

## Reservoir Assessment Tool – Mekong

Reservoir Assessment Tool (RAT) is an integrated satellite remote sensing-modeling framework with an interactive state-of-the-art web-based visualization interface to facilitate the visualization of past and current reservoir state. The tool, originally developed at the University of Washington SASWE Research Group with support from NASA Applied Sciences Program Additional collaborative support was provided by University of Houston and SERVER-Mekong.

The RAT-Mekong provides user friendly intuitive tools to monitor the the existing reservoirs over the Mekong region. The tool facilitates the visualization of reservoir states (such as, storage change, inflow, and outflow), which is useful in understanding downstream impact. It provides reservoir information's in maps, charts, and tabular format. Users can easily visualize reservoir information in chart, tabular format, print chart, download chart image in PNG, JPEG, PDF, SVG format or can download chart data in CSV, XLS format. Alternatively, user can view the raw data of all reservoirs in a tabular format and can print or download this data for further analysis and reporting purposes.

### RAT-Mekong User Interface

The RAT-Mekong tool has different pages and sections representing the tools details and functionalities.

**Pages:** RAT-Mekong have four main pages – Home, About MRC, About RAT-Mekong, and Map Viewer. Additional, the tool provides the resources – concept note, working paper, research paper, user manual and disclaimer in the User Materials page.

**Home Page:** The home page shows the short descriptions of the tool, it's importance, operational area, the working team, some picture of the reservoirs, and additional information's.

**About MRC Page:** This page provides short descriptions of the Mekong River Commission (MRC), their role in developing the RAT-Mekong tool, objectives and purposes of the tool.

**About RAT-Mekong Page:** This page holds the short introduction and the main concept of the RAT-Mekong tool. Additionally, this page provides external resources links to explore and learn more about this tool.

**Map Viewer Page:** The map viewer page has two sections Map and Table. A tab function is used to easily switch from map to table or table to map section.

### A. Map Section

Map section has map window and map sidebar panel. The map displays the reservoirs and various layers, and basemap. The sidebar panel have three menu – filter, layer and basemap. Users can click on each menu and it will show menu details.

#### (a) Filter Menu

By clicking on the query/filter menu, the sidebar will expand and show the filter options. Users can able to filter the reservoir by query parameters - by country and by river basin. By default, all of the reservoirs display on the map when the map page loads at first time. User clicks on the dropdown filter box, it will expand. There is a check box. User can check and uncheck it by mouse click. By checking a specific checkbox, it display the selected reservoir on the map. Similarly, the respective reservoirs hide from the map by unchecking it again. The figure 01 shows the Thailand reservoirs on the map when checking it on mouse click and the rest of all reservoirs hide from the map. Similarly, the figure 02 shows the Lam Pao reservoir by filtering the Chi river basin.

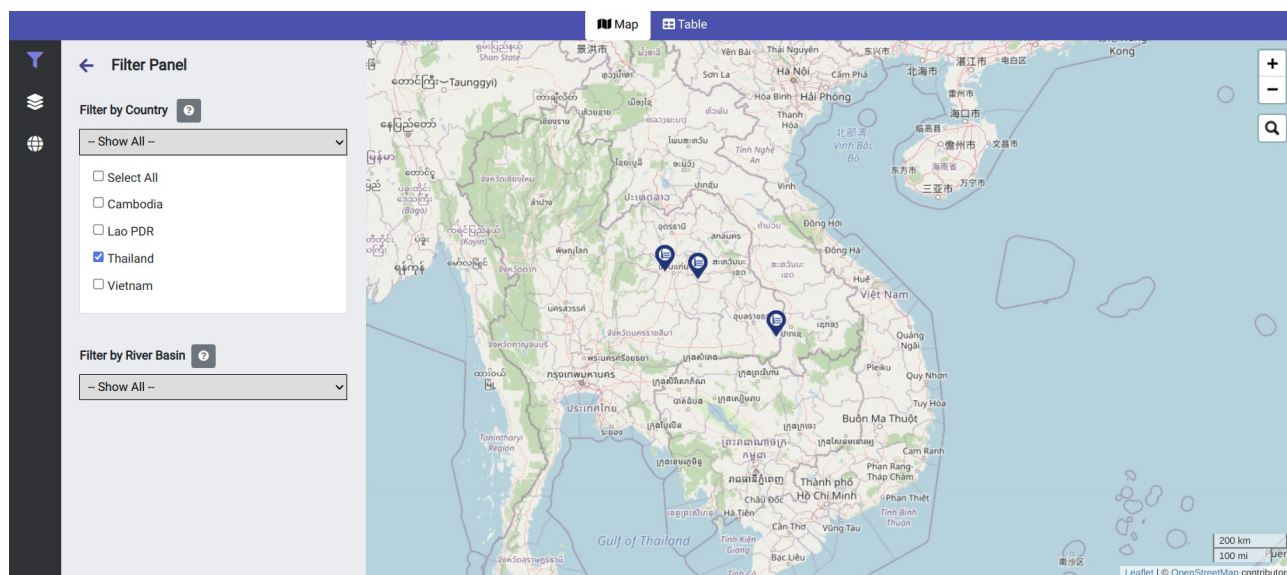


Figure 01: Map showing reservoirs that is filtered by country - Thailand

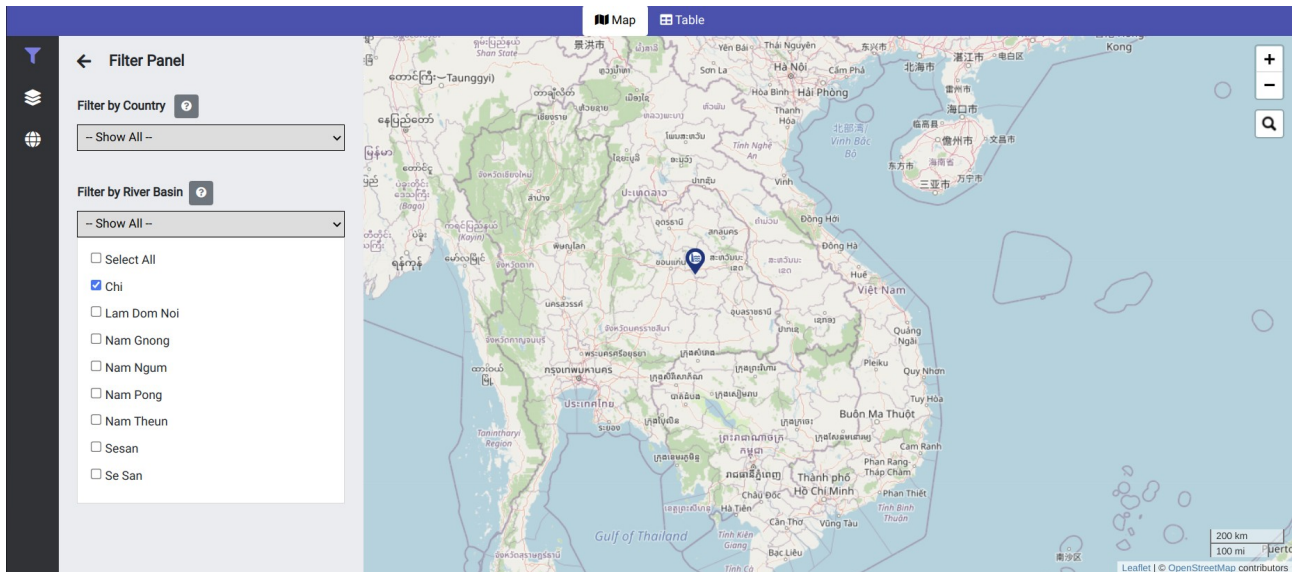


Figure 02: Map showing reservoirs that is filtered by river basin – Chi

### (b) Layer Menu

The layer menu holds various layers – Reservoirs Boundary, Mekong Region, Country Boundary, GMS Rivers, Main rivers and River Sub-basin. Users can toggle to turn on/off the layer. By turning on, the layer will overlay on the basemap and it will be hidden when turn off.

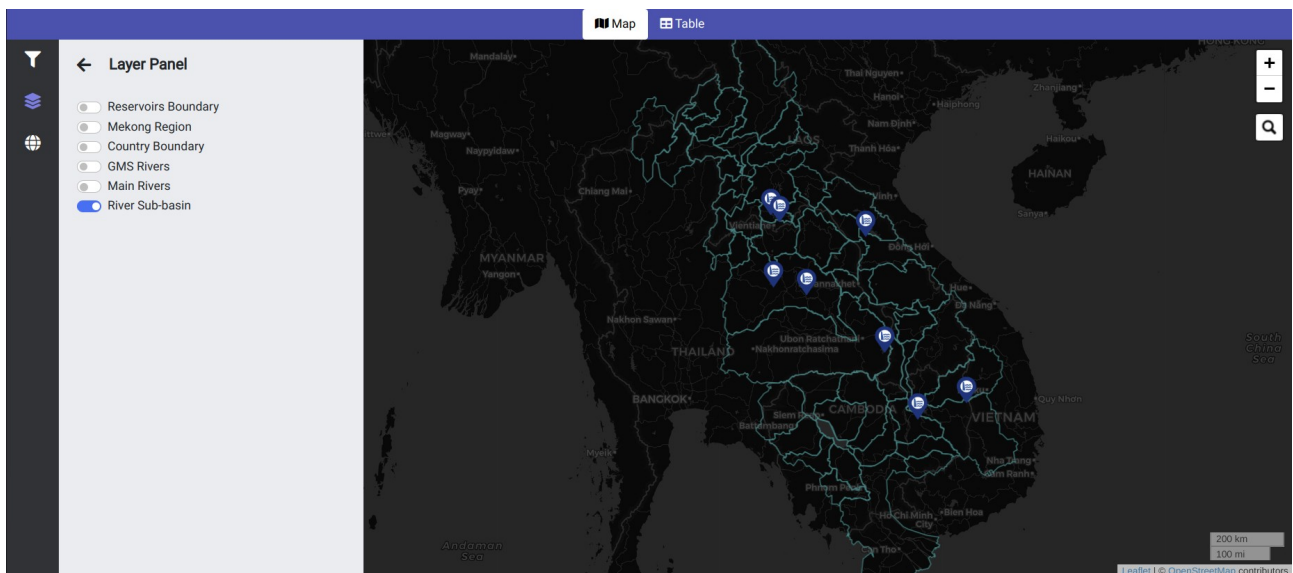


Figure 03: Map showing river sub-basin overlying on map by toggle on from the layer panel

### (c) Basemap Menu

Different types of basemap layers - satellite, street, OSM, topographic, etc. includes in the Basemap layer panel. Users click on the globe icon from the sidebar menu options, it will show the available basemap with a default one highlighted by color. Users can easily switch from one basemap to another by mouse click and it will change the existing basemap from the map window. Open Street Map (OSM) is chosen as the default basemap.

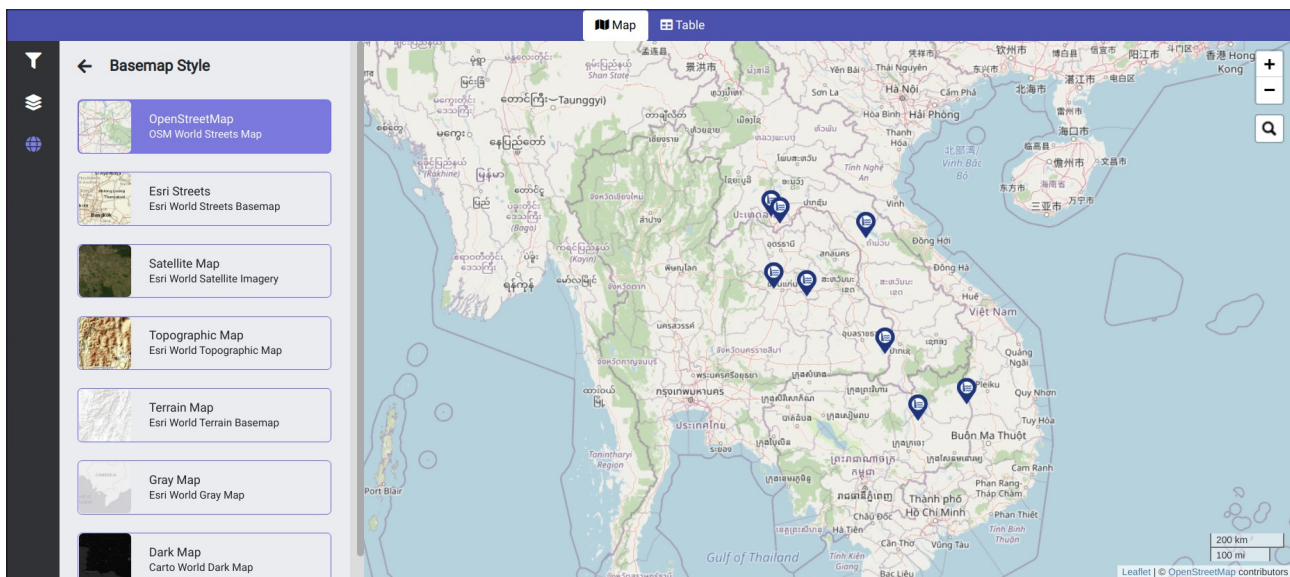


Figure 04: Map showing default OSM basemap

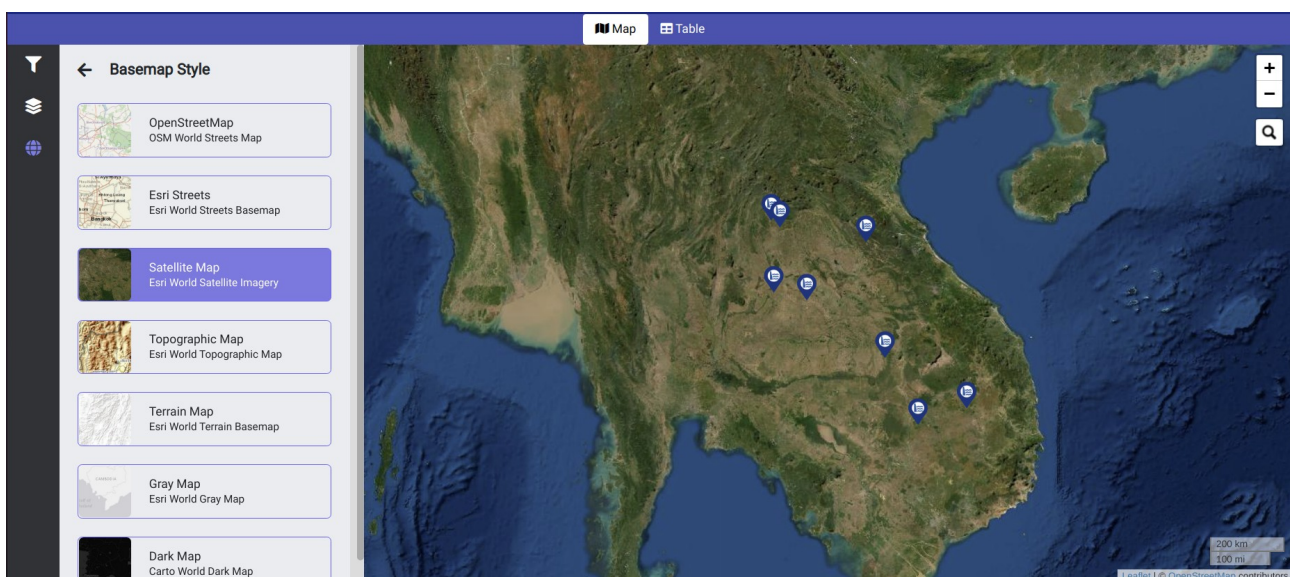


Figure 05: Map showing satellite basemap switching from default OSM map



### Popup Information Panel

Users clicks on a dam/reservoir from on top of the map, a popup will open. There have six tabs - area elevation curve, inflow, outflow, storage change, surface area and rule curve to show the respective charts. By default, the AEC charts show when the popup open at first time. Users can click any of the six tabs and the respective charts will show-up.

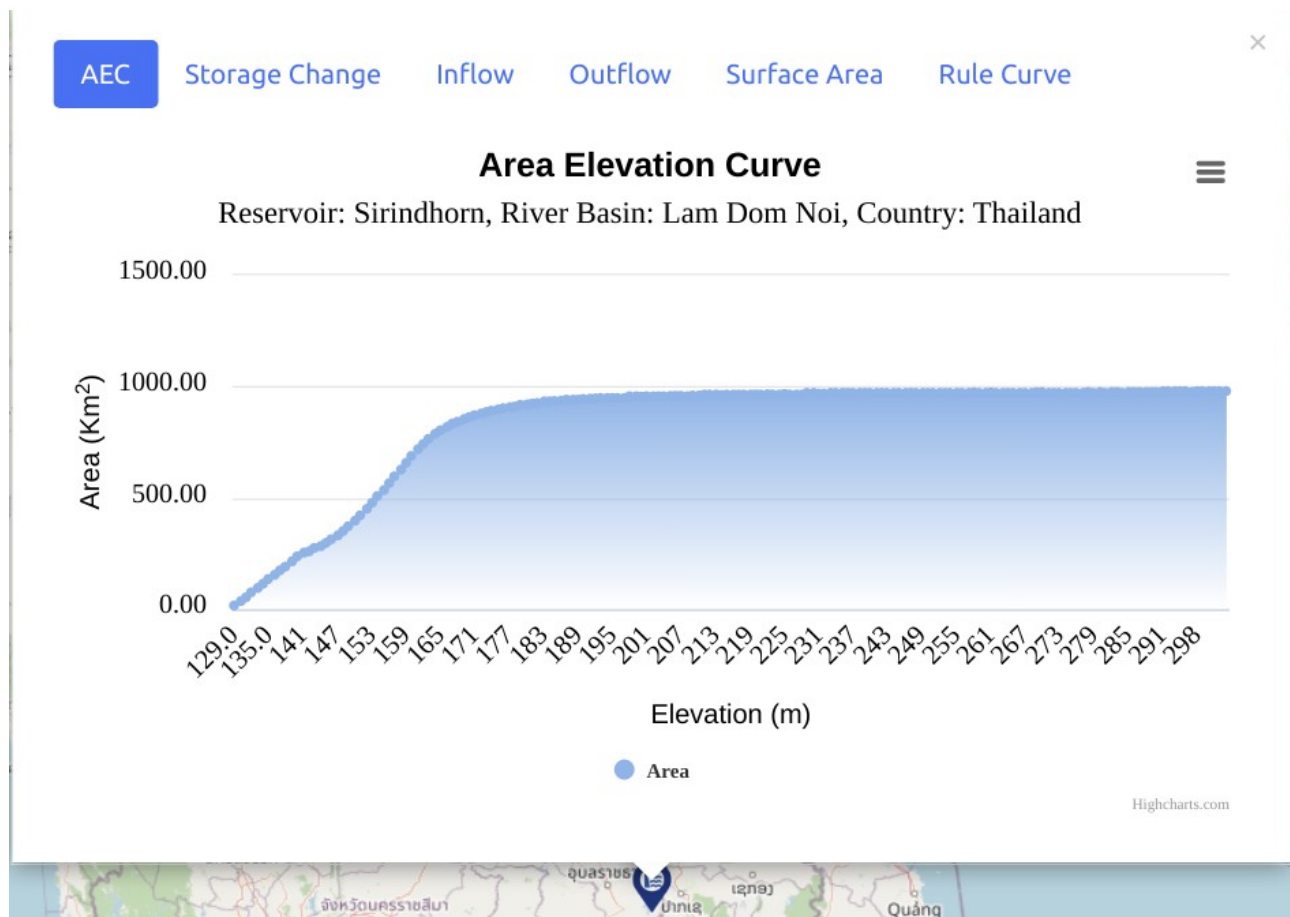


Figure 06: Popup showing area elevation curve of Sirindhorn reservoir



Figure 07: Popup showing time series of inflow of Sirindhorn reservoir

### Download Chart Data and Image

Each chart has a download options (bar icon). When users click on this icon, it will expand and shows different options – view in full screen, print chart and download chart as PNG, JPEG, PDF, SVG format. By clicking view in full screen, it will open the chart in full screen mode. By clicking on the download button, the chart image will be downloaded in selected format. Similarly, users can download chart data as CSV or XLS format. If users don't want to download data, they can view the data in tabular format

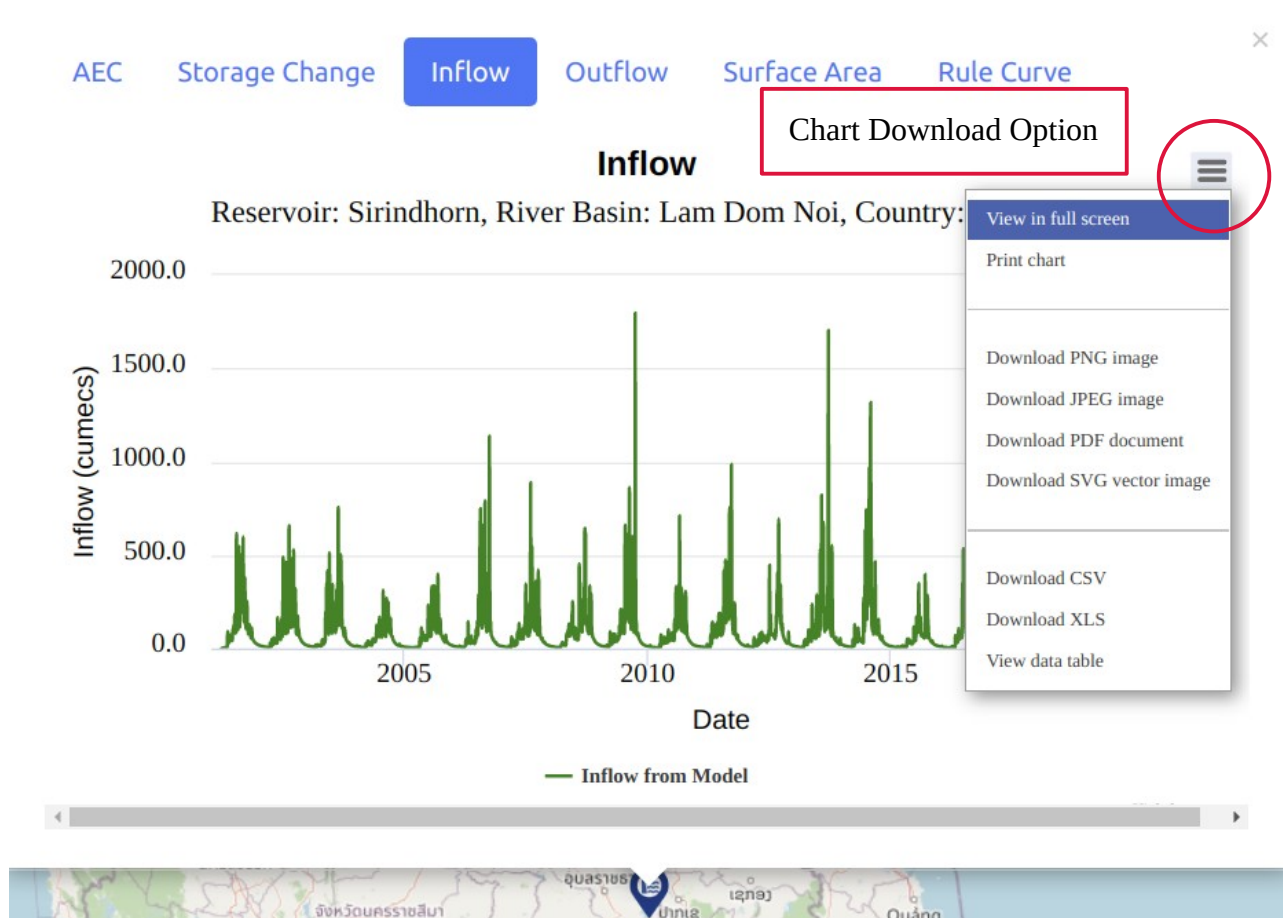




Figure 08: Chart data and image download option

## B. Table Section

The table view section is showing the raw data of the reservoir/dam information in a tabular format that used to generate chart showing in popup. There have six tabs – AEC, Storage change, Inflow, Outflow, Surface Area, and Rule Curve. User can easily switch from one tab to another tab by a mouse click event. Each tab has contained the tab-related information of all the reservoirs. Each tab has also a filter function to filter reservoir - by country or by river basin and the results will show the associated information of the filtered reservoir/dam in the table. There is a search panel which can also use to search and filter reservoir by specific name.

There have a data download and print option at each table. User can directly print the table by print function and download data as Excel, CSV or PDF format by the download function.

AEC Storage Change Inflow Outflow Surface Area Rule Curve

Filter by Country  Filter by River Basin 



-- Show All -- -- Show All --

Show 10 rows Print Excel CSV PDF Search:

Country	River Basin	Reservoir/Dam Name	Elevation	Cumulative Area
Cambodia	Sesan	Lower Sesan 2	86	14.37
Cambodia	Sesan	Lower Sesan 2	87	56.94
Cambodia	Sesan	Lower Sesan 2	88	113.65
Cambodia	Sesan	Lower Sesan 2	89	170.25
Cambodia	Sesan	Lower Sesan 2	90	226.74
Cambodia	Sesan	Lower Sesan 2	91	283.41
Cambodia	Sesan	Lower Sesan 2	92	340.3
Cambodia	Sesan	Lower Sesan 2	93	396.18

Figure 09: Table showing AEC data of all reservoirs

AEC Storage Change Inflow Outflow Surface Area Rule Curve

Filter by Country  Filter by River Basin 

Thailand -- Show All --

Show 10 rows Print Excel CSV PDF Search:

Country	River Basin	Reservoir/Dam Name	Date	Inflow (Cumecs)
Thailand	Chi	Lam Pao	10/15/2021	218.753
Thailand	Chi	Lam Pao	10/14/2021	162.263
Thailand	Chi	Lam Pao	10/13/2021	135.757
Thailand	Chi	Lam Pao	10/12/2021	141.272
Thailand	Chi	Lam Pao	10/11/2021	120.831
Thailand	Chi	Lam Pao	10/10/2021	103.028
Thailand	Chi	Lam Pao	10/9/2021	106.756
Thailand	Chi	Lam Pao	10/8/2021	110.498
Thailand	Chi	Lam Pao	10/7/2021	112.906
Thailand	Chi	Lam Pao	10/6/2021	119.25

Showing 1 to 10 of 22,509 entries (filtered from 60,025 total entries)

Previous 1 2 3 4 5 ... 2251 Next

Figure 10: Table showing reservoir inflow data filter by country – Thailand



[AEC](#)
[Storage Change](#)
[Inflow](#)
[Outflow](#)
[Surface Area](#)
[Rule Curve](#)

Filter by Country 
 Filter by River Basin

-- Show All --
 Nam Pong

Show 10 rows
 Print
 Excel
 CSV
 PDF

Search:

Country	River Basin	Reservoir/Dam Name	Date	Inflow (Cumecs)
Thailand	Nam Pong	Ubol Ratana	10/15/2021	370.583
Thailand	Nam Pong	Ubol Ratana	10/14/2021	407.155
Thailand	Nam Pong	Ubol Ratana	10/13/2021	413.849
Thailand	Nam Pong	Ubol Ratana	10/12/2021	313.918
Thailand	Nam Pong	Ubol Ratana	10/11/2021	241.084
Thailand	Nam Pong	Ubol Ratana	10/10/2021	246.373
Thailand	Nam Pong	Ubol Ratana	10/9/2021	259.122
Thailand	Nam Pong	Ubol Ratana	10/8/2021	268.588
Thailand	Nam Pong	Ubol Ratana	10/7/2021	272.71
Thailand	Nam Pong	Ubol Ratana	10/6/2021	285.303

Showing 1 to 10 of 7,503 entries (filtered from 60,025 total entries)

Previous
 1
 2
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 751
 Next

Figure 11: Table showing reservoir inflow data filter by river basin – Nam Pong

RAT-Mekong

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Country	River Basin	Reservoir/Dam Name	Date	Outflow (Cumecs)
Cambodia	Sesan	Lower Sesan 2	9/16/2021	0
Cambodia	Sesan	Lower Sesan 2	8/16/2021	0.12
Cambodia	Sesan	Lower Sesan 2	7/16/2021	254.35
Cambodia	Sesan	Lower Sesan 2	6/16/2021	854.31
Cambodia	Sesan	Lower Sesan 2	5/16/2021	1777.3
Cambodia	Sesan	Lower Sesan 2	4/16/2021	342.67
Cambodia	Sesan	Lower Sesan 2	3/16/2021	353.1
Cambodia	Sesan	Lower Sesan 2	2/16/2021	0
Cambodia	Sesan	Lower Sesan 2	1/16/2021	211.23
Cambodia	Sesan	Lower Sesan 2	12/16/2020	806.51
Cambodia	Sesan	Lower Sesan 2	11/16/2020	5634.47
Cambodia	Sesan	Lower Sesan 2	9/16/2020	3351
Cambodia	Sesan	Lower Sesan 2	8/16/2020	4636.54
Cambodia	Sesan	Lower Sesan 2	7/16/2020	3184.91
Cambodia	Sesan	Lower Sesan 2	6/16/2020	3485.34
Cambodia	Sesan	Lower Sesan 2	5/16/2020	1395.49
Cambodia	Sesan	Lower Sesan 2	4/16/2020	427.49
Cambodia	Sesan	Lower Sesan 2	3/16/2020	94.27
Cambodia	Sesan	Lower Sesan 2	2/16/2020	35.92
Cambodia	Sesan	Lower Sesan 2	1/16/2020	124.63
Cambodia	Sesan	Lower Sesan 2	12/16/2019	478.72
Cambodia	Sesan	Lower Sesan 2	11/16/2019	1495.64
Cambodia	Sesan	Lower Sesan 2	9/16/2019	4698.3
Cambodia	Sesan	Lower Sesan 2	8/16/2019	5192.34
Cambodia	Sesan	Lower Sesan 2	7/16/2019	3492.4
Cambodia	Sesan	Lower Sesan 2	6/16/2019	3360.46
Cambodia	Sesan	Lower Sesan 2	5/16/2019	2761.89
Cambodia	Sesan	Lower Sesan 2	4/16/2019	459.36

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Print 24 pages

Destination Save as PDF

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Layout Portrait

More settings

Cancel Save

Cambodia	Sesan	Lower Sesan 2	3/16/2020	94.27
Cambodia	Sesan	Lower Sesan 2	2/16/2020	35.92
Cambodia	Sesan	Lower Sesan 2	1/16/2020	124.63

Figure 12: Table data print view

Show 10 rows ▾PrintExcelCSVPDF

Country	↑ ↓	River Basin	↑ ↓
Cambodia		Sesan	
Cambodia		Sesan	
Cambodia		Sesan	
Cambodia		Sesan	
Cambodia		Sesan	

Figure 13: Table data download and print option