



“A BRIEF EVALUATION OF MONSOONAL STAGE-HYDROGRAPHS OF SUKLAI RIVER FOR A DECADE AT NAOKATA SITE, TAMULPUR (BTR), ASSAM”

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Abstract

Hydrographs are generally used to represent the flow characteristics and amount of water flow in a river channel in respect to time and space (its gauge station). It is useful in analyzing the fluvio-geomorphological and hydrological scenario of a river channel, such as variations in water level, volume of water and discharge of water, velocity, flow types etc. within a particular drainage basin and their impacts on the morphology and morphometry of the channel in different period of time.

Here, the recent study analyses the stage-hydrographs of monsoon periods of six years – 2010,2012,2014,2016,2018, and 2020 at an interval of two years to depict the changing pattern of water level of Suklai river in various months of monsoon period. The necessary data have been collected from the Water Resources Department and the Office of the Chief Engineer, Department of Hydrology, Chandmari, Guwahati-3, Assam. Analysis of the data has been done on the basis of maximum and minimum water level or stage (in meter) and danger level (in meter) of Suklai river in reference to specific date, month, and year as recorded at the gauge station. After the analysis, the maximum water level found in the month of July,2010 (54.98 meter), while minimum water level recorded in the month of October,2012 (49.59 meter). Again, the highest number of water level has repeated by the river in the year 2020 (54.32 meter).

Keywords: Monsoonal Stage-Hydrographs, Suklai river, Udalguri, Tamulpur, Water level, Danger level, Fluvio-geomorphological study.

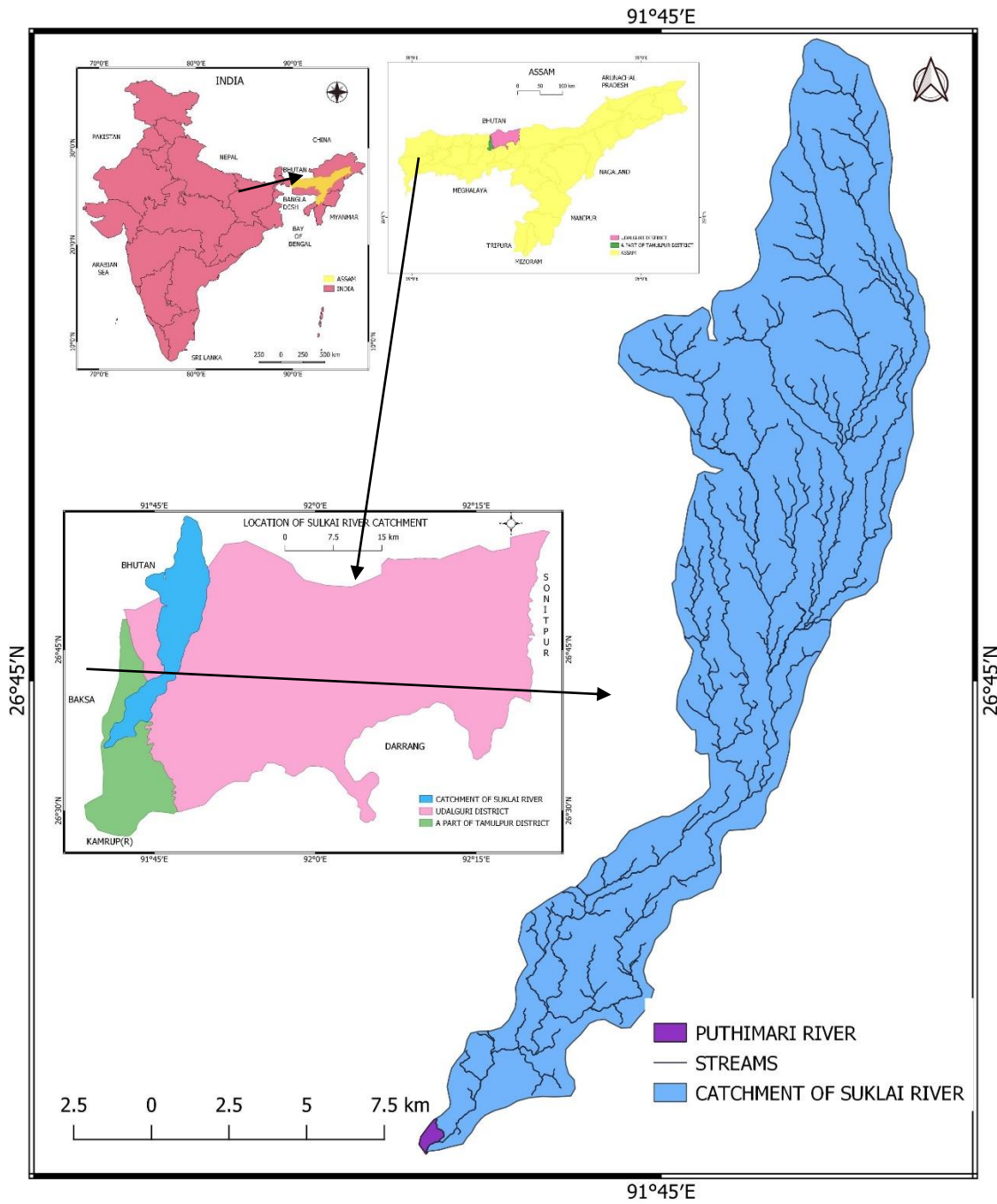
Introduction

A river is very dynamic in nature and its parameters also dynamic in character. Therefore, the water level of a river channel is different in different time period. The streams and rivers of North-East Indian region are directly related with the monsoon period. When monsoon period starts, rivers of this region become more energetic and sluggish with a load of water and sediment. That is why, the floodplains of North-East region are frequently inundated by the rivers and their tributary streams. The water level changes in the rivers abruptly according to the variations in volume of water flowing in course of time. To understand the hydrological parameters and their changing character of a river channel, it is necessary to study the variations of water level in different periods of monsoon season; because monsoon season is the key contributor of surface runoff in the North-Eastern region of Indian territory. The monsoonal Stage-Hydrographs are the depiction of water levels of monsoon period, through which we can easily study either a river crossed its danger level or not. Hydrographs are also useful in predicting the future water level and peak flow of a river.

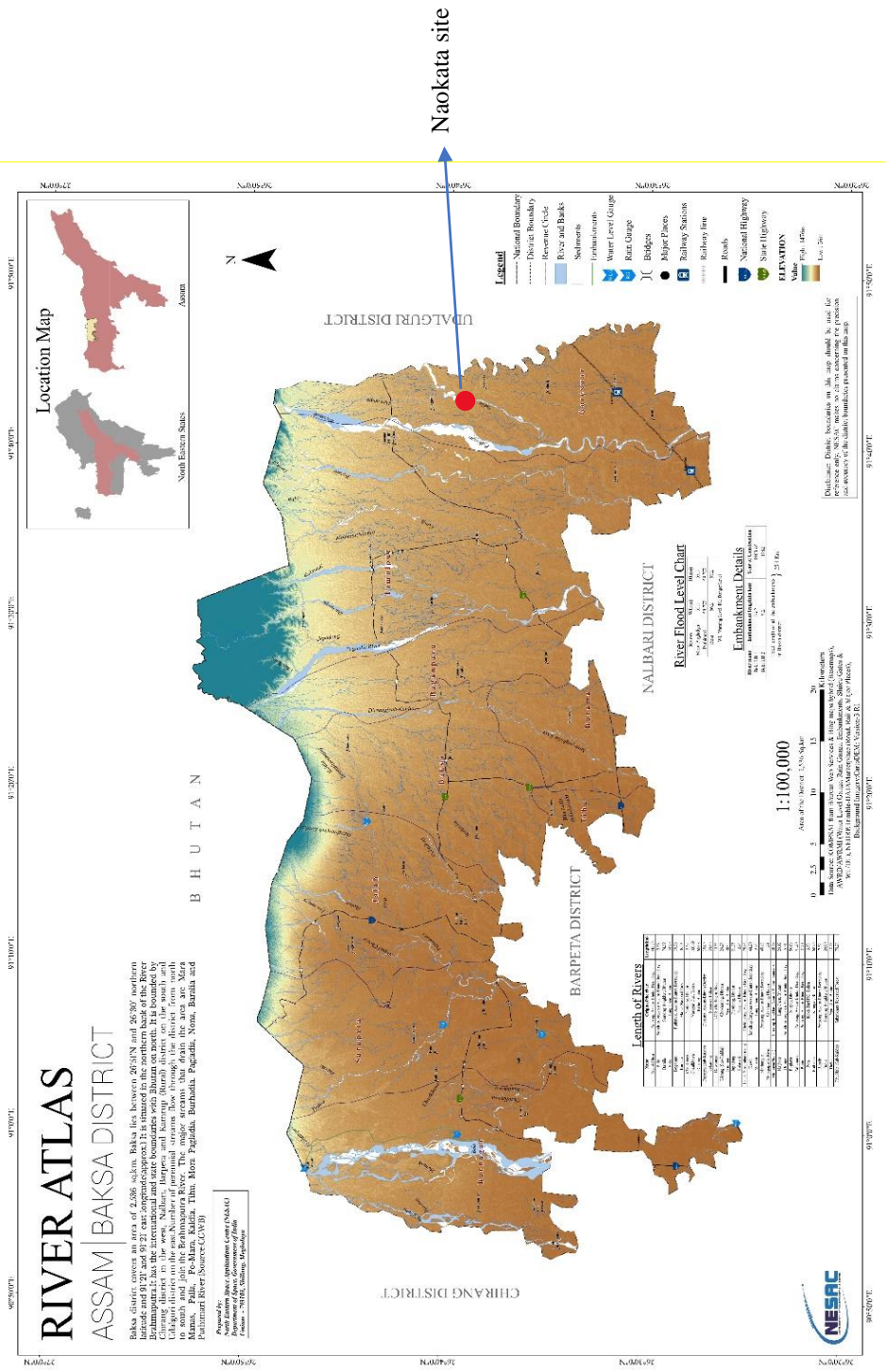
Area under study

The study area, Suklai river is located at the Northern bank of the Brahmaputra River in between $26^{\circ}34'51''$ North to $26^{\circ}52'30''$ North latitude and $91^{\circ}40'16''$ East to $91^{\circ}48'38''$ East longitude. It is bounded by the Royal Kingdom of Bhutan in the North, while southern side is surrounded by Kamrup district. The eastern side is bounded by Udalguri district and the western side is surrounded by Tamulpur district. The study area has numerous streams and abandoned channels. The upper part of the river is situated in Himalayan Bhabar zone, the middle course is in old alluvium zone, and the lower portion or the outlet of the river is located in vast active floodplain region, which is being under frequent floods. Suklai river is originated in Bhutan at an altitude of 800 meters, and it enters Udalguri district of Assam (India) at an elevation of 400 meters. The river is a trans-boundary river, which flows south-westwards upto Kamrup district where it merges with the Brahmaputra River. The river has a length of 66 kilometres.

Location map of study area:



Map1: Suklai river catchment.



Map2: Location of Naokata gauge site.
 [Source: Assam water Centre, Guwahati, and prepared by North Eastern Space Application Centre]

Objective of the present study

The main focus of the present study is to analyse the flow characteristics of Suklai river in monsoon period through Stage-hydrographs and its impact on the occurrence of flood in the study area.

Database and Methodology

The entire work of the present study is generally based on Descriptive Analytical method of investigation. The necessary stage data of Suklai river on daily basis have been collected from the Office of the Chief Engineer, Department of Hydrology, Chandmari-3, Guwahati, Assam, and Assam Water Centre, Ganeshguri, Guwahati, Assam. A systematic sampling method has been applied while selecting the data of various time period.

Different annual and monthly stage-hydrographs have been prepared using MS-Excel Sheet of Windows-10 in order to represent the nature and volume of water level, analysis of hydrological characteristics of Suklai river at the Naokata site. The base map of the study area has been prepared by QGIS software using Sentinel-2 satellite imagery downloaded from Copernicus open access hub, and SRTM DEM imagery of 30 Meters resolution downloaded from USGS Earth Explorer.

Review of relevant literature

Study of river channel and flood hazard always considered as an important and essential field of interest for the Geomorphologists, Hydrologists and Environmentalists. Everyone is curious to know the causes and consequences of flood hazard that can develop some measures to prevent the hazard. Therefore, the study of flood is becoming a global study and a number of problems and prospects were marked and different opinions and views have been suggested by numerous scholars regarding flood. There are so many attempts have been by the Geomorphologists and Hydrologists for the study of flood, its characteristics, various attributes and parameters of a drainage network. Worldwide, the numbers of works related to river channel and flood are uncountable. Various scholars and thinkers made valuable contribution on various aspects from channel morphology to morphometric evaluation of a drainage basin and other relevant arena. Leopold, Wolman and Miller (1964) did marvelous work on river channel and entitled 'Fluvial processes in Geomorphology'; D.C Goswami (1985) worked on Basin denudation and channel aggradation of the Brahmaputra river; A.K.Bora (1997) worked on Jia Bharali river basin of Assam; B.Barman (2014) worked on Lower Brahmaputra River basin and its Floodplain region; P.K.Roy (2015) did an explendid work on Puthimari river basin of Udalguri, Tamulpur and Kamrup district of Assam; S.Deka and I.Das (2020) worked together on flood and bank erosion hazard of Kulsi river of lower Brahmaputra floodplain region, Assam.

TABLE 1: Monsoonal Stage data of Suklai river (in meter) at Naokata site, 2010.

Date	May	June	July	August	September	October
1		51.05	<u>52.18</u>	51.64	51.66	51.25
2		51.07	<u>54.98</u>	51.57	<u>51.98</u>	51.2
3		51.10	<u>51.88</u>	51.52	51.80	51.17
4		51.32	<u>51.87</u>	51.50	51.58	51.14
5		51.23	51.69	51.52	51.53	51.10
6		51.63	51.52	51.41	51.47	51.07
7		<u>52.30</u>	51.36	51.35	51.62	51.06
8		51.60	51.34	51.35	51.16	51.02
9		51.48	51.46	51.30	51.57	51.21
10		51.44	<u>51.82</u>	51.27	51.53	51.21
11		51.39	51.53	51.34	51.64	51.16
12		51.29	<u>51.86</u>	51.22	51.70	51.15
13		51.22	<u>52.45</u>	51.19	51.54	51.12
14		51.12	<u>52.04</u>	51.42	51.52	51.08
15	51.25	51.12	51.75	51.43	51.51	50.92

16	51.18	51.12	51.67	51.44	51.49	
17	51.25	51.11	51.58	51.51	51.52	
18	51.25	51.15	51.50	51.71	51.43	
19	51.08	51.28	<u>52.08</u>	51.50	51.54	
20	51.35	51.36	<u>51.96</u>	51.36	51.55	
21	51.76	51.35	<u>52.08</u>	51.36	51.51	
22	51.50	51.37	<u>52.10</u>	51.58	51.73	
23	51.33	51.18	<u>51.94</u>	<u>51.81</u>	51.56	
24	51.25	51.12	51.79	<u>51.82</u>	51.48	
25	51.63	51.07	<u>51.82</u>	51.62	51.50	
26	51.30	51.25	51.74	51.62	51.43	
27	51.24	51.25	<u>51.95</u>	51.51	51.39	
28	51.21	<u>53.86</u>	<u>51.84</u>	51.58	51.37	
29	51.12	<u>53.36</u>	51.70	51.51	51.32	
30	51.07	<u>52.46</u>	51.63	51.67	51.31	
31	51.11		51.68	51.62		

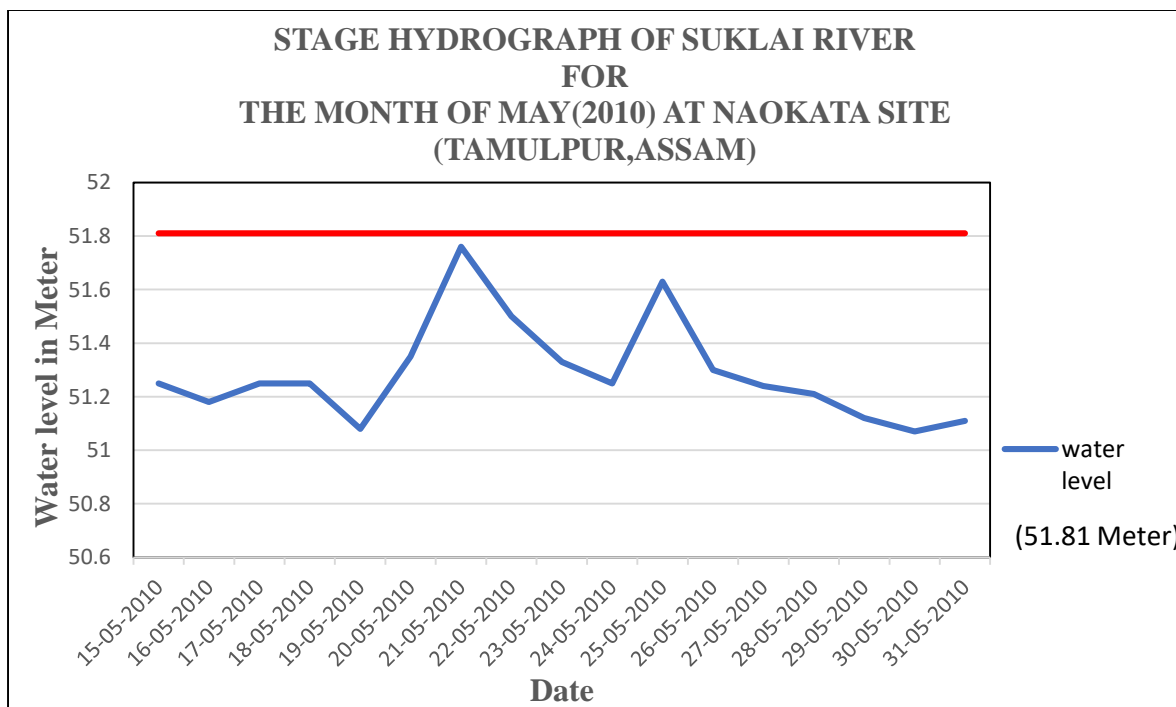


Fig1.1: Daily Stage-Hydrograph of Suklai river for the month of May,2010.

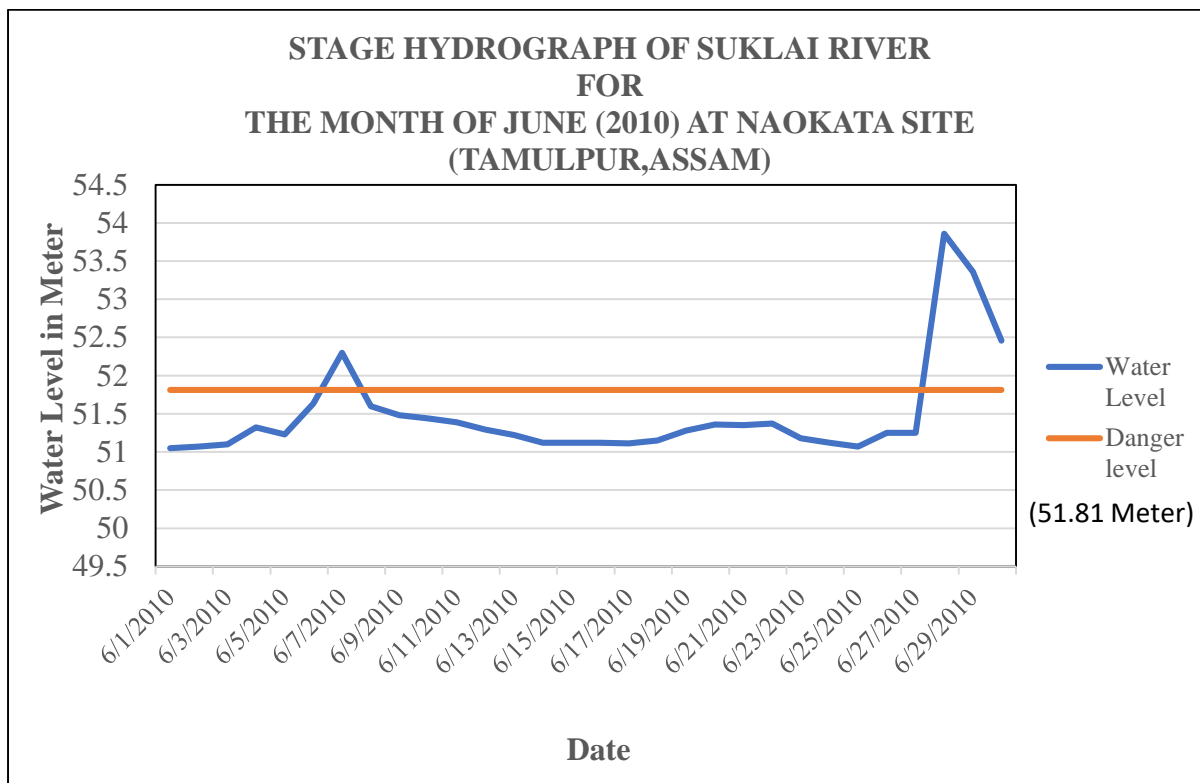


Fig1.2: Daily Stage-Hydrograph of Suklai river for the month of June,2010.

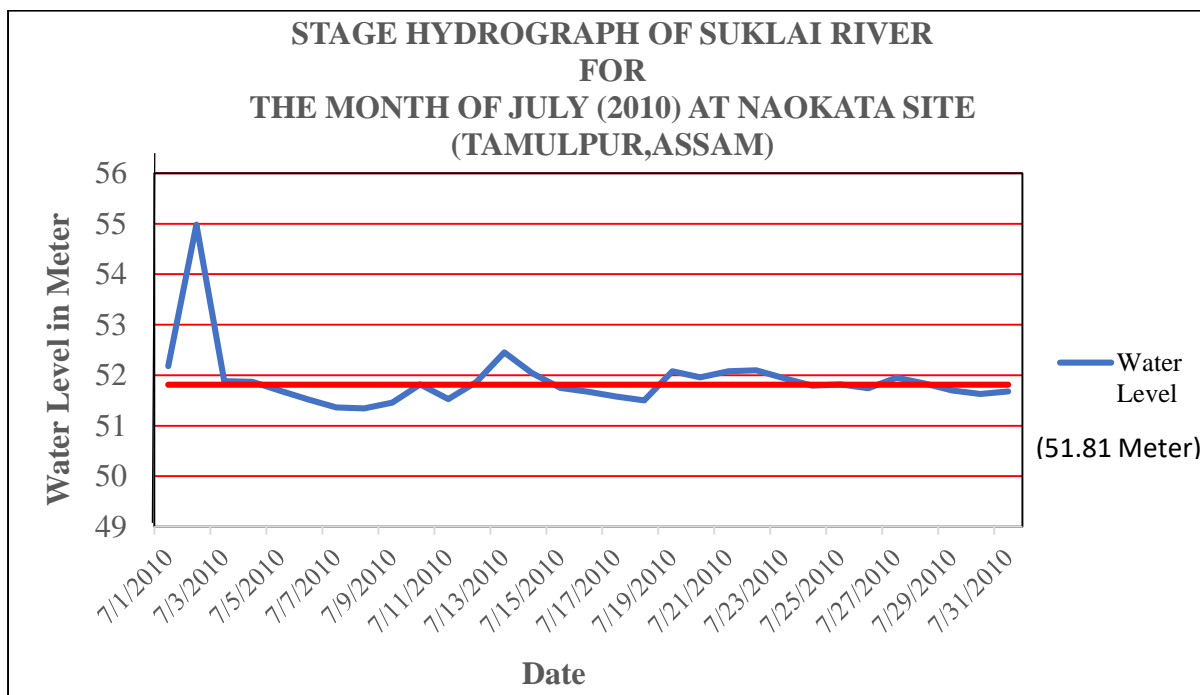


Fig1.3: Daily Stage-Hydrograph of Suklai river for the month of July,2010.

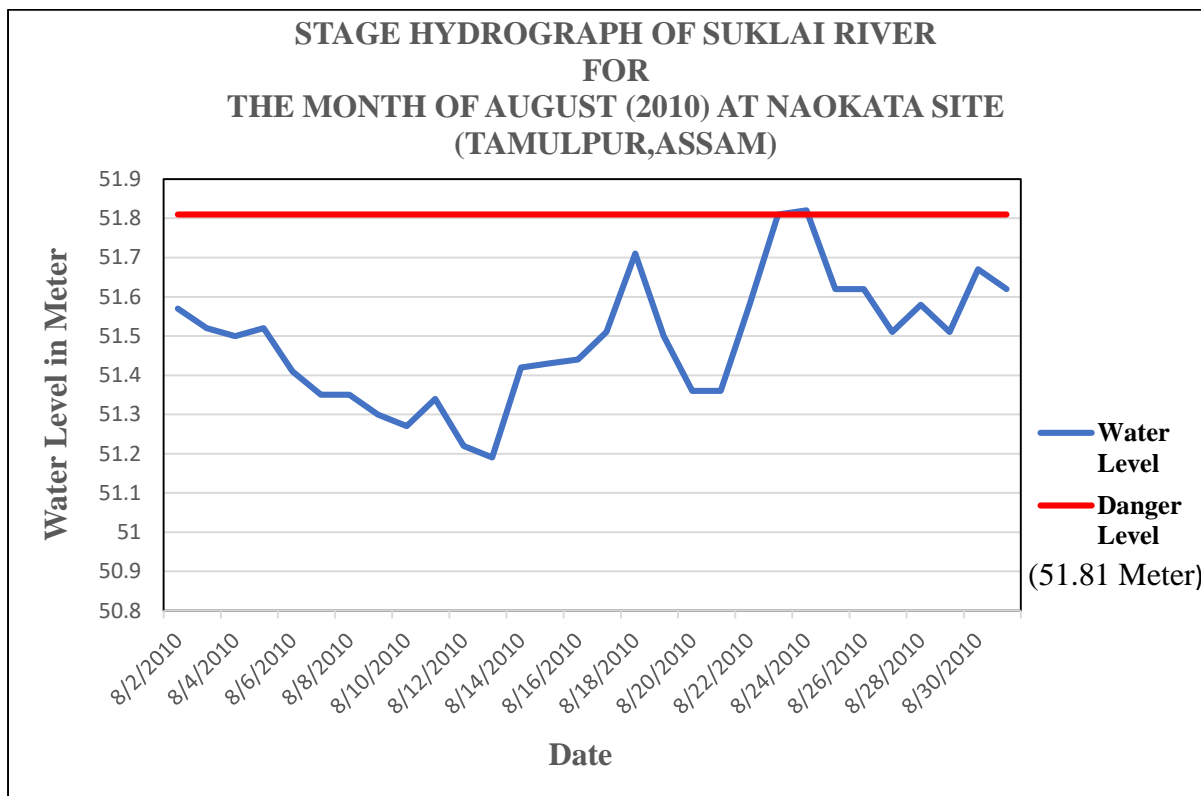


Fig1.4: Daily Stage-Hydrograph of Suklai river for the month of August,2010.

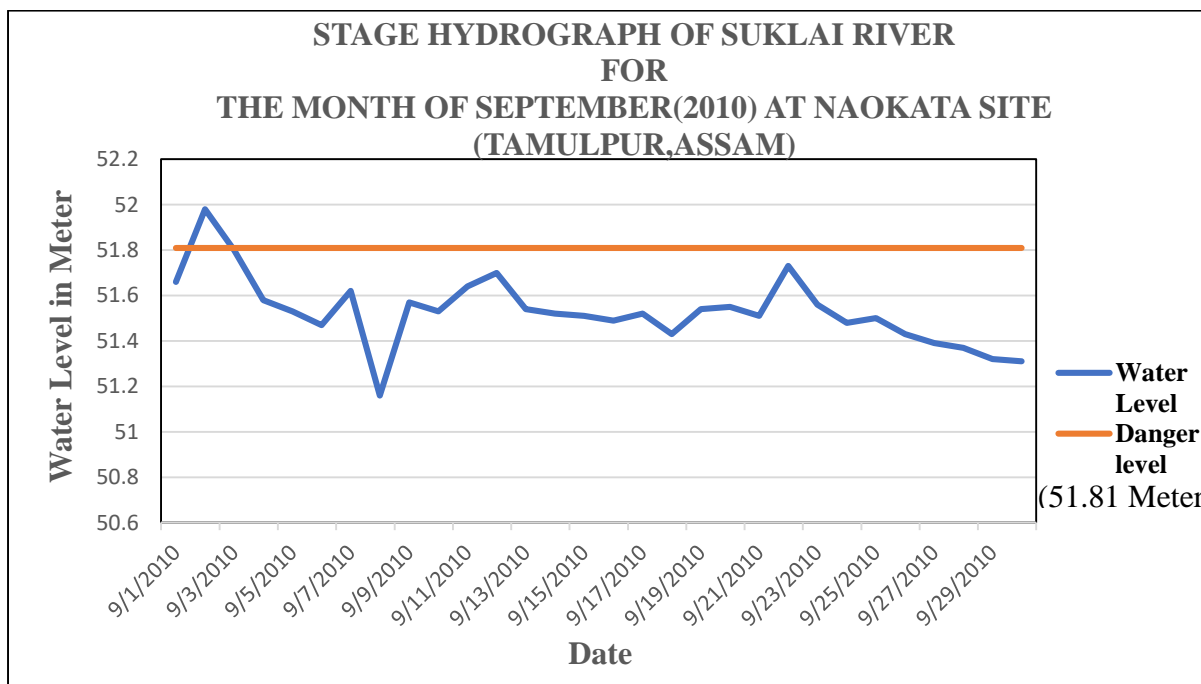


Fig1.5: Daily Stage-Hydrograph of Suklai river for the month of September,2010.

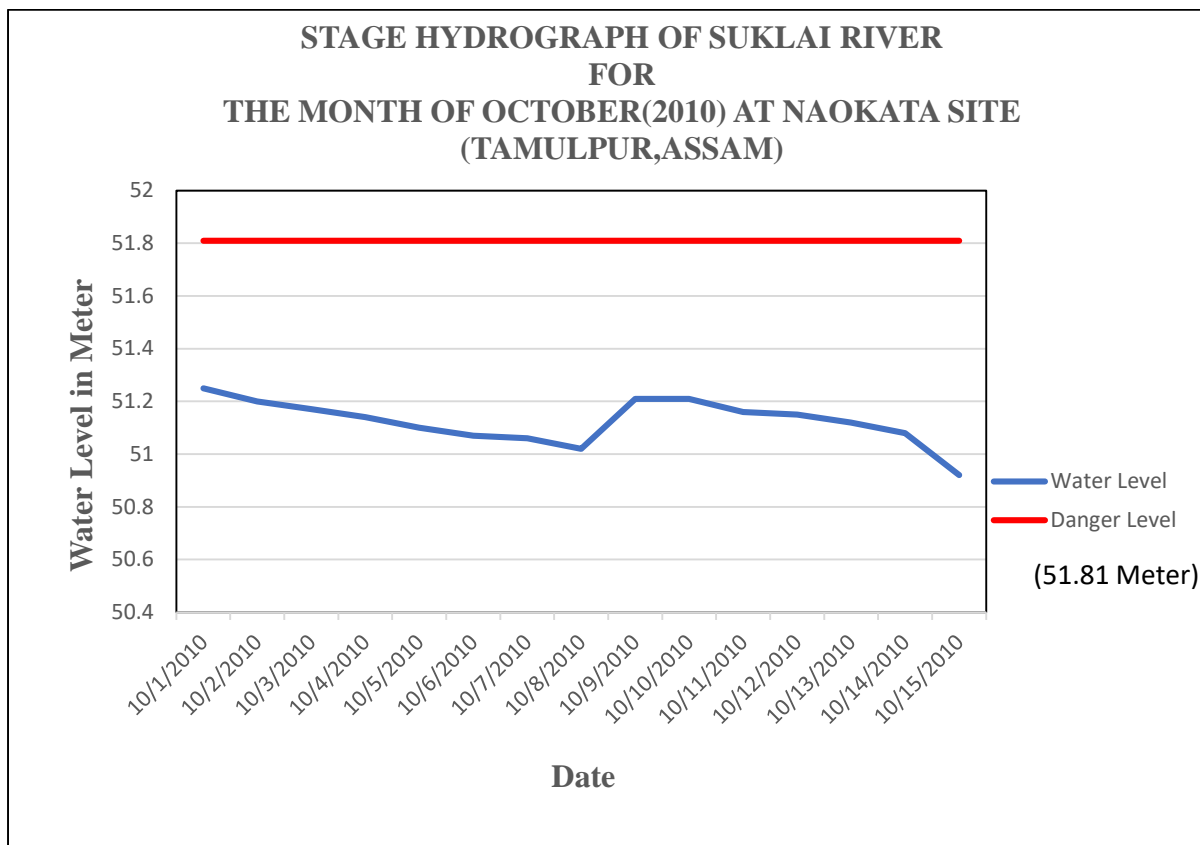


Fig1.6: Daily Stage-Hydrograph of Suklai river for the month of October,2010.

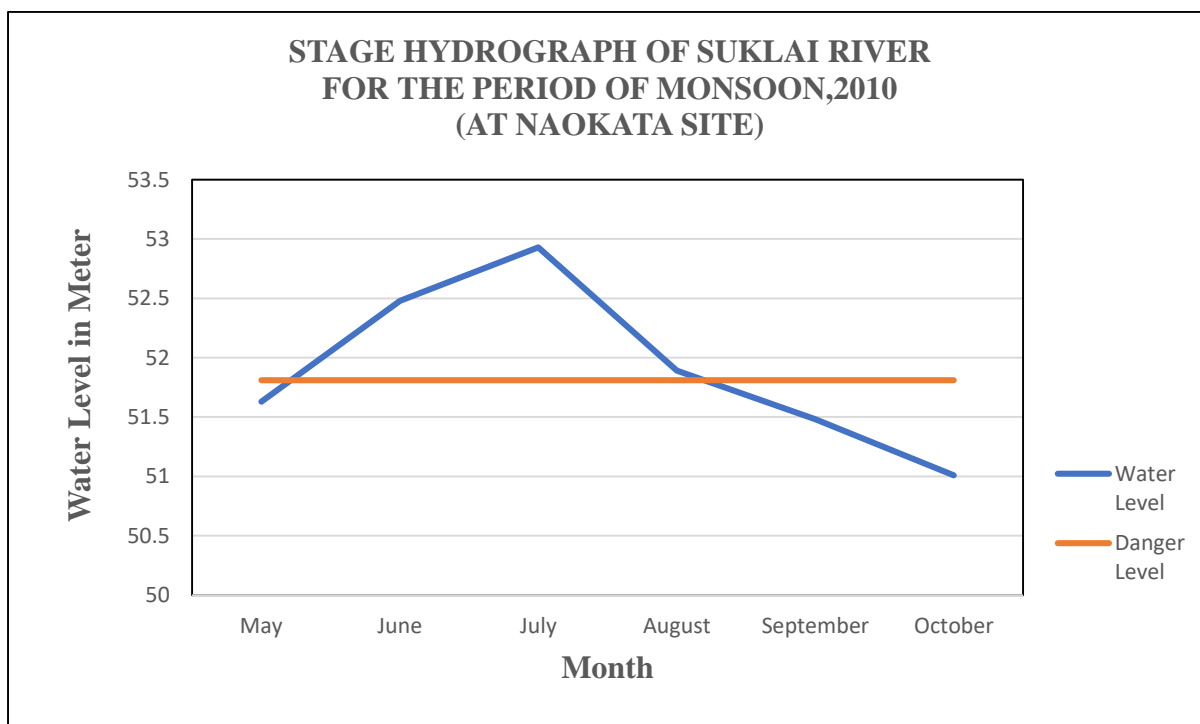


Fig1.7: Monsoonal Average Stage-Hydrograph of Suklai river,2010.

Table2: Monsoonal Water level (in meter) of Suklai river at Naokata site,2012.

Date	May	June	July	August	September	October
1		50.46	50.78	50.05	49.65	49.72
2		50.32	50.63	50.45	49.63	49.75
3		50.66	50.43	50.54	49.62	49.77
4		51.65	50.37	50.13	49.62	49.71
5		51.74	50.30	50.09	49.61	49.70
6		51.20	50.37	50.04	49.61	49.65
7		51.28	50.34	49.90	49.61	49.62
8		51.25	50.38	49.81	49.61	49.61
9		50.87	50.35	49.80	49.60	49.60
10		50.74	50.45	49.74	49.60	49.64
11		50.68	50.33	49.71	49.78	49.61
12		50.61	50.61	49.69	49.68	49.60
13		51.68	50.82	49.69	49.63	49.59
14		<u>51.85</u>	50.79	49.69	49.62	49.59
15	50.36	<u>52.53</u>	50.64	49.68	49.70	49.59
16	50.34	<u>52.45</u>	50.98	49.68	49.76	
17	50.35	<u>52.07</u>	50.95	49.66	49.79	
18	50.36	51.55	50.63	49.65	50.02	
19	50.32	51.31	50.63	49.64	49.74	
20	50.30	51.54	50.41	49.64	50.00	
21	50.29	51.08	50.30	49.85	50.53	
22	50.28	51.10	50.32	50.20	49.91	
23	50.27	51.36	50.26	49.83	49.73	
24	50.29	51.42	50.23	49.76	49.68	
25	50.58	<u>52.24</u>	50.25	49.72	49.67	
26	50.52	<u>52.92</u>	50.32	49.68	49.67	
27	52.40	<u>52.60</u>	50.23	49.67	49.65	
28	50.35	<u>52.09</u>	50.20	49.66	49.64	
29	50.29	51.45	50.28	49.66	49.62	
30	50.28	51.02	50.31	49.71	49.61	
31	50.27		50.18	49.68		

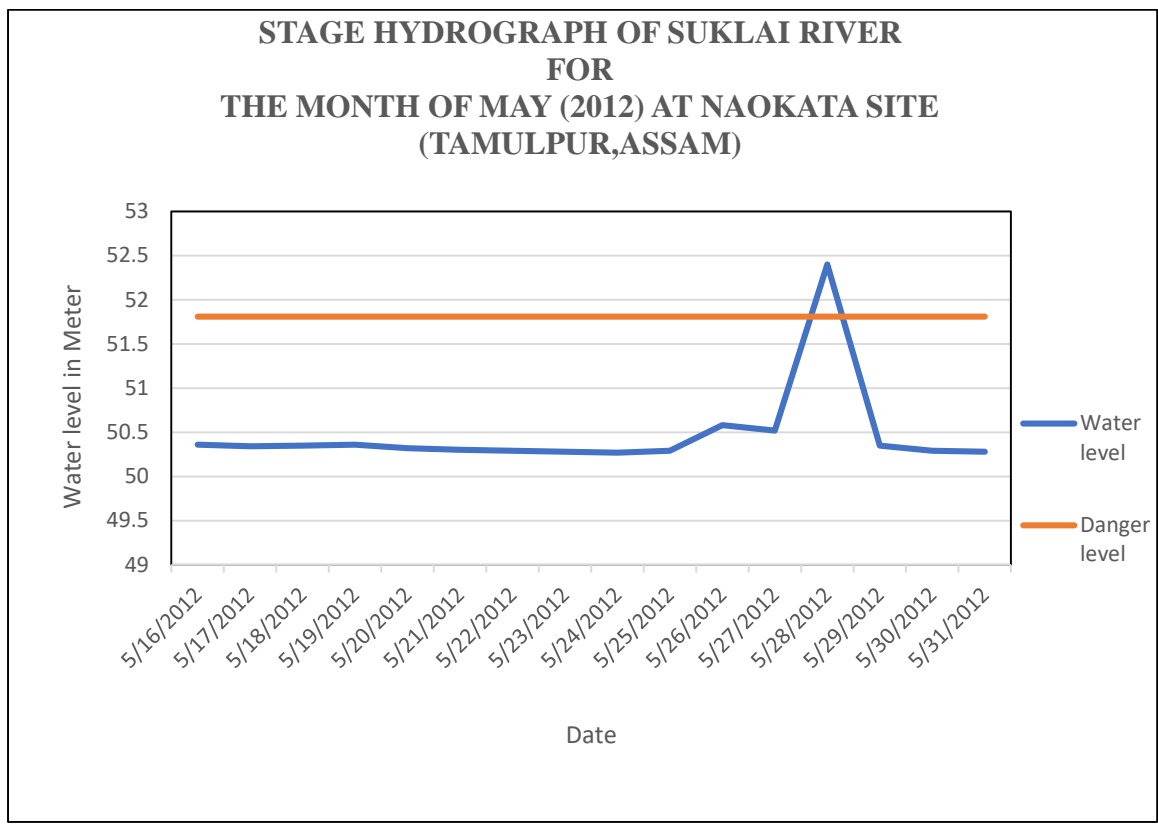


Fig.2.1: Daily Stage-Hydrograph of Suklai river for the month of May,2012.

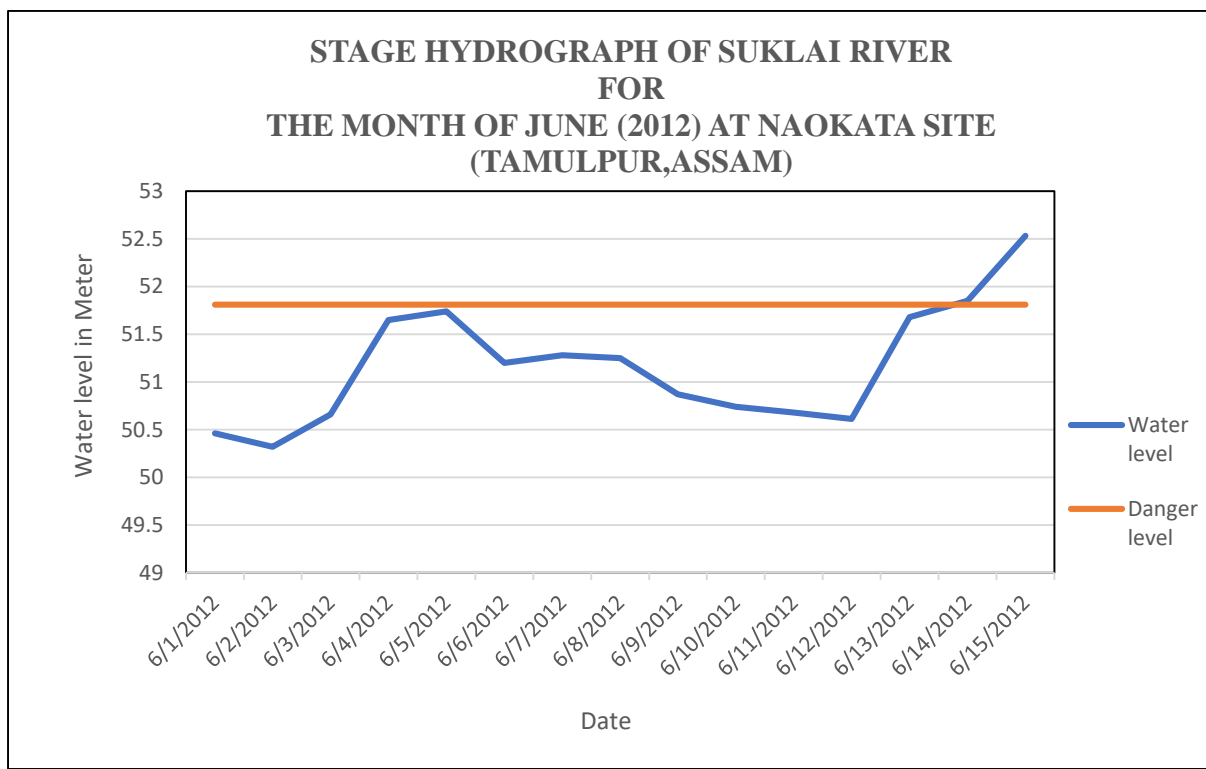


Fig.2.2: Daily Stage-Hydrograph of Suklai river for the month of June,2012.

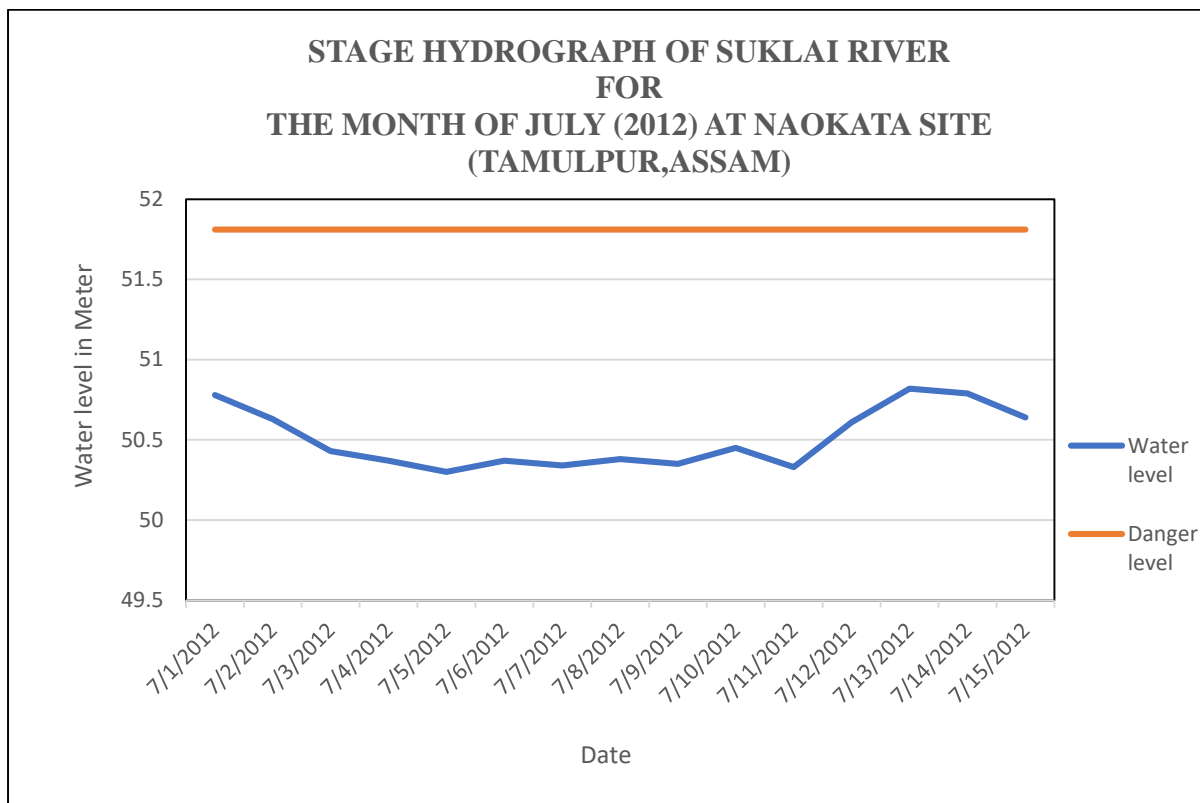


Fig2.3: Daily Stage-Hydrograph of Suklai river for the month of July,2012.

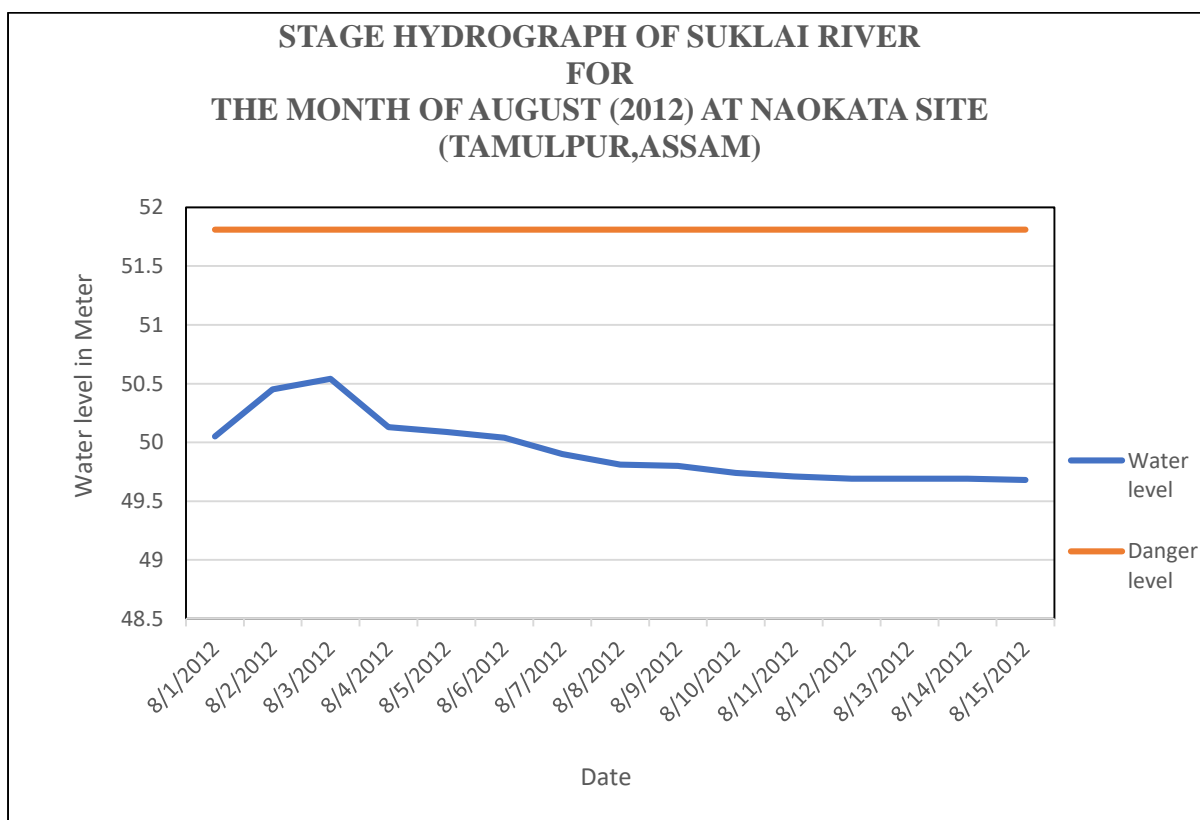


Fig2.4: Daily Stage-Hydrograph of Suklai river for the month of August,2012.

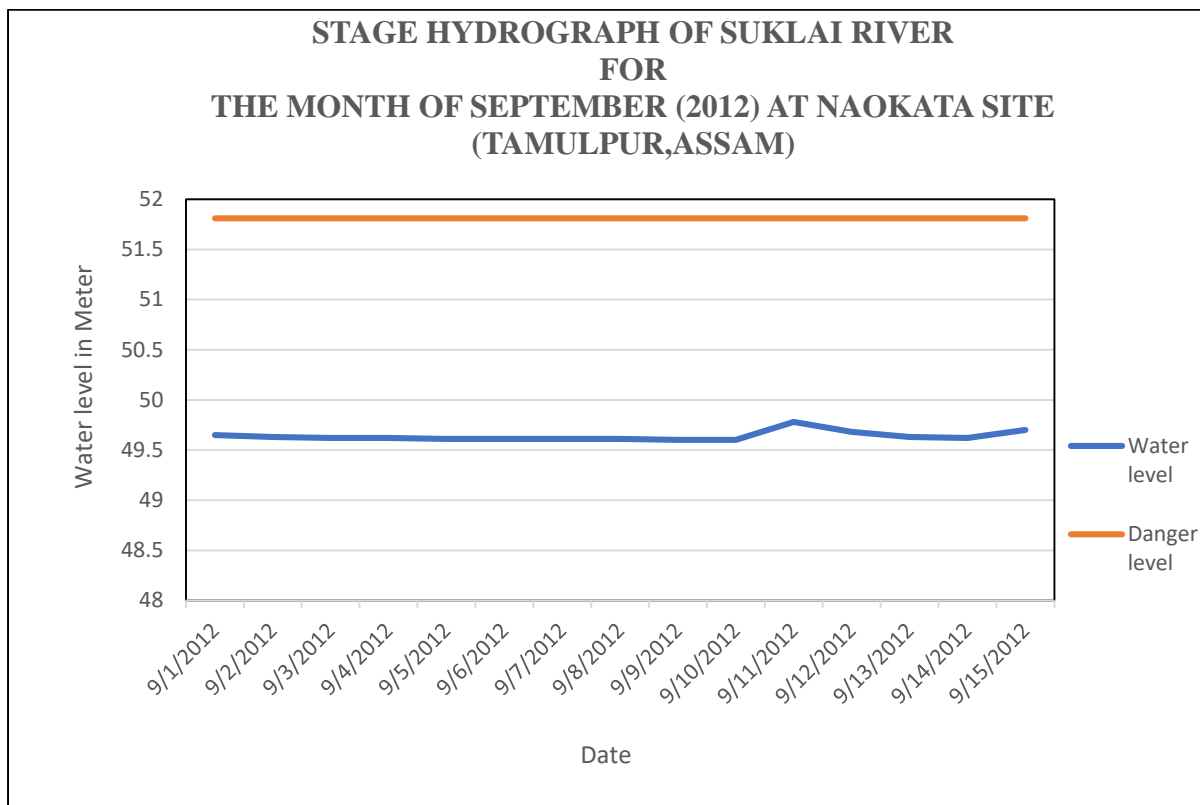


Fig2.5: Daily Stage-Hydrograph of Suklai river for the month of September,2012.

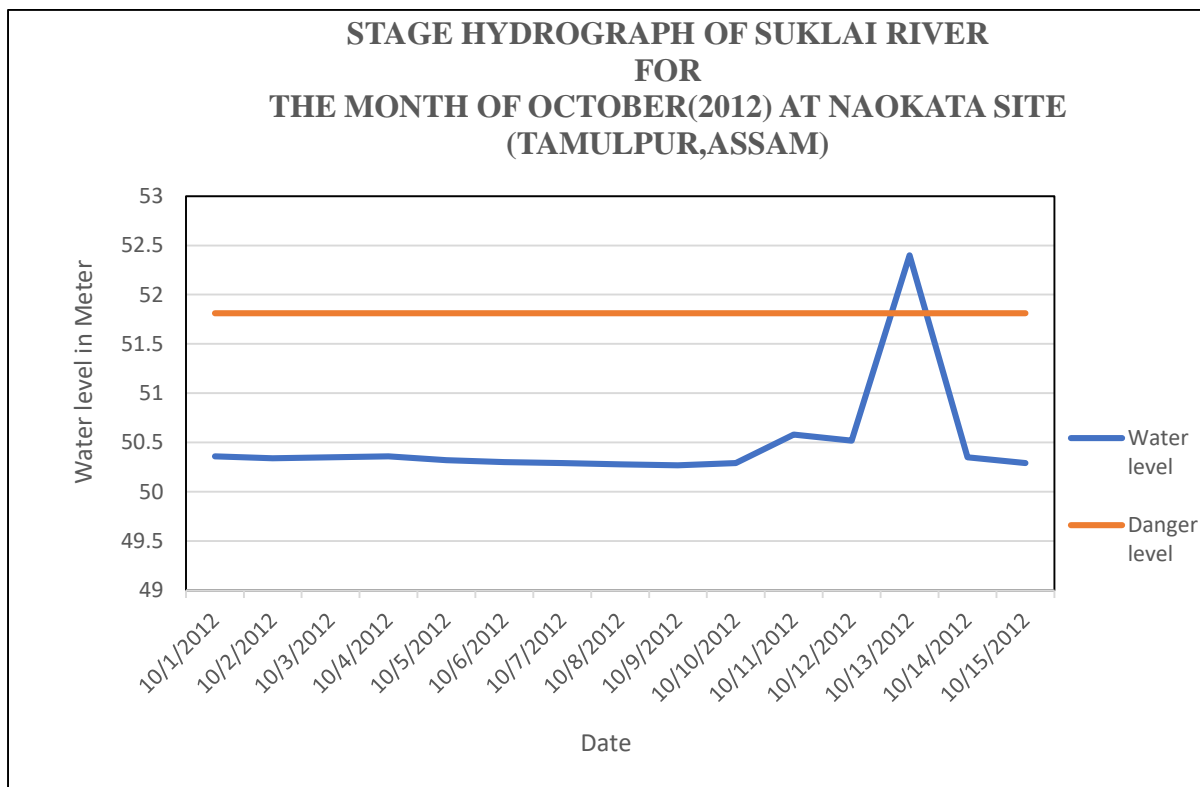


Fig2.6: Daily Stage-Hydrograph of Suklai river for the month of October,2012.

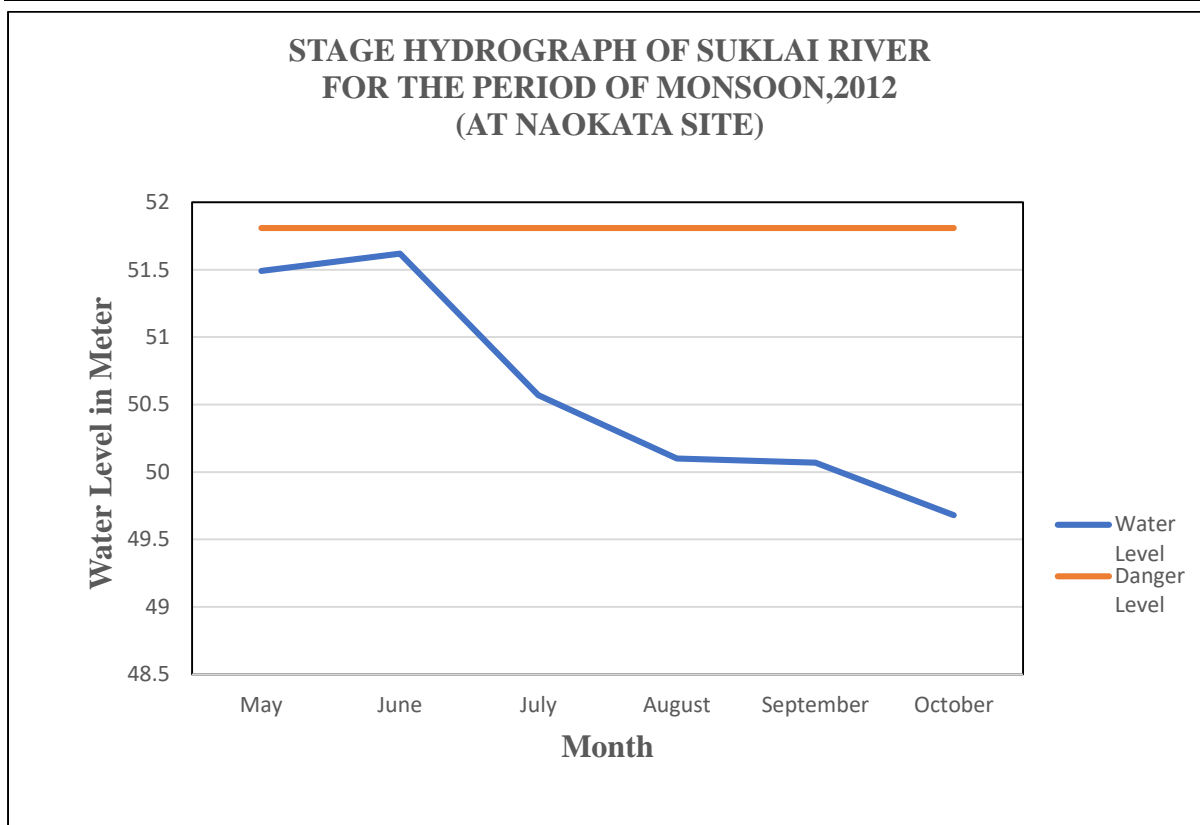


Fig2.7: Monsoonal Average Stage-Hydrograph of Suklai river,2012.

Table3: Monsoonal Water level (in meter) of Suklai river at Naokata site,2014.

Date	May	June	July	Aug	Sept	Oct
1		50.24	51.10	50.70	51.18	51.02
2		50.17	50.79	50.77	51.26	50.98
3		50.08	50.72	50.71	51.06	50.96
4		50.06	50.78	50.69	50.99	50.93
5		50.04	50.87	50.63	50.95	50.90
6		50.28	50.78	50.63	50.95	50.86
7		50.72	50.79	50.59	50.90	50.83
8		50.80	50.67	50.52	50.82	50.73
9		50.80	51.50	50.54	50.74	50.69
10	51.14	50.54	51.12	50.50	50.74	50.67
11	50.72	50.49	50.99	50.95	50.74	50.64
12	50.68	50.46	50.82	50.82	50.74	50.62
13	50.61	50.64	50.76	50.99	50.71	50.61
14	50.80	50.74	50.72	51.09	50.69	50.60
15	50.62	50.36	51.07	52.15	50.68	50.59
16	50.42	50.19	51.22	52.57	50.70	50.58
17	50.32	50.16	50.94	51.95	50.67	50.57
18	50.32	50.10	51.01	51.98	50.64	50.55
19	50.26	50.23	50.91	51.75	50.62	50.55
20	50.18	50.17	50.82	51.46	50.80	50.53
21	50.16	50.22	50.79	51.31	50.82	50.53

22	51.16	51.68	50.92	51.21	52.25	50.50
23	50.8	52.55	50.79	51.01	53.90	50.47
24	50.55	51.74	51.26	50.97	52.60	50.46
25	50.43	51.52	51.10	51.18	51.83	50.45
26	50.41	51.52	50.94	52.20	51.78	50.44
27	50.25	51.24	50.85	51.67	51.47	50.43
28	50.14	51.33	50.79	51.19	51.27	50.44
29	50.18	50.99	50.79	51.09	51.21	50.44
30	50.65	50.73	50.79	51.00	51.03	50.43
31	50.51	---	50.74	51.08	---	50.41

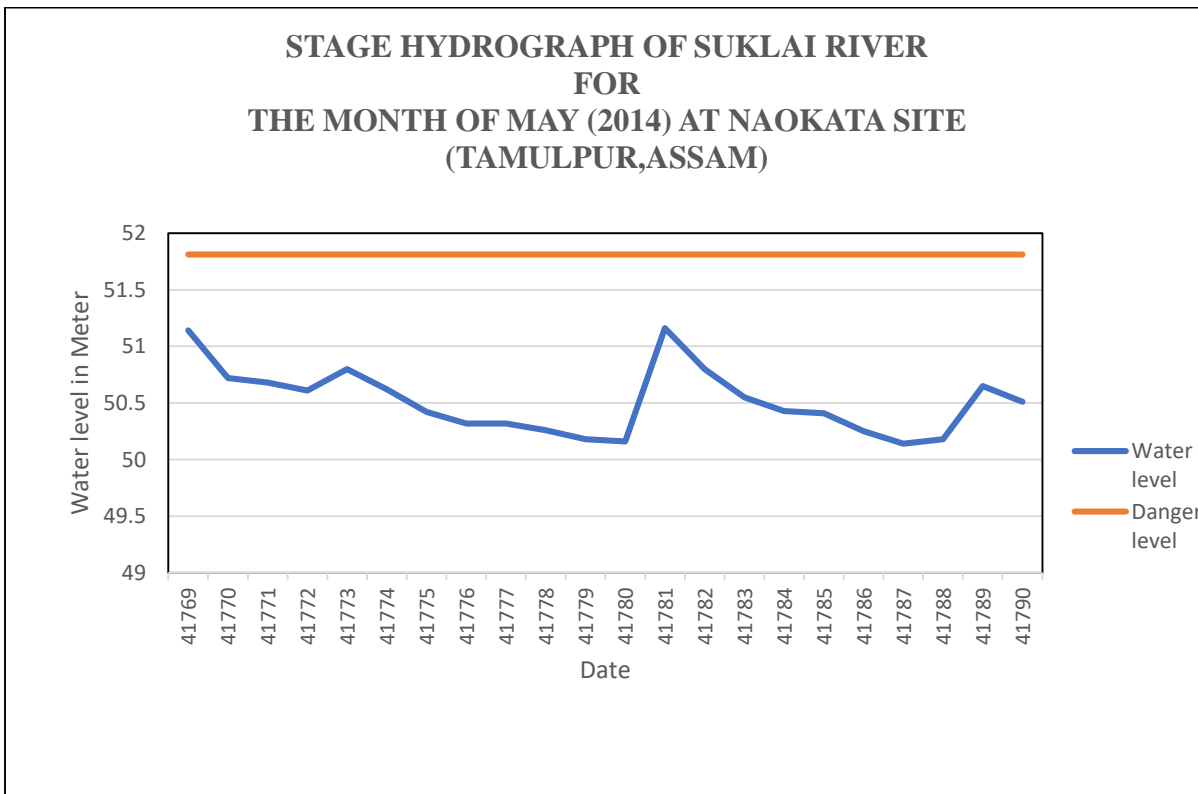


Fig3.1: Daily Stage-Hydrograph of Suklai river for the month of May,2014.

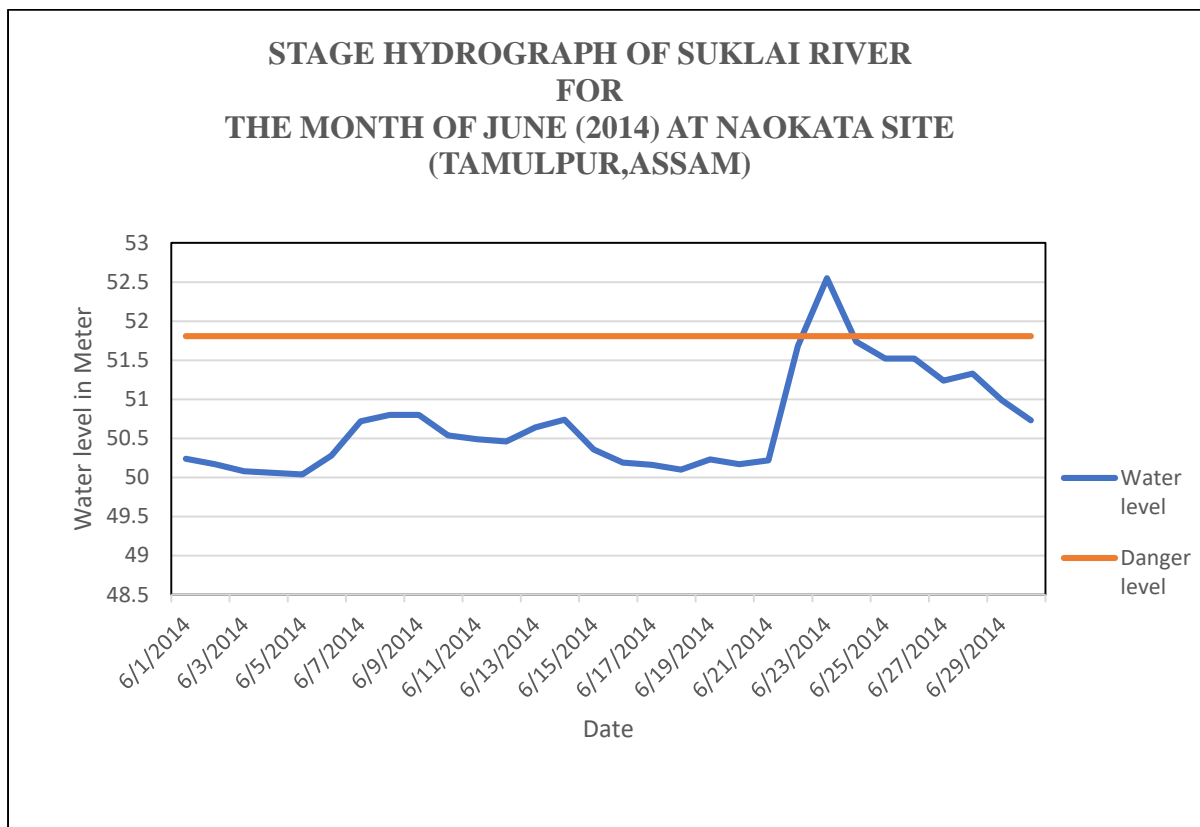


Fig3.2: Daily Stage-Hydrograph of Suklai river for the month of June,2014.

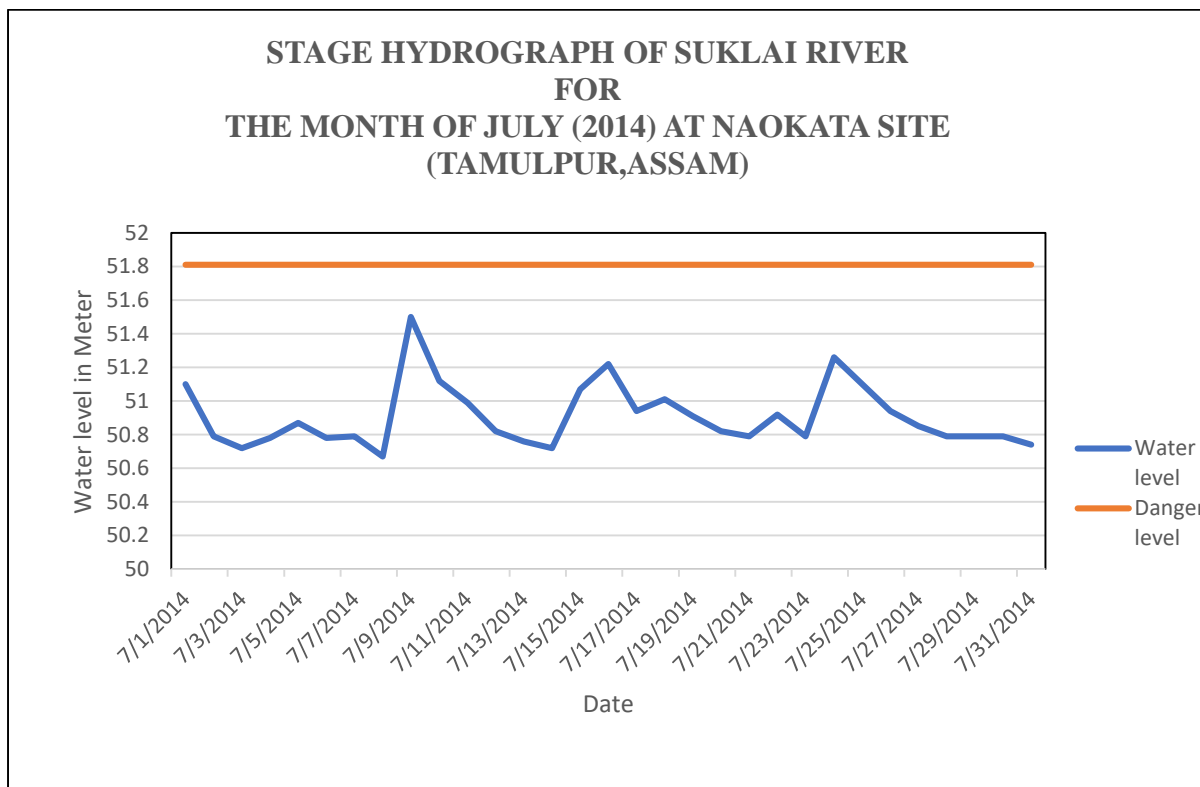


Fig3.3: Daily Stage-Hydrograph of Suklai river for the month of July,2014.

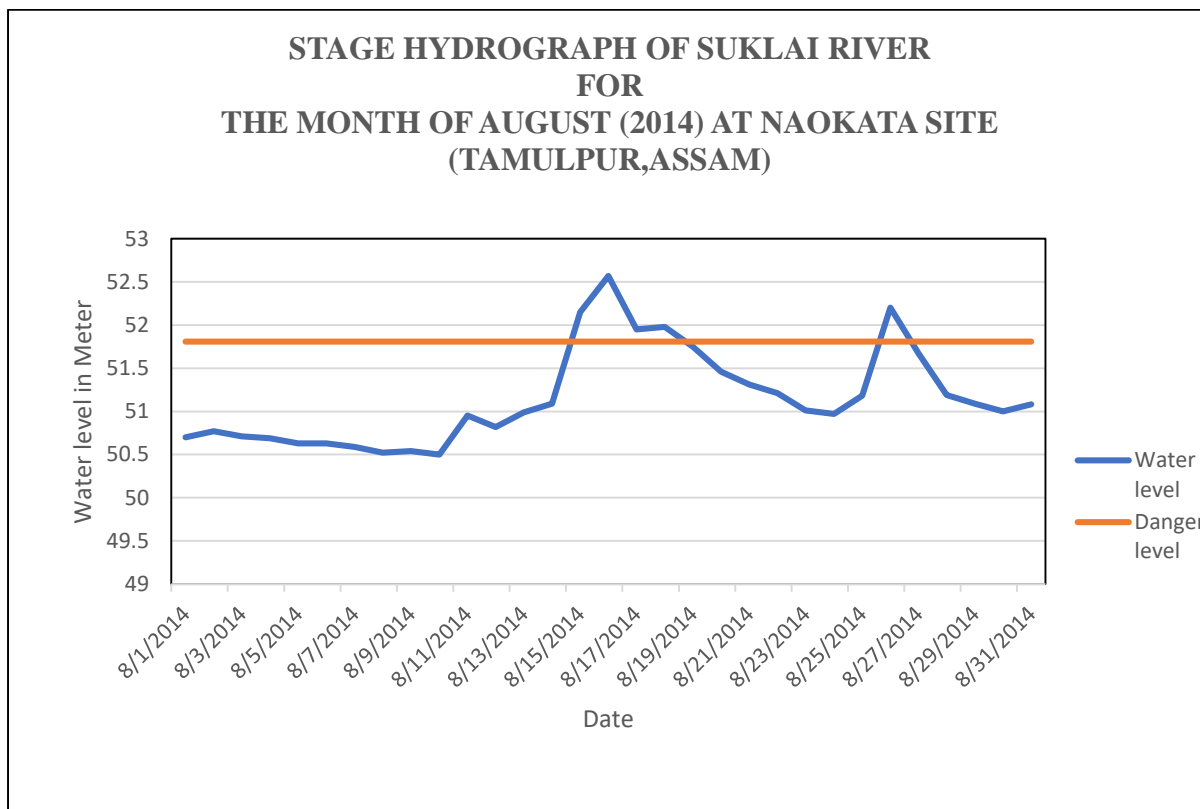


Fig3.4: Daily Stage-Hydrograph of Suklai river for the month of August,2014.

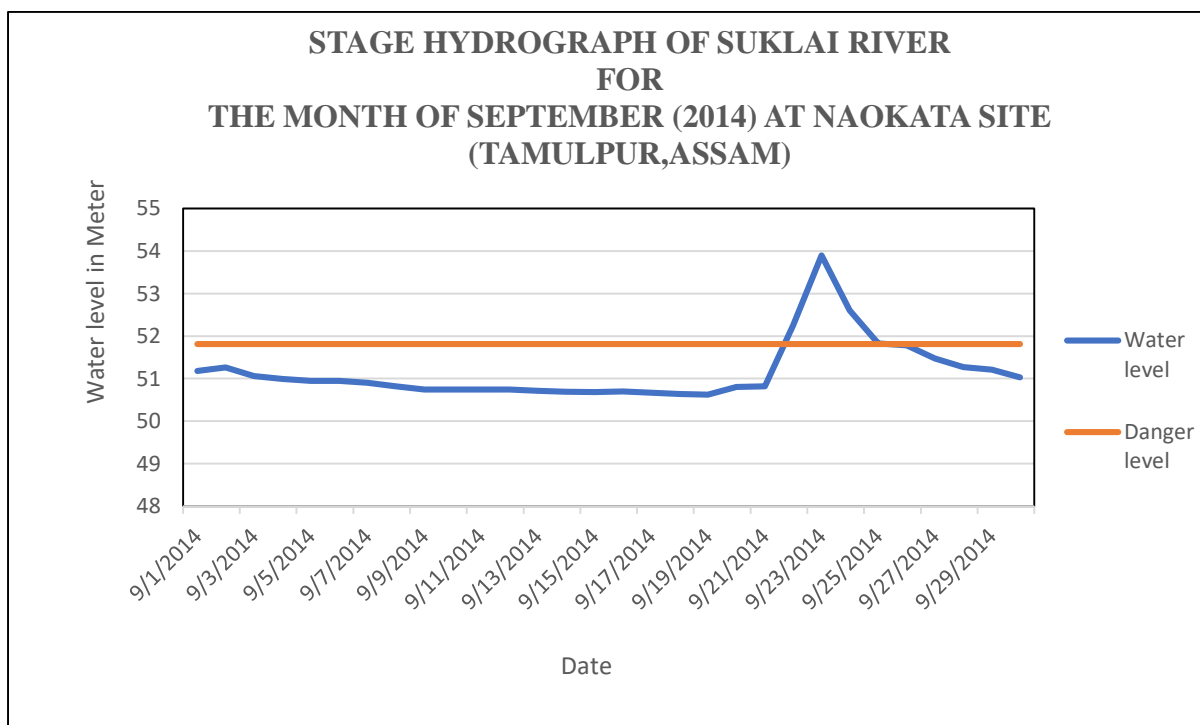


Fig3.5: Daily Stage-Hydrograph of Suklai river for the month of September,2014.

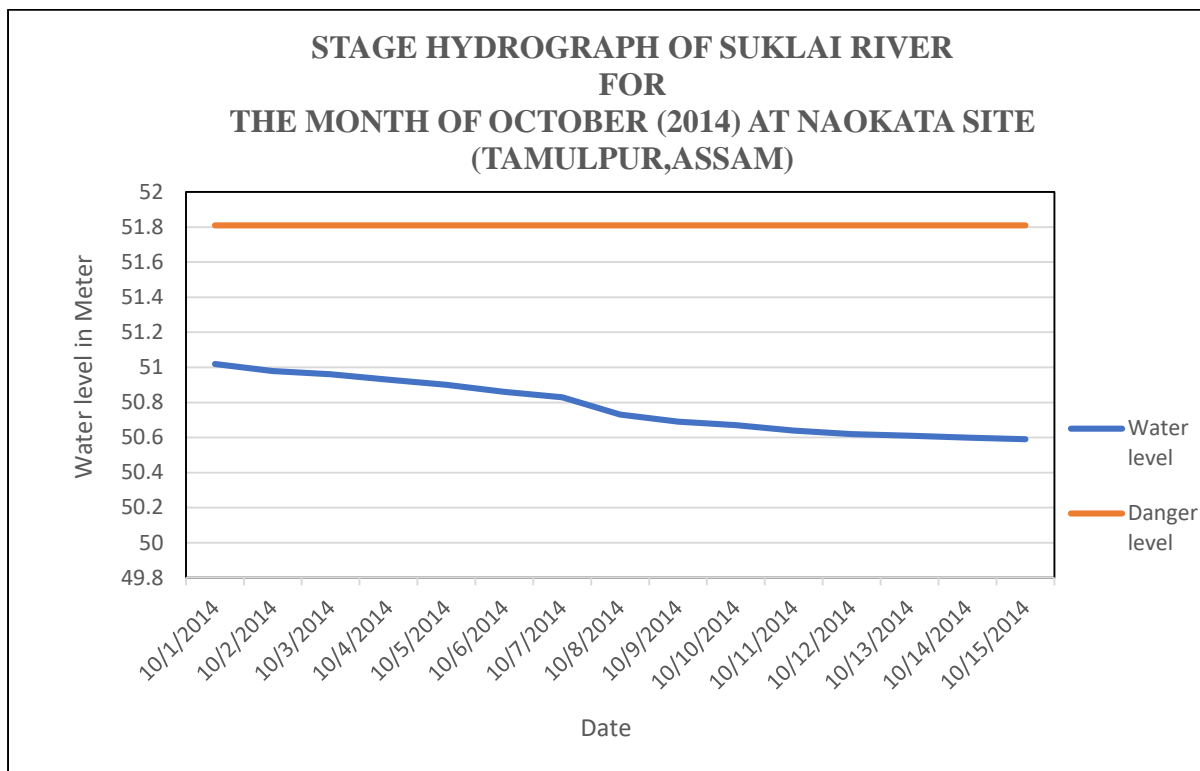


Fig3.6: Daily Stage-Hydrograph of Suklai river for the month of October,2014.

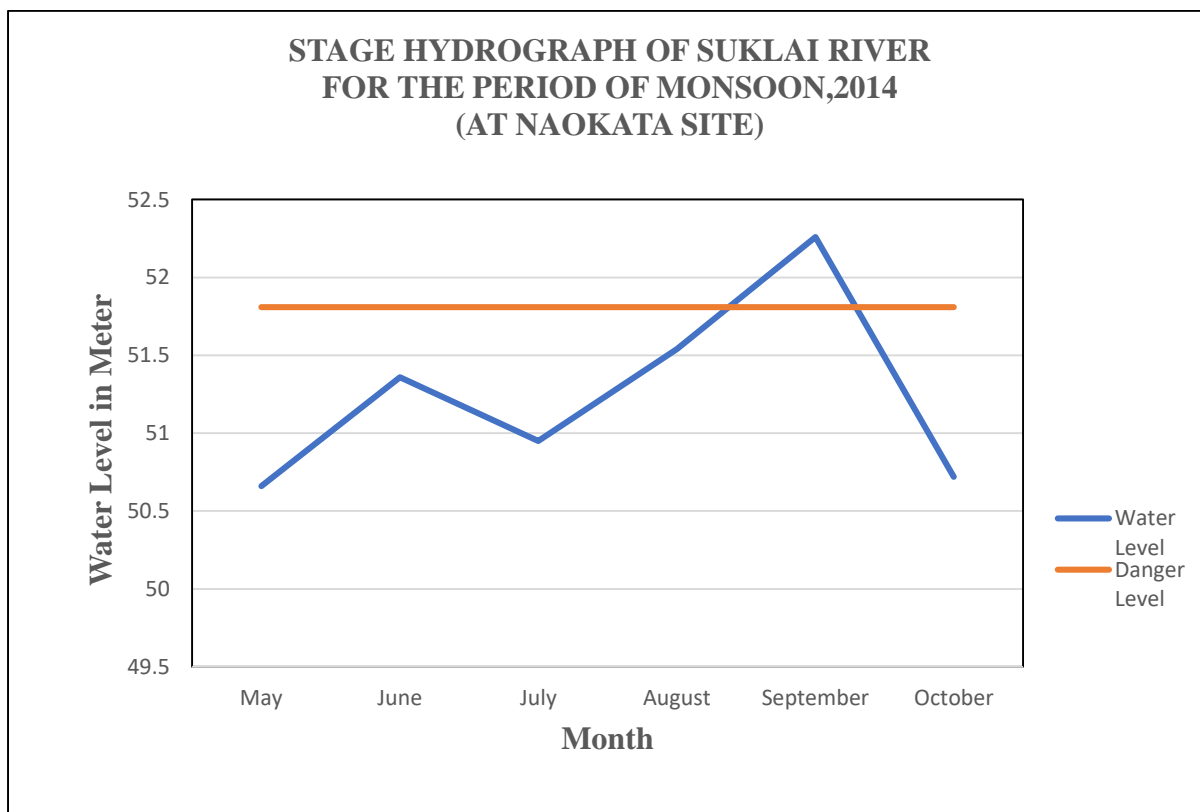


Fig3.7: Monsoonal Average Stage-Hydrograph of Suklai river,2014.

Table4: Monsoonal Water level (in meter) of Suklai river at Naokata site,2016.

Date	May	June	July	Aug	Sept	Oct
1	50.35	50.66	50.66	51.70	50.88	50.80
2	50.30	50.57	50.68	51.63	50.85	50.78
3	50.27	50.35	50.73	51.53	51.17	50.74
4	50.26	50.28	50.91	51.38	50.91	50.70
5	50.24	50.23	51.23	51.24	51.00	50.70
6	50.24	50.21	51.15	51.18	51.07	50.66
7	50.25	50.37	51.02	51.13	51.15	50.62
8	50.24	50.82	51.12	51.06	51.14	50.61
9	50.20	50.44	51.10	51.08	50.93	50.64
10	50.25	50.37	50.91	51.08	50.88	50.61
11	50.15	50.35	50.93	51.06	50.86	50.80
12	50.15	50.33	50.99	51.05	51.11	51.02
13	50.10	50.68	50.92	51.10	51.03	51.05
14	50.18	50.68	50.86	51.00	50.94	51.55
15	50.25	50.43	50.80	51.03	50.90	51.05
16	50.29	50.40	50.80	50.96	50.87	50.94
17	51.50	50.54	51.17	50.96	50.85	50.85
18	51.50	50.73	51.84	50.98	50.84	50.83
19	51.10	50.92	51.27	51.03	50.86	50.77
20	50.80	50.77	51.74	51.01	50.82	50.73
21	50.60	50.80	52.02	50.98	50.90	50.70
22	50.55	51.14	51.67	50.98	51.18	50.68
23	50.48	51.57	52.90	51.04	51.05	50.66
24	50.37	51.47	53.06	50.98	51.05	50.64
25	50.29	51.39	53.03	50.89	50.94	50.62
26	50.27	51.39	53.26	50.86	50.91	50.61
27	50.28	51.07	53.97	50.98	50.88	50.60
28	50.25	50.93	53.01	50.88	50.88	50.60
29	50.35	50.78	52.38	50.87	50.85	50.60
30	50.23	50.80	52.24	50.80	50.80	50.57
31	50.73		52.04	50.87		50.56

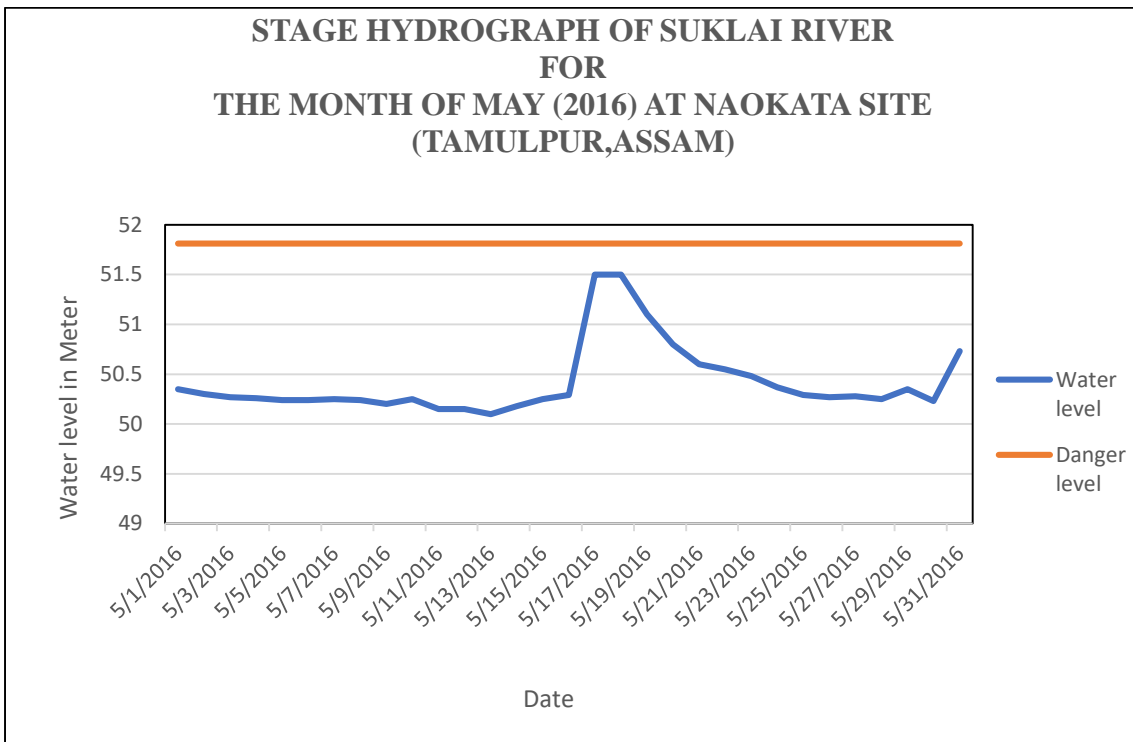


Fig4.1: Daily Stage-Hydrograph of Suklai river for the month of May,2016.

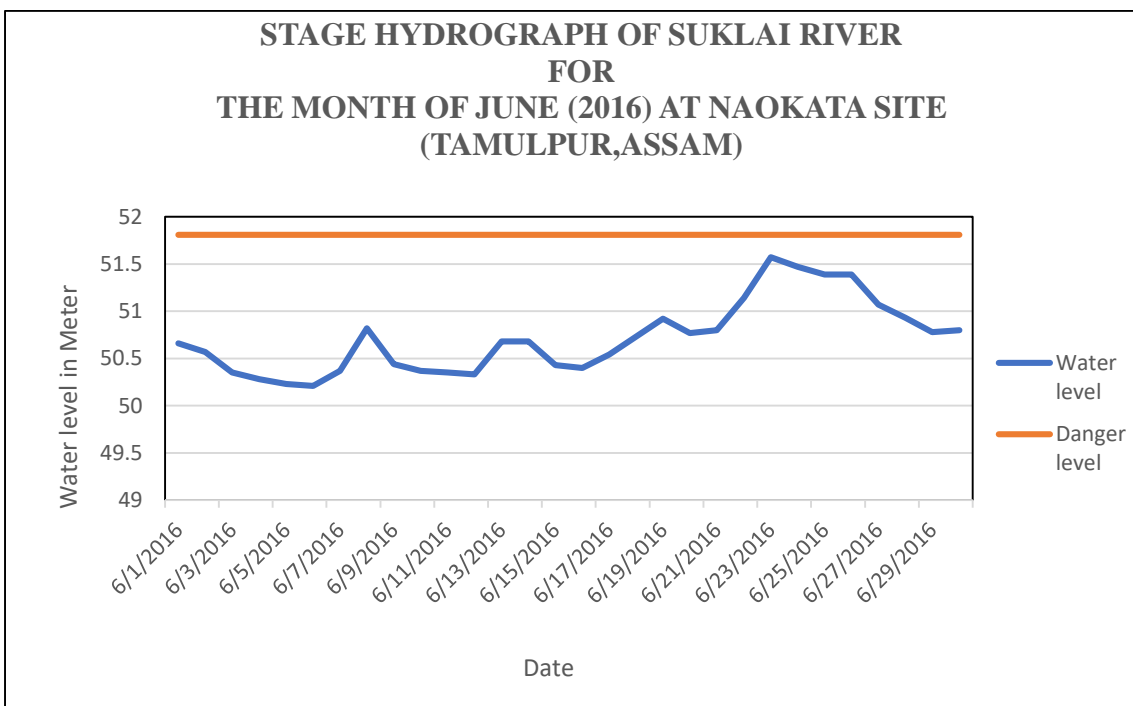


Fig4.2: Daily Stage-Hydrograph of Suklai river for the month of June,2016.

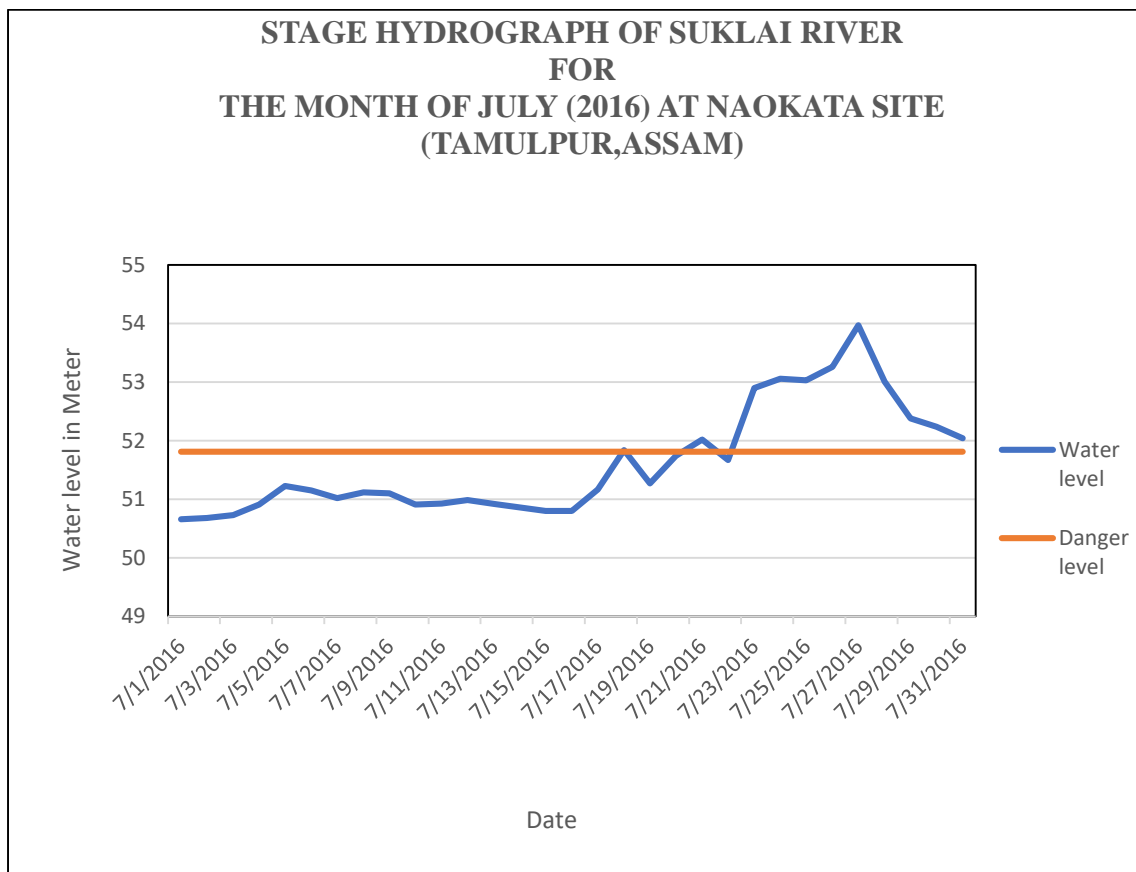


Fig4.3: Daily Stage-Hydrograph of Suklai river for the month of July,2016.

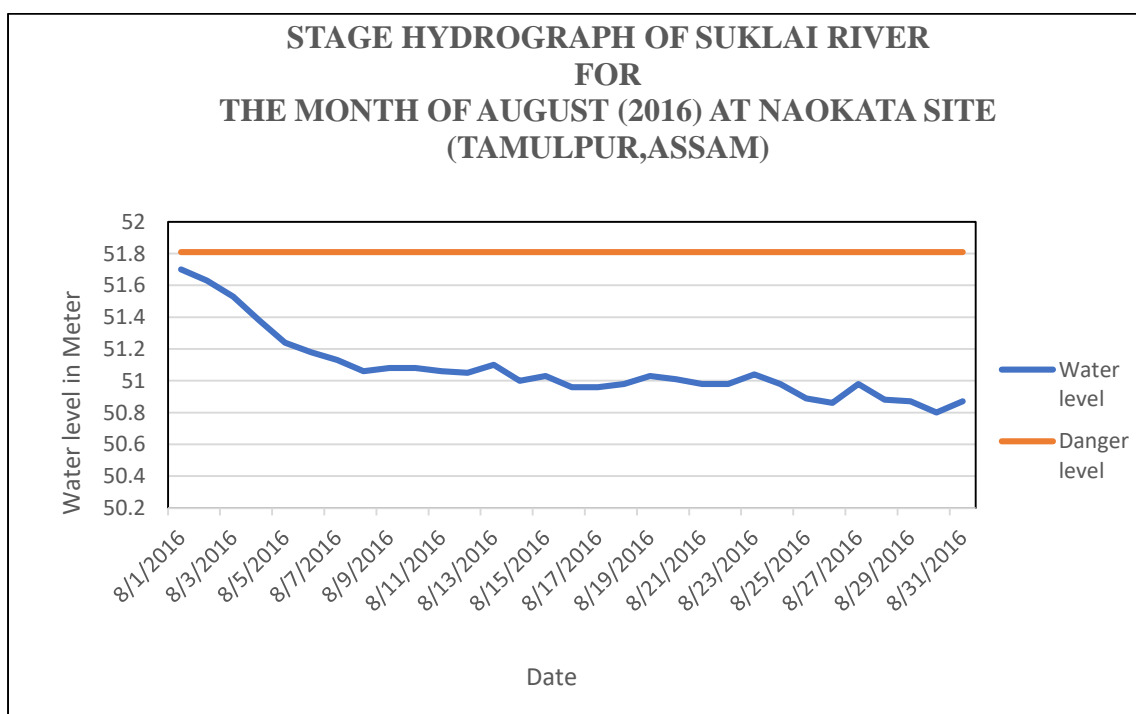


Fig4.4: Daily Stage-Hydrograph of Suklai river for the month of August,2016.

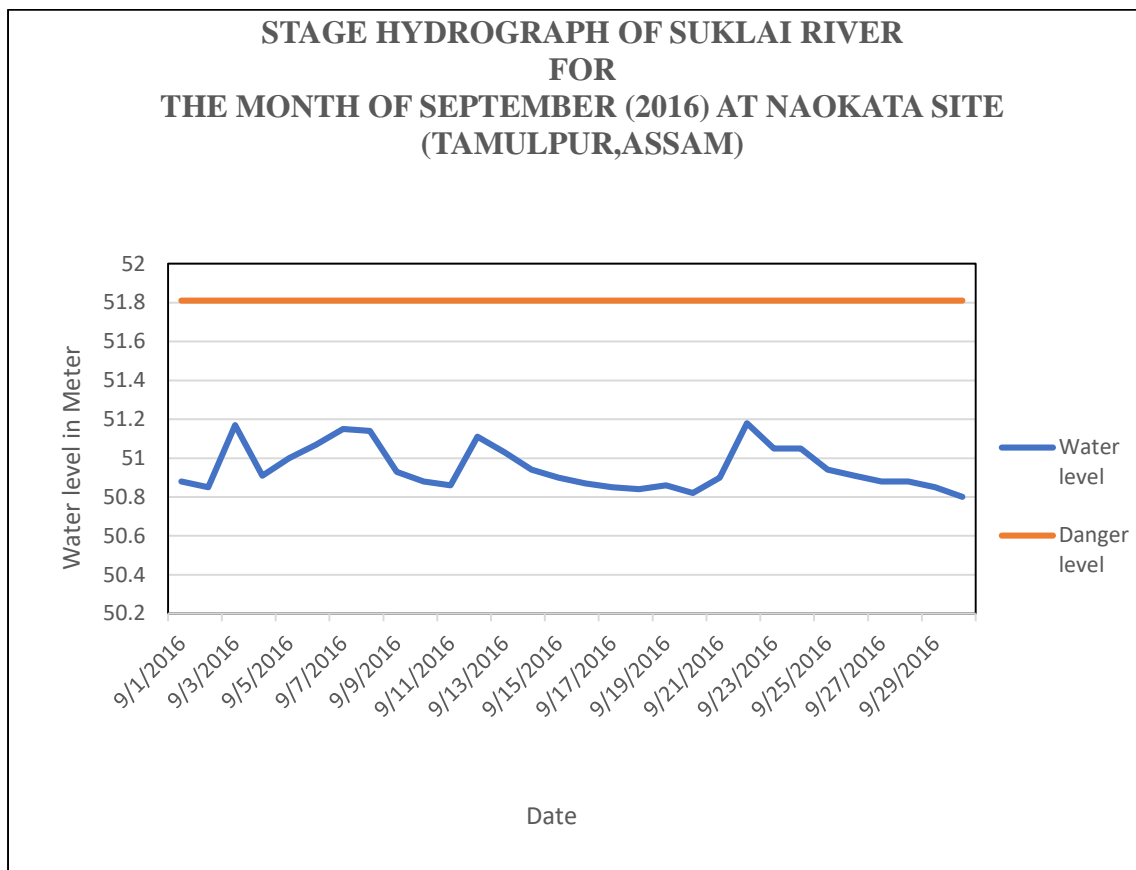


Fig4.5: Daily Stage-Hydrograph of Suklai river for the month of September,2016.

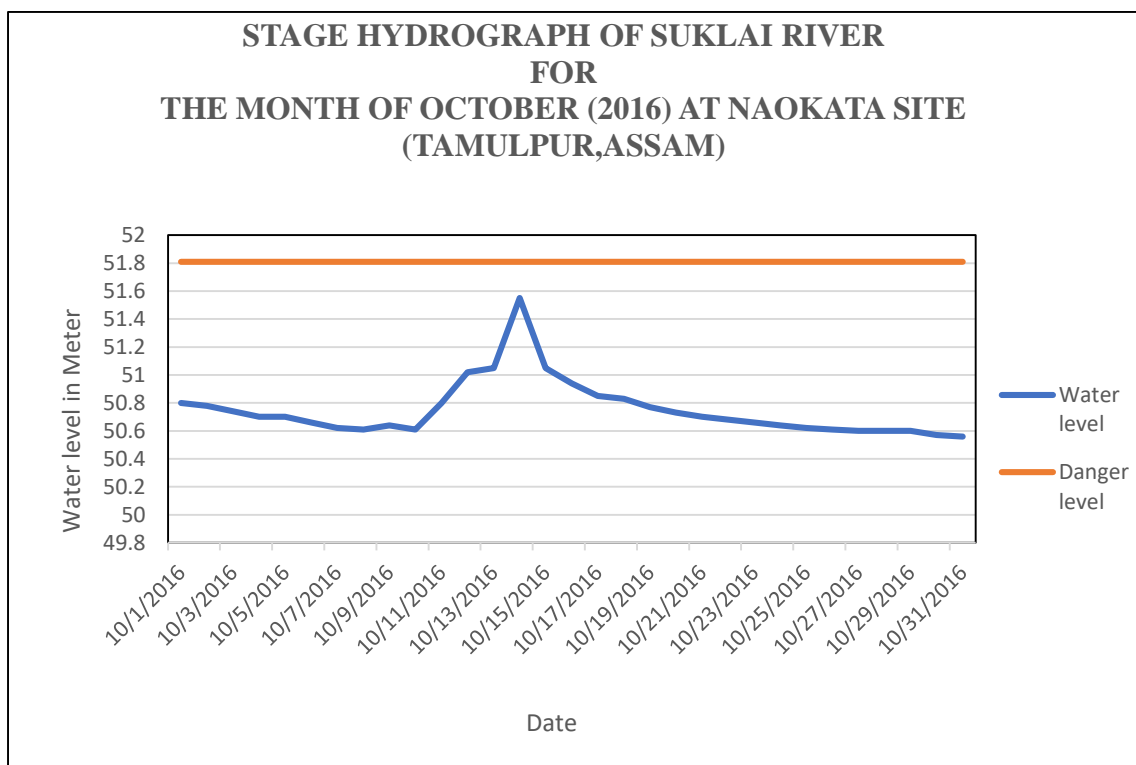


Fig4.6: Daily Stage-Hydrograph of Suklai river for the month of October,2016.

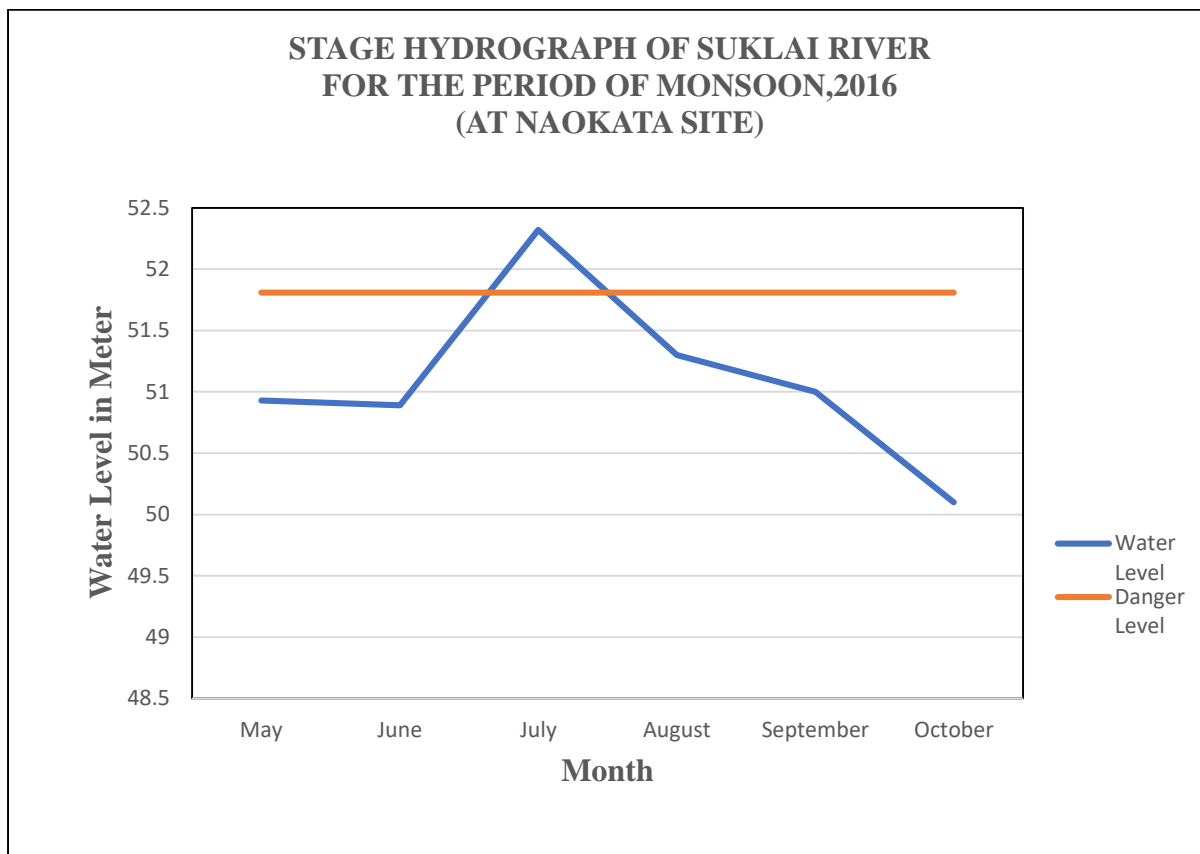


Fig4.7: Monsoonal Average Stage-Hydrograph of Suklai river,2016.

Table5: Monsoonal Water level (in meter) of Suklai river at Naokata site,2018.

Date	May	June	July	Aug	Sept	Oct
1	50.12	50.49	50.42	51.55	50.80	50.85
2	50.12	50.39	50.38	51.71	50.77	50.74
3	50.38	50.37	50.52	51.49	50.78	50.76
4	50.34	50.35	52.45	51.32	50.73	50.68
5	50.23	50.30	52.46	51.13	50.77	50.60
6	50.20	50.28	51.58	51.07	50.69	50.58
7	50.19	50.33	51.21	50.90	50.62	50.53
8	50.18	50.29	51.04	50.77	50.59	50.50
9	50.20	50.29	50.96	50.77	50.56	50.46
10	50.50	50.32	50.91	50.71	50.54	50.46
11	50.38	50.27	50.66	50.66	51.06	50.46
12	50.28	50.25	50.61	50.69	51.36	50.45
13	50.20	50.28	50.63	51.10	52.40	50.43
14	50.18	50.60	50.93	51.02	51.82	50.43
15	50.15	51.30	50.69	50.73	51.72	50.42
16	50.12	50.91	50.75	50.76	51.24	50.42
17	50.11	51.08	50.84	50.77	51.06	50.42
18	50.14	51.52	50.64	50.71	50.94	50.41
19	50.14	50.94	50.59	50.70	50.79	50.40
20	50.16	50.85	50.55	50.63	50.68	50.40
21	50.31	50.82	50.49	50.80	50.63	50.39

22	50.16	50.66	50.51	50.68	50.78	50.38
23	50.16	50.68	50.51	50.79	50.71	50.38
24	50.20	50.64	50.77	50.64	50.67	50.38
25	50.19	50.55	50.83	50.93	51.07	50.37
26	50.79	50.55	50.86	51.01	51.73	50.35
27	50.74	50.54	50.83	51.25	51.42	50.34
28	51.01	50.70	50.87	51.57	51.26	50.34
29	50.99	50.56	50.83	51.20	50.93	50.32
30	50.84	50.48	50.97	51.04	50.85	50.31
31	50.80		51.16	50.90		50.30

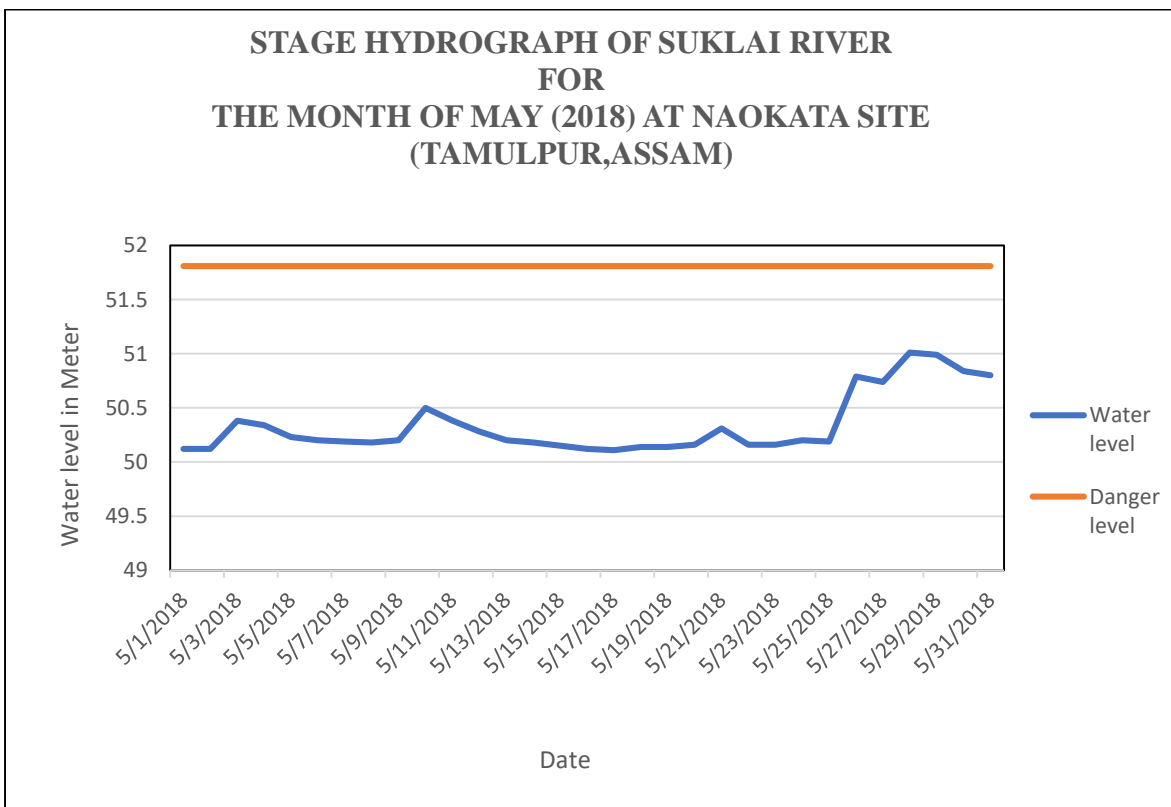


Fig5.1: Daily Stage-Hydrograph of Suklai river for the month of May,2018.

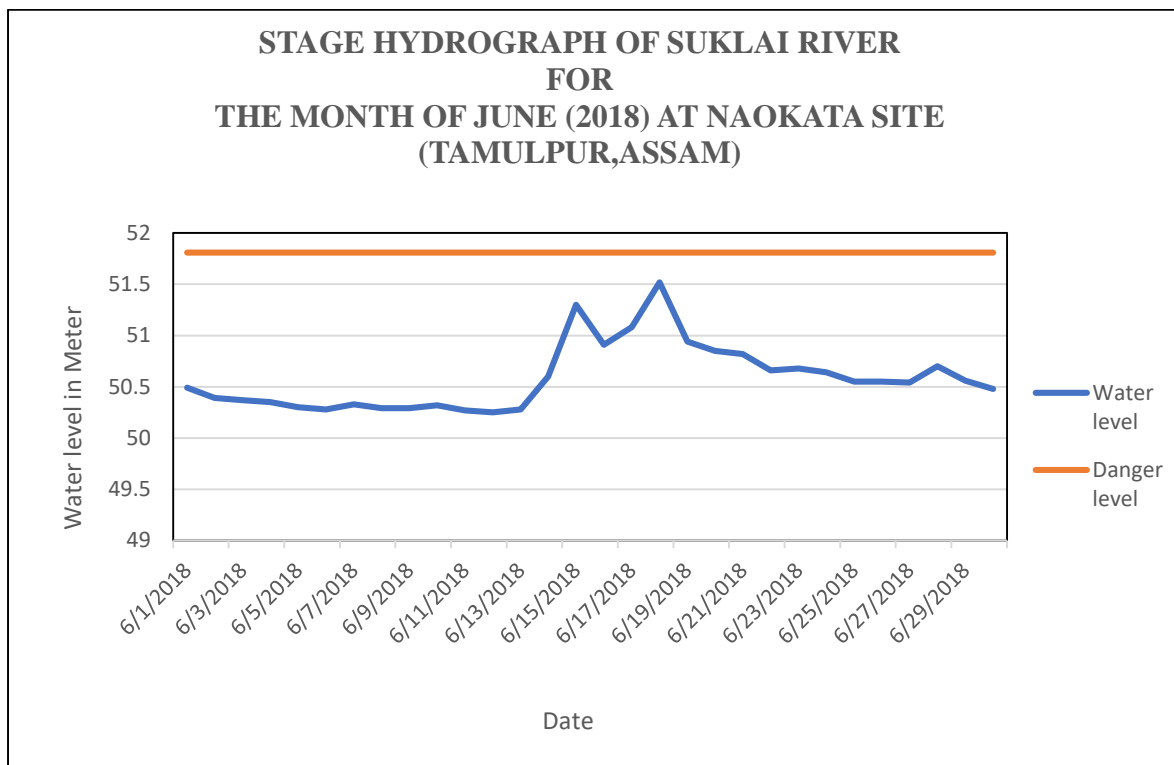


Fig5.2: Daily Stage-Hydrograph of Suklai river for the month of June,2018.

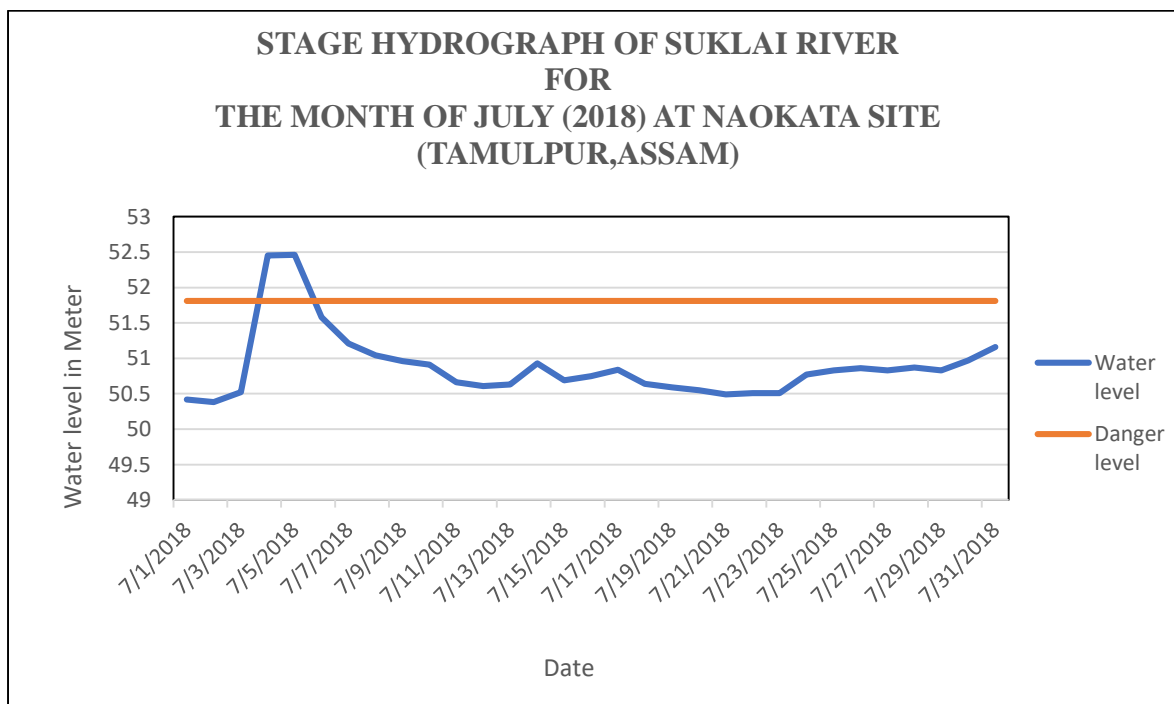


Fig5.3: Daily Stage-Hydrograph of Suklai river for the month of July,2018.

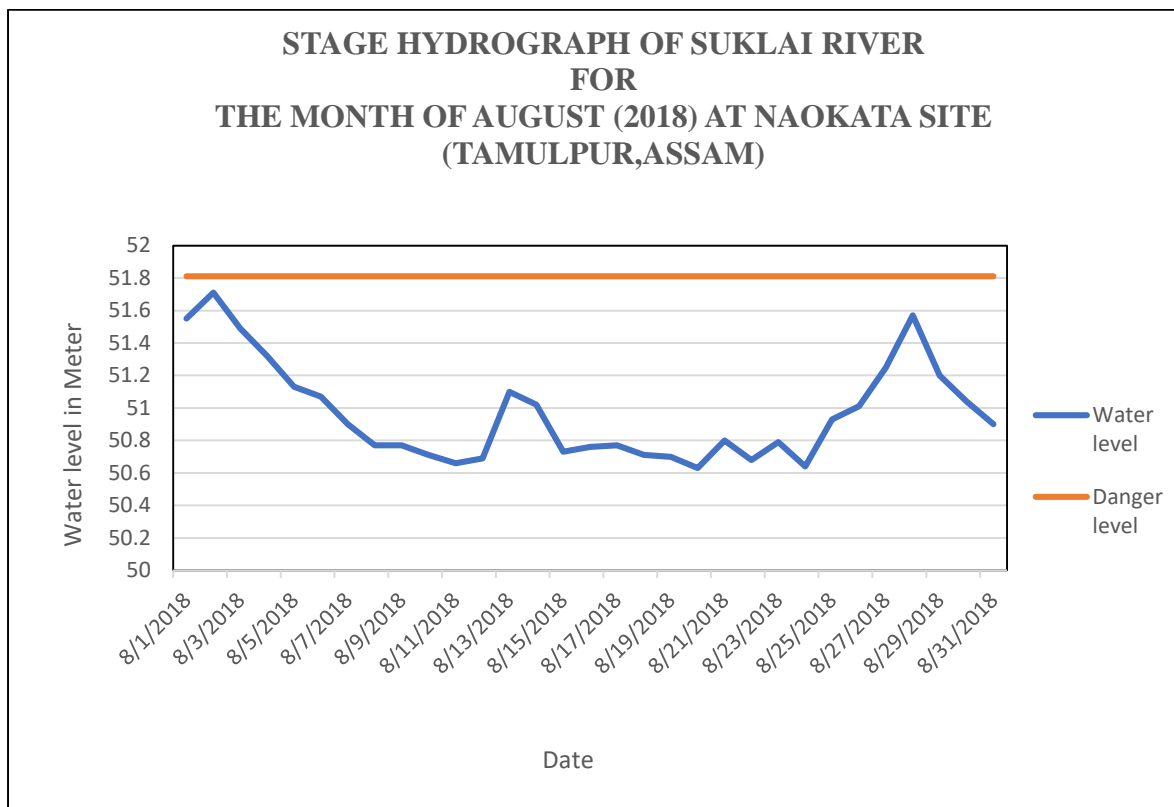


Fig5.4: Daily Stage-Hydrograph of Suklai river for the month of August,2018.

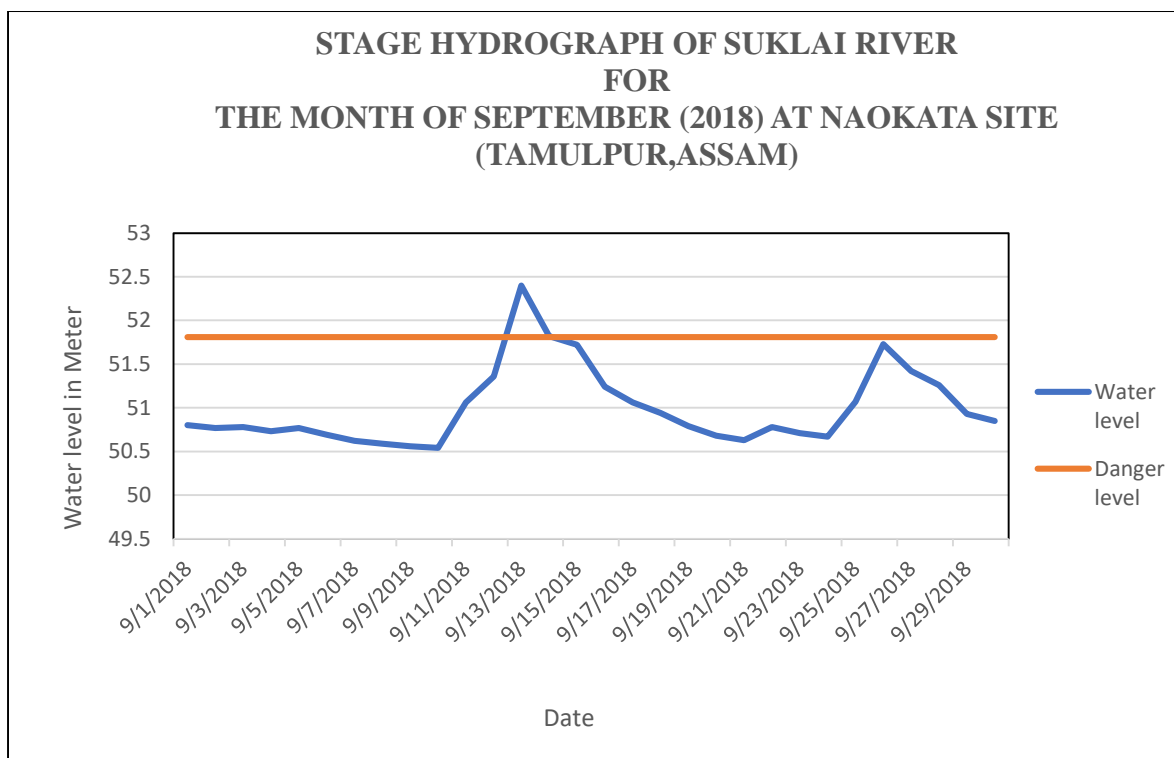


Fig5.5: Daily Stage-Hydrograph of Suklai river for the month of September,2018.

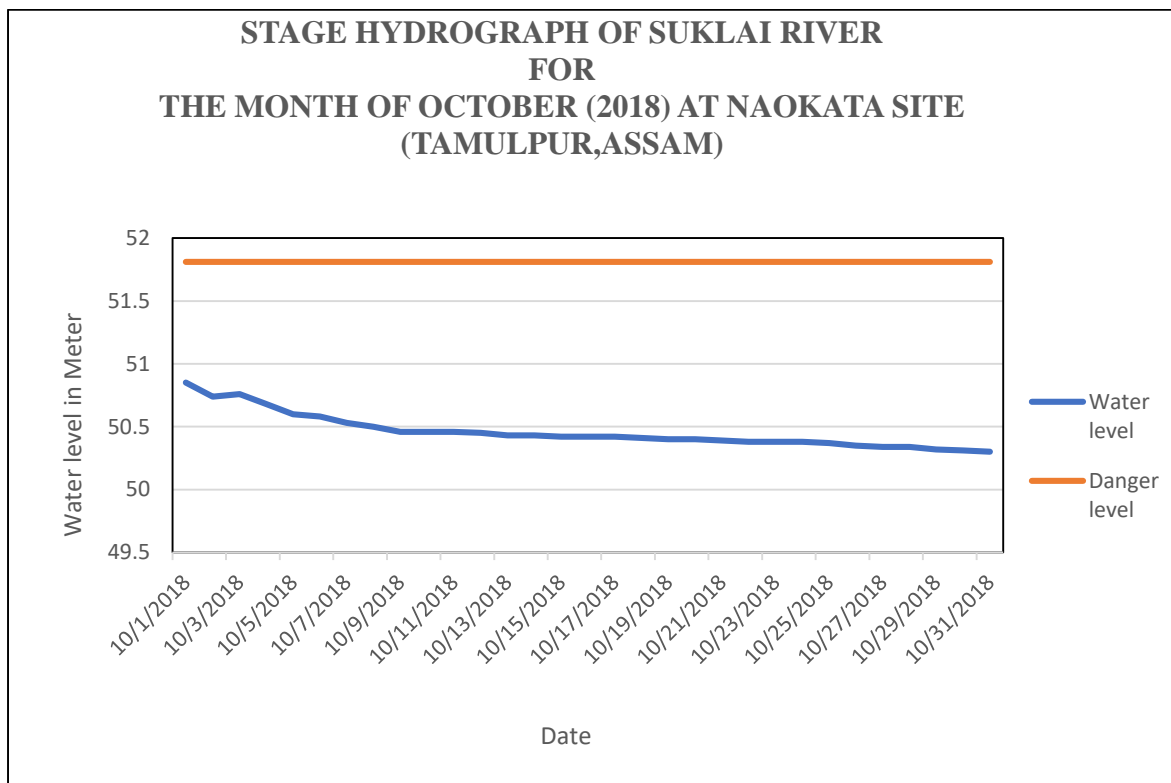


Fig5.6: Daily Stage-Hydrograph of Suklai river for the month of October,2018.

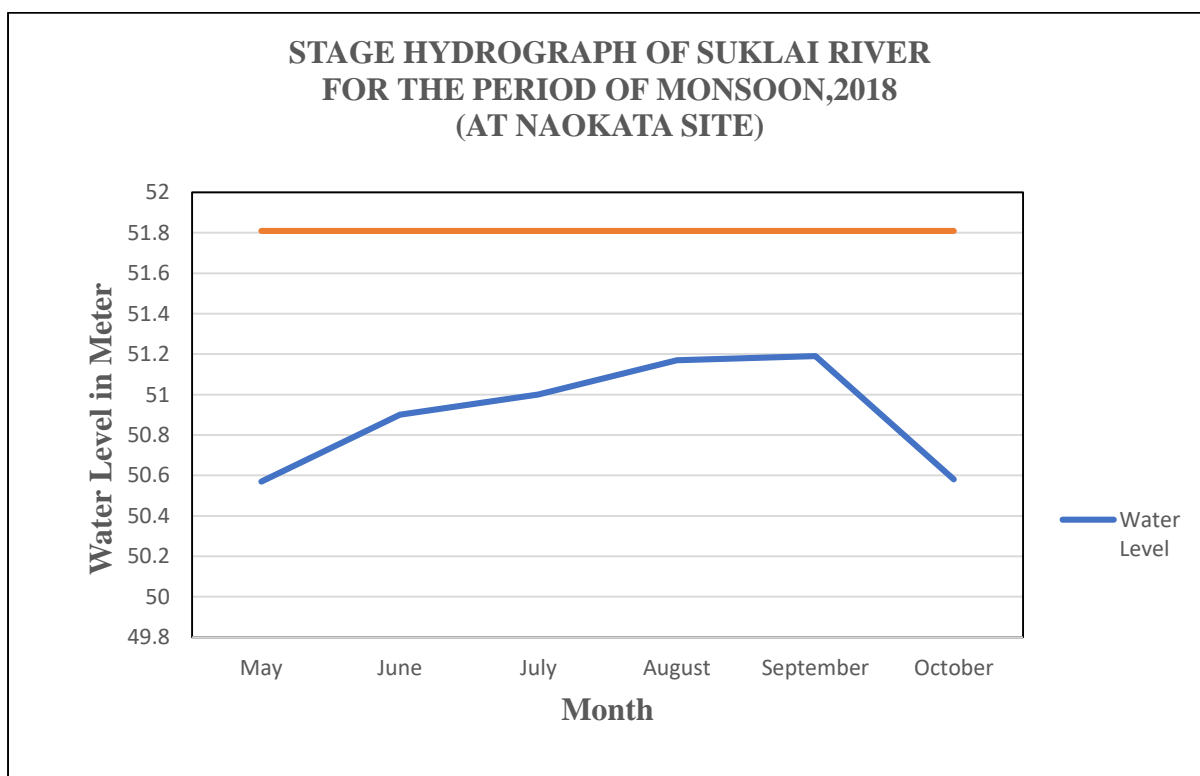


Fig5.7: Monsoonal Average Stage-Hydrograph of Suklai river,2018.

Table6: Monsoonal Water level (in meter) of Suklai river at Naokata site,2020.

Date	May	June	July	Aug	Sept	Oct
1	50.040	50.690	51.330	51.750	50.720	50.490
2	49.980	50.630	51.380	51.240	50.730	50.450
3	50.010	50.440	51.800	51.020	50.730	50.420
4	50.160	50.670	51.480	50.780	50.690	50.390
5	50.120	50.790	51.280	50.720	50.580	50.390
6	50.130	50.780	51.260	50.660	50.780	50.500
7	49.950	51.100	51.170	50.640	50.800	50.470
8	50.150	50.690	51.290	50.600	51.590	50.450
9	50.090	50.580	51.200	50.550	51.030	50.500
10	50.040	50.480	51.780	50.520	50.710	50.460
11	50.000	50.350	53.530	50.510	50.600	50.420
12	49.950	50.470	54.320	50.550	50.530	50.400
13	49.930	50.400	52.500	50.550	50.520	50.450
14	49.980	50.340	51.620	50.500	50.490	50.550
15	50.060	50.460	51.260	50.480	50.450	50.530
16	50.100	50.440	51.100	50.460	50.470	50.500
17	50.060	50.380	50.880	50.430	50.600	50.480
18	50.590	50.400	50.770	50.680	50.670	50.450
19	50.290	51.400	50.780	50.660	50.600	50.430
20	50.240	51.740	50.800	50.680	50.540	50.410
21	50.240	51.150	51.300	50.590	50.480	50.380
22	51.000	50.870	51.700	50.570	50.550	50.360
23	52.540	50.720	51.320	50.540	50.720	50.350
24	51.800	50.620	51.290	50.500	50.850	50.430
25	52.350	50.880	51.070	50.470	50.740	50.470
26	51.550	52.670	50.890	50.590	50.710	50.590
27	52.200	52.600	50.750	50.480	50.780	50.570
28	51.670	53.890	50.790	50.460	50.690	50.570
29	50.980	52.450	50.780	50.460	50.610	50.490
30	50.770	51.860	50.970	50.500	50.550	50.430
31	50.750		52.000	50.680		50.400

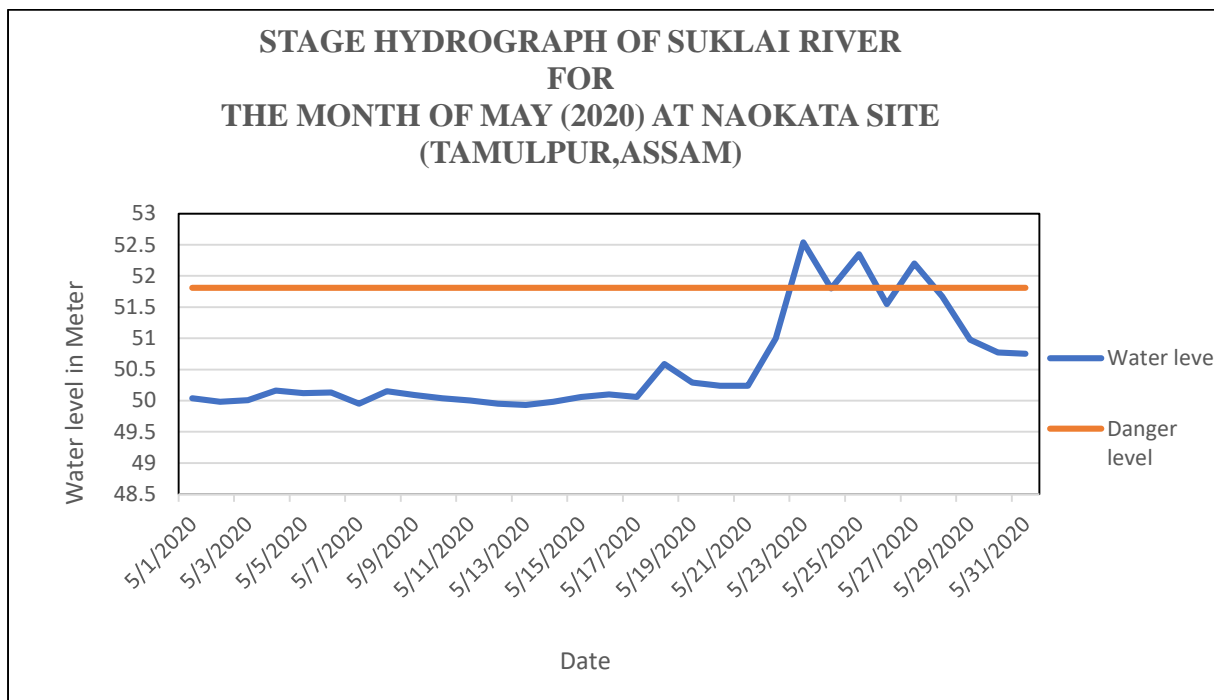


Fig6.1: Daily Stage-Hydrograph of Suklai river for the month of May,2020.

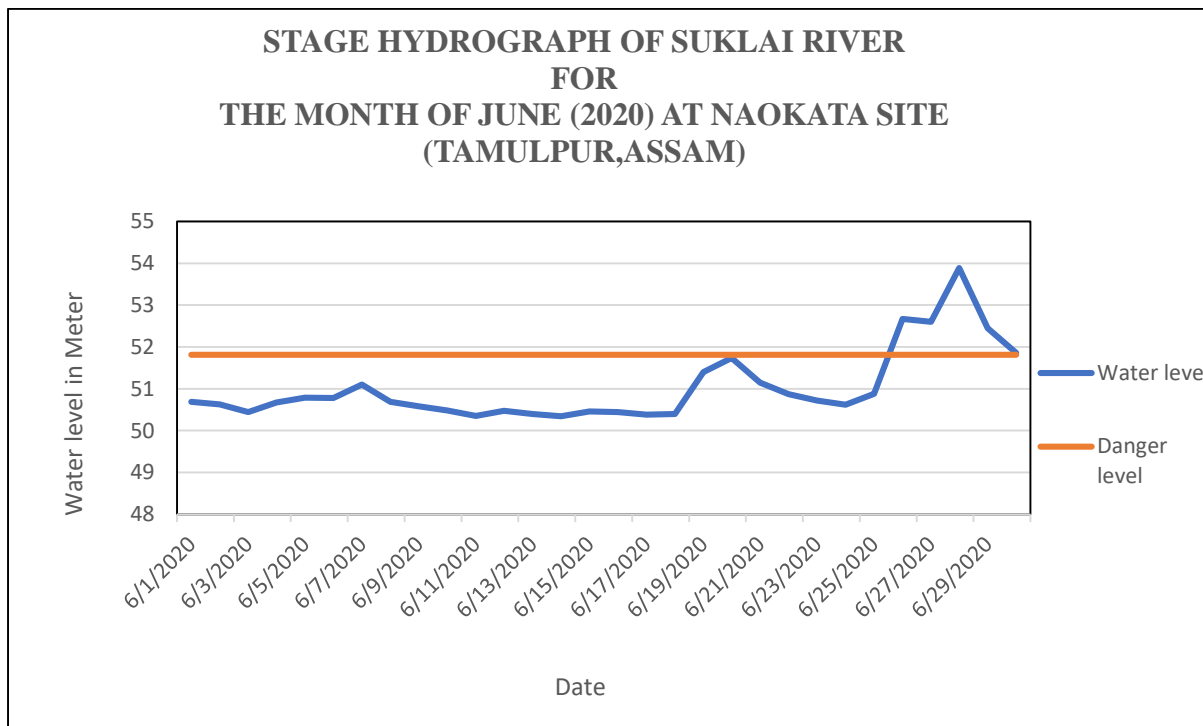


Fig6.2: Daily Stage-Hydrograph of Suklai river for the month of June,2020.

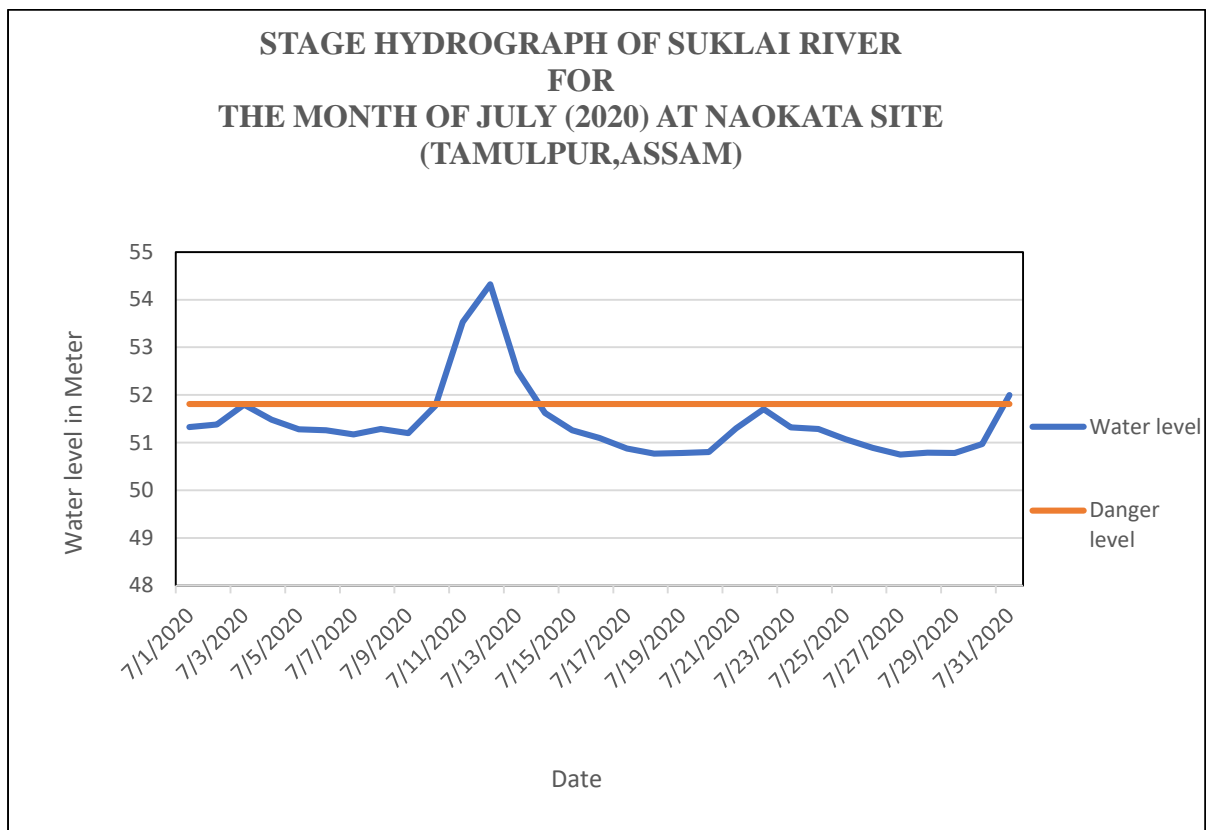


Fig6.3: Daily Stage-Hydrograph of Suklai river for the month of July,2020.

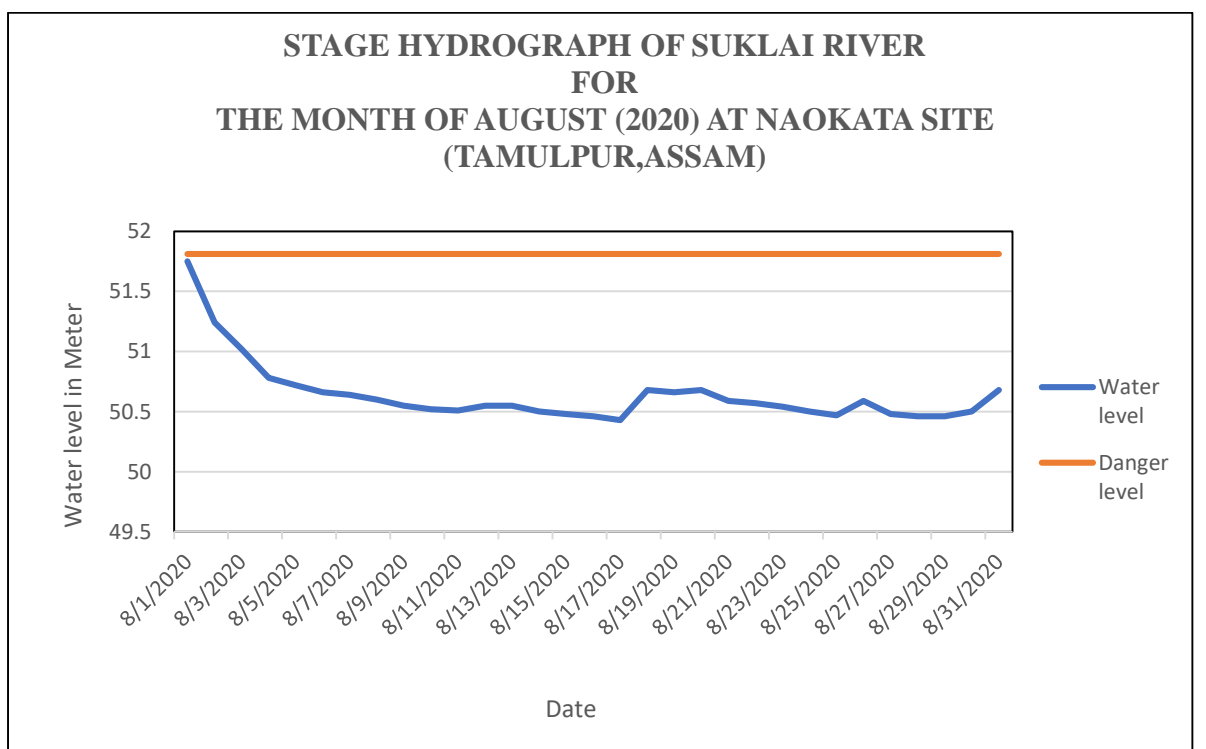


Fig6.4: Daily Stage-Hydrograph of Suklai river for the month of August,2020.

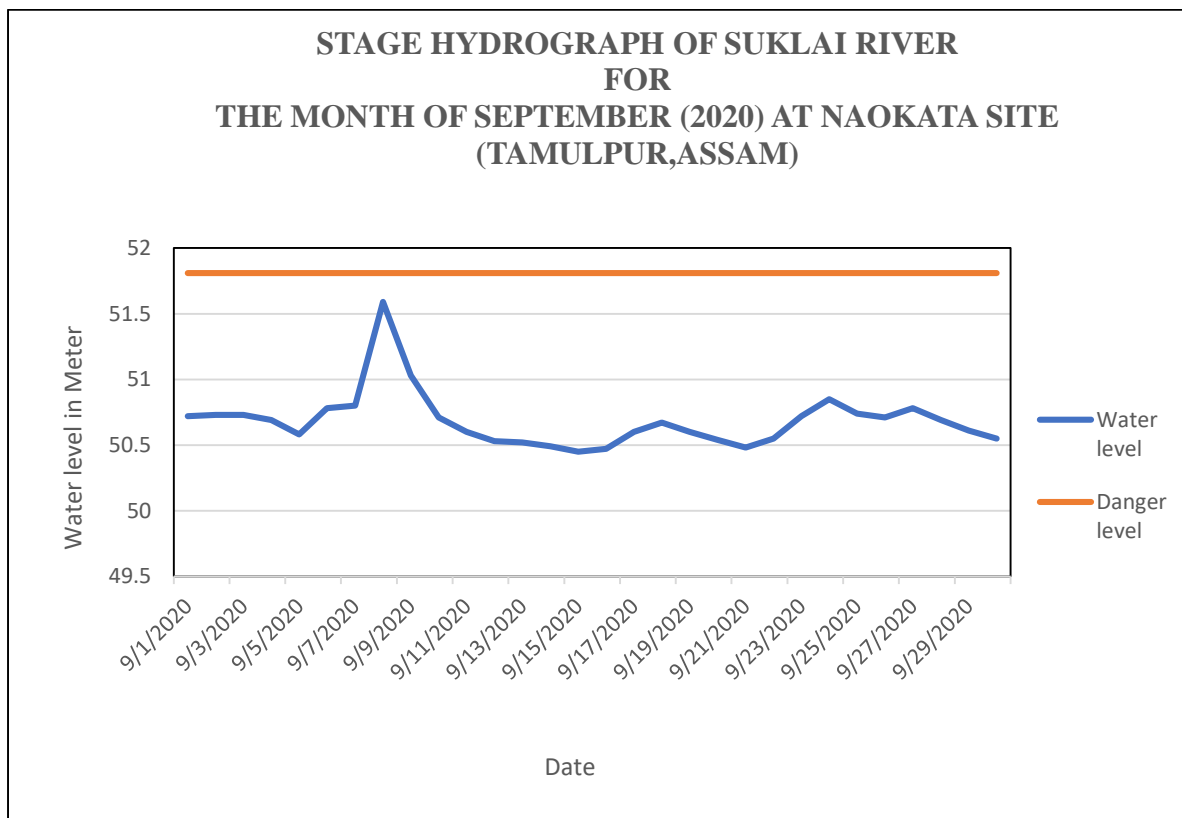


Fig6.5: Daily Stage-Hydrograph of Suklai river for the month of September,2020.

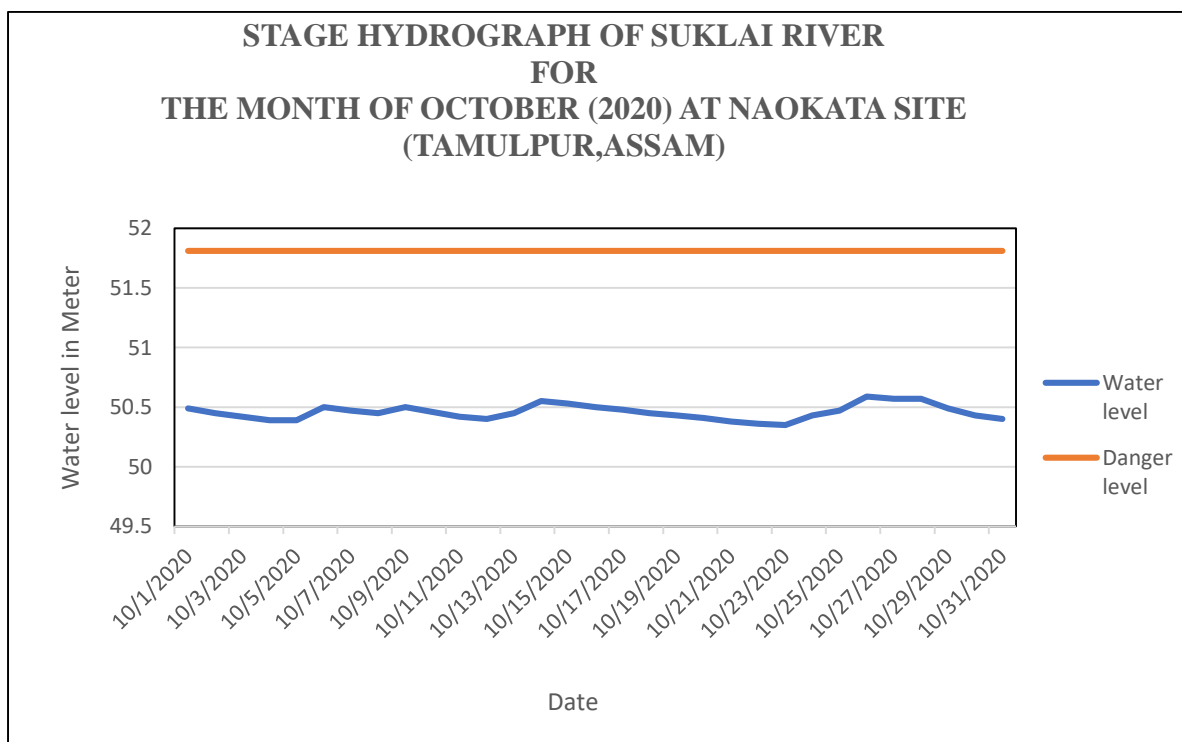


Fig6.6: Daily Stage-Hydrograph of Suklai river for the month of October,2020.

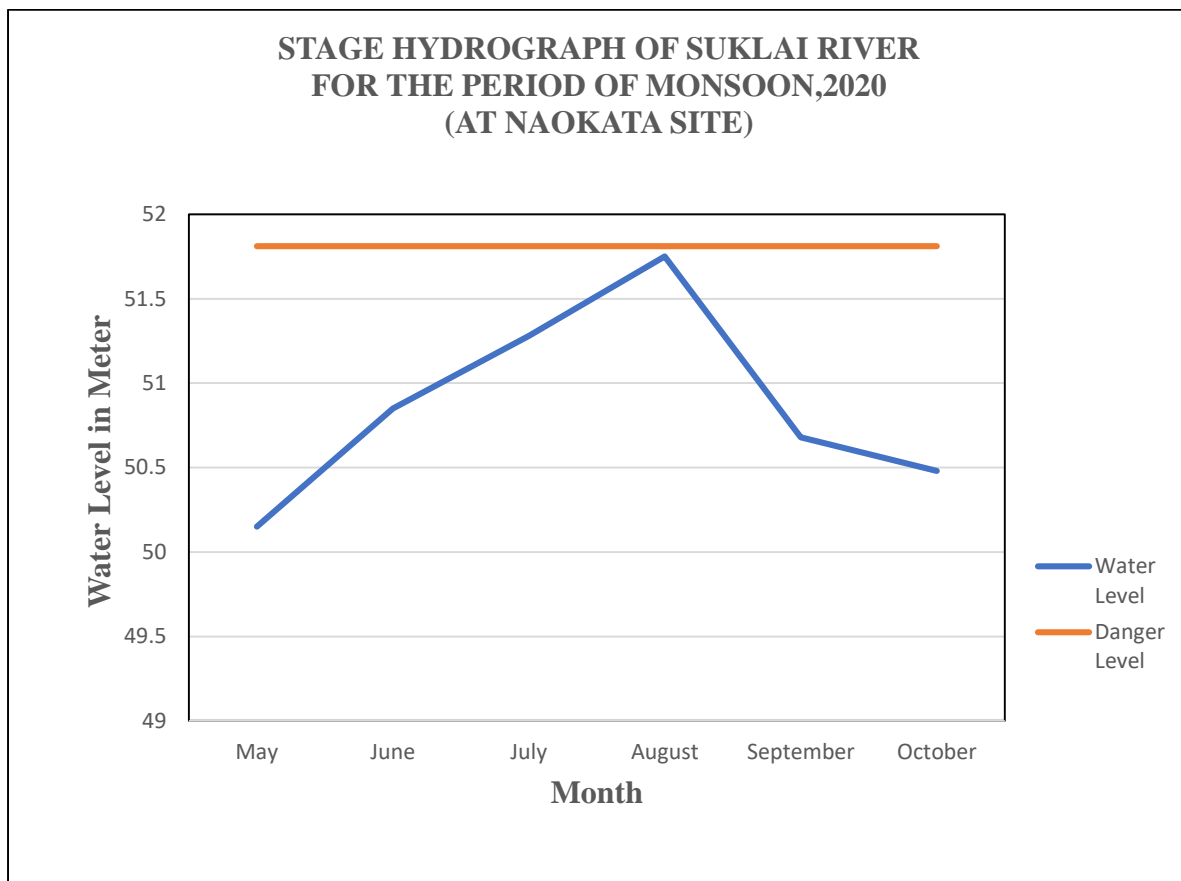


Fig6.7: Monsoonal Average Stage-Hydrograph of Suklai river,2020.

Evaluation of Hydrographs

In the present study, to examine flow characteristics of Suklai river for the period of monsoon, the stage data have taken from 2010,2012,2014,2016,2018, and 2020 at an interval of two years. Stage-hydrographs for monsoon period have been drawn using maximum and minimum water levels for these selected years. Here, the maximum water level found in these years are – 54.98 m, 52.92 m, 53.90 m, 53.97 m, 51.82, and 54.32 meter for the year 2010, 2012, 2014, 2016, 2018, and 2020 respectively. Among these years, danger level was crossed in every year; where we can see the minimum water levels are – 50.92 m, 49.59 m, 50.16 m, 50.21 m, 50.12 m, and 49.95 meter for the year 2010, 2012, 2014, 2016, 2018, and 2020 respectively. The highest water level of Suklai river at Naokata site was 54.98 meter in the year 2010, and 54.32 meter in the year 2020.

The maximum water level in 2010 was found in the month of July (54.98 meter), where the water level had crossed the danger level (51.81 meter) 15 times in one month. On the other hand, the minimum water level in that year was marked in the month of October (50.92 meter). In 2012, the maximum water level was recorded in the month of June (52.92 meter), and minimum water level in October (49.59 meter). In 2014, the maximum water level was found in September (53.90 meter) and minimum water level in October (50.41 meter). During 2016, the peak flow was in July (53.97 meter), and minimum water level was in May (50.15 meter). While in 2018, the maximum water level was marked in September (51.82 meter), and minimum water level was in May (50.12 meter). Again in 2020, the maximum water level recorded was in the month of July (54.32 meter), and minimum water level was in May (49.93 meter). Among these selected years, the highest peak flow of water had been recorded in the month of July 2010 (54.98 meter), and lowest water level in in the month of October, 2012 (49.59 meter). If we see the monthly water flow, the years 2010 and 2020 have maximum water

level in the month of July and minimum water level in the month of October and May respectively. A fluctuation can be seen in daily water flow in the hydrographs, which shows the increasing and decreasing rate of water level in particular date and month.

From the brief examination of the collected data and depiction of the stage-hydrographs, we can say that the water flow of Suklai river increases abruptly during the period of Monsoon, from the month of May to October with loads of surface runoff. The water level crosses the danger level frequently and inundates the entire active floodplain region and creates hazardous situations like flood and bank erosion. The water level decreases from the month of October. The river Suklai attains its peak flow condition during the month of July. Sometimes, the water level increases in the month of September due the retreating of monsoon wind.

Conclusion

Flood is a familiar and frequently experienced hydrological hazard in the state of Assam; where every district experienced this hazard of different magnitudes. Flood causes more damages than any other calamities. It is a state of highest water level and peak discharge along a river channel or on banks that leads to inundation of nearby areas which are normally submerged. The study area of the present study, i.e., the Suklai river basin, frequently experienced this hazard as it is situated in the Northern bank of mighty Brahmaputra River. Therefore, an analysis of the characteristics of flood and bank erosion created by Suklai river is much more necessary in the present time; because the river basin has vast floodplain region, numerous tea-estates, small industries, growing towns and potential eco-tourism spots. The river also influences the Barnadi Wildlife Sanctuary from the eastern side, and the Khaling Duars Reserved Forest from the western side.

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