सत्यमेव जयते

Monthly Monitoring Report

of

Glacial Lakes & Water Bodies in the Himalayan Region of Indian River Basins

(September, 2023)

Morphology & Climate Change Directorate

Central Water Commission

Department of Water Resources, River Development & Ganga Rejuvenation

Monthly Monitoring Report of Glacial Lakes & Water Bodies in the Himalayan Region of Indian River Basins

(September, 2023)

Morphology & Climate Change Directorate

Central Water Commission

Department of Water Resources, River Development & Ganga Rejuvenation

Ministry of Jal Shakti, New Delhi

Document Control Sheet

1.	Report / Document Type	Technical report			
2.	Document Control Number	CWC/M&CC/GLWB/ 2023/TR-4			
3.	Title	**Monthly Monitoring Report of Glacial Lakes & Water Bodies in the Himalayan Region of Indian River Basins (September, 2023)**			
4.	Author(s)	Sh. V.D. Roy, Sh. Mohammad Zishan, Smt. Archa Raj D. & Sh. Rohit Kumar Yadav			
5.	Affiliation of authors	Morphology and Climate Change Directorate, CWC, New Delhi			
6.	Project Team	Sh. V.D. Roy, Sh. Mohammad Zishan, Smt. Archa Raj D. & Sh. Rohit Kumar Yadav, Sh. Chiradip Das			
7.	Scrutiny mechanism	Compiled by Smt. Archa Raj D. Assistant Director-II Sh. Mohammad Zishan Deputy Director	Reviewed by Sh. V.D. Roy, Director	Controlled by Sh. D.P.Mathuria, Chief Engineer, (P&DO)	Approved by Sh. P. M. Scott, Member (RM), CWC
8.	Originating unit	P&D organization, CWC, New Delhi			
9.	Date of Publication				
10.	Abstract (with Keywords): This document presents the details on monitoring of Glacial Lakes and water bodies in the Himalayan region and Tibetan region, draining to India. The work has been carried out using remote sensing technique. The adopted methodology is indicated in the report. The change in water spread area for 902 GL&WBs has been worked out. The Glacial Lakes requiring vigorous monitoring have been identified for the month of September, 2023. Keywords: Glacial Lake, Water Bodies, Himalayas, Satellite Images, Remote Sensing				

Contents

Executive Summary..... vi

1. Introduction 1

1.1 Background 1

1.2 Remote Sensing Technology.....1

1.3 Objectives.....2

2. Study Area &Satellite Data Used 3

2.1 Study Area.....3

2.2 Satellite Data Used.....5

2.2.1 Sentinel-2 MSI.....5

2.2.2 Sentinel-1SAR (Micro).....5

3. Methodology 7

4. Results.....9

5. Conclusions 11

6. References 12

List of Figures

Figure 1: Lake Type Distribution 4

Figure 2: Locations of Glacial Lakes &Water Bodies in the Study Area 5

Figure 3: Analyzed Satellite Images Distribution 6

Figure 4: Methodology of Automatic Monitoring of Glacial Lakes & Water Bodies using Satellite Images 8

Figure 5: Overall Changes in Water spread area of GL&WBs for September, 2023 10

List of Tables

Table 1: List of GL&WBs having water spread greater than 50 ha showing more than 40% increase in area (**Requiring Vigorous monitoring**) 14

Table 2: GL&WBs having water spread greater than 50 ha that have shown INCREASE in water spread area 16

Table 3: GL&WBs having water spread greater than 50 ha that have shown NO CHANGE in water spread area 30

Table 4: GL&WBs having water spread greater than 50 ha that have shown DECREASE in water spread area 32

Table 5: GL&WBs having water spread greater than 50 ha with NO ANALYSIS OF CHANGE in water spread area 52

Table 6: Water spread area of critical GLs identified by NDMA through Swiss Development Agency (SDC) for Indian Himalayan Region 54

Table 7: Water spread area of GLs having size 10 ha to 50 ha prepared by NRSC in 2009 58

ABBREVIATIONS	
AR	Arunachal Pradesh
GEE	Google Earth Engine
GL	Glacial Lake
GLOF	Glacial Lake Outburst Flood
FCC	False Colour Composite
ha	Hectare
HP	Himachal Pradesh
J&K	Jammu & Kashmir
LAT	Latitude
LONG	Longitude
LU/LC	Land Use /Land Cover
NDWI	Normalised Difference Water Index
NDMA	National Disaster Management Authority
NRSC	National Remote Sensing Centre
SAR	Synthetic Aperture Radar
SDC	Swiss Agency for Development and Cooperation
SK	Sikkim
TAR	Tibet Autonomous Region
UID	Unique Identification
UK	Uttarakhand
WB	Water Body

Executive Summary

The Himalayan Region (HR) is facing important challenges in view of coping with the adverse effects of climate change. Physically, the shrinking of mountain glaciers and expansion of Glacial Lakes are amongst the most recognizable and dynamic impacts of climate warming in this environment. In combination with this altered stability of surrounding rock and ice walls, the potential threat from Glacial Lake Outburst Flood (GLOF) is evolving over time. Therefore, under such changing environment, a close watch on the relative change in water spread area of even smaller lakes has become very crucial in this region.

Remote sensing technique being the most cost effective and reliable approach especially for remote and difficult to access terrain, has been applied for detecting water spread area of such lakes. For analysing and processing large number of remote sensed satellite imageries. Google Earth Engine (GEE), which is an open-source cloud computing platform, has been used. High resolution multi-spectral and microwave (SAR) images at 10m resolution from Sentinel satellite have been analysed. This facilitated in detecting lakes even in cloudy conditions.

The water spread areas for Glacial Lakes and Water Bodies has been calculated in an automatic manner. Manual digitisation, of the lakes was carried out wherever required. The algorithm for automation has been developed in-house in GEE. The detailed methodology is included in this report.

For the month of September, 2023, a total of 902 Glacial Lakes and Water Bodies have been monitored. It includes 477 Glacial Lakes & Water Bodies, having water spread area greater than 50 ha, which are being monitored since 2011. All Glacial Lakes having size of 10 ha and above as per NRSC inventory, 2009 have been monitored. Further, the critical Glacial Lakes as identified by Swiss agency for Development and Cooperation (SDC) for NDMA in their report titled "*Synthesis report on GLOF hazard and risk across the Indian Himalayan Region*" has also been included in monitoring.

The monitoring was based on analysis of 14834 satellite images in the month of September, 2023. From disaster point of view, the base year and average area for last 5 and 10 years, has been considered to determine the maximum change. It was observed that out of 477 GL&WBs having size greater than 50ha, 22 GL&WBs have shown increase in water spread area greater than 40%, 174 GL&WBs have shown increase in water spread area less than 40%, 17 GL&WBs have shown no change in water spread area, 252 GL&WBs have shown decrease in water spread area, and change detection for remaining GL&WBs could not be performed due to reasons such as frozen condition, dried up condition, cloud cover etc.

Further, for the remaining 425 Glacial Lakes having water spread area of 50 to 10 ha

or smaller, the area of the GLs for the month of September 2023 was compared with the average area of GL for the year 2022(average of June to October 2022). Out of these, 163 GL have shown an increase in water spread area, 36 GL have shown no change in water spread area, 206 GL have shown decrease in water spread area, and change detection for remaining Glacial Lakes could not be performed.

1. Introduction

1.1 Background

Glacial retreat due to climate change occurring in most parts of the Hindu Kush Himalaya has given rise to the formation of numerous new Glacial Lakes. The water in these Glacial Lakes accumulates behind loose naturally formed 'glacial/moraine dams' made of ice, sand, pebbles and ice residue as the glaciers melt. Different types of lakes may have different levels of hazard potential depending upon many factors like the nature of the damming materials, the position of the lake, the volume of the water, the nature and position of the associated mother glacier, physical and topographical conditions, and other physical conditions of the surroundings. Interaction between the above-mentioned risk factors and triggering processes like ice avalanches, debris flows, rockfall, earthquake or landslides reaching a lake strongly affect the risk of a lake outburst. For instance, moraine-dammed lakes located at the snout of a glacier have a high probability of breaching with high hazard potential whereas there is a reduced risk of breaching in case of erosion lakes.

Glacial Lake Outburst Flood (GLOF) is created when water dammed by a glacier or a moraine is released suddenly. Some of the Glacial Lakes are unstable and particularly moraine dammed lakes are potentially susceptible to sudden discharge of large volumes of water and debris which causes floods downstream. Climate change is expected to alter and potentially increase the probability of lake outbursts in the future.

1.2 Remote Sensing Technology

Remote sensing is the science of acquiring information about the Earth's surface without actually being in contact with it. This is done by sensing and recording reflected or emitted energy and processing, analysing, and applying that information. Satellite remote sensing (SRS) technology has contributed significantly to the acquisition of Earth’s resources, thus helping in their better management. SRS plays a complementary role to other means of spatial data acquisitions i.e., through conventional procedures. Satellite remote sensing offers several unique advantages quick data collection, reliability, more accurate, repetitive collection, geometric integrity and digital storage, which makes it an ideal tool for mapping, inventorying and monitoring the natural resources.

Due to the remote location of Glaciers and Glacial Lakes their access is difficult, owing to tough and difficult terrain. Thus, preparation of inventory of Glacial Lakes using conventional methods requires extensive time and resources together with undergoing hardships in the field. Creating inventories and monitoring of the Glacial Lakes can be done quickly and correctly using satellite images and aerial photographs. Use of these

images and photographs for the evaluation of physical conditions of the area provides greater accuracy. The multi-stage approach using remotely sensed data and field investigation increases the ability and accuracy of the work. Visual and digital image analysis techniques integrated with techniques of geographic information systems (GIS) are very useful for the study of Glacier and Glacial Lakes.

1.3 Objectives

The broad objectives of the study are

- To monitor the spatial extent in terms of water spread area of the Glacial Lakes & Water Bodies on monthly basis during June to October.
- To detect changes in water spread area of GL&WBs with respect to historical information & base year.
- To detect any sharp change in area of GL&WBs for disaster purpose
- To share the monitoring reports with concerned stakeholders including National Disaster Management Authority / State Disaster Management Authority.

2. Study Area &Satellite Data Used

2.1 Study Area

The present study area covers the GL& WBs lying in the region of Himalaya and Tibet that drains to India as shown in Figure 2. The study area extends across the countries of India, Nepal, Bhutan and China.

The Glacial Lakes and Water Bodies taken up for the monitoring in the study area are as follows:

- 477 Glacial Lakes and Water Bodies, having water spread areagreater than 50 ha which have been included from the inventory of Glacial Lakes & Water Bodies in the Indian Himalayan region using satellite data of the year 2009 prepared by NRSC (Ref: NRSC Report No. NRSC-RS&GISAA-WRG-CWC-Lakes- May2011-TR255).
- 385 Glacial Lakes, having spatial extent greater than 10 ha, which have been taken from the inventory of Glacial Lakes & Water Bodies in the Indian Himalayan region using satellite data of the year 2009 prepared by NRSC (Ref: NRSC Report No. NRSC-RS&GISAA-WRG-CWC-Lakes-May2011-TR255).
- 40 Glacial Lakes, which have been listed as high priority lakes, as per Synthesis report on GLOF hazard and risk across the Indian Himalayan Region prepared by Swiss Agency for Development and Cooperation (SDC) for NDMA.

A total of 902 Glacial Lakes and Water Bodies have been monitored. Of these, 544 are Glacial Lakes and 358 are Water Bodies. All Glacial Lakes of size 10 ha and above as per NRSC 2009 inventory and 40 Glacial Lakes of size smaller than 10 ha as identified by SDC have also been included for monitoring. The break-up of Glacial Lakes and Water Bodies is shown in Figure 1.

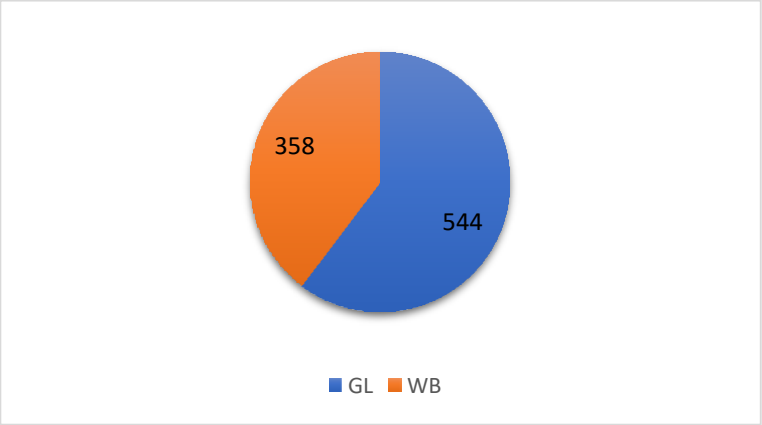

FIGURE 1: LAKE TYPE DISTRIBUTION

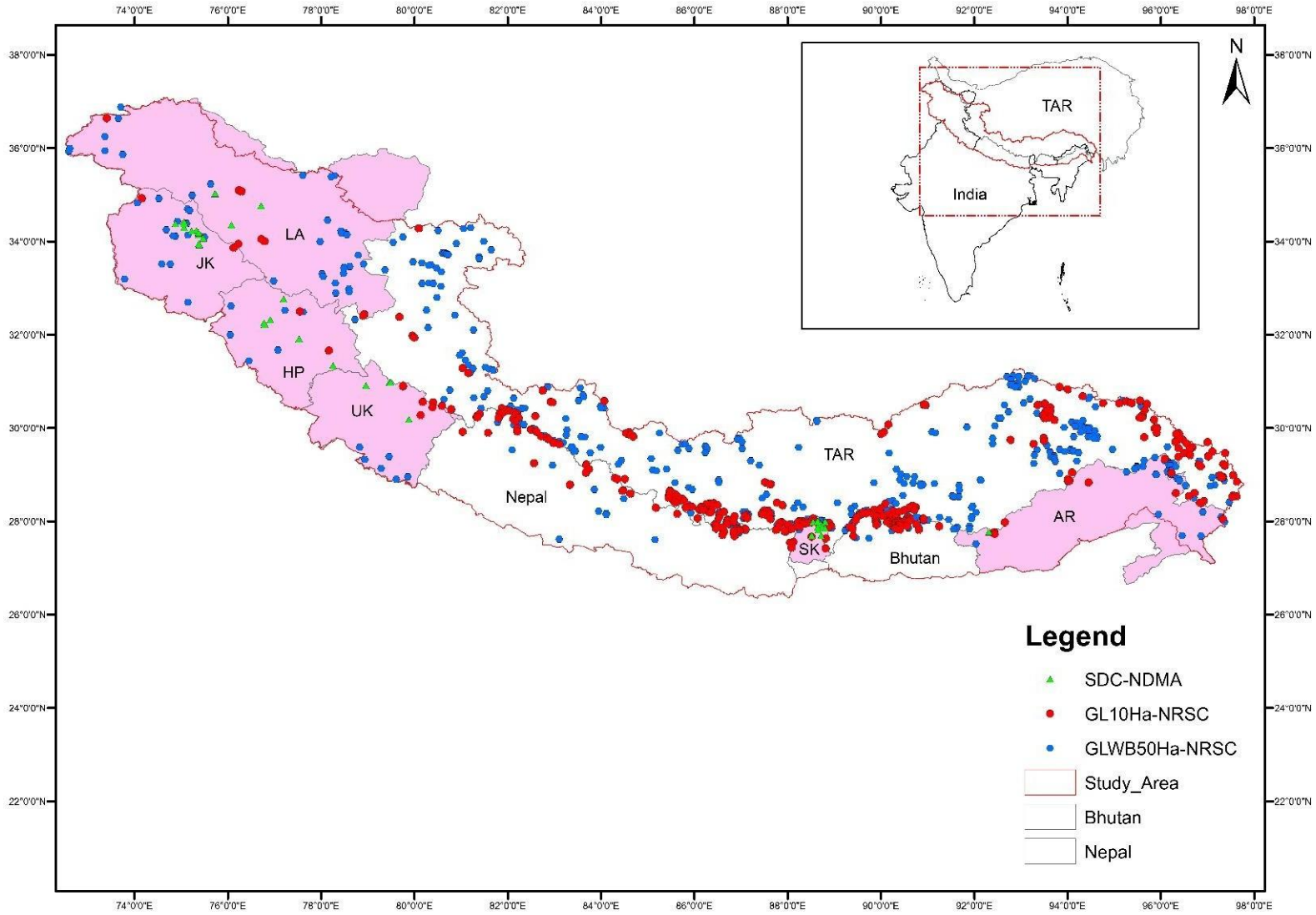

FIGURE 2: GLACIAL LAKES &WATER BODIES IN THE STUDY AREA

2.2 Satellite Data Used

2.2.1 Sentinel-2 MSI

It is a wide-swath, high-resolution, multi-spectral imaging mission, supporting Copernicus Land Monitoring studies, including the monitoring of vegetation, soil and water cover, as well as observation of inland waterways and coastal areas. The SENTINEL-2 Multispectral Instrument (MSI) samples 13 spectral bands: 4 bands at 10 metres, 6 bands at 20 metres and 3 bands at 60 metres spatial resolution. The revisit frequency of each single SENTINEL-2 satellite is 10 day and the combined constellation revisit is 5 day.

2.2.2 Sentinel-1SAR (Micro)

It has C-band synthetic aperture radar (SAR) active sensor which can observe the Earth's surface at any time of the day or night, regardless of weather and environmental conditions. SAR has the advantage of operating at wavelengths not impeded by cloud cover or lack of illumination. SAR actively transmits microwave signals towards the Earth and receives a portion of transmitted energy as backscatter from the ground. The SAR instrument provides radar backscatter measurements influenced by the terrain structure and surface roughness. Generally, the more roughness or structure on the ground, the greater the backscatter. Rough surfaces will scatter the energy and return a significant amount back to the antenna resulting in a bright feature. The repeat orbit cycle of each Sentinel-1 satellite is 12-day.

14834 satellite images consisting of 9317 Multispectral images and 5517 Microwave images were processed for the month of September - 2023 as shown in Figure 3.

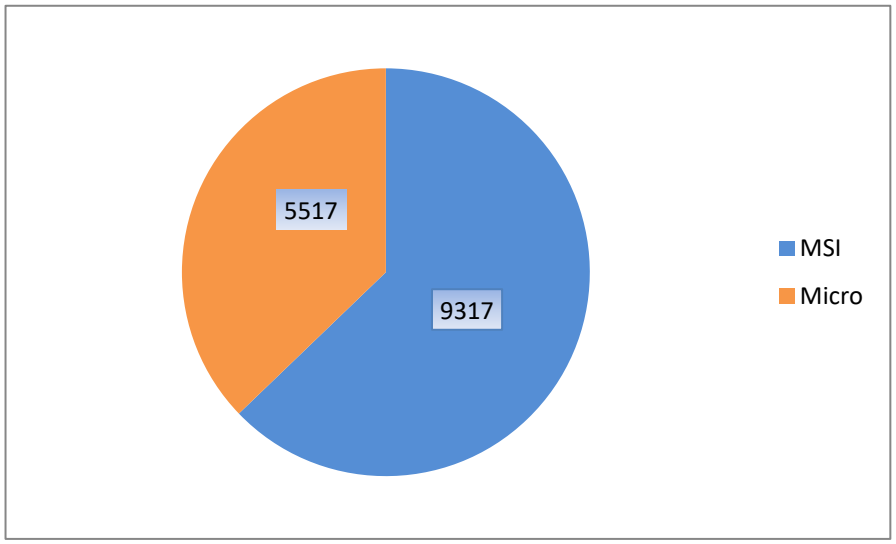

FIGURE 3: ANALYSED SATELLITE IMAGES DISTRIBUTION

Google Earth Engine (GEE) being a planetary-scale platform for Earth science data & analysis has been used to process the Multispectral and Microwave Sentinel image data for the monitoring of Glacial Lakes & water bodies. The Microwave and Multispectral Satellite works on different principle, hence separate methodology has been applied to compute the water spread area of GL&WBs in an automatic manner.

Multispectral data consist of visible and infrared bands. The spectral combination of NIR, red & green bands is used to generate false colour composite (FCC). The Normalised Difference Water Index (NDWI) is computed using green and NIR band. The process of calculation of NDWI and FCC is repeated for each GL&WB. The OTSU algorithm is further used to identify the threshold of NDWI for segregating water pixels from other types of features. The detected water pixels are further summed to calculate water spread area in the region of interest.

Microwave data of Sentinel-1 is a phase-preserving dual polarisation SAR system. It can transmit a signal in either horizontal (H) or vertical (V) polarisation, and then receive in both H and V polarisations. The backscatter intensity of vertical transmit vertical receive (X) band has been used to distinguish water pixels from other types of features. The OTSU algorithm is further used to identify the threshold of backscatter intensity for segregation. The water spread area of each lake has been calculated by summation of water pixels in the region of interest.

It has also been observed that some GL&WBs are required to be delineated manually based on the visual interpretation of satellite images. This is required as the region being monitored is rugged terrain with steep mountains and valleys, which may lead to effects like foreshortening, layover, mountain shadows etc in the microwave/SAR data. Cloud cover on many occasions hinders the performance of Multispectral Satellite images. Thus, creating difficulty in interpreting the signal through automatic means.

The change detection in water spread area of Lake has been calculated for following three cases.

- Difference between the current area of lake and base year
- Difference between the current area of lake and Last five years average area
- Difference between the current area of lake and Last ten years average area

The minimum of change observed in three cases has been adopted to identify increase, decrease and no change in water spread area.

The detailed flow-chart of methodology for automatic monitoring of Glacial Lakes and Water Bodies using satellite images is given below in Figure 4.

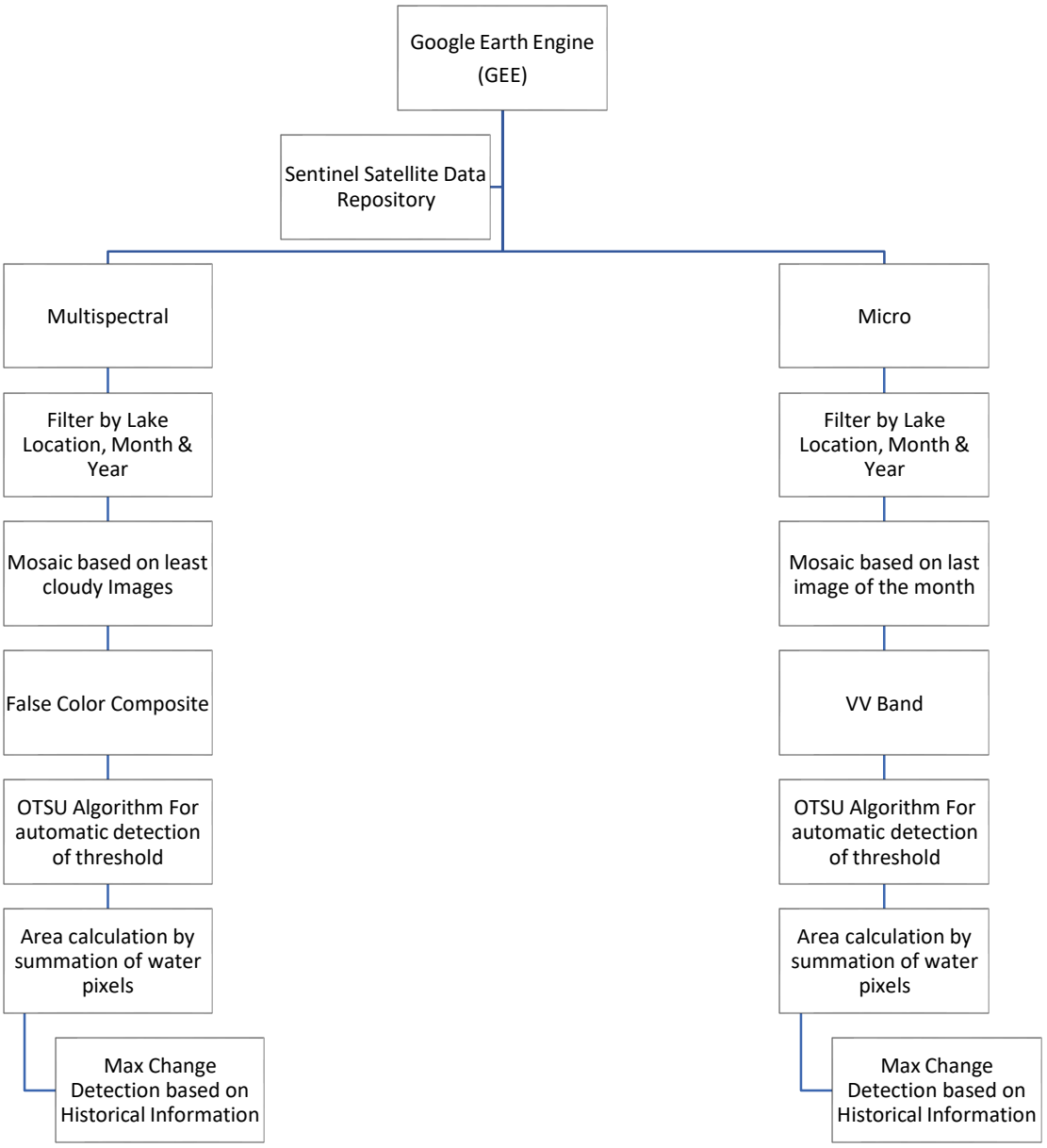

FIGURE 4: METHODOLOGY OF AUTOMATIC MONITORING OF GLACIAL LAKES & WATER BODIES USING SATELLITE IMAGES

4. Results

The water spread area of 902 Glacial Lakes & Water Bodies was calculated for the month of September 2023 in an automatic manner and manually digitized wherever required using the methodology described above. It includes 477 GL&WBs having water spread area greater than 50ha which are being monitored since the year 2011 and 425 GL&WBs having water spread area 10ha to 50 ha or smaller being monitored from the year 2022.

For 477 GL & WBs, the water spread area of September, 2023 and maximum detected change in water spread area with respect to base year, previous 5 years (2018-2022) average area & previous 10 years (2013-2022) average area is shown in Table 1 to Table 5.

The remaining 425 Glacial Lakes consisting of 385 GLs (10ha-50ha as per 2009 NRSC inventory) and 40 GLs (smaller than 10ha as per SDC inventory) were monitored from the year 2022. The water spread area for such lakes for the month of September, 2023 and the change detection with respect to average area of the year 2022(June to October 2022) was calculated and is shown in Table 6 and Table 7.

It was observed that out of 477 GL&WBs, 22 GL&WBs have shown increase in water spread area greater than 40%, 174 GL&WBs have shown increase in water spread area but less than 40%, 17 GL&WBs have shown no change in water spread area, 252 GL&WBs have shown decrease in water spread area, and change detection for remaining GL&WBs could not be performed due to reasons such as frozen condition, dried up condition, cloud cover etc.

Further, out of 425 Glacial Lakes, 163 GL have shown an increase in water spread area, 36 GL have shown no change in water spread area, 206 GL have shown decrease in water spread area, and for remaining Glacial Lakes change detection could not be performed due to reasons mentioned above.

The same is shown in Figure 5.

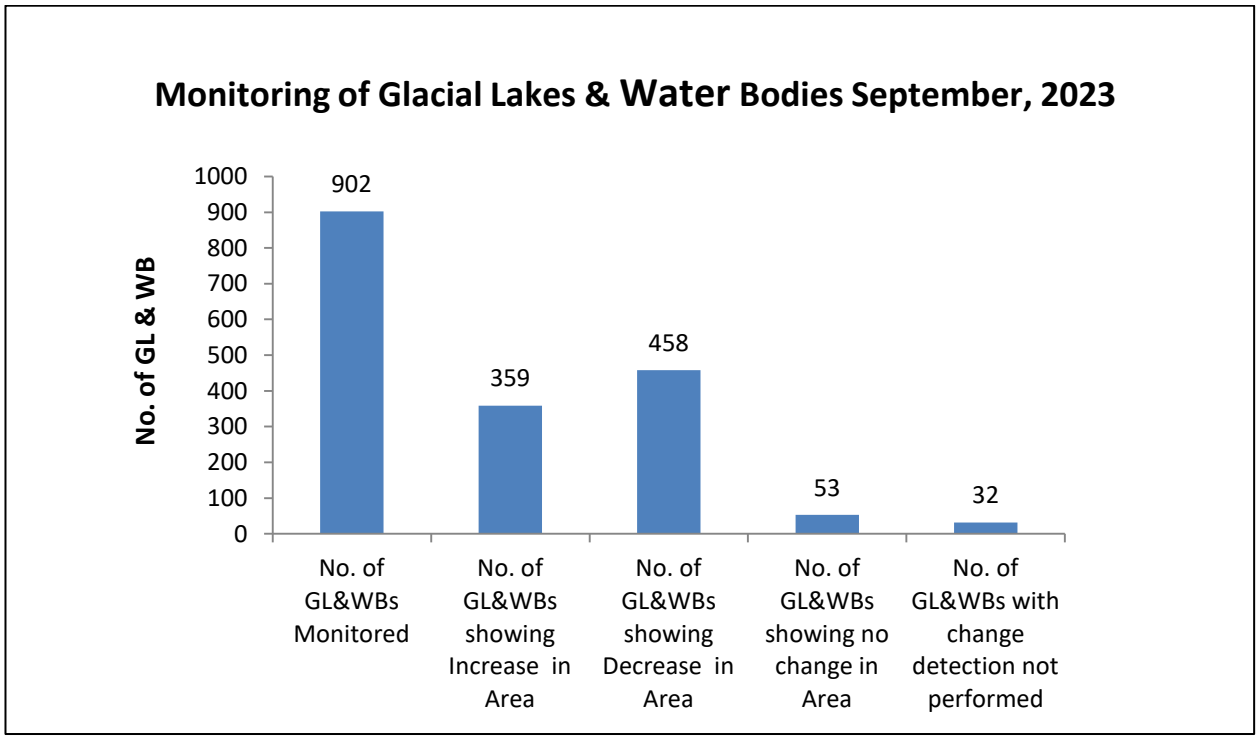

FIGURE 5: OVERALL CHANGES IN WATER SPREAD AREA OF GL&WBS FOR SEPTEMBER, 2023

5. Conclusions

- 3 Glacial Lakes and 19 Water Bodies of size greater than 50 ha warrant **vigorous monitoring for disaster purpose**. These Glacial lakes/water bodies have shown increase in water spread area greater than 40%. Of these, 3 Glacial lakes and 14 Water Bodies are in China, 2 Water Bodies in Bhutan and 3 Water Bodies in India. The Water Bodies in India are in Arunachal Pradesh. The details of these Glacial lake/ water bodies have been highlighted in Table 1.
- 58 Glacial Lakes of size greater than 50 ha displayed marginal increase in water spread area ranging from 1 to 40%, while 3 Glacial Lakes of size greater than 50 ha have shown no change and 51 Glacial Lakes of size greater than 50 ha have shown decrease in water spread area.
- 20 Glacial lakes of size greater than 10 ha (up to 50 Ha) and 3 GL of size less than 10 ha have also diaplayed an increase in water spread area greater than 40% in comparison to the average area of the lakes for the year 2022.
- Google Earth Engine (GEE) has proved to be a very useful and efficient tool in processing large information equivalent to 14834 satellite images in least possible time.
- Automatic algorithm developed in GEE has expedited the process of calculation of water spread area, which has resulted in increase of monitoring of number of lakes from 477 to 902 without any increase in manpower resource and financial implications.
- Use of Microwave satellite image in conjunction with multispectral satellite image (MSI) has overcome short-comings of cloud cover leading to monitoring of all 902 Lakes in all weather conditions. This has increased availability of satellite images at shorter frequency interval. This will further facilitate in reducing the monitoring interval in future.
- The use of Sentinel satellite image has increased the spatial resolution from 56m to10m leading to enhancement of monitoring accuracy. Sentinel images have also aided in improving the temporal resolution.

6. References

1. NRSC, June 2011. *Final Report of "Inventory and Monitoring of Glacial Lakes / Water Bodies in the Himalayan Region of Indian River Basins"*, Technical Report Published by National Remote Sensing Centre, Hyderabad.

2. NRSC, April 2012. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins during 2011"*, Technical Report Published by National Remote Sensing Centre, Hyderabad.

3. NRSC, March 2013. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins during 2012"*, Technical Report Published by National Remote Sensing Centre, Hyderabad.

4. NRSC, December 2013. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins during 2013"*, Technical Report Published by National Remote Sensing Centre, Hyderabad.

5. NRSC, December 2014. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins during 2014"*, Technical Report Published by National Remote Sensing Centre, Hyderabad.

6. NRSC, December 2015. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins during 2015"*, Technical Report Published by National Remote Sensing Centre, Hyderabad.

7. CWC, February 2017. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins for 2016"*, Technical Report Published by Climate Change & IAD Directorate, CWC, New Delhi.

8. CWC, March 2018. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins for 2017"*, Technical Report Published by Morphology & Climate Change Directorate, CWC, New Delhi.

9. CWC, January 2019. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins for 2018"*, Technical Report Published by Morphology & Climate Change Directorate, CWC, New Delhi.

10. CWC, February 2020. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins for 2019"*, Technical Report Published by Morphology & Climate Change Directorate, CWC, New Delhi.

11. CWC, December 2020. *Report on "Monitoring of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins for 2020"*, Technical Report Published by Morphology & Climate Change Directorate, CWC, New Delhi.

12. Gorelick, N. a. (2017). Google Earth Engine: Planetary-scale geospatial analysis for everyone. Remote Sensing of Environment. doi: 10.1016/j.rse.2017.06.031

*TABLE 1: LIST OF GL&WBS HAVING WATER SPREAD GREATER THAN 50 HA SHOWING MORE THAN 40% INCREASE IN AREA (**REQUIRING VIGOROUS MONITORING**)*

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
1	03_82O_047	NRSC		CH_1039	3574	WB	Brahmaputra	Dihang	China	55	-	8	16	244
2	03_82O_044	NRSC		CH_1037	3552	WB	Brahmaputra	Dihang	China	88	-	-	35	151
3	03_78I_085	NRSC		BH_166	4764	WB	Brahmaputra	Puna Tsang Chu	Bhutan	74	-	12	31	139
4	03_91C_074	NRSC		CH_1102	4258	GL	Brahmaputra	Dibang	China	50	-	17	21	138
5	03_91C_049	NRSC		AP_95	4261	WB	Brahmaputra	Dibang	India	73	-	15	32	128
6	03_82K_042	NRSC		CH_898	4364	WB	Brahmaputra		China	178	-	35	85	109
7	03_91H_017	NRSC		CH_1182	4590	WB	Brahmaputra	Luhit	China	37	-	14	18	106
8	03_91C_005	NRSC		CH_1056	4926	GL	Brahmaputra		China	103	-	16	50	106
9	03_82K_040	NRSC		CH_896	4329	WB	Brahmaputra		China	54	-	23	27	100
10	03_82K_049	NRSC		CH_905	4180	WB	Brahmaputra		China	41	-	18	21	95
11	03_92A_005	NRSC		AP_203	3391	WB	Brahmaputra	Luhit	India	49	-	17	27	81

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
12	03_91C_070	NRSC		CH_1098	4252	WB	Brahmaputra	Dibang	China	52	-	21	29	79
13	03_91D_080	NRSC		CH_1135	4295	WB	Brahmaputra	Luhit	China	44	-	25	20	76
14	03_82K_103	NRSC		CH_959	3964	WB	Brahmaputra		China	40	-	15	23	74
15	03_91C_042	NRSC		AP_89	4531	WB	Brahmaputra	Dibang	India	51	-	19	32	59
16	03_77P_023	NRSC		CH_593	4235	WB	Brahmaputra	Kuri Chu	China	78	-	50	43	56
17	03_78M_022	NRSC		BH_197	4549	WB	Brahmaputra	Dang me Chu	Bhutan	87	-	54	56	55
18	03_82K_007	NRSC		CH_863	4294	WB	Brahmaputra		China	122	-	49	79	54
19	03_91H_011	NRSC		CH_1176	4494	WB	Brahmaputra	Luhit	China	57	-	37	32	54
20	03_91C_078	NRSC		CH_1106	3694	WB	Brahmaputra	Dibang	China	38	-	26	26	46
21	03_82J_008	NRSC		CH_838	4036	GL	Brahmaputra		China	240	166	167	165	44
22	03_82F_016	NRSC		CH_741	4632	WB	Brahmaputra		China	44	-	28	31	42

G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability

-Unobservable (as per NRSC) , Ø indicates small rivulet/first order stream

TABLE 2: GL&WBS HAVING WATER SPREAD GREATER THAN 50 HA THAT HAVE SHOWN INCREASE IN WATER SPREAD AREA

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
1	01_52I_004	NRSC		JK_196	5141	WB	Indus	Shyok	India	87	-	63	62	38
2	02_62J_003	NRSC	254G	NP_19	4854	WB	Ganga	Karnali	Nepal	62	-	45	42	38
3	03_78A_021	NRSC		SK_26	5431	GL	Brahmaputra	Teesta	India	76	56	53	50	36
4	03_78E_026	NRSC		CH_613	5161	GL	Brahmaputra	Amo Chu	China	58	-	43	43	35
5	02_71P_054	NRSC		CH_242	4859		Ganga	Arun Kosi	China	102	-	76	75	34
6	03_82O_061	NRSC		AP_54	3811	WB	Brahmaputra	Dibang	India	63	47	41	44	34
7	01_61C_010	NRSC		CH_38	4495	WB	Indus	Indus	China	161	94	118	121	33
8	02_71L_001	NRSC		CH_156	5106	WB	Ganga	Arun Kosi	China	111	81	85	82	31
9	03_77L_043	NRSC		CH_552	5200	GL	Brahmaputra	Kuri Chu	China	246	178	188	189	30
10	03_82G_060	NRSC		CH_821	4577	WB	Brahmaputra		China	57	-	34	44	30
11	03_78M_010	NRSC		BH_188	4496	WB	Brahmaputra	Dangme Chu	Bhutan	45	-	35	33	29
12	03_91C_024	NRSC		CH_1075	3977	GL	Brahmaputra		China	377	287	298	280	27

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
13	03_82O_062	NRSC		AP_55	3612	WB	Brahmaputra	Dibang	India	53	42	9	24	26
14	03_82J_019	NRSC		CH_849	3944	GL	Brahmaputra		China	80	-	64	52	25
15	03_82N_004	NRSC		CH_975	4290	GL	Brahmaputra		China	132	106	71	75	25
16	03_91D_009	NRSC		AP_108	4037	WB	Brahmaputra	Dibang	India	46	-	37	30	24
17	03_82N_030	NRSC		CH_1001	4462	GL	Brahmaputra		China	130	-	106	100	23
18	01_61C_011	NRSC		CH_39	4494	WB	Indus	Indus	China	663	434	539	472	23
19	02_77D_009	NRSC	71G	CH_264	5296	GL	Ganga	Arun Kosi	China	69	56	46	44	23
20	03_91C_040	NRSC		AP_87	4450	WB	Brahmaputra	Luhit	India	87	-	71	60	23
21	03_77L_010	NRSC		CH_526	4457	WB	Brahmaputra		China	49	-	40	37	23
22	03_78M_019	NRSC		BH_194	4697	WB	Brahmaputra	Dangme Chu	Bhutan	55	-	45	45	22
23	03_82L_009	NRSC		CH_971	3893	GL	Brahmaputra		China	73	55	60	54	22
24	03_78E_029	NRSC		BH_73	4250	WB	Brahmaputra	Puna Tsang Chu	Bhutan	40	-	33	28	21
25	02_71L_010	NRSC	185G	CH_165	5387	GL	Ganga	Sun Kosi	China	64	-	53	46	21

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
26	03_82G_065	NRSC		CH_826	4148	WB	Brahmaputra		China	71	-	55	59	20
27	02_77D_008	NRSC	266G	CH_263	5285	GL	Ganga	Arun Kosi	China	51	-	43	34	19
28	03_82O_064	NRSC		AP_57	3689	WB	Brahmaputra	Dihang	India	44	-	37	31	19
29	03_82N_019	NRSC		CH_990	4877	WB	Brahmaputra		China	46	-	39	39	18
30	03_91H_010	NRSC		CH_1175	4433	WB	Brahmaputra	Luhit	China	86	-	73	66	18
31	03_91D_010	NRSC		AP_109	3323	WB	Brahmaputra	Dibang	India	47	-	40	34	18
32	02_71P_040	NRSC	126G	CH_228	4962	WB	Ganga	Arun Kosi	China	155	131	129	115	18
33	02_78A_004	NRSC	194G	CH_270	5603	GL	Ganga	Arun Kosi	China	120	85	102	95	18
34	03_77L_017	NRSC		CH_533	5340	WB	Brahmaputra		China	90	76	75	71	18
35	03_91C_064	NRSC		AP_100	3972	WB	Brahmaputra	Dibang	India	85	-	72	65	18
36	03_91D_107	NRSC		AP_163	3769	WB	Brahmaputra	Luhit	India	63	-	49	54	17
37	03_82P_010	NRSC		AP_67	1676	WB	Brahmaputra	Dibang	India	95	-	81	68	17
38	03_91C_059	NRSC		CH_1089	4303	WB	Brahmaputra	Dibang	China	89	-	76	72	17

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
39	03_91C_014	NRSC		CH_1065	4033	GL	Brahmaputra		China	52	-	45	42	16
40	03_77L_066	NRSC		BH_34	4896	GL	Brahmaputra	Manas Chu &Mang de Chu	Bhutan	155	134	132	133	16
41	03_77L_014	NRSC		CH_530	5289	WB	Brahmaputra		China	43	-	37	36	16
42	02_53K_001	NRSC		UK_1	355	WB	Ganga	Ramganga	India	6441	5557	5371	5332	16
43	03_77L_042	NRSC		CH_551	5057	GL	Brahmaputra	Kuri Chu	China	72	62	61	60	16
44	02_72I_025	NRSC	66G	NP_78	4884	GL	Ganga	Sun Kosi	Nepal	145	102	126	111	15
45	03_78I_051	NRSC		BH_132	5074	GL	Brahmaputra	Manas Chu &Mang de Chu	Bhutan	129	112	88	95	15
46	03_91C_038	NRSC		AP_85	4002	WB	Brahmaputra	Dibang	India	98	-	73	85	15
47	03_82K_045	NRSC		CH_901	4572	WB	Brahmaputra		China	32	-	28	25	14
48	03_77L_033	NRSC		BH_13	5176	GL	Brahmaputra		Bhutan	224	186	197	185	14
49	03_82G_055	NRSC		CH_816	4619	WB	Brahmaputra		China	49	-	31	43	14

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
50	03_91D_022	NRSC		AP_118	3143	WB	Brahmaputra	Dibang	India	41	-	36	30	14
51	03_77D_003	NRSC		SK_3	5098	WB	Brahmaputra	Teesta	India	110	97	93	91	13
52	03_71K_007	NRSC		CH_430	4752	WB	Brahmaputra		China	108	96	82	80	13
53	03_82K_074	NRSC		CH_930	4553	WB	Brahmaputra		China	77	-	68	64	13
54	03_77O_001	NRSC		CH_564	3879	WB	Brahmaputra		China	180	153	160	159	13
55	03_82B_028	NRSC		CH_654	4998	WB	Brahmaputra		China	51	-	45	40	13
56	03_77H_023	NRSC		CH_492	5313	WB	Brahmaputra		China	46	-	41	33	12
57	03_82F_022	NRSC		CH_747	4200	GL	Brahmaputra		China	110	98	89	93	12
58	02_71P_025	NRSC		CH_213	4807	WB	Ganga	Arun Kosi	China	142	110	127	107	12
59	02_72M_016	NRSC	7G	NP_92	4572	GL	Ganga	Arun Kosi	Nepal	223	139	199	163	12
60	02_71L_032	NRSC	122G	CH_187	5250	GL	Ganga	Sun Kosi	China	57	51	51	51	12
61	03_71C_011	NRSC		CH_404	4684	WB	Brahmaputra		China	172	127	153	138	12
62	01_52H_005	NRSC		HP_6	4286	WB	Indus	Chenab	India	48	-	43	38	12

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
63	03_92E_001	NRSC		AP_206	4206	WB	Brahmaputra	Luhit	India	48	-	43	30	12
64	01_52H_004	NRSC		HP_5	4155	GL	Indus	Chenab	India	158	-	142	114	11
65	03_62J_026	NRSC		CH_298	5078	GL	Brahmaputra		China	136	115	123	116	11
66	03_91H_040	NRSC		CH_1205	4324	WB	Brahmaputra	Luhit	China	50	-	45	41	11
67	02_71H_029	NRSC	1G	CH_149	5098	GL	Ganga	Sun Kosi	China	538	484	411	452	11
68	03_91D_041	NRSC		AP_135	3526	WB	Brahmaputra	Dibang	India	121	110	103	85	10
69	03_82K_017	NRSC		CH_873	4397	WB	Brahmaputra		China	170	-	146	155	10
70	02_62P_003	NRSC	4G	NP_36	4937	GL	Ganga	Trisuli	Nepal	362	330	320	298	10
71	02_71L_004	NRSC	5G	CH_159	5518	GL	Ganga	Arun Kosi	China	125	78	114	92	10
72	01_52O_002	NRSC		CH_5	5262	WB	Indus	Indus	China	127	115	112	102	10
73	03_77O_002	NRSC		CH_565	3806	WB	Brahmaputra		China	90	82	80	79	10
74	03_78E_002	NRSC		BH_57	5110	GL	Brahmaputra	Puna Tsang Chu	Bhutan	65	59	35	40	10
75	02_72I_004	NRSC	9G	CH_244	5074	GL	Ganga	Sun Kosi	China	221	125	201	174	10

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
76	02_72I_011	NRSC	1G	NP_64	5034	GL	Ganga	Sun Kosi	Nepal	175	103	160	130	9
77	02_71P_043	NRSC	18G	CH_231	5206	GL	Ganga	Arun Kosi	China	84	66	77	64	9
78	03_71P_001	NRSC		CH_448	5302	WB	Brahmaputra		China	140	130	130	127	8
79	01_43M_003	NRSC		JK_120	2663	WB	Indus	Shigar (Indus)	India	243	198	224	220	8
80	03_77L_044	NRSC		BH_19	4385	GL	Brahmaputra	Puna Tsang Chu	Bhutan	131	121	103	110	8
81	02_77D_006	NRSC		CH_261	4894	GL	Ganga	Arun Kosi	China	105	89	92	97	8
82	03_82K_002	NRSC		CH_858	3998	WB	Brahmaputra		China	61	57	50	44	7
83	03_77L_041	NRSC		CH_550	5214	GL	Brahmaputra	Kuri Chu	China	65	-	61	57	7
84	03_62O_042	NRSC		CH_387	4964	WB	Brahmaputra		China	62	58	56	55	7
85	03_62O_032	NRSC		CH_377	5012	WB	Brahmaputra		China	59	-	55	45	7
86	01_53A_002	NRSC		HP_10	495	WB	Indus	Satluj	India	13029	12198	11339	11603	7
87	03_82G_051	NRSC		CH_812	4735	WB	Brahmaputra		China	45	-	42	35	7
88	01_52L_002	NRSC		JK_226	4986	WB	Indus	Indus	India	454	406	423	408	7

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
89	03_78E_010	NRSC		CH_606	4582	WB	Brahmaputra		China	46	-	43	37	7
90	03_77H_003	NRSC		CH_478	4714	WB	Brahmaputra		China	245	231	148	145	6
91	03_77K_015	NRSC		CH_517	4455	WB	Brahmaputra		China	115	106	108	106	6
92	01_61G_002	NRSC		CH_63	4663	WB	Indus	Indus	China	1384	1218	1308	1264	6
93	03_77L_072	NRSC		BH_40	5201	GL	Brahmaputra	Manas Chu &Mang de Chu	Bhutan	93	88	79	82	6
94	01_43J_004	NRSC	5I	JK_82	4078	WB	Indus	Jhelum	India	74	70	68	63	6
95	01_43G_001	NRSC		JK_67	346	WB	Indus	Jhelum	India	24416	22572	22977	22344	6
96	03_77H_018	NRSC		CH_488	4699	WB	Brahmaputra		China	88	75	83	77	6
97	03_77D_005	NRSC/SDC	/Very High Risk	SK_5	5249	GL	Brahmaputra	Teesta	India	104	98	94	84	6
98	03_71K_003	NRSC		CH_426	4982	WB	Brahmaputra		China	92	73	87	76	6
99	03_82J_014	NRSC		CH_844	3703	WB	Brahmaputra		China	194	183	158	147	6
100	03_77N_004	NRSC		CH_563	3890	WB	Brahmaputra		China	1331	1257	1238	1231	6

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
101	01_52H_002	NRSC/SDC	4I/Very High Risk	HP_3	4101	GL	Indus	Chenab	India	103	61	97	83	6
102	03_82O_029	NRSC		CH_1032	3345	WB	Brahmaputra	Dihang	China	72	68	44	45	6
103	03_71G_007	NRSC		CH_416	5153	WB	Brahmaputra		China	199	188	189	187	5
104	03_82B_014	NRSC		CH_640	4825	WB	Brahmaputra		China	162	155	152	127	5
105	03_91H_005	NRSC		CH_1170	4123	WB	Brahmaputra	Luhit	China	63	56	60	46	5
106	03_78A_014	NRSC/SDC	/Very High Risk	SK_20	5234	GL	Brahmaputra	Teesta	India	147	132	140	125	5
107	03_78E_023	NRSC		CH_612	5291	GL	Brahmaputra		China	59	-	48	56	5
108	03_82J_023	NRSC		CH_853	4315	WB	Brahmaputra		China	108	101	103	99	5
109	02_71P_047	NRSC	81G	CH_235	5614	GL	Ganga	Arun Kosi	China	90	82	86	72	5
110	02_72I_023	NRSC	227G	NP_76	5232	GL	Ganga	Sun Kosi	Nepal	86	82	70	72	5
111	03_62J_011	NRSC		CH_283	5181	WB	Brahmaputra		China	400	355	380	365	5
112	01_43K_010	NRSC		JK_111	3946	WB	Indus	Jhelum	India	68	65	60	60	5

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
113	01_43N_030	NRSC		JK_157	3799	WB	Indus	Jhelum	India	91	87	76	77	5
114	03_82B_008	NRSC		CH_634	4928	WB	Brahmaputra		China	273	262	262	254	4
115	03_82B_005	NRSC		CH_631	4888	WB	Brahmaputra		China	223	215	211	203	4
116	02_71L_006	NRSC	3G	CH_161	5365	GL	Ganga	Arun Kosi	China	395	372	380	341	4
117	02_71H_002	NRSC		CH_122	4650	WB	Ganga	Arun Kosi	China	2553	2353	2466	2390	4
118	01_61F_004	NRSC		CH_61	4814	WB	Indus	Indus	China	40761	37181	39073	38352	4
119	01_61D_004	NRSC		CH_56	4991	WB	Indus	Indus	China	568	501	546	511	4
120	03_82O_016	NRSC		CH_1023	4374	WB	Brahmaputra	Dihang	China	98	94	21	41	4
121	03_78E_009	NRSC		CH_605	4580	WB	Brahmaputra		China	182	176	168	164	3
122	02_78A_003	NRSC	24G	CH_269	5522	GL	Ganga	Arun Kosi	China	157	131	152	137	3
123	03_62O_040	NRSC		CH_385	4896	WB	Brahmaputra		China	123	112	119	113	3
124	02_72M_009	NRSC	51G	NP_86	4932	GL	Ganga	TamurKosi	Nepal	66	-	64	56	3
125	01_52K_012	NRSC		JK_220	4695	WB	Indus	Indus	India	164	160	159	156	3

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
126	03_71G_001	NRSC		CH_410	5163	WB	Brahmaputra		China	776	741	753	732	3
127	01_53A_001	NRSC		HP_9	409	WB	Indus	Beas	India	22707	22072	18290	17771	3
128	02_71L_028	NRSC	38G	CH_183	5027	GL	Ganga	Sun Kosi	China	101	82	98	91	3
129	03_77L_030	NRSC		BH_12	5305	GL	Brahmaputra		Bhutan	92	89	73	76	3
130	02_71D_004	NRSC	16G	NP_45	4064	GL	Ganga	Trisuli	Nepal	101	75	98	90	3
131	03_62O_030	NRSC		CH_375	5013	WB	Brahmaputra		China	114	99	111	101	3
132	01_62E_003	NRSC		CH_78	5104	WB	Indus	Indus	China	161	148	157	148	3
133	03_62N_017	NRSC		CH_334	5454	WB	Brahmaputra		China	82	79	80	77	3
134	02_62K_012	NRSC		NP_30	3653	WB	Ganga	Bheri	Nepal	510	481	494	471	3
135	02_72M_005	NRSC	139G	CH_251	5141	GL	Ganga	Arun Kosi	China	81	79	78	69	3
136	03_71O_006	NRSC		CH_442	4738	WB	Brahmaputra		China	118	104	115	109	3
137	03_77L_051	NRSC		BH_22	4548	GL	Brahmaputra	Puna Tsang Chu	Bhutan	167	142	162	150	3
138	01_52J_009	NRSC		JK_205	5576	WB	Indus	Shyok	India	62	61	56	51	2

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
139	03_82A_007	NRSC		CH_626	4911	WB	Brahmaputra		China	95	87	93	88	2
140	02_72M_007	NRSC	33G	CH_253	4950	GL	Ganga	Arun Kosi	China	99	88	97	89	2
141	01_62E_005	NRSC		CH_80	5174	WB	Indus	Indus	China	202	193	198	187	2
142	03_91C_044	NRSC		AP_90	4230	WB	Brahmaputra	Luhit	India	65	64	52	52	2
143	03_77D_002	NRSC		SK_2	5156	GL	Brahmaputra	Teesta	India	114	112	101	96	2
144	03_62J_032	NRSC		CH_304	4857	GL	Brahmaputra		China	91	89	89	82	2
145	03_77H_008	NRSC		CH_482	4570	WB	Brahmaputra		China	1279	1250	1134	1147	2
146	03_78E_012	NRSC		CH_607	4576	WB	Brahmaputra		China	285	274	280	267	2
147	01_52O_001	NRSC		CH_4	4242	WB	Indus	Shyok	China	69481	66075	67960	66500	2
148	01_61C_005	NRSC		CH_33	4495	WB	Indus	Indus	China	390	153	384	279	2
149	01_61C_005	NRSC		CH_33	4495	WB	Indus	Indus	China	390	153	384	279	2
150	02_72I_003	NRSC	319G	NP_59	4762	GL	Ganga	Sun Kosi	Nepal	43	-	42	36	2
151	01_61C_001	NRSC		CH_29	4526	WB	Indus	Indus	China	11788	11304	11562	11424	2

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
152	01_52K_004	NRSC		JK_212	4293	WB	Indus	Shyok	India	5931	5797	5817	5737	2
153	03_82B_009	NRSC		CH_635	4963	WB	Brahmaputra		China	180	176	174	166	2
154	01_61C_022	NRSC		CH_50	4339	WB	Indus	Indus	China	1591	1494	1560	1459	2
155	01_62E_004	NRSC		CH_79	5161	WB	Indus	Indus	China	252	227	248	238	2
156	02_71H_003	NRSC		CH_123	4649	WB	Ganga	Arun Kosi	China	224	193	220	211	2
157	03_82N_033	NRSC		CH_1004	4357	GL	Brahmaputra		China	88	86	69	67	2
158	01_43N_027	NRSC		JK_154	3683	WB	Indus	Jhelum	India	45	-	44	38	2
159	02_71H_007	NRSC		CH_127	5149	GL	Ganga	Arun Kosi	China	124	122	120	117	2
160	01_52K_010	NRSC		JK_218	5313	WB	Indus	Shyok	India	150	148	140	136	1
161	01_52J_006	NRSC		JK_202	5401	WB	Indus	Shyok	India	108	107	104	100	1
162	01_62F_003	NRSC		CH_94	4586	WB	Indus	Satluj	China	41665	40806	41185	41037	1
163	03_62O_039	NRSC		CH_384	4555	WB	Brahmaputra		China	308	306	294	286	1
164	03_78E_007	NRSC		BH_60	5008	GL	Brahmaputra	Puna Tsang Chu	Bhutan	68	67	47	52	1

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
165	01_62E_006	NRSC		CH_81	5055	WB	Indus	Indus	China	525	516	522	506	1
166	03_77L_012	NRSC		CH_528	5014	WB	Brahmaputra		China	29289	28995	29060	28965	1
167	03_62K_009	NRSC		CH_313	5079	GL	Brahmaputra		China	316	265	312	291	1
168	03_62N_021	NRSC		CH_338	5432	WB	Brahmaputra		China	202	200	185	183	1
169	02_71P_022	NRSC	34G	CH_210	5439	GL	Ganga	Arun Kosi	China	83	82	82	70	1
170	03_82J_005	NRSC		CH_835	4134	GL	Brahmaputra		China	75	74	58	60	1
171	03_77L_013	NRSC		CH_529	5191	WB	Brahmaputra		China	347	342	327	315	1
172	03_71K_006	NRSC		CH_429	4847	WB	Brahmaputra		China	2195	2173	2088	2036	1
173	03_82C_010	NRSC		CH_665	4921	WB	Brahmaputra		China	150	149	120	128	1
174	03_82K_077	NRSC		CH_933	4590	WB	Brahmaputra		China	100	-	99	94	1

G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability

- Unobservable (as per NRSC) , Ø indicates small rivulet/first order stream

TABLE 3: GL&WBS HAVING WATER SPREAD GREATER THAN 50 HA THAT HAVE SHOWN NO CHANGE IN WATER SPREAD AREA

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
1	03_91C_069	NRSC		AP_101	3245	WB	Brahmaputra	Dibang	India	72	72	46	45	0
2	02_71P_019	NRSC		CH_207	4199	GL	Ganga	Arun Kosi	China	55	-	55	46	0
3	03_82B_021	NRSC		CH_647	5041	WB	Brahmaputra		China	52	52	44	39	0
4	03_82K_080	NRSC		CH_936	4530	WB	Brahmaputra		China	49	-	49	37	0
5	02_71P_028	NRSC		CH_216	4997	GL	Ganga	Arun Kosi	China	61	44	58	61	0
6	03_62N_001	NRSC		CH_318	5102	WB	Brahmaputra		China	14831	14352	14856	14616	0
7	02_71H_001	NRSC		CH_121	4580	WB	Ganga	Arun Kosi	China	27029	26974	26951	26898	0
8	03_62J_015	NRSC		CH_287	5207	WB	Brahmaputra		China	85	80	85	82	0
9	01_62F_004	NRSC		CH_95	5493	WB	Indus	Satluj	China	191	186	191	181	0
10	03_62J_031	NRSC		CH_303	4897	GL	Brahmaputra		China	217	174	218	192	0
11	01_61C_024	NRSC		CH_52	4323	WB	Indus	Indus	China	5095	4733	5107	4842	0
12	01_52N_001	NRSC		CH_3	4964	WB	Indus	Indus	China	12339	11883	12283	12099	0

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
13	03_62O_027	NRSC		CH_372	4575	WB	Brahmaputra		China	39	-	39	35	0
14	01_52O_003	NRSC		CH_6	4252	WB	Indus	Indus	China	221	220	196	181	0
15	03_71B_002	NRSC		CH_392	5388	WB	Brahmaputra		China	8264	8251	8211	8132	0
16	01_62A_003	NRSC		CH_69	5142	WB	Indus	Indus	China	1379	1385	1343	1304	0
17	03_77H_030	NRSC		CH_495	4802	WB	Brahmaputra		China	62	62	58	56	0

G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability

- Unobservable (as per NRSC) , Ø indicates small rivulet/first order stream

TABLE 4: GL&WBS HAVING WATER SPREAD GREATER THAN 50 HA THAT HAVE SHOWN DECREASE IN WATER SPREAD AREA

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
1	03_71K_011	NRSC		CH_434	4761	WB	Brahmaputra		China	405	409	399	371	-1
2	03_77L_009	NRSC		CH_525	4515	WB	Brahmaputra		China	579	569	584	542	-1
3	03_71G_006	NRSC		CH_415	5065	WB	Brahmaputra		China	961	970	955	933	-1
4	03_82G_023	NRSC		CH_784	4377	WB	Brahmaputra		China	75	76	70	65	-1
5	01_61C_002	NRSC		CH_30	4494	WB	Indus	Indus	China	811	717	822	779	-1
6	03_62O_041	NRSC		CH_386	4963	WB	Brahmaputra		China	211	208	214	205	-1
7	03_62J_013	NRSC		CH_285	4934	WB	Brahmaputra		China	930	935	933	911	-1
8	01_62J_001	NRSC		CH_102	4784	WB	Indus	Satluj	China	5718	5525	5774	5583	-1
9	03_78A_013	NRSC		SK_19	5470	GL	Brahmaputra	Teesta	India	80	74	81	77	-1
10	03_78I_018	NRSC		BH_99	5083	GL	Brahmaputra	Puna Tsang Chu	Bhutan	68	69	68	65	-1
11	01_52K_009	NRSC		JK_217	4921	WB	Indus	Shyok	India	202	205	196	191	-1
12	03_71O_009	NRSC		CH_445	4302	WB	Brahmaputra		China	2179	2111	2210	2129	-1

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
13	01_43J_017	NRSC	3I	JK_95	3580	WB	Indus	Jhelum	India	158	160	159	153	-1
14	02_71H_012	NRSC		CH_132	5379	GL	Ganga	Arun Kosi	China	128	-	129	120	-1
15	01_43K_014	NRSC		JK_115	3521	WB	Indus	Jhelum	India	137	134	138	126	-1
16	01_61C_018	NRSC		CH_46	4291	WB	Indus	Indus	China	2008	1958	2037	1901	-1
17	03_78M_020	NRSC		BH_195	4157	WB	Brahmaputra	Dangme Chu	Bhutan	58	59	54	56	-2
18	03_82B_004	NRSC		CH_630	4893	WB	Brahmaputra		China	101	98	103	98	-2
19	03_82K_037	NRSC		CH_893	4147	WB	Brahmaputra		China	54	55	21	30	-2
20	03_82A_002	NRSC		CH_621	4905	WB	Brahmaputra		China	376	351	382	355	-2
21	01_61H_001	NRSC		CH_66	4619	WB	Indus	Indus	China	311	317	315	287	-2
22	02_71H_028	NRSC	15G	CH_148	5174	WB	Ganga	Sun Kosi	China	192	194	194	195	-2
23	03_78A_009	NRSC		SK_16	5044	GL	Brahmaputra	Teesta	India	60	61	55	52	-2
24	03_77L_001	NRSC		CH_520	4443	WB	Brahmaputra		China	55259	56442	54547	54439	-2
25	03_62O_038	NRSC		CH_383	4893	WB	Brahmaputra		China	133	128	136	130	-2

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
26	03_62K_001	NRSC		CH_305	4834	WB	Brahmaputra		China	390	396	395	376	-2
27	01_61C_016	NRSC		CH_44	4289	WB	Indus	Indus	China	369	377	364	360	-2
28	03_91C_025	NRSC		CH_1076	4022	GL	Brahmaputra		China	111	107	113	107	-2
29	03_71K_002	NRSC		CH_425	4974	WB	Brahmaputra		China	2326	2369	2288	2280	-2
30	03_77K_017	NRSC		CH_519	4448	WB	Brahmaputra		China	3745	3807	3760	3734	-2
31	03_82F_030	NRSC		CH_755	3485	WB	Brahmaputra		China	2667	2735	2694	2665	-2
32	03_77L_037	NRSC		BH_15	5139	GL	Brahmaputra		Bhutan	588	599	599	578	-2
33	01_62E_013	NRSC		CH_88	5345	WB	Indus	Indus	China	165	169	167	159	-2
34	02_71L_023	NRSC	39G	CH_178	5106	GL	Ganga	Arun Kosi	China	126	124	128	121	-2
35	03_82F_014	NRSC		CH_739	4691	GL	Brahmaputra		China	44	-	45	35	-2
36	03_82B_015	NRSC		CH_641	5124	WB	Brahmaputra		China	82	84	78	76	-2
37	01_52K_011	NRSC		JK_219	5291	WB	Indus	Shyok	India	178	183	175	170	-3
38	01_52J_002	NRSC		JK_198	5359	WB	Indus	Shyok	India	65	67	61	59	-3

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
39	01_52K_014	NRSC		JK_222	4535	WB	Indus	Indus	India	433	446	413	410	-3
40	01_61F_003	NRSC		CH_60	5256	WB	Indus	Indus	China	550	565	536	512	-3
41	01_43A_001	NRSC		JK_22	3641	WB	Indus	Gilgit	India	202	196	208	194	-3
42	02_71D_007	NRSC		NP_48	700	WB	Ganga	Trisuli	Nepal	284	294	281	280	-3
43	01_43N_001	NRSC		JK_128	4142	WB	Indus	Shingo (Indus)	India	127	131	124	122	-3
44	03_82D_004	NRSC		CH_710	4481	WB	Brahmaputra		China	370	375	382	372	-3
45	03_77P_019	NRSC		CH_590	4637	WB	Brahmaputra	Dangme Chu	China	254	237	263	240	-3
46	02_77D_007	NRSC	244G	CH_262	5215	GL	Ganga	Arun Kosi	China	57	58	59	56	-3
47	02_78A_005	NRSC		CH_271	5376	GL	Ganga	Arun Kosi	China	112	91	110	116	-3
48	03_82K_036	NRSC		CH_892	4251	WB	Brahmaputra		China	62	64	38	36	-3
49	03_82F_007	NRSC		CH_732	4801	GL	Brahmaputra		China	116	120	119	113	-3
50	02_53P_001	NRSC		UK_9	210	WB	Ganga	Ganga	India	1800	1855	1621	1567	-3
51	03_82K_075	NRSC		CH_931	4511	WB	Brahmaputra		China	117	-	120	102	-3

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
52	01_62E_002	NRSC		CH_77	5139	WB	Indus	Indus	China	168	173	157	149	-3
53	03_82J_017	NRSC		CH_847	3829	WB	Brahmaputra		China	278	287	284	279	-3
54	01_62F_001	NRSC		CH_92	4571	WB	Indus	Satluj	China	24695	25680	25164	25241	-4
55	03_82B_010	NRSC		CH_636	4990	WB	Brahmaputra		China	48	50	47	41	-4
56	03_82A_004	NRSC		CH_623	5008	WB	Brahmaputra		China	47	-	49	42	-4
57	01_61B_003	NRSC		CH_28	5074	WB	Indus	Indus	China	210	218	193	196	-4
58	03_82J_004	NRSC		CH_834	3957	GL	Brahmaputra		China	505	378	526	474	-4
59	03_82B_007	NRSC		CH_633	4964	WB	Brahmaputra		China	199	206	207	196	-4
60	03_78M_003	NRSC		CH_614	4459	WB	Brahmaputra	Dangme Chu	China	206	215	168	186	-4
61	03_77D_008	NRSC		SK_8	5039	GL	Brahmaputra	Teesta	India	44	-	46	35	-4
62	03_62J_012	NRSC		CH_284	4883	WB	Brahmaputra		China	161	164	168	159	-4
63	03_82E_002	NRSC		CH_720	5008	WB	Brahmaputra		China	670	675	701	613	-4
64	01_52L_001	NRSC		JK_225	4523	WB	Indus	Satluj	India	13798	14351	14180	14105	-4

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
65	03_91C_029	NRSC		CH_1078	4229	WB	Brahmaputra		China	213	221	218	211	-4
66	03_82F_004	NRSC		CH_729	4508	WB	Brahmaputra		China	688	713	701	690	-4
67	03_62J_001	NRSC		CH_273	5449	WB	Brahmaputra		China	145	151	143	140	-4
68	03_82O_054	NRSC		CH_1046	3311	WB	Brahmaputra	Dibang	China	49	51	19	33	-4
69	03_91C_045	NRSC		AP_91	3493	WB	Brahmaputra	Dibang	India	107	111	86	96	-4
70	03_82D_003	NRSC		CH_709	4408	WB	Brahmaputra		China	44	46	44	43	-4
71	03_82B_020	NRSC		CH_646	4986	WB	Brahmaputra		China	45	-	47	41	-4
72	01_52J_001	NRSC	8I	JK_197	5311	GL	Indus	Shyok	India	99	104	96	92	-5
73	03_82F_008	NRSC		CH_733	4828	WB	Brahmaputra		China	84	84	88	83	-5
74	03_78E_028	NRSC		BH_72	2161	WB	Brahmaputra	Puna Tsang Chu	Bhutan	42	-	44	35	-5
75	02_71L_002	NRSC		CH_157	5261	WB	Ganga	Arun Kosi	China	77	71	81	79	-5
76	02_71L_013	NRSC	58G	CH_168	5324	GL	Ganga	Sun Kosi	China	56	57	59	56	-5
77	03_82J_025	NRSC		CH_855	4038	WB	Brahmaputra		China	56	59	45	41	-5

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
78	01_43A_002	NRSC		JK_23	3790	WB	Indus	Gilgit	India	99	96	104	95	-5
79	02_71P_027	NRSC	82G	CH_215	5389	GL	Ganga	Arun Kosi	China	52	-	55	40	-5
80	03_77H_011	NRSC		BH_4	4963	GL	Brahmaputra		Bhutan	153	161	158	142	-5
81	02_71H_027	NRSC	2G	CH_147	5242	GL	Ganga	Sun Kosi	China	454	480	441	437	-5
82	02_53O_001	NRSC		UK_4	1968	WB	Ganga	Ramganga	India	38	-	40	33	-5
83	01_43N_020	NRSC		JK_147	4112	WB	Indus	Jhelum	India	62	65	61	58	-5
84	03_77L_067	NRSC		BH_35	5231	GL	Brahmaputra	Manas Chu &Mangde Chu	Bhutan	83	87	68	71	-5
85	01_52C_003	NRSC	7I	JK_187	4512	GL	Indus	Indus	India	57	-	60	49	-5
86	03_78M_016	NRSC		CH_617	4647	WB	Brahmaputra	Dangme Chu	China	143	151	117	128	-5
87	03_82G_050	NRSC		CH_811	4734	WB	Brahmaputra		China	38	-	40	34	-5
88	03_82F_020	NRSC		CH_745	4110	GL	Brahmaputra		China	70	71	74	68	-5
89	01_62E_010	NRSC		CH_85	5233	WB	Indus	Indus	China	155	164	155	146	-5

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
90	03_82E_003	NRSC		CH_721	5027	WB	Brahmaputra		China	93	98	95	94	-5
91	01_43J_022	NRSC		JK_100	1583	WB	Indus	Jhelum	India	61	62	64	59	-5
92	01_52G_001	NRSC		JK_189	5008	WB	Indus	Shyok	India	42	-	44	38	-5
93	03_77D_004	NRSC/SDC	/Very High Risk	SK_4	5287	GL	Brahmaputra	Teesta	India	116	113	122	112	-5
94	01_62F_002	NRSC		CH_93	4592	WB	Indus	Satluj	China	314	334	320	316	-6
95	01_42H_001	NRSC		JK_1	4292	WB	Indus	Gilgit	India	253	264	268	254	-6
96	03_62O_024	NRSC		CH_369	4637	WB	Brahmaputra		China	836	740	894	814	-6
97	02_71H_017	NRSC		CH_137	5314	GL	Ganga	Arun Kosi	China	481	512	485	475	-6
98	03_82A_003	NRSC		CH_622	4896	WB	Brahmaputra		China	94	100	92	91	-6
99	03_62K_002	NRSC		CH_306	4858	WB	Brahmaputra		China	48	-	51	44	-6
100	03_71C_003	NRSC		CH_396	5412	GL	Brahmaputra		China	49	-	52	45	-6
101	03_62K_012	NRSC		CH_316	5368	GL	Brahmaputra		China	80	78	85	75	-6
102	02_72M_006	NRSC	349G	CH_252	5188	GL	Ganga	Arun Kosi	China	62	64	66	61	-6

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
103	03_78I_023	NRSC		BH_104	5055	GL	Brahmaputra	Manas Chu &Mang de Chu	Bhutan	49	52	48	44	-6
104	02_71L_026	NRSC	73G	CH_181	5057	GL	Ganga	Sun Kosi	China	62	56	67	62	-7
105	03_77L_077	NRSC		BH_45	5136	WB	Brahmaputra	Puna Tsang Chu	Bhutan	51	55	10	29	-7
106	02_71L_011	NRSC	61G	CH_166	5439	GL	Ganga	Sun Kosi	China	51	55	54	53	-7
107	03_77L_068	NRSC		BH_36	4764	WB	Brahmaputra	Kuri Chu	Bhutan	76	82	69	73	-7
108	01_52K_016	NRSC		JK_224	4675	WB	Indus	Satluj	India	518	555	523	514	-7
109	03_78E_017	NRSC		CH_609	5253	GL	Brahmaputra		China	43	-	38	46	-7
110	02_62P_004	NRSC		NP_37	807	WB	Ganga	Trisuli	Nepal	366	385	394	389	-7
111	01_43N_022	NRSC		JK_149	4243	WB	Indus	Jhelum	India	69	74	72	68	-7
112	03_82K_039	NRSC		CH_895	4128	WB	Brahmaputra		China	196	211	131	167	-7
113	03_82G_048	NRSC		CH_809	4663	WB	Brahmaputra		China	43	38	46	43	-7
114	03_82B_006	NRSC		CH_632	4837	WB	Brahmaputra		China	116	121	125	120	-7

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
115	03_91C_034	NRSC		AP_84	4288	WB	Brahmaputra	Dibang	India	146	157	59	80	-7
116	03_77L_006	NRSC		CH_522	4533	WB	Brahmaputra		China	28	-	30	30	-7
117	03_77H_020	NRSC		CH_490	4473	WB	Brahmaputra		China	4559	4976	4525	4594	-8
118	01_61C_012	NRSC		CH_40	4282	WB	Indus	Indus	China	302	317	330	308	-8
119	01_62E_015	NRSC		CH_90	5415	WB	Indus	Satluj	China	46	50	49	46	-8
120	02_71H_008	NRSC		CH_128	5152	GL	Ganga	Arun Kosi	China	100	99	109	101	-8
121	03_77P_009	NRSC		CH_580	5086	WB	Brahmaputra		China	97	104	106	100	-8
122	02_62F_019	NRSC	144G	NP_12	5039	WB	Ganga	Karnal	Nepal	59	56	64	59	-8
123	01_61C_023	NRSC		CH_51	4350	WB	Indus	Indus	China	616	672	622	599	-8
124	03_82G_045	NRSC		CH_806	4523	WB	Brahmaputra		China	68	73	74	69	-8
125	01_61F_002	NRSC		CH_59	5279	WB	Indus	Indus	China	58	63	54	50	-8
126	01_43P_002	NRSC		JK_167	669	WB	Indus	Ravi	India	54	58	59	55	-8
127	02_71H_021	NRSC	76G	CH_141	4463	GL	Ganga	Trisuli	China	44	-	48	40	-8

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
128	01_61C_021	NRSC		CH_49	4349	WB	Indus	Indus	China	1099	1147	1195	1071	-8
129	01_43J_020	NRSC		JK_98	1584	WB	Indus	Jhelum	India	170	185	168	164	-8
130	02_71P_029	NRSC	43G	CH_217	5045	GL	Ganga	Arun Kosi	China	94	76	102	82	-8
131	03_78E_006	NRSC		CH_604	4572	WB	Brahmaputra		China	60	65	59	56	-8
132	03_82G_035	NRSC		CH_796	4386	WB	Brahmaputra		China	80	80	88	74	-9
133	02_71L_003	NRSC		CH_158	5324	WB	Ganga	Arun Kosi	China	252	276	273	267	-9
134	03_82K_018	NRSC		CH_874	4168	WB	Brahmaputra		China	160	175	65	92	-9
135	03_77L_003	NRSC		CH_521	4434	WB	Brahmaputra		China	3743	4113	4016	4022	-9
136	02_71H_035	NRSC		CH_155	4366	WB	Ganga	Sun Kosi	China	43	-	47	41	-9
137	03_92A_006	NRSC		AP_204	1178	WB	Brahmaputra	Luhit	India	75	82	80	78	-9
138	03_91H_025	NRSC		CH_1190	3741	WB	Brahmaputra	Luhit	China	83	85	91	61	-9
139	03_77L_029	NRSC		CH_545	5451	GL	Brahmaputra	Kuri Chu	China	49	-	54	43	-9
140	03_71C_005	NRSC		CH_398	5551	GL	Brahmaputra		China	53	58	56	54	-9

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
141	03_77P_004	NRSC		CH_575	4452	WB	Brahmaputra		China	194	205	216	205	-10
142	03_83A_012	NRSC		AP_77	4287	WB	Brahmaputra	Dangme Chu	India	54	60	39	46	-10
143	03_77L_027	NRSC		CH_543	4531	WB	Brahmaputra	Kuri Chu	China	170	188	173	168	-10
144	03_82E_004	NRSC		CH_722	5049	WB	Brahmaputra		China	43	48	48	46	-10
145	01_61C_014	NRSC		CH_42	4279	WB	Indus	Indus	China	279	305	311	298	-10
146	03_82E_007	NRSC		CH_725	5043	WB	Brahmaputra		China	61	68	68	65	-10
147	01_43N_032	NRSC		JK_159	3595	WB	Indus	Jhelum	India	55	-	61	50	-10
148	01_53E_001	NRSC		HP_12	921	WB	Indus	Beas	India	97	70	109	95	-11
149	02_62K_010	NRSC		NP_28	2975	WB	Ganga	Karnal	Nepal	939	1054	1048	1026	-11
150	03_82K_009	NRSC		CH_865	4168	WB	Brahmaputra		China	97	109	60	82	-11
151	03_77L_035	NRSC		BH_14	5486	GL	Brahmaputra		Bhutan	63	71	49	52	-11
152	03_82G_009	NRSC		CH_770	4580	WB	Brahmaputra		China	41	-	46	46	-11
153	01_42H_003	NRSC		JK_3	3854	WB	Indus	Gilgit	India	106	119	109	101	-11

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
154	02_71P_015	NRSC		CH_203	4153	WB	Ganga	Arun Kosi	China	944	1031	1059	950	-11
155	03_71G_008	NRSC		CH_417	5187	WB	Brahmaputra		China	55	62	60	59	-11
156	03_77C_006	NRSC		CH_460	4514	WB	Brahmaputra		China	90	101	93	91	-11
157	03_78I_056	NRSC		BH_137	4794	WB	Brahmaputra	Manas Chu &Mang de Chu	Bhutan	74	84	46	57	-12
158	03_77H_012	NRSC		CH_483	4723	GL	Brahmaputra		China	71	81	80	76	-12
159	01_52I_003	NRSC		JK_195	5159	WB	Indus	Shyok	India	185	186	211	169	-12
160	03_82B_002	NRSC		CH_628	4906	WB	Brahmaputra		China	390	449	436	422	-13
161	02_71H_015	NRSC		CH_135	5367	GL	Ganga	Arun Kosi	China	469	540	537	524	-13
162	03_62J_016	NRSC		CH_288	5303	GL	Brahmaputra		China	47	-	54	44	-13
163	03_77B_002	NRSC		CH_453	5019	WB	Brahmaputra		China	215	248	210	206	-13
164	03_77H_013	NRSC		CH_484	4950	GL	Brahmaputra		China	45	-	52	43	-13
165	01_43J_007	NRSC	6I	JK_85	3708	WB	Indus	Jhelum	India	89	92	102	92	-13

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
166	02_53O_005	NRSC		UK_8	239	WB	Ganga	Ramganga	India	1100	1284	1263	1160	-14
167	03_77L_011	NRSC		CH_527	4533	WB	Brahmaputra		China	1100	1282	1200	1150	-14
168	03_77P_017	NRSC		CH_588	4751	WB	Brahmaputra	Dangme Chu	China	2032	2357	2097	2184	-14
169	02_72I_002	NRSC	645G	NP_58	4854	GL	Ganga	Sun Kosi	Nepal	56	65	60	59	-14
170	03_82G_062	NRSC		CH_823	4925	WB	Brahmaputra		China	50	-	58	54	-14
171	03_77B_001	NRSC		CH_452	5039	WB	Brahmaputra		China	49	57	43	44	-14
172	01_52G_003	NRSC		JK_191	4533	WB	Indus	Indus	India	1367	1609	1315	1335	-15
173	03_91H_067	NRSC		AP_185	3791	WB	Brahmaputra	Luhit	India	40	-	44	47	-15
174	01_43E_006	NRSC		JK_30	4186	WB	Indus	Gilgit	India	64	75	66	66	-15
175	03_91C_046	NRSC		AP_92	3353	WB	Brahmaputra	Dibang	India	51	60	43	46	-15
176	03_71O_010	NRSC		CH_446	4296	WB	Brahmaputra		China	869	850	1017	920	-15
177	02_53P_003	NRSC		UK_11	207	WB	Ganga	Ramganga	India	962	1138	842	844	-15
178	03_78E_019	NRSC		CH_611	5022	GL	Brahmaputra		China	53	60	62	58	-15

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
179	03_77P_020	NRSC		CH_591	4649	WB	Brahmaputra	Kuri Chu	China	49	58	45	50	-16
180	01_62F_010	NRSC	9I	CH_101	5250	GL	Indus	Satluj	China	56	-	67	53	-16
181	03_62N_022	NRSC		CH_339	4599	WB	Brahmaputra		China	162	193	194	187	-16
182	03_62O_002	NRSC		CH_347	4587	WB	Brahmaputra		China	41	47	49	42	-16
183	03_62O_043	NRSC		CH_388	5285	WB	Brahmaputra		China	70	83	80	73	-16
184	03_77H_001	NRSC		CH_476	4275	WB	Brahmaputra		China	433	521	353	361	-17
185	03_62N_004	NRSC		CH_321	5168	WB	Brahmaputra		China	764	899	925	900	-17
186	03_82K_006	NRSC		CH_862	4523	WB	Brahmaputra		China	40	48	40	44	-17
187	03_82G_019	NRSC		CH_780	4460	WB	Brahmaputra		China	48	58	40	47	-17
188	03_82G_024	NRSC		CH_785	4647	WB	Brahmaputra		China	90	108	78	76	-17
189	03_77K_009	NRSC		CH_511	3937	WB	Brahmaputra		China	57	67	69	67	-17
190	03_82C_016	NRSC		CH_671	4679	WB	Brahmaputra		China	45	54	50	52	-17
191	03_91C_052	NRSC		CH_1085	4591	WB	Brahmaputra	Luhit	China	31	-	34	38	-18

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
192	03_77J_003	NRSC		CH_499	5039	WB	Brahmaputra		China	75	91	85	84	-18
193	01_52J_005	NRSC		JK_201	5430	WB	Indus	Shyok	India	36	-	44	37	-18
194	03_82K_020	NRSC		CH_876	4364	WB	Brahmaputra		China	70	85	48	54	-18
195	02_71D_008	NRSC		NP_49	639	WB	Ganga	Trisuli	Nepal	85	104	102	98	-18
196	03_78A_001	NRSC/SDC	/High Risk	SK_9	5371	GL	Brahmaputra	Teesta	India	181	162	149	222	-18
197	03_71K_009	NRSC		CH_432	4750	WB	Brahmaputra		China	209	258	218	193	-19
198	03_82K_060	NRSC		CH_916	4316	WB	Brahmaputra		China	80	99	71	68	-19
199	03_71G_011	NRSC		CH_420	4619	WB	Brahmaputra		China	1189	1236	1461	1318	-19
200	01_43J_021	NRSC		JK_99	1582	WB	Indus	Jhelum	India	1051	1305	992	1028	-19
201	03_77L_007	NRSC		CH_523	4510	WB	Brahmaputra		China	1287	1582	1380	1402	-19
202	02_72I_007	NRSC	785G	NP_62	4540	GL	Ganga	Sun Kosi	Nepal	57	-	70	67	-19
203	03_82K_068	NRSC		CH_924	4320	WB	Brahmaputra		China	44	55	54	50	-20
204	03_82J_018	NRSC		CH_848	3913	GL	Brahmaputra		China	78	94	97	92	-20

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
205	03_91H_029	NRSC		CH_1194	3325	WB	Brahmaputra	Luhit	China	39	-	49	37	-20
206	03_71G_014	NRSC		CH_423	4606	WB	Brahmaputra		China	178	139	222	181	-20
207	02_53K_002	NRSC		UK_2	260	WB	Ganga	Ramganga	India	1182	1481	1000	918	-20
208	02_72E_001	NRSC		NP_57	1554	WB	Ganga	Baghmati	Nepal	135	165	168	153	-20
209	03_77H_004	NRSC		CH_479	4428	WB	Brahmaputra		China	165	205	149	150	-20
210	01_52D_001	NRSC		HP_1	780	WB	Indus	Ravi	India	664	819	838	768	-21
211	03_77L_032	NRSC		CH_547	4669	GL	Brahmaputra	Kuri Chu	China	87	111	80	82	-22
212	03_71G_013	NRSC		CH_422	4543	WB	Brahmaputra		China	212	228	277	250	-23
213	03_77P_013	NRSC		CH_584	5155	WB	Brahmaputra		China	49	64	52	48	-23
214	03_91C_033	NRSC		CH_1079	4278	GL	Brahmaputra		China	146	190	177	161	-23
215	03_78A_003	NRSC/SDC	Very High Risk	SK_11	4977	GL	Brahmaputra	Teesta	India	57	-	74	57	-23
216	01_52O_005	NRSC		CH_8	4358	WB	Indus	Indus	China	630	829	792	757	-24
217	01_61D_002	NRSC		CH_54	4313	WB	Indus	Indus	China	1263	1654	1562	1461	-24

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
218	03_82G_017	NRSC		CH_778	4437	WB	Brahmaputra		China	45	59	51	50	-24
219	01_43E_023	NRSC		JK_47	4155	WB	Indus	Gilgit	India	73	96	83	80	-24
220	03_77P_006	NRSC		CH_577	4616	WB	Brahmaputra		China	4413	5796	5293	4301	-24
221	03_62N_009	NRSC		CH_326	5241	WB	Brahmaputra		China	220	289	292	280	-25
222	03_78A_018	NRSC		CH_598	4880	WB	Brahmaputra	Amo Chu	China	40	53	17	30	-25
223	03_77P_021	NRSC		CH_592	4749	GL	Brahmaputra	Dangme Chu	China	47	64	45	47	-27
224	03_71G_009	NRSC		CH_418	5032	WB	Brahmaputra		China	114	155	156	148	-27
225	03_71O_002	NRSC		CH_438	4909	WB	Brahmaputra		China	36	-	49	44	-27
226	02_71P_035	NRSC		CH_223	5146	WB	Ganga	Arun Kosi	China	78	108	98	98	-28
227	01_42H_005	NRSC		JK_5	2237	WB	Indus	Gilgit	India	52	72	60	54	-28
228	01_52L_003	NRSC		JK_227	4985	WB	Indus	Indus	India	488	680	573	594	-28
229	03_91D_081	NRSC		CH_1136	3356	WB	Brahmaputra	Luhit	China	311	436	312	247	-29
230	02_77D_003	NRSC		CH_258	4364	WB	Ganga	Arun Kosi	China	95	102	82	133	-29

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
231	03_62N_003	NRSC		CH_320	5208	WB	Brahmaputra		China	32	-	46	44	-30
232	01_61G_001	NRSC		CH_62	4973	WB	Indus	Indus	China	56	81	71	71	-31
233	03_77P_018	NRSC		CH_589	4707	WB	Brahmaputra	Dangme Chu	China	106	153	129	131	-31
234	03_71G_010	NRSC		CH_419	4491	WB	Brahmaputra		China	210	310	262	259	-32
235	02_71P_016	NRSC		CH_204	4182	WB	Ganga	Arun Kosi	China	101	151	139	124	-33
236	03_82O_042	NRSC		AP_49	3093	WB	Brahmaputra	Dibang	India	29	-	43	36	-33
237	02_71P_018	NRSC		CH_206	4199	WB	Ganga	Arun Kosi	China	55	54	82	64	-33
238	02_71L_034	NRSC	89G	CH_188	5095	GL	Ganga	Sun Kosi	China	46	-	69	55	-33
239	01_61C_015	NRSC		CH_43	4280	WB	Indus	Indus	China	548	777	832	770	-34
240	01_61D_003	NRSC		CH_55	4453	WB	Indus	Indus	China	41	64	62	50	-36
241	03_77P_016	NRSC		CH_587	4749	WB	Brahmaputra	Dangme Chu	China	164	262	224	227	-37
242	02_62B_001	NRSC		CH_106	5216	WB	Ganga	Karnal	China	28	42	45	40	-38
243	03_71C_010	NRSC		CH_403	4561	WB	Brahmaputra		China	33	-	54	42	-39

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
244	03_77P_012	NRSC		CH_583	4975	WB	Brahmaputra		China	44	73	61	56	-40
245	02_77D_004	NRSC		CH_259	4378	WB	Ganga	Arun Kosi	China	574	1013	802	740	-43
246	02_63M_002	NRSC		NP_41	112	WB	Ganga	Rapti	Nepal	83	148	107	119	-44
247	01_61G_003	NRSC		CH_64	4864	WB	Indus	Indus	China	42	80	58	64	-48
248	02_77D_001	NRSC		CH_256	4423	WB	Ganga	Arun Kosi	China	2506	4849	3677	3583	-48
249	03_77H_007	NRSC		CH_481	4424	WB	Brahmaputra		China	378	823	737	670	-54
250	01_62B_001	NRSC		CH_73	4526	WB	Indus	Satluj	China	206	472	301	316	-56
251	03_82D_010	NRSC		CH_716	5043	WB	Brahmaputra	Dangme Chu	China	26	70	49	57	-63
252	03_62O_028	NRSC		CH_373	4577	WB	Brahmaputra		China	231	902	644	635	-74

G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability
-Unobservable (as per NRSC), Ø indicates small rivulet/first order stream

TABLE 5: GL&WBS HAVING WATER SPREAD GREATER THAN 50 HA WITH NO ANALYSIS OF CHANGE IN WATER SPREAD AREA

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
1	01_52L_008	NRSC		CH_1	3873	WB	Indus	Satluj	China	#	32	101	78	#
2	03_78I_048	NRSC		BH_129	4169	WB	Brahmaputra	Manas Chu & Mangde Chu	Bhutan	#	52	32	38	#
3	02_72I_014	NRSC	6G	NP_67	4574	GL	Ganga	Sun Kosi	Nepal	#	149	164	163	#
4	01_61D_001	NRSC		CH_53	5593	WB	Indus	Indus	China	#	81	76	66	#
5	03_82F_010	NRSC		CH_735	5030	GL	Brahmaputra		China	17	-	-	-	#
6	03_77P_005	NRSC		CH_576	4619	WB	Brahmaputra		China	#	110	95	97	#
7	01_52E_001	NRSC		JK_188	5116	GL	Indus	Shyok	India	#	48	4	19	#
8	01_61C_004	NRSC			4495	WB			China	#	-	-	-	#
9	03_82J_024	NRSC		CH_854	4362	WB	Brahmaputra		China	#	-	25	38	#
10	02_72I_027	NRSC	41G	NP_80	4977	GL	Ganga	Sun Kosi	Nepal	#	78	73	73	#
11	03_82J_020	NRSC		CH_850	3852	WB	Brahmaputra		China	#	439	348	383	#

Sl. No.	Lake ID	Inventory Developed by	Rank of Vulnerability	UID	Elevation (m)	Lake Type	Basin	River	Country	Area of September - 2023 (ha)	Area of Base Year of 2011 (ha)	Area of Last 5 Years (ha)	Area of Last 10 years (ha)	Max Change in Area (%)
12	03_77L_008	NRSC		CH_524	4448	WB	Brahmaputra		China	#	76	80	79	#

G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability,
- Unobservable (as per NRSC) , Ø indicates small rivulet/first order stream, # indicates frozen/ dried lakes

TABLE 6: WATER SPREAD AREA OF CRITICAL GLS IDENTIFIED BY NDMA THROUGH SWISS DEVELOPMENT AGENCY (SDC) FOR INDIAN HIMALAYAN REGION

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	State	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
1	98	SDC	High Risk	GL	4103	JK	India	3	#	#
2	976	SDC	High Risk/15I	GL	4314	JK	India	17	#	#
3	2147	SDC	Medium Risk	GL	5688	UK	India	#	0.5	#
4	2299	SDC	Very High Risk	GL	4490	UK	India	#	#	#
5	1805	SDC	Very High Risk/81I	GL	4775	HP	India	5	1.67	199
6	958	SDC	Very High Risk	GL	4103	JK	India	8	3.33	140
7	173	SDC	Medium Risk	GL	5150	JK	India	10	7	43
8	298	SDC	Very High Risk	GL	4508	SK	India	6	4.67	28
9	2207	SDC	Very High Risk	GL	4707	UK	India	13	10.33	26
10	227	SDC	Very High Risk	GL	5176	SK	India	65	53	23
11	27	SDC	Very High Risk	GL	3775	JK	India	15	13	15
12	963	SDC	Medium Risk	GL	3725	JK	India	30	26.67	12

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnera bility	Lake Type	Elevation	State	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
13	1360	SDC	Very High Risk	GL	4667	JK	India	10	9	11
14	312	SDC	Medium Risk	GL	5137	SK	India	9	8.33	8
15	260	SDC	Medium Risk	GL	5253	SK	India	42	39.67	6
16	1847	SDC	Very High Risk	GL	4570	HP	India	12	12	0
17	1936	SDC	Very High Risk/321I	GL	4606	HP	India	3	3	0
18	1998	SDC	Very High Risk	GL	3857	HP	India	1	1	0
19	295	SDC	Very High Risk	GL	4850	SK	India	6	6	0
20	1032	SDC	Very High Risk	GL	4007	JK	India	1	1	0
21	129	SDC	Very High Risk	GL	4895	AP	India	9	9	0
22	2108	SDC	Very High Risk/347G	GL	5587	UK	India	18	18	0
23	1774	SDC	Very High Risk	GL	4593	HP	India	7	7	0
24	182	SDC	Very High Risk	GL	4304	JK	India	8	8.5	-6
25	951	SDC	Very High Risk	GL	3762	JK	India	17	18.33	-7

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnera bility	Lake Type	Elevation	State	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
26	1037	SDC	Medium Risk/27I	GL	3603	JK	India	36	39	-8
27	569	SDC	Medium Risk	GL	5450	SK	India	28	32	-13
28	515	SDC	Medium Risk	GL	5063	SK	India	7	8	-13
29	931	SDC	Very High Risk	GL	4082	JK	India	16	18.67	-14
30	938	SDC	Very High Risk	GL	3683	JK	India	18	21	-14
31	180	SDC	Very High Risk	GL	4442	JK	India	7	8.33	-16
32	292	SDC	Medium Risk	GL	5577	SK	India	3	3.67	-18
33	2031	SDC	Very High Risk	GL	4702	HP	India	9	12	-25
34	599	SDC	Very High Risk	GL	4251	SK	India	6	8	-25
35	345	SDC	Medium Risk	GL	5108	SK	India	14	18.67	-25
36	237	SDC	Very Low Risk	GL	5322	SK	India	5	7	-29
37	993	SDC	Very High Risk	GL	4148	JK	India	5	9	-44
38	293	SDC	Very High Risk	GL	5048	SK	India	1	2	-50

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnera bility	Lake Type	Elevation	State	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
39	1014	SDC	Very High Risk	GL	3989	JK	India	2	4.33	-54
40	256	SDC	High risk	GL	4615	SK	India	7	16.33	-57

G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability

- Unobservable (as per NRSC) , # indicates frozen/ dried lakes

 - Lakes with Maximum change in Area > 40%

 - Lakes with Maximum change in Area – 0% to 40%

TABLE 7: WATER SPREAD AREA OF GLS HAVING SIZE 10 HA TO 50 HA PREPARED BY NRSC IN 2009

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
1	03_91C_036	NRSC		GL	4298		Brahmaputra	china	55	#	#
2	03_91D_096	NRSC		GL	3794	Luhit	Brahmaputra	china	39	#	#
3	01_52P_004	NRSC		GL	5470	Indus	Indus	china	0	#	#
4	01_53M_003	NRSC	110I	GL	5511	Indus	Indus	china	12	#	#
5	03_82F_011	NRSC		GL	4720		Brahmaputra	china	12	#	#
6	03_82O_004	NRSC		GL	4148		Brahmaputra	china	25	#	#
7	03_91C_013	NRSC		GL	4925		Brahmaputra	china	14	#	#
8	03_91H_073	NRSC		GL	4481	Luhit	Brahmaputra	India	19	#	#
9	03_77L_040	NRSC		GL	4515	Puna Tsang Chu	Brahmaputra	Bhutan	#	#	#
10	02_71P_017	NRSC		GL	4194	Arun Kosi	Ganga	china	#	60	#
11	02_62B_007	NRSC		GL	4839	Sarda	Ganga	India	#	0	#
12	03_82N_032	NRSC		GL	4384		Brahmaputra	china	#	41	#
13	02_71H_018	NRSC	123G	GL	4787	Trisuli	Ganga	china	#	31.33	#

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
14	02_72I_028	NRSC	146G	GL	4408	Sun Kosi	Ganga	Nepal	#	25.33	#
15	02_72M_011	NRSC	86G	GL	4865	Arun Kosi	Ganga	Nepal	#	42.5	#
16	02_72I_009	NRSC		GL	5292	Sun Kosi	Ganga	Nepal	#	17.33	#
17	03_77L_054	NRSC		GL	4717	Puna Tsang Chu	Brahmaputra	Bhutan	6	2	200
18	02_62F_007	NRSC		GL	5179	Karnal	Ganga	Nepal	28	10.67	162
19	03_91C_023	NRSC		GL	4811	Luhit	Brahmaputra	china	31	16.67	86
20	03_77L_053	NRSC		GL	4793	Kuri Chu	Brahmaputra	china	50	27	85
21	02_72I_017	NRSC	49G	GL	5018	Sun Kosi	Ganga	Nepal	15	8.33	80
22	03_77H_005	NRSC		GL	5113		Brahmaputra	china	35	21	67
23	03_78I_004	NRSC		GL	5194	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	42	26.67	57
24	03_91D_098	NRSC		GL	4197	Luhit	Brahmaputra	china	18	11.5	57
25	03_82F_021	NRSC		GL	4487		Brahmaputra	china	12	7.67	56
26	03_78I_001	NRSC		GL	5129	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	11	7.33	50

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
27	03_78I_028	NRSC		GL	4792	Manas Chu &Mangde Chu	Brahmaputra	Bhutan	30	20	50
28	03_82F_023	NRSC		GL	4354		Brahmaputra	china	12	8	50
29	03_77K_003	NRSC		GL	5303		Brahmaputra	china	15	10	50
30	02_62B_005	NRSC	580G	GL	4314	Sarda	Ganga	India	12	8	50
31	02_71L_035	NRSC	657G	GL	5091	Sun Kosi	Ganga	Nepal	19	13	46
32	02_62J_002	NRSC		GL	5021	Karnal	Ganga	Nepal	17	11.67	46
33	01_62B_002	NRSC	381I	GL	4998	Satluj	Indus	china	28	19.33	45
34	02_71P_044	NRSC	557G	GL	5555	Arun Kosi	Ganga	china	12	8.33	44
35	02_71P_033	NRSC		GL	4888	Arun Kosi	Ganga	china	28	19.67	42
36	03_82J_003	NRSC		GL	4161		Brahmaputra	china	33	23.33	41
37	03_78A_035	NRSC		GL	4998	Teesta	Brahmaputra	India	12	8.67	38
38	01_53M_002	NRSC	142I	GL	5468	Indus	Indus	china	10	7.33	36
39	02_62F_008	NRSC		GL	5620	Karnal	Ganga	Nepal	11	8.33	32
40	03_77H_019	NRSC		GL	4804	Puna Tsang Chu	Brahmaputra	Bhutan	10	7.67	30
41	01_62F_009	NRSC	387I	GL	5712	Satluj	Indus	china	26	20.33	28

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
42	03_78E_001	NRSC		GL	5157	Puna Tsang Chu	Brahmaputra	Bhutan	37	29	28
43	03_91D_099	NRSC		GL	4406	Luhit	Brahmaputra	china	34	26.5	28
44	03_91C_043	NRSC		GL	4429		Brahmaputra	china	13	10.33	26
45	02_71H_034	NRSC	320G	GL	4745	Trisuli	Ganga	Nepal	21	16.67	26
46	03_71D_003	NRSC		GL	5362		Brahmaputra	china	10	8	25
47	03_91D_075	NRSC		GL	4274	Dibang	Brahmaputra	India	26	21	24
48	03_78E_003	NRSC		GL	5152	Puna Tsang Chu	Brahmaputra	Bhutan	27	22	23
49	03_78I_026	NRSC		GL	5233	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	18	14.67	23
50	03_71C_004	NRSC		GL	5575		Brahmaputra	china	15	12.33	22
51	03_77L_020	NRSC		GL	4682	Kuri Chu	Brahmaputra	china	11	9	22
52	02_71P_030	NRSC	166G	GL	5329	Arun Kosi	Ganga	china	26	21.33	22
53	02_62B_004	NRSC	232G	GL	4918	Sarda	Ganga	India	26	21.33	22

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
54	02_71P_023	NRSC	124G	GL	5235	Arun Kosi	Ganga	china	23	19	21
55	03_77D_006	NRSC/SDC	/Very High Risk	GL	5084	Teesta	Brahmaputra	India	27	22.33	21
56	03_82G_003	NRSC		GL	4936		Brahmaputra	china	21	17.33	21
57	03_82F_025	NRSC		GL	4253		Brahmaputra	china	10	8.33	20
58	02_71H_014	NRSC		GL	4458	Trisuli	Ganga	china	10	8.33	20
59	02_78A_002	NRSC	668G	GL	5397	Arun Kosi	Ganga	china	16	13.33	20
60	03_77H_029	NRSC		GL	5049	Puna Tsang Chu	Brahmaputra	Bhutan	26	21.67	20
61	02_72I_024	NRSC	358G	GL	5165	Sun Kosi	Ganga	Nepal	34	28.67	19
62	03_71P_002	NRSC		GL	5537		Brahmaputra	china	17	14.33	19
63	02_71L_029	NRSC	747G	GL	5237	Arun Kosi	Ganga	china	54	45.33	19
64	03_82G_007	NRSC		GL	4994		Brahmaputra	china	13	11	18
65	02_62F_009	NRSC	536G	GL	5586	Karnal	Ganga	china	11	9.33	18
66	03_62O_031	NRSC		GL	5381		Brahmaputra	china	37	31.33	18
67	03_91C_008	NRSC		GL	4899		Brahmaputra	china	24	20.5	17
68	02_62J_001	NRSC		GL	5182	Karnal	Ganga	Nepal	7	6	17

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnera bility	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
69	02_71P_026	NRSC	322G	GL	5340	Arun Kosi	Ganga	china	16	13.67	17
70	02_71L_019	NRSC	323G	GL	5378	Sun Kosi	Ganga	china	14	12	17
71	03_77L_073	NRSC		GL	5166	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	14	12	17
72	03_78A_010	NRSC		GL	5078	Teesta	Brahmaputra	India	39	33.33	17
73	02_71L_016	NRSC	570G	GL	5345	Sun Kosi	Ganga	china	11	9.5	16
74	02_62K_003	NRSC	546G	GL	4571	Karnal	Ganga	Nepal	45	38.67	16
75	03_91C_016	NRSC		GL	4813		Brahmaputra	china	15	13	15
76	03_82F_013	NRSC		GL	4761		Brahmaputra	china	10	8.67	15
77	03_78A_027	NRSC/SDC	/Very High Risk	GL	4888	Teesta	Brahmaputra	India	35	30.67	14
78	03_78I_054	NRSC		GL	5138	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	17	15	13
79	02_71P_031	NRSC	141G	GL	5395	Arun Kosi	Ganga	china	20	17.67	13
80	02_71P_034	NRSC	726G	GL	5259	Arun Kosi	Ganga	china	26	23	13

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
81	03_78I_025	NRSC		GL	5194	Puna Tsang Chu	Brahmaputra	Bhutan	15	13.33	13
82	02_71D_002	NRSC		GL	4063	Trisuli	Ganga	Nepal	6	5.33	13
83	03_91C_012	NRSC		GL	4663		Brahmaputra	china	19	17	12
84	03_78E_008	NRSC		GL	5045	Puna Tsang Chu	Brahmaputra	Bhutan	12	10.67	12
85	03_71D_001	NRSC		GL	5454		Brahmaputra	china	19	17	12
86	03_77L_075	NRSC		GL	4718	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	20	18	11
87	02_71P_041	NRSC	768G	GL	5064	Arun Kosi	Ganga	china	20	18	11
88	03_71C_006	NRSC		GL	5482		Brahmaputra	china	21	19	11
89	02_71H_016	NRSC		GL	5305	Arun Kosi	Ganga	china	28	25.33	11
90	02_71H_032	NRSC		GL	5116	Sun Kosi	Ganga	china	28	25.33	11
91	01_62E_007	NRSC	437I	GL	5641	Satluj	Indus	china	15	13.5	11
92	02_71P_001	NRSC		GL	5498	Arun Kosi	Ganga	china	20	18	11

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
93	03_77L_071	NRSC		GL	5228	Puna Tsang Chu	Brahmaputra	Bhutan	23	21	10
94	03_62J_009	NRSC		GL	5624		Brahmaputra	china	26	23.67	10
95	03_91C_026	NRSC		GL	4305	Dibang	Brahmaputra	India	27	24.5	10
96	03_78I_040	NRSC		GL	5167	Puna Tsang Chu	Brahmaputra	Bhutan	22	20	10
97	03_77L_022	NRSC		GL	4810	Kuri Chu	Brahmaputra	china	11	10	10
98	02_71L_008	NRSC	457G	GL	5577	Sun Kosi	Ganga	china	39	35.33	10
99	01_52L_006	NRSC	306I	GL	5727	Indus	Indus	India	11	10	10
100	03_78I_057	NRSC		GL	5060	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	49	44.67	10
101	03_82F_026	NRSC		GL	4607		Brahmaputra	china	11	10	10
102	03_91C_015	NRSC		GL	4421		Brahmaputra	china	23	21	10
103	03_78M_013	NRSC		GL	4232	Kuri Chu	Brahmaputra	Bhutan	6	5.5	9
104	03_82N_016	NRSC		GL	5017		Brahmaputra	china	4	3.67	9

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
105	03_78I_020	NRSC		GL	5331	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	21	19.33	9
106	03_78E_025	NRSC		GL	4341	Puna Tsang Chu	Brahmaputra	Bhutan	16	14.67	9
107	03_78I_067	NRSC		GL	4918	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	23	21.33	8
108	02_72I_031	NRSC	14G	GL	4777	Sun Kosi	Ganga	Nepal	30	27.67	8
109	02_71L_030	NRSC	242G	GL	5242	Sun Kosi	Ganga	china	23	21.33	8
110	03_78I_036	NRSC		GL	5028	Puna Tsang Chu	Brahmaputra	Bhutan	13	12	8
111	03_82L_006	NRSC		GL	4147		Brahmaputra	china	14	13	8
112	03_77L_065	NRSC		GL	5025	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	16	15	7
113	03_78I_038	NRSC		GL	5143	Puna Tsang Chu	Brahmaputra	Bhutan	10	9.33	7
114	02_71H_019	NRSC	92G	GL	4674	Trisuli	Ganga	china	16	15	7

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnera bility	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
116	03_78I_015	NRSC		GL	5116	Puna Tsang Chu	Brahmaputra	Bhutan	16	15	7
117	02_78A_001	NRSC	498G	GL	5201	Arun Kosi	Ganga	china	24	22.33	7
118	03_77L_063	NRSC		GL	5183	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	19	18	6
119	03_78A_019	NRSC/SDC	/Very High Risk	GL	4809	Teesta	Brahmaputra	India	12	11.33	6
120	02_71H_009	NRSC		GL	5448	Arun Kosi	Ganga	china	24	22.67	6
121	03_77L_025	NRSC		GL	5370	Kuri Chu	Brahmaputra	china	17	16	6
122	02_53N_001	NRSC	250G	GL	4688	Ganga	Ganga	India	24	22.67	6
123	03_78A_026	NRSC		GL	4736	Teesta	Brahmaputra	India	12	11.33	6
124	02_72M_014	NRSC	47G	GL	5217	Tamur Kosi	Ganga	Nepal	23	21.67	6
125	03_77H_025	NRSC		GL	4312	Puna Tsang Chu	Brahmaputra	Bhutan	25	23.67	6
126	03_77H_021	NRSC		GL	5135	Puna Tsang Chu	Brahmaputra	Bhutan	14	13.33	5

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
127	02_71L_009	NRSC	520G	GL	5546	Arun Kosi	Ganga	china	33	31.33	5
128	03_62O_035	NRSC		GL	5256		Brahmaputra	china	33	31.33	5
129	03_82F_001	NRSC		GL	4822		Brahmaputra	china	15	14.33	5
130	03_77L_038	NRSC		GL	5521		Brahmaputra	china	14	13.33	5
131	03_82J_001	NRSC		GL	4775		Brahmaputra	china	29	27.67	5
132	02_72I_016	NRSC	739G	GL	5231	Sun Kosi	Ganga	Nepal	30	28.67	5
133	02_71P_036	NRSC	54G	GL	5121	Arun Kosi	Ganga	china	39	37.67	4
134	02_71P_048	NRSC	283G	GL	5094	Arun Kosi	Ganga	china	19	18.33	4
135	03_83A_004	NRSC		GL	5109	Dangme Chu	Brahmaputra	India	17	16.33	4
136	03_82F_024	NRSC		GL	4197		Brahmaputra	china	20	19.33	3
137	02_71H_013	NRSC	172G	GL	4446	Trisuli	Ganga	china	17	16.5	3
138	02_62O_002	NRSC	410G	GL	5495	Kali Gandak	Ganga	Nepal	22	21.33	3
139	03_62K_005	NRSC		GL	4999		Brahmaputra	china	23	22.33	3
140	02_71L_031	NRSC	52G	GL	4682	Sun Kosi	Ganga	china	31	30	3
141	03_71P_004	NRSC		GL	5637		Brahmaputra	china	11	10.67	3

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
142	03_78A_031	NRSC		GL	4305	Teesta	Brahmaputra	India	12	11.67	3
143	02_62O_004	NRSC	299G	GL	5529	Kali Gandak	Ganga	Nepal	21	20.33	3
144	02_62G_003	NRSC	589G	GL	3603	Karnal	Ganga	Nepal	34	33	3
145	03_91C_019	NRSC		GL	3858		Brahmaputra	china	51	49.67	3
146	02_71L_007	NRSC	572G	GL	5576	Arun Kosi	Ganga	china	13	12.67	3
147	03_82L_004	NRSC		GL	4441		Brahmaputra	china	12	11.67	3
148	02_71L_018	NRSC	651G	GL	5377	Sun Kosi	Ganga	china	15	14.67	2
149	02_72I_006	NRSC		GL	4741	Sun Kosi	Ganga	Nepal	18	17.67	2
150	02_72I_013	NRSC	694G	GL	5497	Sun Kosi	Ganga	Nepal	18	17.67	2
151	03_62K_006	NRSC		GL	5101		Brahmaputra	china	26	25.5	2
152	02_71P_032	NRSC	564G	GL	5190	Arun Kosi	Ganga	china	19	18.67	2
153	03_62J_028	NRSC		GL	5603		Brahmaputra	china	43	42.33	2
154	03_77K_002	NRSC		GL	5154		Brahmaputra	china	38	37.33	2
155	02_71H_020	NRSC		GL	5354	Arun Kosi	Ganga	china	74	72.67	2
156	03_91C_035	NRSC		GL	4283		Brahmaputra	china	56	55	2

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
157	03_91H_034	NRSC		GL	4629	Luhit	Brahmaputra	china	14	13.67	2
158	01_43J_003	NRSC		GL	3954	Jhelum	Indus	India	14	13.67	2
159	03_77L_039	NRSC		GL	5457	Kuri Chu	Brahmaputra	china	43	42.33	2
160	02_62F_015	NRSC	59G	GL	5359	Karnal	Ganga	china	29	28.67	1
161	02_71D_003	NRSC	67G	GL	3668	Trisuli	Ganga	Nepal	26	25.67	1
162	01_52H_003	NRSC		GL	4165	Chenab	Indus	India	163	160.67	1
163	03_77L_058	NRSC		GL	5016	Kuri Chu	Brahmaputra	china	33	32.67	1
164	03_91C_002	NRSC		GL	4691		Brahmaputra	china	34	33.5	1
165	02_77D_011	NRSC	393G	GL	5305	Arun Kosi	Ganga	china	46	45.67	1
166	03_77L_062	NRSC		GL	5295	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	48	47.33	1
167	03_82N_029	NRSC		GL	4492		Brahmaputra	china	43	42.5	1
168	03_77L_045	NRSC		GL	5224	Kuri Chu	Brahmaputra	china	33	32.67	1
169	03_62J_025	NRSC		GL	5362		Brahmaputra	china	21	21	0
170	03_77H_015	NRSC		GL	4801		Brahmaputra	china	14	14	0
171	02_72I_010	NRSC	263G	GL	5125	Sun Kosi	Ganga	Nepal	14	14	0

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
172	03_78I_064	NRSC		GL	4976	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	20	20	0
173	03_91C_010	NRSC		GL	4712		Brahmaputra	china	21	21	0
174	03_78I_058	NRSC		GL	5041	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	26	26	0
175	02_62F_011	NRSC	362G	GL	5524	Karnal	Ganga	china	26	26	0
176	02_62F_013	NRSC	256G	GL	5252	Karnal	Ganga	china	45	45	0
177	03_62J_004	NRSC		GL	5556		Brahmaputra	china	15	15	0
178	03_82O_002	NRSC		GL	4198		Brahmaputra	china	19	19	0
179	03_62K_007	NRSC		GL	4911		Brahmaputra	china	29	29	0
180	02_71L_027	NRSC	433G	GL	5234	Sun Kosi	Ganga	china	18	18	0
181	03_77H_009	NRSC		GL	5150		Brahmaputra	china	15	15	0
182	02_72M_003	NRSC	823G	GL	5608	Arun Kosi	Ganga	china	18	18	0
183	02_71P_024	NRSC	576G	GL	5273	Arun Kosi	Ganga	china	22	22	0

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
184	03_62J_024	NRSC		GL	5548		Brahmaputra	china	20	20	0
185	03_77H_026	NRSC		GL	5233		Brahmaputra	china	10	10	0
186	01_52L_007	NRSC	184I	GL	5498	Indus	Indus	India	33	33	0
187	01_52A_004	NRSC/SDC	/Very High Risk	GL	4619	Shyok	Indus	India	10	10	0
188	01_42H_002	NRSC	162I	GL	2763	Gilgit	Indus	India	16	16	0
189	02_78A_007	NRSC	429G	GL	5618	Tamur Kosi	Ganga	Nepal	15	15	0
190	02_62F_006	NRSC		GL	5444	Karnal	Ganga	Nepal	15	15	0
191	03_77H_010	NRSC		GL	5518		Brahmaputra	china	14	14	0
192	03_77J_005	NRSC		GL	5766		Brahmaputra	china	13	13	0
193	03_77H_027	NRSC		GL	4927		Brahmaputra	china	22	22	0
194	03_78A_011	NRSC		GL	5168	Amo Chu	Brahmaputra	china	16	16	0
195	03_82N_015	NRSC		GL	5090		Brahmaputra	china	5	5	0
196	03_91C_006	NRSC		GL	5057		Brahmaputra	china	4	4	0
197	03_77J_001	NRSC		GL	5354		Brahmaputra	china	24	24.33	-1
198	03_62K_011	NRSC		GL	5136		Brahmaputra	china	45	45.33	-1

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
199	02_77D_010	NRSC	590G	GL	5127	Arun Kosi	Ganga	china	37	37.33	-1
200	03_78I_005	NRSC		GL	5338	Puna Tsang Chu	Brahmaputra	Bhutan	44	44.67	-1
201	03_77H_017	NRSC		GL	4537	Puna Tsang Chu	Brahmaputra	Bhutan	25	25.33	-1
202	01_52C_002	NRSC	46I	GL	4092	Chenab	Indus	India	43	43.33	-1
203	03_62J_010	NRSC		GL	5571		Brahmaputra	china	24	24.33	-1
204	03_77H_024	NRSC		GL	4369	Puna Tsang Chu	Brahmaputra	Bhutan	46	46.33	-1
205	02_72I_015	NRSC	814G	GL	5416	Sun Kosi	Ganga	Nepal	42	42.67	-2
206	03_82G_004	NRSC		GL	4498		Brahmaputra	china	30	30.67	-2
207	03_77H_022	NRSC		GL	4936		Brahmaputra	china	19	19.33	-2
208	02_62P_001	NRSC	258G	GL	4472	Bheri	Ganga	Nepal	44	45	-2
209	03_82F_012	NRSC		GL	4454		Brahmaputra	china	19	19.33	-2
210	03_71D_002	NRSC		GL	5574		Brahmaputra	china	35	35.67	-2
211	02_62B_006	NRSC	495G	GL	5106	Karnal	Ganga	china	41	42	-2
212	02_71H_022	NRSC		GL	5735	Arun Kosi	Ganga	china	19	19.33	-2

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
213	02_71H_036	NRSC	195G	GL	5024	Trisuli	Ganga	Nepal	13	13.33	-2
214	02_71H_006	NRSC		GL	5167	Arun Kosi	Ganga	china	34	34.67	-2
215	02_72I_012	NRSC	113G	GL	4409	Sun Kosi	Ganga	Nepal	40	40.67	-2
216	03_82O_001	NRSC		GL	4348		Brahmaputra	china	41	41.67	-2
217	03_82K_109	NRSC		GL	4356		Brahmaputra	china	20	20.67	-3
218	01_53I_002	NRSC/SDC	26I/Very High Risk	GL	4273	Satluj	Indus	India	29	30	-3
219	03_83A_001	NRSC		GL	5018		Brahmaputra	china	46	47.33	-3
220	03_62K_010	NRSC		GL	5181		Brahmaputra	china	66	68.33	-3
221	03_62J_027	NRSC		GL	4781		Brahmaputra	china	22	22.67	-3
222	03_91C_071	NRSC		GL	4339	Dibang	Brahmaputra	china	33	34	-3
223	01_52B_010	NRSC/SDC	75I/Medium Risk	GL	5122	Indus	Indus	India	16	16.5	-3
224	02_78A_008	NRSC	199G	GL	5032	Tamur Kosi	Ganga	Nepal	24	24.67	-3
225	03_82F_009	NRSC		GL	4712		Brahmaputra	china	23	23.67	-3
226	01_52B_012	NRSC	129I	GL	5137	Indus	Indus	India	14	14.5	-3
227	03_77L_034	NRSC		GL	5500	Kuri Chu	Brahmaputra	china	21	21.67	-3

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
228	03_91C_003	NRSC		GL	4703		Brahmaputra	china	30	31	-3
229	02_71P_020	NRSC		GL	4200	Arun Kosi	Ganga	china	114	118.5	-4
230	03_82L_007	NRSC		GL	4163	Ding	Brahmaputra	India	15	15.67	-4
231	03_91H_006	NRSC		GL	4620	Luhit	Brahmaputra	china	16	16.67	-4
232	03_62K_013	NRSC		GL	5101		Brahmaputra	china	45	47	-4
233	01_61B_002	NRSC	345I	GL	5722	Indus	Indus	china	25	26	-4
234	03_83A_003	NRSC		GL	5188	Dangme Chu	Brahmaputra	India	79	82	-4
235	02_78A_006	NRSC	676G	GL	5743	Arun Kosi	Ganga	china	16	16.67	-4
236	01_62B_003	NRSC	86I	GL	5288	Satluj	Indus	India	12	12.5	-4
237	03_78I_019	NRSC		GL	5224	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	23	24	-4
238	03_78A_007	NRSC/SDC	/Very High Risk	GL	4977	Teesta	Brahmaputra	India	16	16.67	-4
239	03_71P_003	NRSC		GL	5360		Brahmaputra	china	27	28.33	-5
240	03_77L_028	NRSC		GL	4632	Kuri Chu	Brahmaputra	china	12	12.67	-5

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
241	03_91G_005	NRSC		GL	5170	Luhit	Brahmaputra	china	10	10.5	-5
242	03_62O_045	NRSC		GL	5566		Brahmaputra	china	9	9.5	-5
243	02_72I_001	NRSC	198G	GL	5333	Sun Kosi	Ganga	Nepal	12	12.67	-5
244	03_77L_078	NRSC		GL	5296	Puna Tsang Chu	Brahmaputra	Bhutan	14	14.67	-5
245	01_62E_016	NRSC	270I	GL	5528	Satluj	Indus	china	19	20	-5
246	02_71H_031	NRSC	78G	GL	5268	Sun Kosi	Ganga	china	26	27.33	-5
247	03_78I_046	NRSC		GL	5168	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	21	22	-5
248	02_62G_002	NRSC	599G	GL	4822	Karnal	Ganga	Nepal	18	19	-5
249	02_71H_005	NRSC		GL	5010	Arun Kosi	Ganga	china	71	75	-5
250	03_77L_036	NRSC		GL	5810	Kuri Chu	Brahmaputra	china	22	23.33	-6
251	02_72I_005	NRSC	483G	GL	4715	Sun Kosi	Ganga	Nepal	23	24.5	-6
252	03_78A_023	NRSC		GL	4547	Teesta	Brahmaputra	India	27	28.67	-6
253	03_77L_079	NRSC		GL	5386	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	33	35	-6

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
254	03_62J_003	NRSC		GL	5553		Brahmaputra	china	10	10.67	-6
255	02_71L_021	NRSC	438G	GL	5373	Sun Kosi	Ganga	china	16	17	-6
256	02_71L_033	NRSC	408G	GL	5369	Sun Kosi	Ganga	Nepal	14	15	-7
257	03_78E_011	NRSC		GL	4952	Puna Tsang Chu	Brahmaputra	Bhutan	18	19.33	-7
258	02_71L_005	NRSC	282G	GL	5524	Arun Kosi	Ganga	china	17	18.33	-7
259	02_62K_011	NRSC	612G	GL	4673	Bheri	Ganga	Nepal	27	29	-7
260	03_82N_001	NRSC		GL	5055		Brahmaputra	china	32	34.33	-7
261	02_71H_023	NRSC		GL	5595	Arun Kosi	Ganga	china	55	59.33	-7
262	02_71P_042	NRSC	654G	GL	5524	Arun Kosi	Ganga	china	19	20.33	-7
263	03_77L_048	NRSC		GL	4792	Kuri Chu	Brahmaputra	china	24	25.67	-7
264	03_77L_023	NRSC		GL	5489	Kuri Chu	Brahmaputra	china	28	30	-7
265	03_78A_002	NRSC/SDC	/Very High Risk	GL	4952	Teesta	Brahmaputra	India	37	40	-8
266	03_62K_008	NRSC		GL	4968		Brahmaputra	china	41	44.33	-8
267	02_71L_024	NRSC	245G	GL	5263	Sun Kosi	Ganga	china	24	26	-8
268	03_83A_005	NRSC		GL	4994	Dangme Chu	Brahmaputra	India	11	12	-8

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
269	01_52C_001	NRSC	11I	GL	4394	Shingo (Indus)	Indus	India	51	55.33	-8
270	03_77L_057	NRSC		GL	4897	Kuri Chu	Brahmaputra	china	41	44.33	-8
271	03_77L_074	NRSC		GL	5324	Manas Chu & MangdeChu	Brahmaputra	Bhutan	16	17.33	-8
272	01_53M_001	NRSC	33I	GL	5576	Indus	Indus	china	17	18.5	-8
273	03_71C_001	NRSC		GL	5543		Brahmaputra	china	7	7.67	-9
274	02_71L_025	NRSC	154G	GL	5357	Sun Kosi	Ganga	china	17	18.67	-9
275	03_77L_047	NRSC		GL	4364	Puna Tsang Chu	Brahmaputra	Bhutan	39	42.67	-9
276	03_78E_027	NRSC		GL	4808	Puna Tsang Chu	Brahmaputra	Bhutan	17	18.67	-9
277	02_72M_004	NRSC	336G	GL	5293	Arun Kosi	Ganga	china	47	51.67	-9
278	03_82N_037	NRSC		GL	4691		Brahmaputra	china	10	11	-9
279	03_91H_033	NRSC		GL	4389	Luhit	Brahmaputra	china	10	11	-9
280	02_71P_039	NRSC	396G	GL	5489	Arun Kosi	Ganga	china	17	18.67	-9

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
281	03_78A_008	NRSC		GL	4998	Teesta	Brahmaputra	India	17	18.67	-9
282	02_71L_020	NRSC	156G	GL	5348	Sun Kosi	Ganga	china	25	27.67	-10
283	03_82L_008	NRSC		GL	4342		Brahmaputra	china	9	10	-10
284	03_77L_082	NRSC		GL	5019	Puna Tsang Chu	Brahmaputra	Bhutan	12	13.33	-10
285	03_78I_011	NRSC		GL	5239	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	20	22.33	-10
286	02_71L_017	NRSC	179G	GL	5211	Sun Kosi	Ganga	china	12	13.33	-10
287	02_72M_001	NRSC	737G	GL	5675	Arun Kosi	Ganga	china	6	6.67	-10
288	03_91H_015	NRSC		GL	4553	Luhit	Brahmaputra	china	9	10	-10
289	03_91C_007	NRSC		GL	4817		Brahmaputra	china	9	10	-10
290	03_91G_003	NRSC		GL	5018	Luhit	Brahmaputra	china	18	20	-10
291	02_72M_012	NRSC	69G	GL	4932	Tamur Kosi	Ganga	Nepal	15	16.67	-10
292	02_71H_004	NRSC		GL	5239	Arun Kosi	Ganga	china	22	24.67	-11
293	03_91G_001	NRSC		GL	5147		Brahmaputra	china	8	9	-11

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
294	02_71L_022	NRSC	715G	GL	5554	Arun Kosi	Ganga	china	24	27	-11
295	03_78A_012	NRSC		GL	5130	Teesta	Brahmaputra	India	26	29.33	-11
296	02_71H_025	NRSC	464G	GL	5303	Trisuli	Ganga	china	17	19	-11
297	03_82C_011	NRSC		GL	5242		Brahmaputra	china	13	14.67	-11
298	03_78A_016	NRSC		GL	5451	Teesta	Brahmaputra	India	10	11.33	-12
299	01_62F_007	NRSC		GL	5344	Satluj	Indus	china	19	21.67	-12
300	02_72M_008	NRSC	376G	GL	4722	Tamur Kosi	Ganga	Nepal	33	37.67	-12
301	02_72I_022	NRSC	287G	GL	5344	Sun Kosi	Ganga	Nepal	27	30.67	-12
302	03_82O_003	NRSC		GL	4180		Brahmaputra	china	13	15	-13
303	02_71L_014	NRSC	240G	GL	5364	Sun Kosi	Ganga	china	14	16	-13
304	01_62J_004	NRSC	446I	GL	5504	Satluj	Indus	china	9	10.33	-13
305	03_82N_025	NRSC		GL	4764		Brahmaputra	china	21	24	-13
306	03_91H_008	NRSC		GL	4755	Luhit	Brahmaputra	china	40	46	-13
307	03_78I_065	NRSC		GL	4668	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	11	12.67	-13
308	03_91C_021	NRSC		GL	4093		Brahmaputra	china	26	30	-13

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
309	03_91G_009	NRSC		GL	4637	Luhit	Brahmaputra	china	15	17.33	-13
310	03_78A_020	NRSC		GL	5219	Teesta	Brahmaputra	India	13	15	-13
311	02_71H_024	NRSC	155G	GL	4890	Trisuli	Ganga	china	23	26.33	-13
312	03_91D_070	NRSC		GL	4126	Luhit	Brahmaputra	china	14	16	-13
313	03_77L_056	NRSC		GL	4963	Kuri Chu	Brahmaputra	china	12	14	-14
314	03_91G_004	NRSC		GL	5262	Luhit	Brahmaputra	china	26	30.33	-14
315	02_71L_015	NRSC	284G	GL	5261	Sun Kosi	Ganga	china	19	22.33	-15
316	03_82J_006	NRSC		GL	3657		Brahmaputra	china	48	56.33	-15
317	02_62O_005	NRSC	609G	GL	5450	Kali Gandak	Ganga	Nepal	11	13	-15
318	03_78A_030	NRSC		GL	4447	Amo Chu	Brahmaputra	china	13	15.33	-15
319	03_77L_049	NRSC		GL	4716	Puna Tsang Chu	Brahmaputra	Bhutan	29	34	-15
320	03_77L_019	NRSC		GL	5681		Brahmaputra	china	12	14.33	-16
321	02_71H_010	NRSC		GL	5481	Arun Kosi	Ganga	china	21	25	-16

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
322	03_78I_006	NRSC		GL	5158	Puna Tsang Chu	Brahmaputra	Bhutan	18	21.33	-16
323	03_91H_036	NRSC		GL	4457	Luhit	Brahmaputra	china	18	21.33	-16
324	02_71H_030	NRSC	598G	GL	5411	Sun Kosi	Ganga	china	11	13.33	-17
325	02_72I_008	NRSC	99G	GL	5040	Sun Kosi	Ganga		30	36	-17
326	03_82N_034	NRSC		GL	4181		Brahmaputra	china	12	14.5	-17
327	03_78A_015	NRSC/SDC	/Medium Risk	GL	4970	Teesta	Brahmaputra	India	8	9.67	-17
328	03_83A_007	NRSC		GL	5028	Jia Brali	Brahmaputra	India	13	15.67	-17
329	02_71D_001	NRSC		GL	4111	Trisuli	Ganga	Nepal	18	22	-18
330	02_72I_026	NRSC	112G	GL	5188	Sun Kosi	Ganga	Nepal	24	29.33	-18
331	03_78I_043	NRSC		GL	5000	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	17	20.67	-18
332	02_62F_016	NRSC	591G	GL	5359	Karnal	Ganga	Nepal	12	14.67	-18
333	03_91C_004	NRSC		GL	4137		Brahmaputra	china	15	18.33	-18
334	03_77L_031	NRSC		GL	4698	Kuri Chu	Brahmaputra	china	15	18.33	-18
335	02_72I_019	NRSC	757G	GL	5510	Sun Kosi	Ganga	Nepal	14	17	-18

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnera bility	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
336	03_78I_009	NRSC		GL	5108	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	21	26	-19
337	03_77D_007	NRSC/SDC	/Very High Risk	GL	5015	Teesta	Brahmaputra	India	20	24.67	-19
338	03_77H_016	NRSC		GL	4929		Brahmaputra	china	33	40.67	-19
339	02_71H_011	NRSC	775G	GL	4509	Trisuli	Ganga	china	23	28.5	-19
340	03_78E_018	NRSC		GL	5164		Brahmaputra	china	15	18.5	-19
341	02_71L_012	NRSC	96G	GL	5570	Sun Kosi	Ganga	china	17	21	-19
342	02_62K_001	NRSC	329G	GL	4404	Karnal	Ganga	Nepal	23	28.33	-19
343	01_52A_003	NRSC		GL	4586	Shyok	Indus	India	17	21.33	-20
344	03_78I_008	NRSC		GL	5252	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	10	12.67	-21
345	03_82N_008	NRSC		GL	4546		Brahmaputra	china	27	34.33	-21
346	02_72I_021	NRSC	764G	GL	5276	Sun Kosi	Ganga	Nepal	16	20.33	-21
347	03_71C_002	NRSC		GL	5663		Brahmaputra	china	7	9	-22
348	03_78E_016	NRSC		GL	5004		Brahmaputra	china	13	16.67	-22

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
349	03_78I_014	NRSC		GL	5087	Puna Tsang Chu	Brahmaputra	Bhutan	15	19.33	-22
350	03_91D_082	NRSC		GL	4550	Luhit	Brahmaputra	china	27	34.67	-22
351	02_72I_020	NRSC	763G	GL	5436	Sun Kosi	Ganga	Nepal	16	20.67	-23
352	03_91G_007	NRSC		GL	4785	Luhit	Brahmaputra	china	9	11.67	-23
353	02_62F_010	NRSC		GL	5502	Karnal	Ganga	Nepal	8	10.33	-23
354	03_82F_018	NRSC		GL	4554		Brahmaputra	china	13	17	-24
355	03_77L_061	NRSC		GL	5038	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	13	17.33	-25
356	03_91H_003	NRSC		GL	4439	Luhit	Brahmaputra	china	10	13.33	-25
357	02_72M_013	NRSC	518G	GL	5233	Arun Kosi	Ganga	Nepal	9	12	-25
358	03_62J_020	NRSC		GL	5603		Brahmaputra	china	11	14.67	-25
359	02_72M_015	NRSC	115G	GL	4969	Tamur Kosi	Ganga	Nepal	10	13.33	-25
360	02_71P_038	NRSC	586G	GL	5483	Arun Kosi	Ganga	china	20	27	-26
361	03_78A_025	NRSC		GL	4888	Amo Chu	Brahmaputra	china	7	9.5	-26

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
362	01_52A_002	NRSC		GL	4537	Shyok	Indus	India	15	20.67	-27
363	03_91G_006	NRSC		GL	5028	Luhit	Brahmaputra	china	16	22.33	-28
364	03_82N_011	NRSC		GL	4997		Brahmaputra	china	15	21	-29
365	02_77D_005	NRSC	499G	GL	5738	Arun Kosi	Ganga	china	5	7	-29
366	03_91H_001	NRSC		GL	4429	Luhit	Brahmaputra	china	12	17	-29
367	03_77J_002	NRSC		GL	5254		Brahmaputra	china	7	10	-30
368	03_78I_022	NRSC		GL	5048	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	10	14.33	-30
369	03_82F_005	NRSC		GL	4762		Brahmaputra	china	31	44	-30
370	03_78A_006	NRSC		GL	5004	Teesta	Brahmaputra	India	10	14.33	-30
371	03_78A_004	NRSC		GL	5456		Brahmaputra	china	16	23.33	-31
372	02_62K_006	NRSC	70G	GL	5053	Karnal	Ganga	Nepal	20	30	-33
373	03_78I_072	NRSC		GL	4788	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	8	12.33	-35
374	02_72I_018	NRSC	776G	GL	5370	Sun Kosi	Ganga	Nepal	22	33.67	-35

Sl.No.	Lake ID	Inventory Developed by	Rank of Vulnerability	Lake Type	Elevation	River	Basin	Country	Area of September-2023 (ha)	Base Area (Avg area of year 2022) (ha)	Max Change in Area (%)
375	02_71P_046	NRSC	317G	GL	4898	Arun Kosi	Ganga	china	18	28	-36
376	03_91H_007	NRSC		GL	4635	Luhit	Brahmaputra	china	20	31.5	-37
377	03_82N_031	NRSC		GL	4409		Brahmaputra	china	10	16	-38
378	03_82N_035	NRSC		GL	4479		Brahmaputra	china	11	20.5	-46
379	03_78A_017	NRSC		GL	5545	Teesta	Brahmaputra	India	14	27.5	-49
380	03_78I_037	NRSC		GL	5159	Manas Chu & Mangde Chu	Brahmaputra	Bhutan	7	15	-53
381	03_82N_018	NRSC		GL	4333		Brahmaputra	china	4	10	-60
382	03_77H_032	NRSC		GL	5056		Brahmaputra	china	3	9	-67
383	02_62F_014	NRSC	236G	GL	5481	Karnal	Ganga	china	1	6.67	-85
384	02_72I_030	NRSC	480G	GL	4624	Sun Kosi	Ganga	Nepal	0	7.67	-100
385	03_78A_005	NRSC		GL	5201	Teesta	Brahmaputra	India	0	12.67	-100

G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability,

- Unobservable (as per NRSC) , Ø indicates small rivulet/first order stream, #indicates frozen/ dried lakes

- Lakes with Maximum change in Area > 40%

- Lakes with Maximum change in Area – 0% to 40%