C	C	C
12	Chrouy Changvar	Mekong	Cambodia	C	C	C	B	C
13	Neak Loung	Mekong	Cambodia	C	C	C	C	C
14	Krom Samnor	Mekong	Cambodia	C	D	C	C	C
15	Tan Chau	Mekong	Viet Nam	C	D	D	D	C
16	My Thuan	Mekong	Viet Nam	C	D	D	D	C
17	My Tho	Mekong	Viet Nam	D	D	D	D	D
18	Takhmao	Bassac	Cambodia	D	D	D	D	D
19	Koh Khel	Bassac	Cambodia	D	D	D	D	D
20	Koh Thom	Bassac	Cambodia	D	D	D	D	C
21	Chau Doc	Bassac	Viet Nam	D	D	D	D	D
22	Can Tho	Bassac	Viet Nam	C	D	D	D	D

