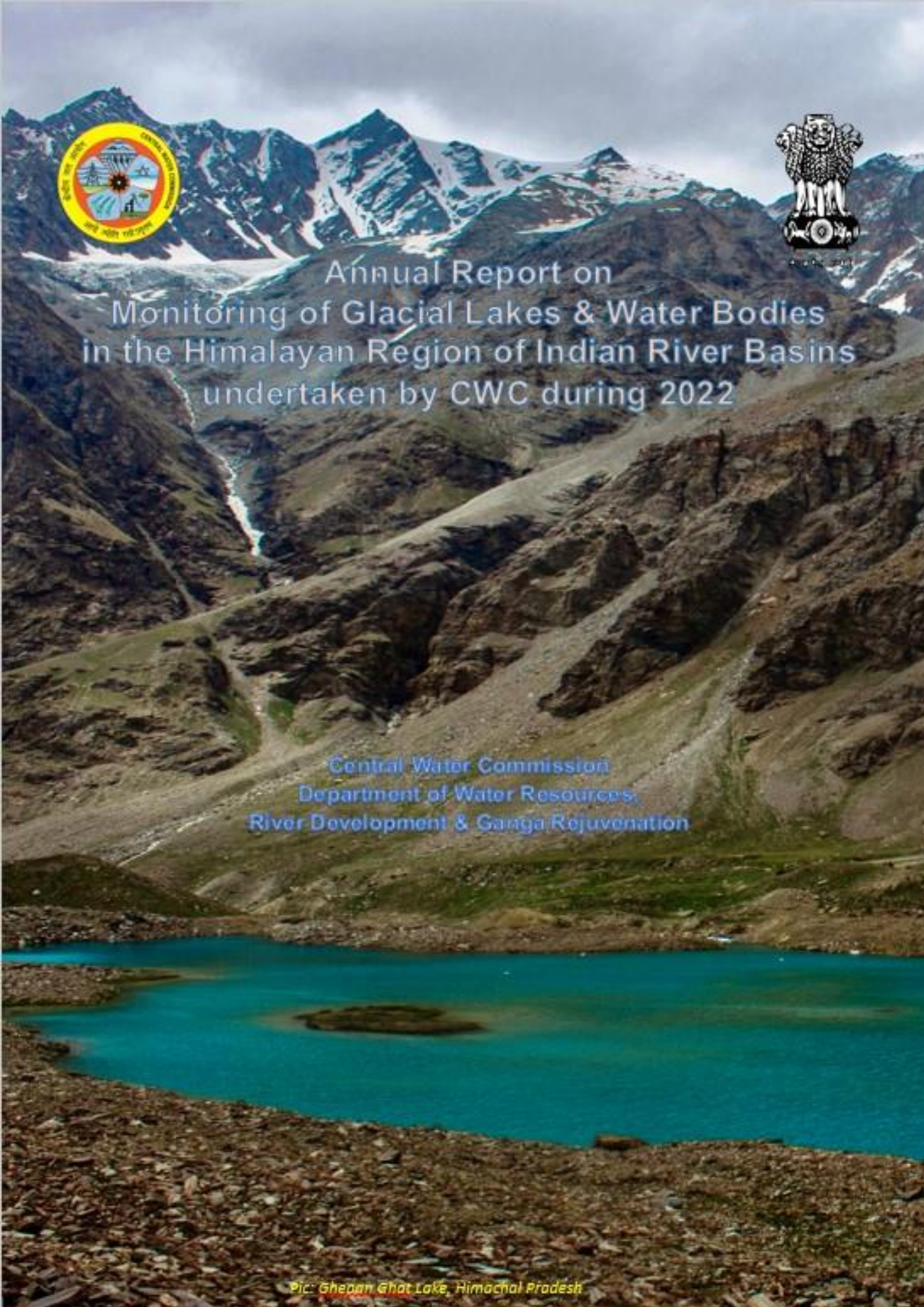
Annual Report on Monitoring of Glacial Lakes & Water Bodies in the Himalayan Region of Indian River Basins undertaken by CWC during 2022

Central Water Commission
Department of Water Resources,
River Development & Ganga Rejuvenation



Pic: Gheogan Ghat Lake, Himachal Pradesh

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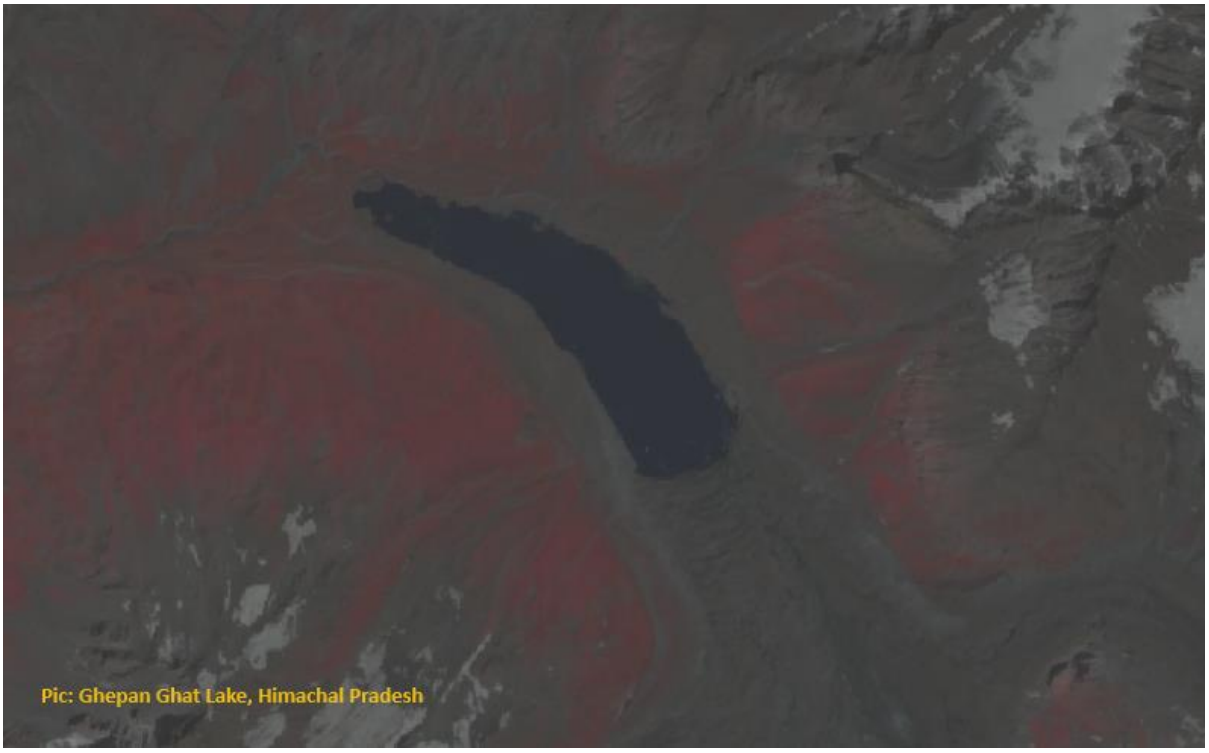

Morphology & Climate Change Directorate
Planning & Development Organisation
Central Water Commission
Department of Water Resources, River Development & Ganga Rejuvenation
Ministry of Jal Shakti, New Delhi

Document Control Sheet

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3.	Title	**Annual Report on Monitoring of Glacial Lakes & Water Bodies in the Himalayan Region of Indian River Basins undertaken by CWC during 2022**			
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10.	Abstract (with Keywords): CWC monitors 902 Glacial Lakes & Water Bodies in the Himalayan region and Tibetan region, draining to India on monthly basis – June to Oct, every year, using Remote Sensing Data. The summary of monthly monitoring of 902 Glacial Lakes & Water Bodies during 2022 is presented in the report. Keywords: Glacial Lake, Water Bodies, Indian Himalayan Region, Satellite Images, Remote Sensing, Google Earth Engine.				

FOREWORD

The Himalayas are an abode to many a glacier and glacial lake with vast tracts being snow-bound. Rapid accumulation of water in the glacial lakes, particularly in those adjacent to receding glaciers, can lead to a sudden breach of their unstable moraine dams. The resultant high peak flood discharges from the dam failure called Glacial Lake Outburst Flood (GLOF) can bring catastrophic effects on the stretch of river downstream of the lakes. Hence, monitoring of these glacial lakes is imperative in management and mitigation of disaster risk and climate change impact assessment.

Monitoring of Glacial Lakes/Water Bodies (GLs/WBs) by remote sensing technique was taken up by CWC, DoWR, RD&DR, Ministry of Jal Shakti, during XI Plan period in the year 2009 under DWRIS Plan scheme. Monitoring of 477 GLs/WBs (from Glacial Lake Inventory 2011)of size greater than 50 ha for change in water spread area, was undertaken during monsoon months (June to October) every year since 2011. The monitoring was initiated in NRSC in the year 2011 which continued till 2015. CWC then took up monitoring independently from 2016 onwards where the work was carried out by downloading and manually digitising Advanced Wide Field Sensor (AWiFS) Satellite imageries procured/ downloaded from NRSC and processing them in Arc GIS and this continued till 2021. From 2022, monitoring of an additional 425 GLs with sizes 10ha to 50ha was also included. This comprised 385 Glacial Lakes with water spread area between 10-50 Ha sourced from Glacial Lake Inventory 2011 and 40 high priority Glacial Lakes identified by Swiss Agency for Development and Cooperation (SDC) for NDMA. CWC is presently monitoring a total of 902 GLs/WBs. High resolution multi-spectral and microwave (SAR) images of foreign satellites at 10 m resolution have been processed and analysed in open-source cloud computing platform, Google Earth Engine, using automatic algorithm which CWC developed in-house. Visual inspections & manual digitisation were carried out to supplement the automatic algorithm to complete the task.

This Annual Monitoring Report 2022, prepared under the inspiration of Chairman,CWC, presents an abstract of the monthly monitoring reports of June to October 2022. The lake-wise details are systematically documented at State/UT level for the Indian region, whereas similar details for trans-boundary region have been documented separately.

The Report is a useful reference data for GLOF risk assessment and long-term climate impact analysis.

I hope that this document will be immensely beneficial to the Officers and Scientists of water related Departments of Govt. of India and State Governments, Environmental & Disaster Management Organisations and particularly to those who have a flair for the subject. Suggestions and feedback are always welcome for the improvement of the quality of future reports.

New Delhi
July, 2024

(P. Manroi Scott)
Member (River Management)
CWC

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ABBREVIATIONS	
AR	Arunachal Pradesh
CWC	Central Water Commission
DoWR, RD & GR	Department of Water Resources, River Development & Ganga Rejuvenation
DWRIS	Development of Water Resources Information System
GEE	Google Earth Engine
GL(s)	Glacial Lake(s)
GLOF	Glacial Lake Outburst Flood
FCC	False Color Composite
ha	Hectare
HP	Himachal Pradesh
J&K	Jammu & Kashmir
LAT	Latitude
LONG	Longitude
LU/LC	Land Use /Land Cover
NDWI	Normalized Difference Water Index
NDMA	National Disaster Management Authority
NIR	Near-Infrared
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(s)	Water Body(ies)

Executive Summary

The Himalayan Region (HR) is facing important challenges in 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.

Analysis of worldwide literature on the outburst of glacial lakes and the field and theoretical experience have led to the conclusion that it is not feasible to make a reliable prediction of a specific occurrence on the basis of our existing knowledge. As direct predictions cannot be made, there is an urgent need to monitor a careful selection of prioritized lakes on a regular basis. This should be carried out in collaboration with other institutions, both nationally and internationally.

The work of monitoring of Glacial Lakes/Water Bodies (GLs/WBs) using remote sensing technique was taken up by CWC, DoWR, RD&DR, Ministry of Jal Shakti, during XI Plan period in the year 2009 under DWRIS Plan scheme. The inventory of GLs/WBs was published in June, 2011 in association with National Remote Sensing Centre (NRSC), Hyderabad based on the satellite data of Advanced Wide Field Sensor (AWiFS) of the Indian Remote Sensing Satellite, Resourcesat-2 collected from May-Nov, 2009. This inventory is therefore hereafter referred as *Inventory of Glacial Lakes & Water Bodies (2011).* As per this inventory, there are 2028 GLs/WBs with size more than 10 ha in the Himalayan Region draining towards India. The country wise & basin wise details of the inventory are given in **Table ES.1.**

Table ES.1: Country wise & Basin wise Distribution of Glacial lakes and Water bodies above 10 Ha(in Nos.)

Country-wise Distribution					Basin-wise Distribution			
Country	**Glacial Lakes (>10 Ha)**	**Water Bodies (>10 Ha)**	**Total (>10 Ha)**		**Basin Name**	**Glacial Lakes**	**Water Bodies**	**Total**
India	60	448	508		Brahmaputra	294	1099	1393
Bhutan	77	124	201		Ganga	178	105	283
Nepal	57	45	102		Indus	31	321	352
China	309	904	1213		**Total**	**503**	**1525**	**2028**
Myanmar	-	4	4					
Total	**503**	**1525**	**2028**					

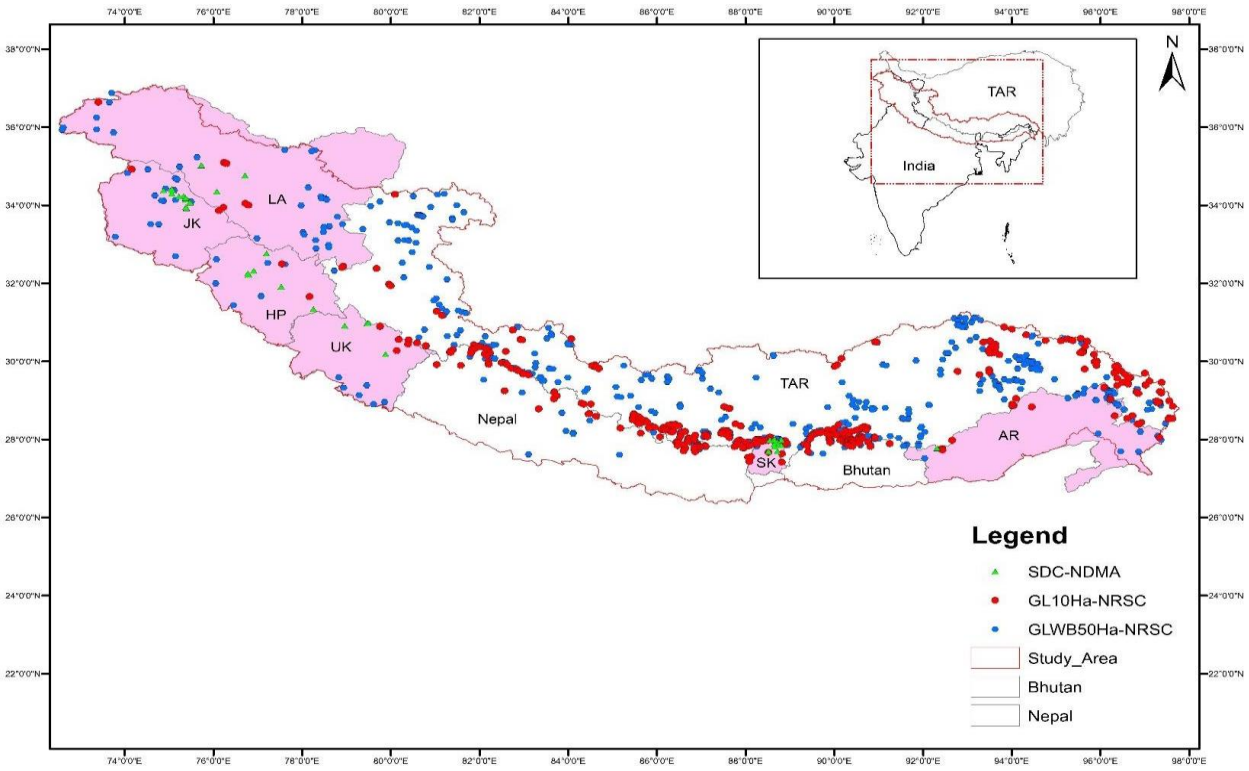
Monitoring of 477 GLs/WBs with size more than 50 ha, sourced from Glacial Lake Inventory 2011, for change in water spread area, was carried out during monsoon season (June to October) every year since 2011. The monitoring activity initiated in NRSC was continued till 2015. CWC has taken up monitoring during 2016 and the work was undertaken by downloading and manually digitising Advanced Wide Field Sensor (AWiFS) Satellite imageries procured/ downloaded from NRSC and processing them in Arc GIS. This continued till 2021. From 2022, monitoring of additional 425 GLs with sizes of 10ha to 50ha was also included. This includes 385 Glacial Lakes with water spread area between 10-50 Ha from Glacial Lake Inventory (2011) and 40 high priority Glacial Lakes identified by Swiss Agency for Development and Cooperation (SDC) for NDMA. Thus, currently CWC is monitoring a total of 902 GLs/WBs. High resolution multi-spectral and microwave (SAR) images of foreign satellites

at 10 m resolution have been processed and analysed in open-source cloud computing platform Google Earth Engine using automatic algorithm which has been developed in-house. Visual inspection & manual digitisation has been used to supplement the automatic algorithm to complete the task. The Monthly Monitoring Report is shared with all stakeholders through email for further necessary action. The reports are also e-published on CWC website for any time access by the concerned *(https://cwc.gov.in/glacial-lakeswater-bodies-himalayan-region)*. The abstract of 902 GL/WB is given in **Table ES.2.**

Table ES.2: Abstract of 902 GLs/WBs

Country/ Area	State/ Union Territory	No of Glacial Lakes					No of Water Bodies				Grand Total
		Indus Basin	Ganga Basin	Brahma-putra Basin	Total		Indus Basin	Ganga Basin	Brahma-putra Basin	Total	
India	Ladakh	15	0	0	15		26	0	0	26	41
	Jammu & Kashmir	15	0	0	15		16	0	0	16	31
	Himachal Pradesh	10	0	0	10		5	0	0	5	15
	Uttarakhand	0	9	0	9		0	6	0	6	15
	Sikkim	0	0	42	42		0	0	1	1	42
	Arunachal Pradesh	0	0	9	9		0	0	25	25	35
	Total	40	9	51	100		47	6	26	79	179
	India Total	100					79				179
Transboundary	China	12	110	187	309		49	19	191	259	568
	Bhutan	0	0	71	71		0	0	11	11	82
	Nepal	0	64	0	64		0	9	0	9	73
	Total	12	174	258	444		49	28	202	279	723
	Transboundary Total	444					279				723
Grand Total		544					358				902

Map of Study Area showing Glacial Lakes and Water Bodies being monitored by CWC



Limitations and Assumptions:

Limitations:

- Glacial lake identification can be done either using visual interpretation or automatic mapping methods. The automatic mapping procedures have limitations due to varying terrain conditions such as lakes situated in the shadow portions of mountains, presence of snow cover, cloud cover, lakes being partly frozen, etc. As lake water absorbs the incident radiation making it appear in darker tone and colour in the standard FCC of satellite data, similar response also prevails over shadow region of clouds or mountains on surface, which may lead to incorrect mapping. Moreover, a mountain shadow covering a lake partly/completely within its vicinity, also makes it difficult to accurately map the lake boundary.
- A few Glacial lakes could not be mapped owing to the constraints such as Glacial lakes being under frozen condition, presence of snow or cloud cover over the lakes, lakes under mountain shadow or lakes in dried up condition.

Assumptions:

- Inclusion or exclusion of water pixels near lake boundaries depending on more than or less than certain fraction of its area falling within the lake boundary.

This document presents the abstract of monthly monitoring data of 902 GL&WBs for the year 2022. The lakes are analysed monthly for change in water spread area with respect to area of Inventory 2009 and are categorized into 5 classes such as GLs & WBs showing

(i) increase in water spread area greater than 40%

(ii) increase in water spread area up to 40%

(iii) no change in water spread area

(iv) decrease in water spread area

(v) change detection could not be performed due to reasons such as frozen condition, dried up condition, cloud cover etc.

The number of lakes in each class has been identified for each month. The lakes showing an increase in water spread area greater than 40% have been identified as those requiring vigorous monitoring for disaster purpose.

Results of monthly monitoring Report and Conclusion:

Month	No of GLs/WBs monitored	GLs/WBs showing increase in area(Nos)	GLs/WBs showing decrease in area(Nos)	GLs/WBs showing no change in area(Nos)	GLs/WBs with change detection not performed(Nos)
June	902	339	103	15	445
July	902	231	312	275	84
August	902	305	419	105	73
September	902	363	458	61	20
October	902	322	508	45	27

- The total Inventory area of ***Glacial Lakes and Water Bodies*** was 5,21,115 Ha during the year 2011 which has increased to 5,57,346 Ha during the year 2022. There is a **6.95%** increase in area. *(Out of 902 GLs & WBs, only 838 GLs & WBs were considered for this interpretation. This includes 40 SDC Glacial lakes which have no inventory details as well as lakes which were not analysed during the year 2022.)*

- The total Inventory area of *Glacial Lakes* was 20,751 Ha during the year 2011 which has increased to 25,427 Ha during the year 2022. There is a **22.53%** increase in area. *(Out of 544 GLs, only 495 lakes were considered for this interpretation. This includes 40 SDC lakes which have no inventory details as well as lakes which were not analysed during the year 2022.*

- The total Inventory area of *Glacial Lakes within India* was 1,962 Ha during the year 2011 which has increased to 2,658 Ha during the year 2022. There is a **35.47%** increase in area. *(Out of 100GLs, only 59 lakes were considered for this interpretation. This includes 40 SDC lakes which have no inventory details as well as lakes which were not analysed during the year 2022.)*

- Most of the GLs & WBS exhibiting 40% or more increase in water spread area lie in transboundary region.

1. Introduction

1.1 Glacial Lakes and Water Bodies

A glacial lake is a body of water with origins from a glacier. It is formed when a glacier erodes the surface before melting and the melt water fills the resulting depression. The water in Glacial Lakes accumulates behind loose naturally formed 'glacial/moraine dams' made of ice, sand, pebbles and ice residue as the glaciers melt. Various types of lakes may have different levels of hazard potential depending upon many factors such as the nature of damming materials, position of the lake, 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 risk factors and triggering processes such as ice avalanches, debris flows, rock fall, earthquake or landslides reaching a lake strongly affect the risk of a lake outburst. Moraine-dammed lakes located at the snout of a glacier have a high probability of breaching with high hazard potential and can breach suddenly leading to catastrophic floods. Such outburst floods are known as Glacial Lake Outburst Flood (GLOF).

A water Body referred in this report is the body of water retained permanently due to obstruction created naturally or artificially but not directly associated with Glaciers.

1.2 Glacial Lakes in Indian Himalayan Region

The Indian Himalayan Region (IHR) contains the world's largest number of glaciers and snow outside the Polar Regions and are aptly called Third Pole of the world. It consist of three major river systems, ie, Indus, Ganga and Brahmaputra stretching over five countries viz. India, China, Nepal, Pakistan and Bhutan.

1.3 Inventory of Glacial Lakes & Water Bodies 2011

The work of monitoring of Glacial Lakes/Water Bodies (GLs/WBs) was taken up by CWC, DoWR, RD&DR, Ministry of Jal Shakti, during XI Plan period in the year 2009, under DWRIS Plan scheme. The inventory of glacial lakes and water bodies of the Himalayan region of Indian river basins published in June, 2011 was done in association with National Remote Sensing Centre (NRSC), Hyderabad based on the satellite data of Advanced Wide Field Sensor (AWiFS) of the Indian Remote Sensing Satellite, Resourcesat-2 collected from May to November, 2009. The inventory consisted of a total of 2028 glacial lakes and water bodies with water spread area greater than 10 Ha. The country-wise and basin-wise details of the Inventory are furnished in **Table No. 1.1** and **Table No. 1.2**

Table 1.1: Country-wise details of Glacial Lakes & Water Bodies of Inventory (2011)

Country	Glacial Lakes >10 Ha (Nos.)	Water Bodies >10 Ha (Nos.)	Total >10 Ha (Nos.)
India	60	448	508
Bhutan	77	124	201
Nepal	57	45	102
China	309	904	1213
Myanmar	-	4	4
Total	**503**	**1525**	**2028**

Table 1.2: Basin-wise details of Glacial Lakes & Water Bodies of Inventory (2011)

Basin Name	Glacial Lakes (Nos.)	Water Bodies (Nos.)	Total (Nos.)
Brahmaputra	294	1099	1393
Ganga	178	105	283
Indus	31	321	352
Total	**503**	**1525**	**2028**

1.4 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 from the inventory on monthly basis during June to October.
- To detect temporal changes in water spread area of Glacial Lakes & Water Bodies.
- To share the report with concerned stakeholders including National Disaster Management Authority / State Disaster Management Authority for suitable action.

1.5 Limitations and Assumption

Limitations

- Glacial lake identification can be done either using visual interpretation or automatic mapping methods. The automatic mapping procedures have limitations due to varying terrain conditions such as lakes being situated in the shadow portions of mountains, presence of snow cover, cloud cover, lakes being partly frozen, etc. As lake water absorbs the incident radiation making it appear in darker tone and colour in the standard FCC of satellite data, similar response also prevails over shadow region of clouds or mountains on surface, which may lead to incorrect mapping. Moreover, a mountain shadow covering a lake partly/completely within its vicinity, also makes it difficult to accurately map the lake boundary.

- A few Glacial lakes could not be mapped owing to the constraints such as they being under frozen condition, presence of snow or cloud cover over the lakes, lakes under mountain shadow or lakes in dried-up condition.

Assumptions:

- Inclusion or exclusion of water pixels near lake boundaries depending on more than or less than certain fraction of its area falling within the lake boundary.

2. Monitoring of Glacial Lakes and Water Bodies

2.1 Study Area

The present study area covers the Glacial Lakes & Water Bodies (GLs & WBs) lying in the region of Himalaya and TAR, that drain to India, based on 2011 Inventory of NRSC. The study area extends across the countries of India, Nepal, Bhutan and China.

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

(i) **477** Glacial Lakes/Water Bodies, with water spread area greater than 50Ha which have been sourced from the inventory of Glacial Lakes & Water Bodies in the Indian Himalayan region(2011) (Ref: NRSC Report No. NRSC-RS&GISAA-WRG-CWC-Lakes- May2011-TR255).

The state-wise and basin-wise details of the 477 GLs/WBs above 50 Ha are shown in **Table.2.1**

Table 2.1: State-wise and Basin-wise details of the 477 GLs/WBs above 50 Ha (Nos.)

Country/ Area	State/UT	Glacial Lake>50Ha				Water Body >50Ha				Grand Total
		Indus Basin	Ganga Basin	Brahma-putra Basin	Total	Indus Basin	Ganga Basin	Brahma-putra Basin	Total	
India	Ladakh	3	0	0	3	26	0	0	26	26
	Jammu & Kashmir	0	0	0	0	16	0	0	16	16
	Himachal Pradesh	2	0	0	2	5	0	0	5	7
	Uttarakhand	0	0	0	0	0	6	0	6	6
	Sikkim	0	0	10	10	0	0	1	1	11
	Arunachal Pradesh	0	0	0	0	0	0	25	25	25
	Total	5	0	10	15	47	6	26	79	94
	India Total	15				79				94
Transboundary	China	1	36	40	77	49	19	191	259	336
	Bhutan	0	0	15	15	0	0	11	11	26
	Nepal	0	12	0	12	0	9	0	9	21
	Total	1	48	55	104	49	28	202	279	383
	Total Transboundary	104				279				383
Grand Total		**Total Glacial Lakes = 119**				**Total Water Bodies = 358**				477

(ii) **385** Glacial Lakes, with spatial extent greater than 10 ha, have been taken from the inventory of Glacial Lakes & Water Bodies in the Indian Himalayan region(2011) (Ref: NRSC Report No. NRSC-RS&GISAA-WRG-CWC-Lakes-May2011-TR255).

(iii) **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.

This adds up to a total of **425 Glacial Lakes of water spread area between 10Ha and 50Ha.** The state-wise and basin-wise details of these lakes are shown in **Table No. 2.2.**

Table 2.2: State-wise and Basin-wise details of the 425 GLs/WBs with water spread area between 10Ha and 50 Ha

Country/Area	Glacial Lake of size 10Ha -50 Ha				Grand Total (Nos.)
	State/UT	Indus Basin (Nos.)	Ganga Basin (Nos.)	Brahmaputra Basin (Nos.)	
India	Ladakh	**12**	0	0	12
	Jammu & Kashmir	**15**	0	0	15
	Himachal Pradesh	**8**	0	0	8
	Uttarakhand	0	**9**	0	9
	Sikkim	0	0	**32**	32
	Arunachal Pradesh	0	0	**9**	9
	Total	35	9	41	85
	India Total	85			
Transboundary	China	**11**	**74**	**147**	232
	Bhutan	0	0	**56**	56
	Nepal	0	**52**	0	52
	Total	11	126	203	340
	Total Transboundary	340			
Grand Total		425			

Currently, a total of **902 Glacial Lakes and Water Bodies** are being monitored by CWC. Of these, 544 are Glacial Lakes and 358 are Water Bodies. The break-up of Glacial Lakes and Water Bodies is shown in **Figure 2.1**. The abstract of state-wise and basin-wise details of the 902 GLs & WBs being monitored by CWC on monthly basis are furnished in **Table no. 2.3.**

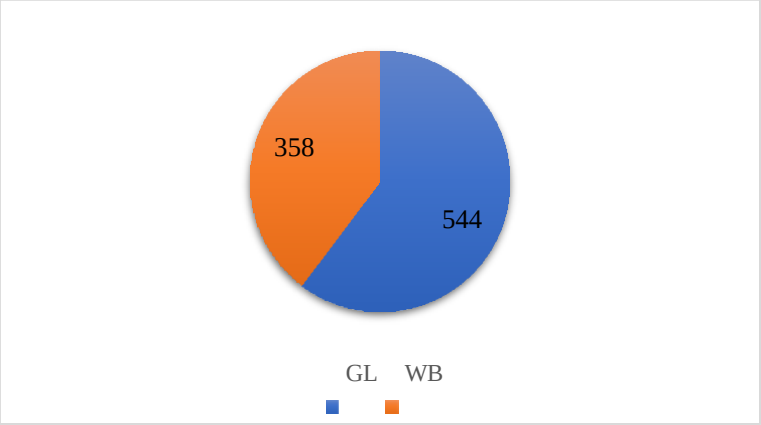


Figure 2.1: Lake Type Distribution

Table 2.3: Abstract of State-wise & Basin-wise details of GLs&WBs being monitored monthly by CWC

Country/ Area	State/ Union Territory	No of Glacial Lakes					No of Water Bodies				Grand Total
		Indus Basin	Ganga Basin	Brahma-putra Basin	Total		Indus Basin	Ganga Basin	Brahma-putra Basin	Total	
India	Ladakh	15	0	0	15		26	0	0	26	41
	Jammu & Kashmir	15	0	0	15		16	0	0	16	31
	Himachal Pradesh	10	0	0	10		5	0	0	5	15
	Uttarakhand	0	9	0	9		0	6	0	6	15
	Sikkim	0	0	42	42		0	0	1	1	42
	Arunachal Pradesh	0	0	9	9		0	0	25	25	35
	Total	40	9	51	100		47	6	26	79	179
	India Total	100					79				179
Transboundary	China	12	110	187	309		49	19	191	259	568
	Bhutan	0	0	71	71		0	0	11	11	82
	Nepal	0	64	0	64		0	9	0	9	73
	Total	12	174	258	444		49	28	202	279	723
	Transboundary Total	444					279				723
Grand Total		544					358				902

The index map of the study area is shown in **Figure. 2.2,** and the location map of the study area showing the glacial lakes and Water Bodies being monitored by CWC is shown in **Figure.2.3**.

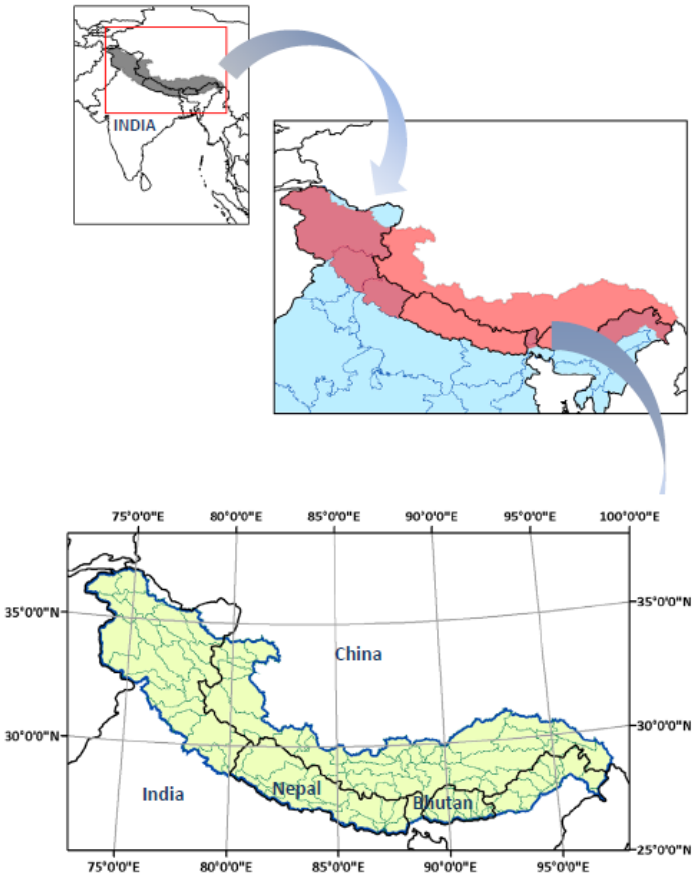


Figure 2.2: Index Map of Study Area

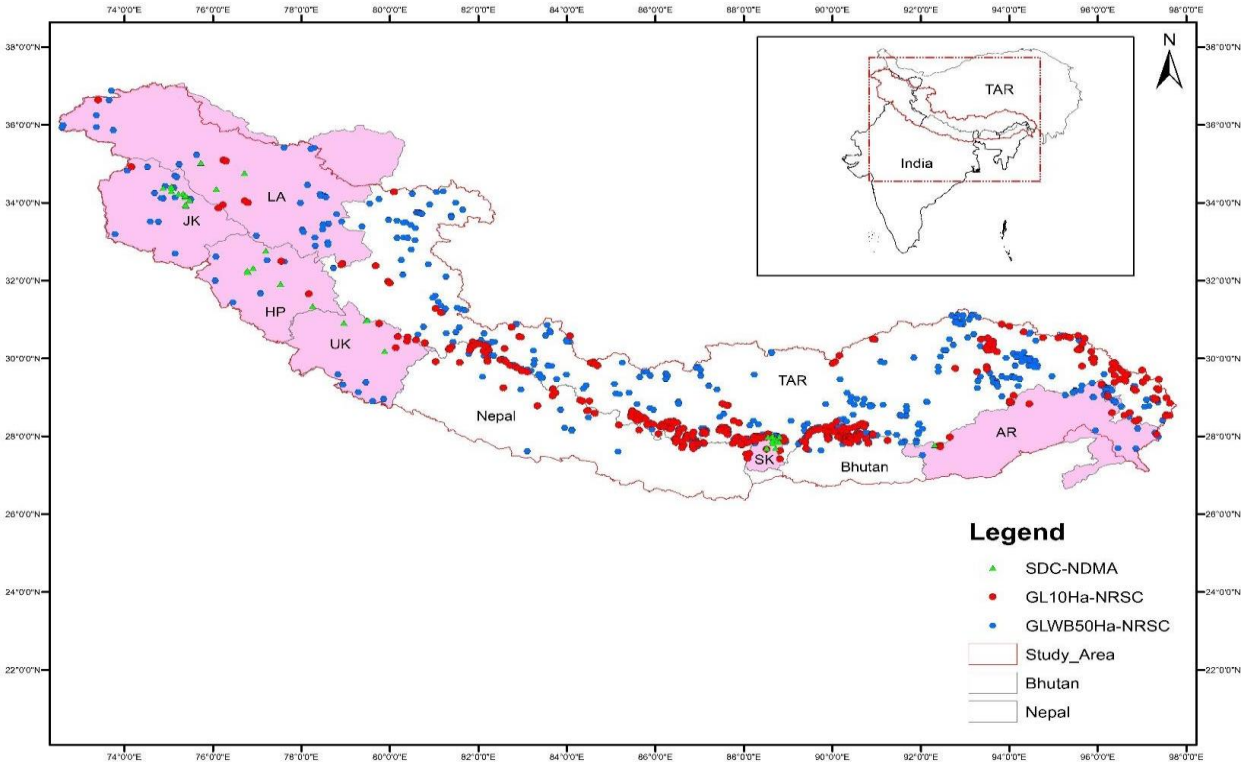


Figure 2.3: **Map of Study Area showing Glacial Lakes and Water Bodies being monitored by CWC**

The GLs & WBs are mostly located at an elevation range of 3000m to 5000m. A few of them are located above elevation of 5000m and some below 3000m. The elevation of Waterbodies range from 200 m to 5000m. This can be visualized by comparing the location map of study area (**Figure 2.3**) with the relief map of the study area shown in **Figure 2.4**. The elevation range of GLs & WBs being monitored by CWC is shown in **Figure 2.5**

Figure 2.4: **Relief Map of the Study Area**

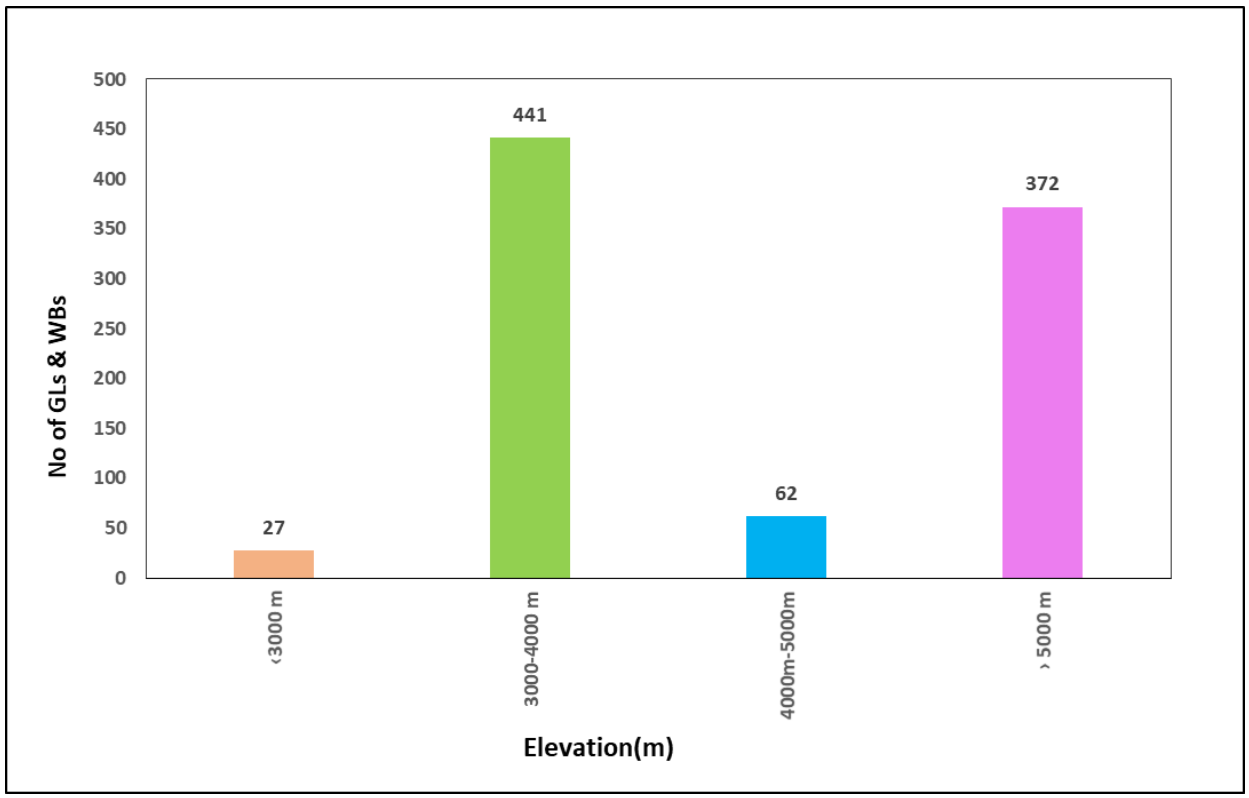


Figure 2.5: Elevation Range of GLs&WBs within Indian Himalayan Region being monitored by CWC

The country-wise distribution of Glacial Lakes & Water Bodiess being monitored by CWC is shown in **Figure 2.6**.

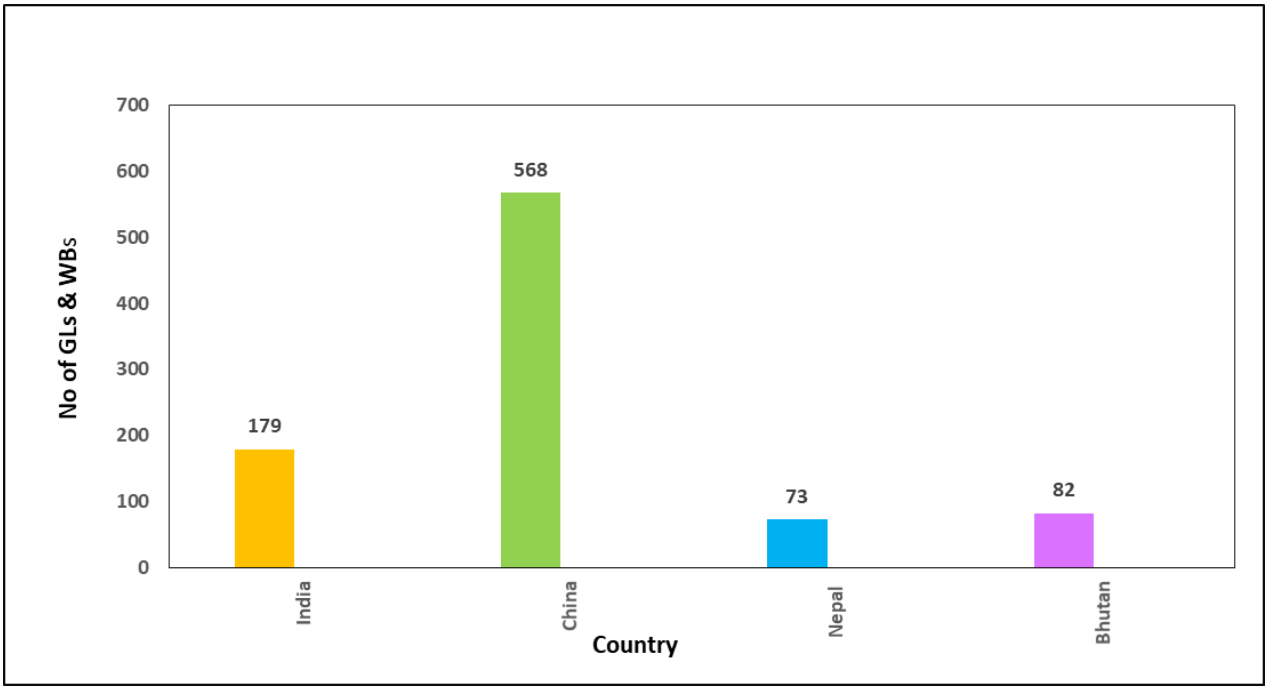


Figure 2.6:**Country-wise distribution of GLs & WBs in Indian Himalayan Region being monitored by CWC**

The state-wise distribution of Glacial Lakes being monitored by CWC within India is shown in **Figure 2.7**.

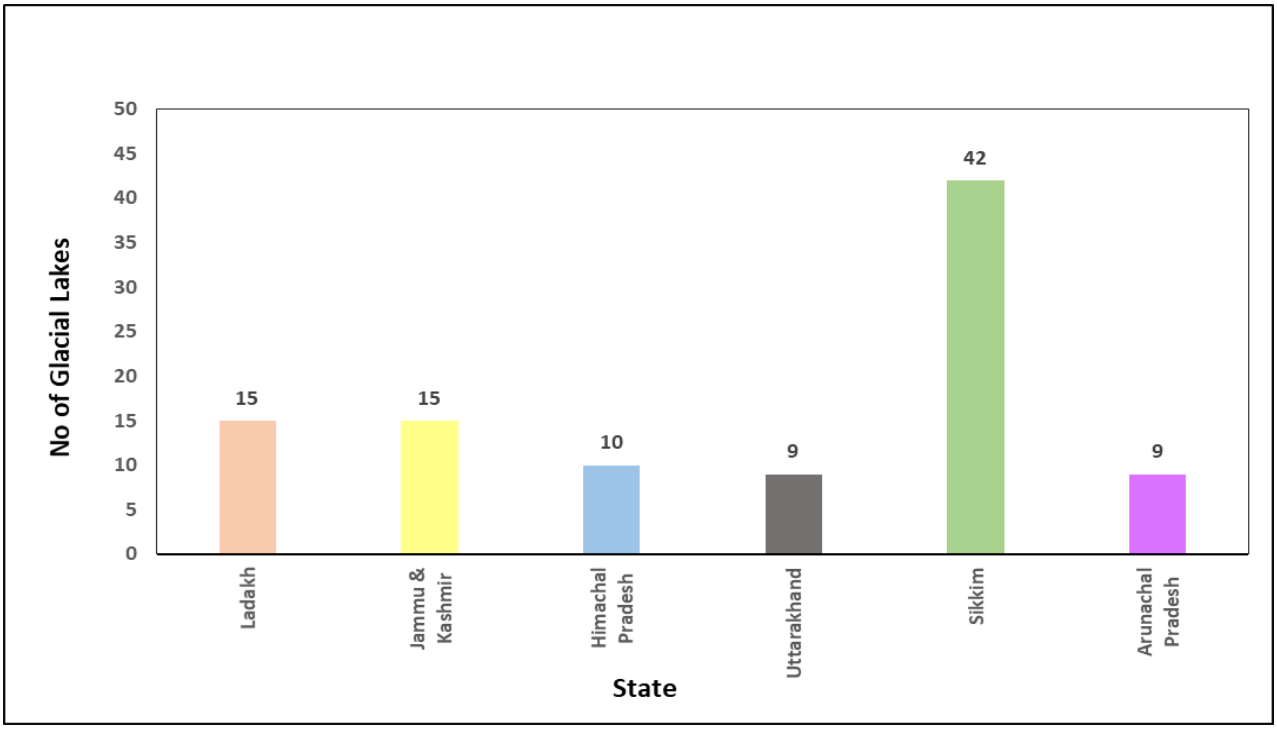


Figure: 2.7: State-wise Distribution of Glacial Lakes within India being monitored by CWC

The State-wise distribution of Water Bodies within India being monitored by CWC is shown in **Figure 2.8.**

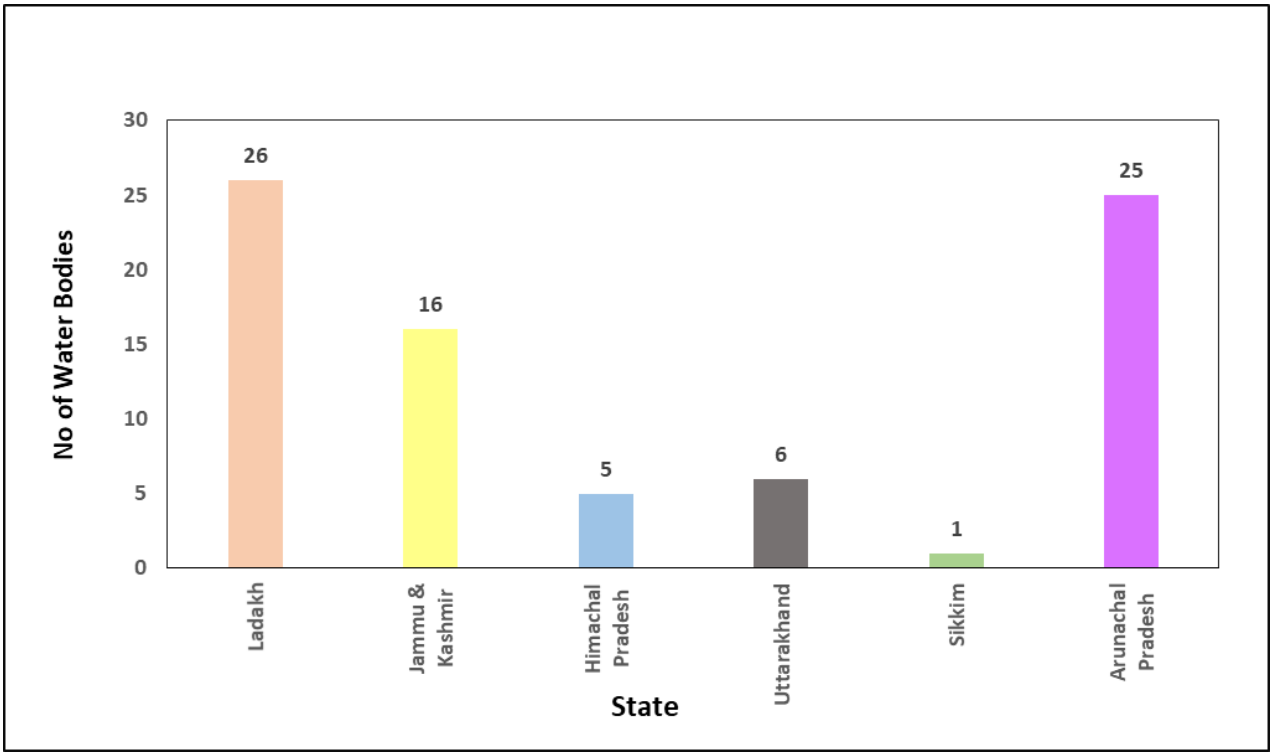


Figure: 2.8 State-wise Distribution of Water Bodies being monitored by CWC

2.2 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 technology has contributed significantly to the acquisition of Earth's resources, thus helping in their better management. They also plays a complementary role to the conventional data collection procedures. Satellite remote sensing offers several unique advantages like quick and repetitive data collection, reliability, accuracy, geometric integrity and digital storage, which makes it an ideal tool for mapping,inventorying and monitoring the natural resources.

Monitoring of glacial lakes located in remote mountain areas with rugged terrain and inclement weather by traditional means is very tedious and difficult. Hence Remote Sensing data plays a greater role in generating information on glacial lakes. Satellites with high spatial, spectral and temporal resolution sensors are useful in deriving lake information with better accuracy at regular intervals. Visual and digital image processing and analysis techniques integrated with Geographic Information Systems (GIS) are very useful for the study and monitoring of Glacial Lakes and Water Bodies.

The monitoring was done by downloading and manually digitising Advanced Wide Field Sensor (AWiFS) Satellite imageries procured/ downloaded from NRSC till 2021. The SENTINEL-2 Multispectral Imagery (MSI) and Sentinel-1 Synthetic Aperture Radar (SAR) data (Microwave Imagery) have been utilized for the study.

2.2.1 Sentinel-2 Multi Spectral Imagery

The Sentinal-2 mission comprises of a constellation of two polar-orbiting satellites placed in the same sun-synchronous orbit, phased at 180° to each other. It is a wide-swath, high-resolution, multi-spectral imaging mission for monitoring of vegetation, soil and water cover, inland waterways and coastal areas. The SENTINEL-2 Multi-Spectral Instrument (MSI) has visible, near infrared and shortwave infrared sensors sampling 13 spectral bands - 4 bands at 10 m, 6 bands at 20 m and 3 bands at 60 m spatial resolution with a swath width of 290 km. The revisit frequency of each single SENTINEL-2 satellite is 10 days and the combined constellation revisit is 5 days. The Green, Red and NIR bands have been utilized for this study.

2.2.2 Sentinel-1 Synthetic Aperture Radar (Microwave Imagery)

The Sentinel-1 mission comprises a constellation of two polar-orbiting satellites, Sentinel-1A and Sentinel-1B, sharing the same orbital plane. It has C-band synthetic aperture radar (SAR) active sensor. Synthetic Aperture Radar (SAR) has the advantage of operating at wavelengths not impeded by cloud cover or a lack of illumination and can acquire data over a site during day or night time under all weather conditions. 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 C-band imaging operates in four exclusive imaging modes with different resolution (down to 5 m) and coverage (up to 400 km). It provides dual polarisation capability, very short revisit times and rapid product delivery. It can transmit a signal in either horizontal (H) or vertical (V) polarisation, and then receive in both H and V polarisations. For each observation, precise measurements of spacecraft position and altitude are available. The repeat orbit cycle of each Sentinel-1 satellite is 12-day. The backscatter intensity of vertical transmit-vertical receive (X) band (VV band) data has been utilized for the study.

2.2.3 Challenges in Identification of Lakes from Satellite Imagery

Glacial lake identification can be done either using visual interpretation or automatic mapping methods. The automatic mapping procedures have limitations due to varying terrain conditions such as lakes situated in the shadow portions of mountains, presence of snow cover, cloud cover, lakes being partly frozen, etc. As lake water absorbs the incident radiation making it appear in darker tone and colour in the standard FCC of satellite data, similar response also prevails over shadow region of clouds or mountains on surface, which may lead to incorrect mapping. Moreover, a mountain shadow covering a lake partly/completely within its vicinity, also make it difficult to accurately map the lake boundary.

2.2.4 Limitations in Remote Sensing Technology

The Sentinel satellite images used for monitoring of Glacial Lakes were occasionally obscured with cloud and seasonal/permanent snow. Also, the Himalayan region being highly varying in topography with steep slopes, the satellite images have hill shadows. Thus, a few Glacial lakes could not be mapped owing to the following constraints

- Glacial lakes being under frozen condition
- Presence of snow or cloud cover over the glacial lakes
- Glacial Lakes under mountain shadow
- Dried up Glacial Lakes

The month-wise details of Multispectral and Microwave satellite imageries processed from June to October 2022, are given in **Figure No. 2.9**.

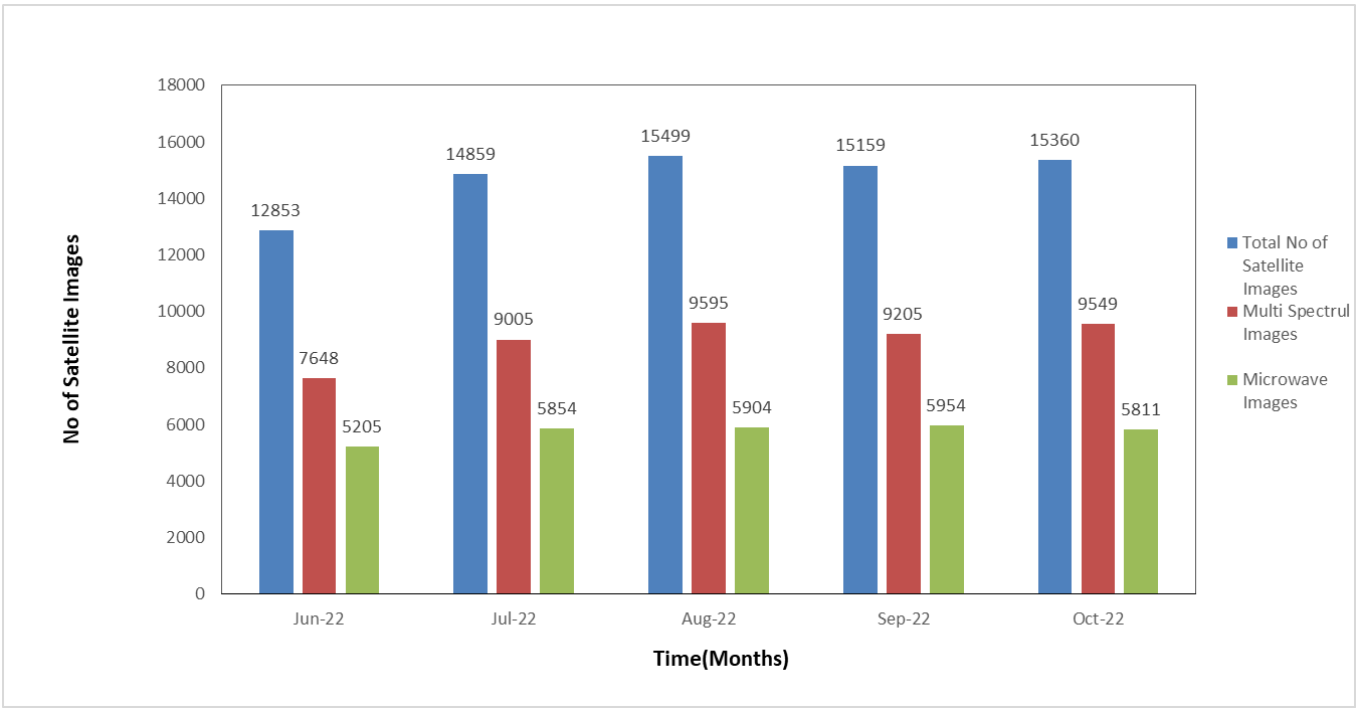


Figure 2.9: Details of Satellite Images processed during 2022

3. Methodology

Google Earth Engine(GEE) has been used to process the Multispectral and Microwave Sentinel image data for the monitoring of Glacial Lakes & Water Bodies. Google Earth Engine (GEE) is a cloud-based geospatial analysis platform that enables users to visualize and analyze satellite images. The Microwave and Multispectral Satellite works on different principle, and hence separate methodology has been adopted 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. 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.

The automated area of the GLs&WBs are then verified manually in GEE. The lakes which show discrepancy in automated area extraction are required to be delineated manually based on the visual interpretation. This is required as the region being monitored has rugged terrain with high mountains and deep valleys, which may lead to effects like foreshortening, layover, mountain shadows etc in the microwave/SAR data. Cloud cover hinders the performance of Multispectral Satelliteimages.

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

- Difference between the current area of lake and base year area(2009)
- 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 from the above three cases has been adopted to identify increase, decrease and no change in water spread area.

Thereafter the lakes are categorized as lakes with increase in water spread area greater than 40%, increase in water spread area up to 40%, no change in water spread area, decrease in water spread area and lakes for which analysis could not be performed due to limitations in remote sensing technology such as cloud cover, frozen condition, dried up condition etc.

The detailed flow-chart on methodology for automatic monitoring of Glacial Lakes and Water Bodies using satellite images is given below in **Figure 3.1**

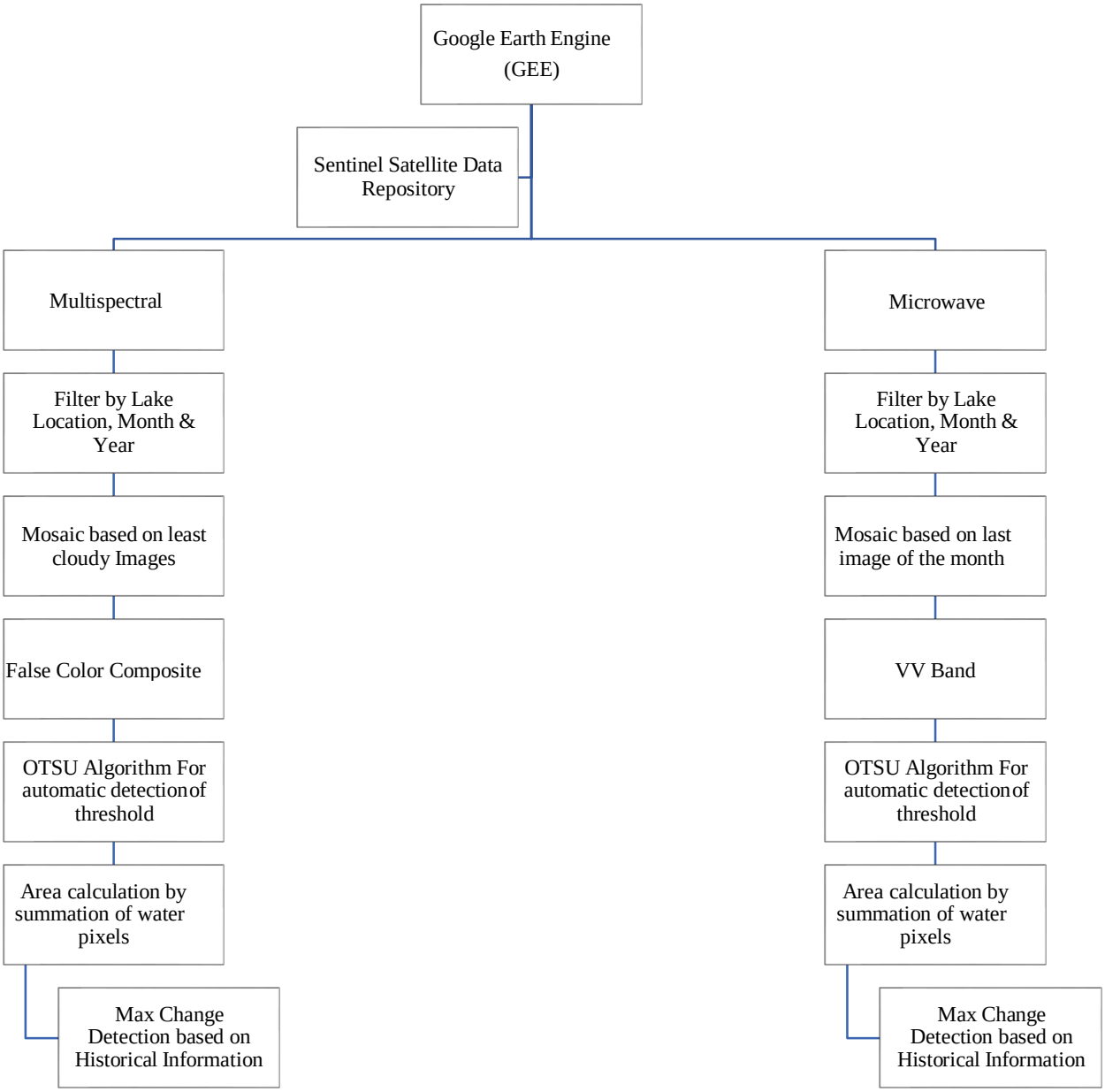


Figure 3.1*:* Flowchart on Methodology for automatic monitoring of Glacial Lakes & Water Bodies using Satellite Images

4. Results

Monthly monitoring of 902 GLs & WBs was carried out during the year 2022 for the months of June, July, August, September & October. The month-wise brief of results is given below.

4.1 June 2022

During June 2022, it was observed that 339 GLs & WBs exhibited an increase in area, 103 exhibited decrease in area and 15 exhibited no change in area. The change detection of 445 GLs& WBs could not be performed.The same is shown in **Figure 4.1.**

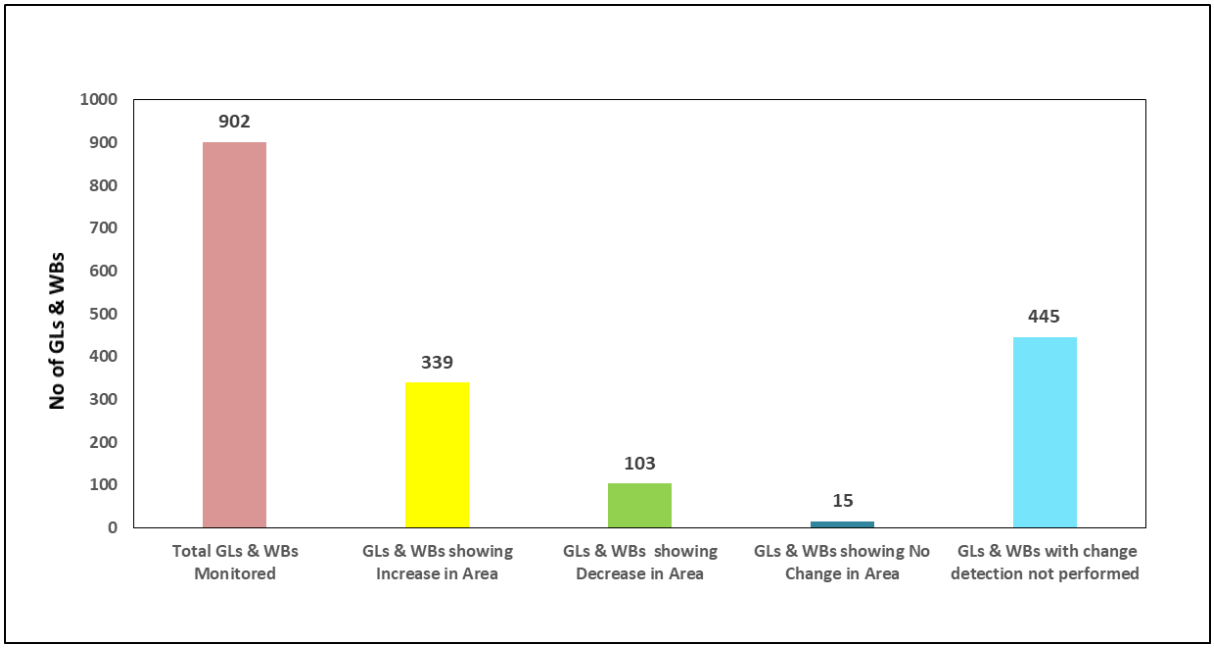


Figure 4.1: **Outcome of monitoring of GLs/WBs for June 2022**

4.2 July 2022

During July 2022, it was observed that 231 GLs & WBs exhibited an increase in area, 312 exhibited decrease in area and 275 exhibited no change in area. The change detection of 84 GLs & WBs could not be performed.The same is shown in **Figure 4.2.**

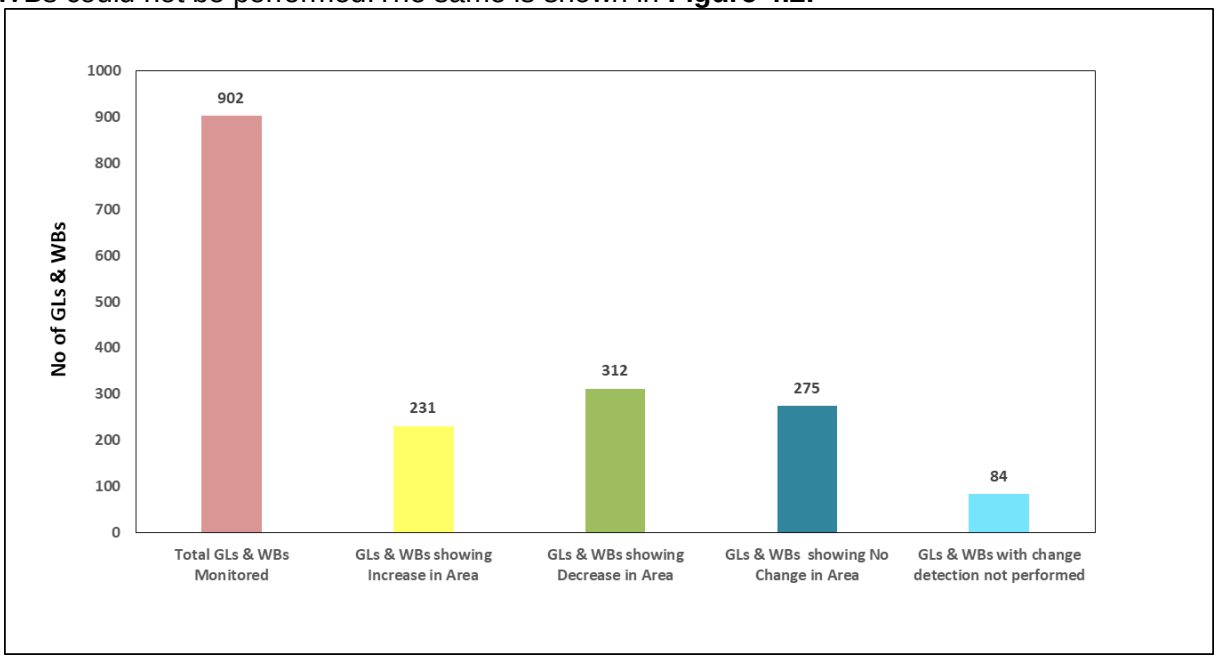


Figure 4.2: **Outcome of monitoring of GLs/WBs for July, 2022**

4.3 August 2022

During August 2022, it was observed that out 305 GLs & WBs exhibited an increase in area, 419 exhibited decrease in area and 105 exhibited no change in area. The change detection of 75 GLs& WBs could not be performed.The same is shown in **Figure 4.3.**

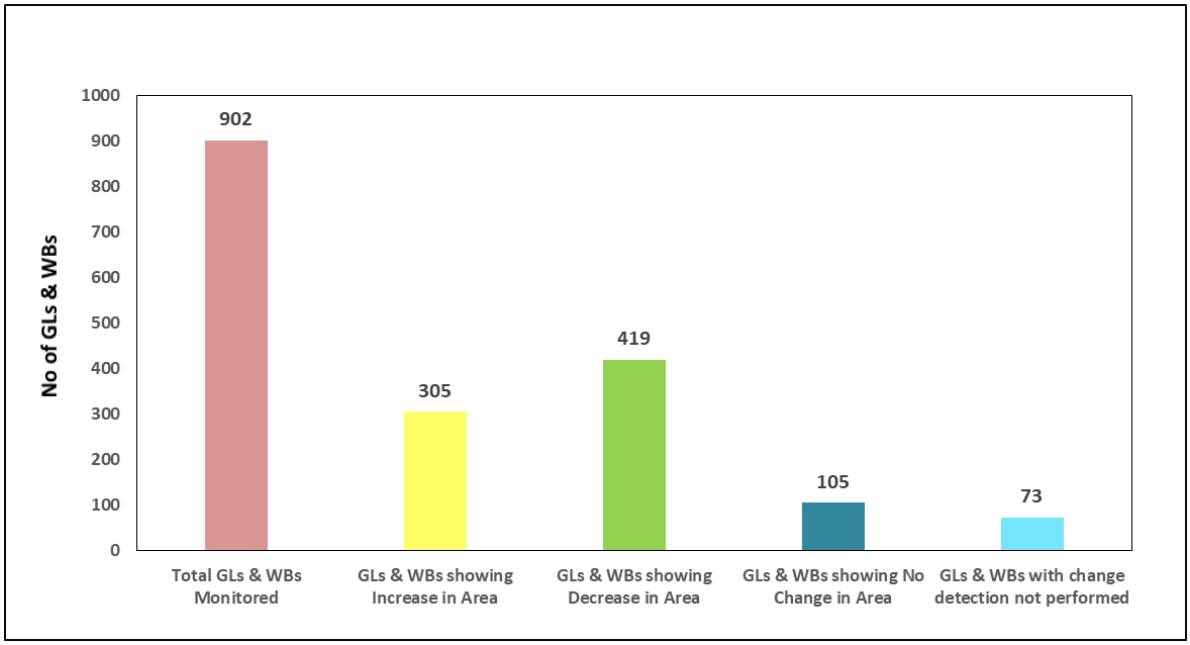


Figure 4.3: Outcome of monitoring of GLs/WBs for August, 2022

4.4 September 2022

During September 2022, it was observed that 363 GLs & WBs exhibited an increase in area, 458 exhibited decrease in area and 61 exhibited no change in area. The change detection of 20 GLs & WBs could not be performed.The same is shown in **Figure 4.3.**

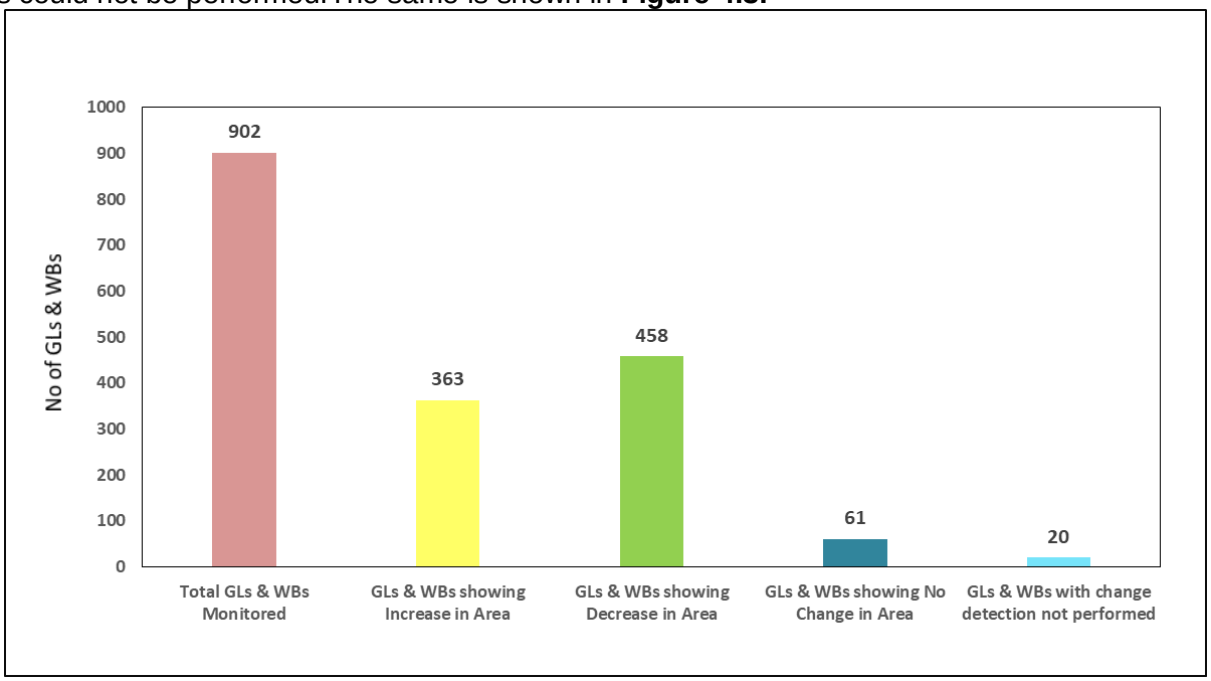


Figure 4.4: Outcome of monitoring of GL/WBs for September 2022

4.5 October 2022

During October 2022, it was observed that 322 GLs & WBs exhibited an increase in area, 508 exhibited decrease in area and 45 exhibited no change in area. The change detection of 27 GLs & WBs could not be performed.The same is shown in **Figure 4.3.**

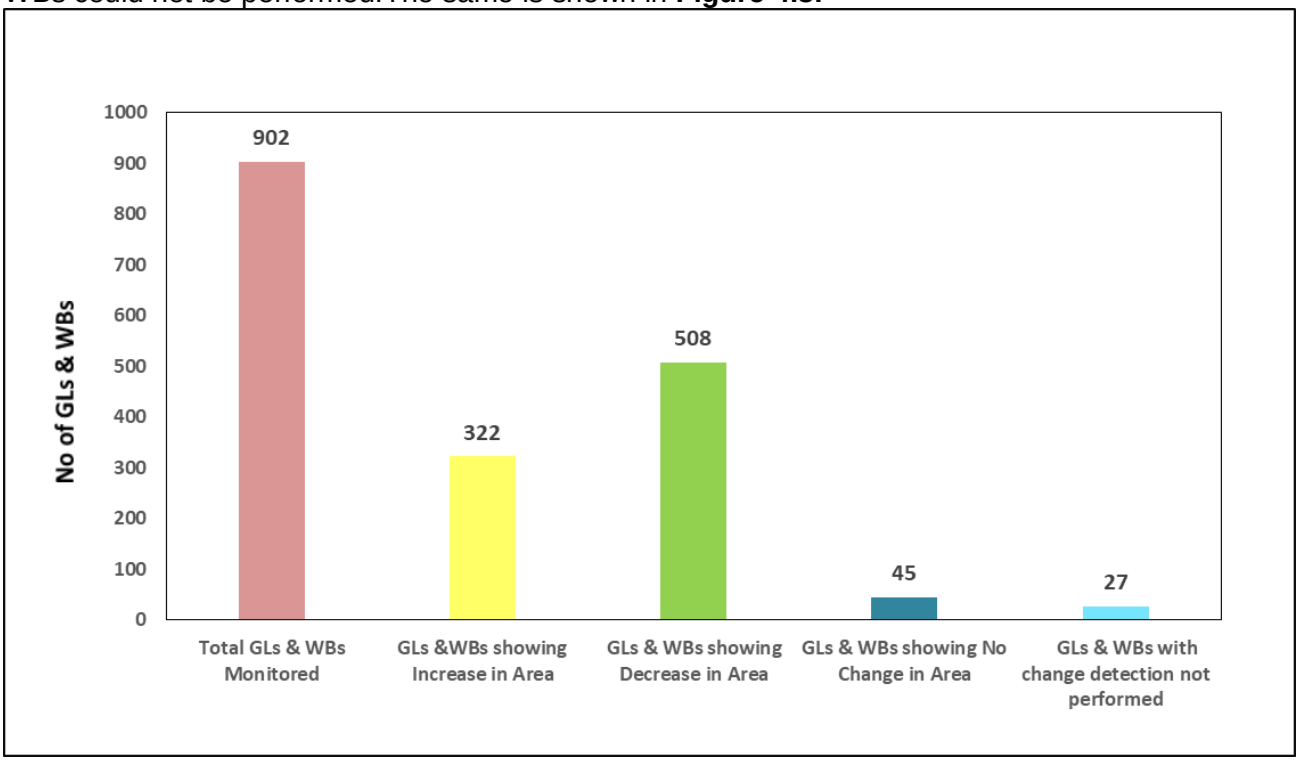
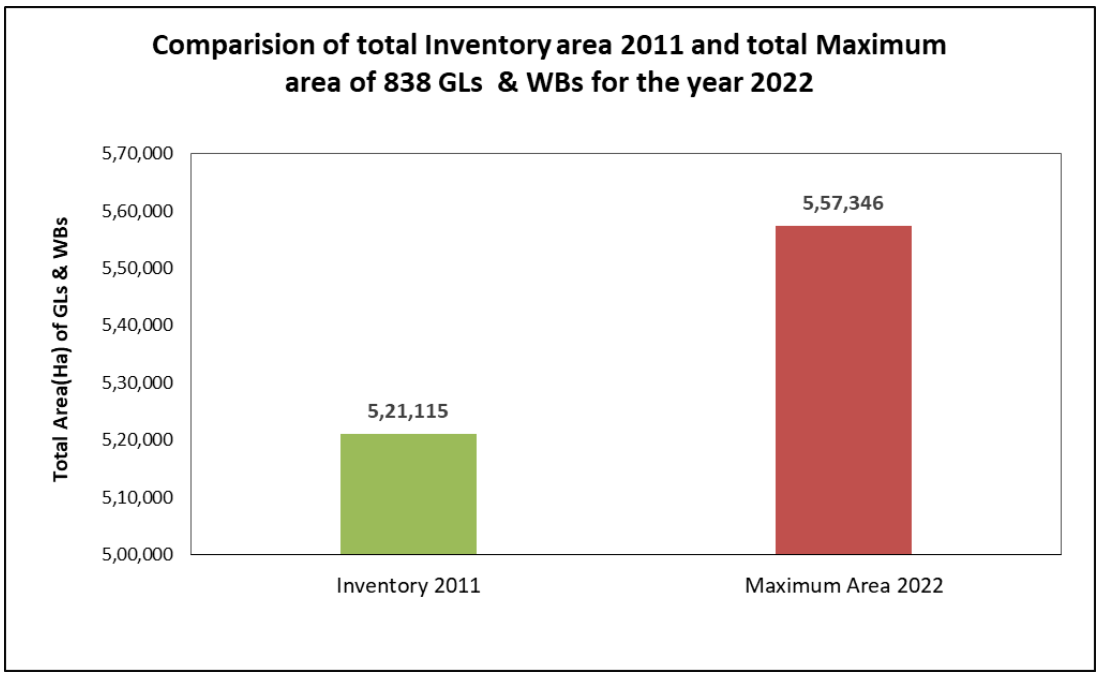


Figure 4.5: **Outcome of monitoring of GLs/WBs for October 2022**

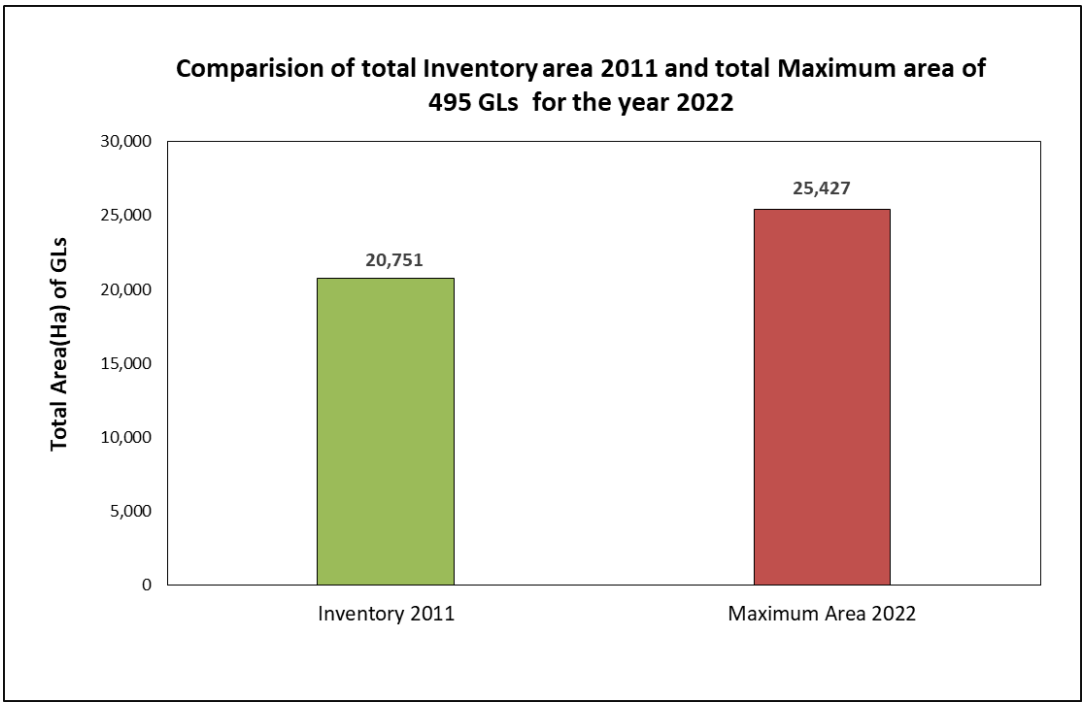
The details of results of analysis of Glacial Lakes and Water Bodies within India for the year 2022 are shown in Tables 5.1 & 5.2, respectively. The results of analysis of transboundary Glacial Lakes and Water Bodies are shown in Table 5.3.

5 Conclusion

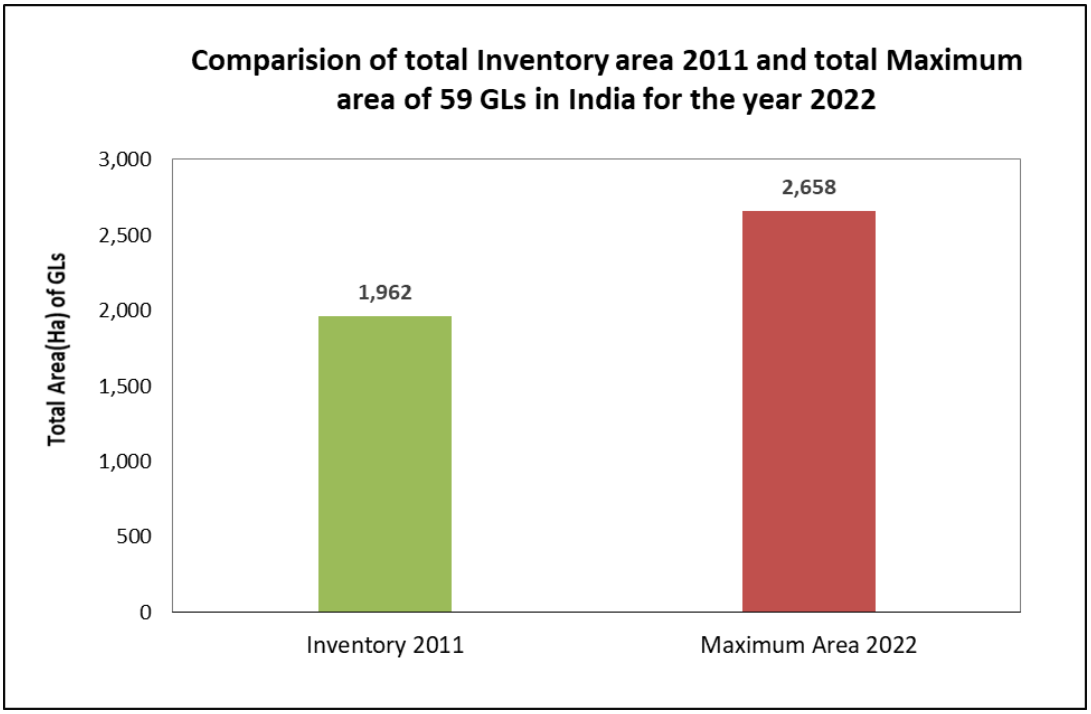
- The total Inventory area of Glacial Lakes and Water Bodies was 5,21,115 Ha during the year 2011 which has increased to 5,57,346 Ha during the year 2022. There is a **6.95%** increase in area. (*Out of 902 GL & WB, only 838 lakes were considered for this interpretation. This includes 40 SDC lakes which have no inventory details as well as lakes which were not analysed during the year 2022.)*



- The total Inventory area of Glacial Lakes was 20,751 Ha during the year 2011 which has increased to 25,427 Ha during the year 2022. There is a **22.53%** increase in area. *(Out of 544 GL, only 495 lakes were considered for this interpretation. This includes 40 SDC lakes which have no inventory details as well as lakes which were not analysed during the year 2022.)*



- The total Inventory area of Glacial Lakes within India was 1,962 Ha during the year 2011 which has increased to 2,658 Ha during the year 2022. There is a **35.47%** increase in area. *(Out of 100GLs, only 59 lakes were considered for this interpretation. This includes 40 SDC lakes which have no inventory details as well as lakes which were not analysed during the year 2022.)*



- Use of a combination of Microwave satellite images in conjunction with multispectral satellite images (MSI) has largely overcome the short-comings due to obscurity from cloud cover and this has led to almost all-time and all-weather monitoring of all 902 Lakes. This has increased availability of satellite images at shorter frequency interval and will facilitate in reducing the monitoring interval in future.
- The use of Sentinel satellite images has brought the improvement of spatial resolution from 56m to10m leading to enhancement of monitoring accuracy. Sentinel images have also aided in improving temporal resolution.
- Most of GLs & WBs exhibiting 40% or more increase in water spread area, are located in transboundary region.

Table No.5.1: Results of Analysis of Glacial Lakes within India for the year 2022

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
1	01_42H_002	NRSC	162I		2763	36° 38' 34.8"	73° 24'26.64"	Indus	Gilgit	India	Ladakh	-	13	#	17	15	16	16	15	17	16
2	01_52A_002	NRSC			4537	35° 5' 48.12"	76° 14' 0.6"	Indus	Shyok	India	Ladakh	-	23	19	21	22	22	21	19	22	21
3	01_52A_003	NRSC			4586	35° 5' 33.36"	76° 15' 7.2"	Indus	Shyok	India	Ladakh	-	24	1	28	20	18	13	1	28	16
4	01_52A_004	NRSC/ SDC	Very High Risk		4619	35° 4' 28.2"	76° 17'33.72"	Indus	Shyok	India	Ladakh	-	11	#	10	10	10	10	10	10	10
5	01_52B_010	NRSC/ SDC	75I/Medium Risk		5122	34° 3' 6.48"	76° 43' 5.16"	Indus	Indus	India	Ladakh	-	18	#	17	16	16	8	8	17	14
6	01_52B_012	NRSC	129I		5137	34° 0' 19.8"	76° 47'12.84"	Indus	Indus	India	Ladakh	-	17	#	15	14	14	8	8	15	13
7	01_52C_001	NRSC	11I		4394	33° 56'44.52"	76° 13'53.76"	Indus	Shingo (Indus)	India	Ladakh	-	36	55	52	59	51	51	51	59	54
8	01_52C_003	NRSC	7I	JK_187	4512	33° 9' 26.28"	76° 59' 3.48"	Indus	Indus	India	Ladakh	45	45	57	57	55	55	55	55	57	56
9	01_52E_001	NRSC		JK_188	5116	35° 25' 4.8"	77° 36'16.56"	Indus	Shyok	India	Ladakh	51	51	#	4	0	0	0	0	4	1
10	01_52J_001	NRSC	8I	JK_197	5311	34° 27'27.72"	78° 8' 6.36"	Indus	Shyok	India	Ladakh	97	65	98	103	102	102	84	84	103	98
11	01_52L_006	NRSC	306I		5727	32° 26'27.24"	78° 55'29.28"	Indus	Indus	India	Ladakh	-	12	10	10	10	11	6	6	11	9
12	01_52L_007	NRSC	184I		5498	32° 24'36.36"	78° 53' 56.4"	Indus	Indus	India	Ladakh	-	32	#	33	33	33	20	20	33	30
13	173	SDC	Medium Risk		5150	34° 45' 54"	76° 42' 36"	Indus		India	Ladakh	-	-	#	10	4	8	2	2	10	6
14	180	SDC	Very High Risk		4442	34° 21' 10.8"	76° 4' 37.2"	Indus		India	Ladakh	-	-	11	7	7	7	4	4	7	7
15	1360	SDC	Very High Risk		4667	35.027	75.725	Indus		India	Ladakh	-	-	9	9	9	9	8	8	9	9
16	01_43J_003	NRSC			3954	34° 55'36.12"	74° 9' 19.44"	Indus	Jhelum	India	Jammu & Kashmir	-	20	12	12	17	20	14	12	20	15
17	01_52C_002	NRSC	46I		4092	33° 52' 10.2"	76° 7' 9.48"	Indus	Chenab	India	Jammu & Kashmir	-	26	43	43	44	43	38	38	44	42

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
18	27	SDC	Very High Risk		3775	34° 22' 51.6"	74° 52' 33.6"	Indus		India	Jammu & Kashmir	-	-	14	14	11	11	13	11	14	13
19	98	SDC	High Risk		4103	34° 23' 31.2"	75° 5' 6"	Indus		India	Jammu & Kashmir	-	-	#	2	2	3	4	2	4	3
20	182	SDC	Very High Risk		4304	34° 14' 2.4"	75° 19' 30"	Indus		India	Jammu & Kashmir	-	-	#	9	8	8	5	5	9	8
21	931	SDC	Very High Risk		4082	33° 55' 44.4"	75° 23' 20.4"	Indus		India	Jammu & Kashmir	-	-	20	20	16	17	16	16	20	18
22	938	SDC	Very High Risk		3683	33° 57' 10.8"	75° 22' 40.8"	Indus		India	Jammu & Kashmir	-	-	23	23	17	19	22	17	23	21
23	951	SDC	Very High Risk		3762	34° 4' 1.2"	75° 28' 30"	Indus		India	Jammu & Kashmir	-	-	1	18	20	18	16	1	20	15
24	958	SDC	Very High Risk		4103	34° 8' 16.8"	75° 24' 57.6"	Indus		India	Jammu & Kashmir	-	-	7	3	0	0	8	0	8	4
25	963	SDC	Medium Risk		3725	34° 8' 20.4"	75° 22' 33.6"	Indus		India	Jammu & Kashmir	-	-	26	26	28	30	32	26	32	28
26	976	SDC	High Risk/15I		4314	34° 11' 6"	75° 22' 19.2"	Indus		India	Jammu & Kashmir	-	-	#	17	16	15	16	15	17	16
27	993	SDC	Very High Risk		4148	34° 13' 37.2"	75° 13' 19.2"	Indus		India	Jammu & Kashmir	-	-	11	11	5	5	6	5	11	8
28	1014	SDC	Very High Risk		3989	34° 17' 56.4"	75° 3' 36"	Indus		India	Jammu & Kashmir	-	-	5	5	3	4	5	3	5	4
29	1032	SDC	Very High Risk		4007	34° 23' 9.6"	75° 3' 50.4"	Indus		India	Jammu & Kashmir	-	-	1	1	1	1	1	1	1	1
30	1037	SDC	Medium Risk/27I		3603	34° 25' 19.2"	75° 3' 28.8"	Indus		India	Jammu & Kashmir	-	-	40	40	37	37	40	37	40	39
31	01_52H_002	NRSC/ SDC	4I/Very High Risk	HP_3	4101	32° 31'28.92"	77° 13' 5.88"	Indus	Chenab	India	Himachal Pradesh	62	62	99	90	97	110	99	90	110	99
32	01_52H_003	NRSC			4165	32° 29' 54.6"	77° 32'37.32"	Indus	Chenab	India	Himachal Pradesh	-	28	147	173	162	170	135	135	173	157
33	01_52H_004	NRSC		HP_5	4155	32° 29'47.04"	77° 33' 5.76"	Indus	Chenab	India	Himachal Pradesh	46	46	157	173	0	170	135	0	173	127

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
34	01_53I_002	NRSC/ SDC	26I/Very High Risk		4273	31° 39'38.52"	78° 10' 1.92"	Indus	Sutlej	India	Himachal Pradesh	-	23	#	30	30	25	28	25	30	28
35	1774	SDC	Very High Risk		4593	32° 13' 15.6"	76° 47' 16.8"	Indus		India	Himachal Pradesh	-	-	7	7	7	7	7	7	7	7
36	1805	SDC	Very High Risk/81I		4775	32° 45' 43.2"	77° 11' 42"	Indus		India	Himachal Pradesh	-	-	1	1	3	3	4	1	4	2
37	1847	SDC	Very High Risk		4570	31° 54' 54"	77° 31' 37.2"	Indus		India	Himachal Pradesh	-	-	11	12	13	17	#	11	17	13
38	1936	SDC	Very High Risk/321 I		4606	32° 15' 21.6"	76° 46' 37.2"	Indus		India	Himachal Pradesh	-	-	#	3	3	3	2	2	3	3
39	1998	SDC	Very High Risk		3857	32° 19' 12"	76° 54' 28.8"	Indus		India	Himachal Pradesh	-	-	#	1	1	0	1	0	1	1
40	2031	SDC	Very High Risk		4702	31° 20' 20.4"	78° 15' 10.8"	Indus		India	Himachal Pradesh	-	-	19	8	9	8	8	8	9	10
41	01_62B_003	NRSC	86I		5288	30° 28'36.48"	80° 35'35.16"	Indus	Sutlej	India	Uttarakhand	-	12	#	14	11	14	9	9	14	12
42	02_53N_001	NRSC	250G		4688	30° 54' 7.92"	79° 45' 12.6"	Ganga	Ganga	India	Uttarakhand	-	21	21	21	26	26	15	15	26	22
43	02_62B_004	NRSC	232G		4918	30° 33' 52.2"	80° 10'41.16"	Ganga	Sarda	India	Uttarakhand	-	19	21	21	22	21	7	7	22	18
44	02_62B_005	NRSC	580G		4314	30° 26'44.52"	80° 23'16.08"	Ganga	Sarda	India	Uttarakhand	-	12	8	8	8	9	10	8	10	9
45	02_62B_007	NRSC			4839	30° 16'42.96"	80° 7' 49.8"	Ganga	Sarda	India	Uttarakhand	-	19	#	#	#	#	#	0	0	0
46	2108	SDC	Very High Risk/347 G		5587	30° 58' 33.6"	79° 27' 32.4"	Ganga		India	Uttarakhand	-	-	17	17	20	19	11	11	20	17
47	2147	SDC	Medium Risk		5688	30° 58' 48"	79° 29' 13.2"	Ganga		India	Uttarakhand	-	-	#	1	0	0	#	0	1	0
48	2207	SDC	Very High Risk		4707	30° 54' 43.2"	78° 57' 28.8"	Ganga		India	Uttarakhand	-	-	10	10	11	12	5	5	12	10
49	2299	SDC	Very High Risk		4490	30° 11' 2.4"	79° 52' 48"	Ganga		India	Uttarakhand	-	-	#	#	#	#	#	0	0	0

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
50	03_77D_002	NRSC		SK_2	5156	28° 1' 33.96"	88° 42' 36"	Brahmaputra	Teesta	India	Sikkim	105	104	116	111	108	108	108	108	111	110
51	03_77D_004	NRSC/ SDC	/Very High Risk	SK_4	5287	28° 0' 25.56"	88° 42'46.08"	Brahmaputra	Teesta	India	Sikkim	106	106	120	120	123	123	122	120	123	122
52	03_77D_005	NRSC/ SDC	/Very High Risk	SK_5	5249	28° 0' 32.76"	88° 41'52.44"	Brahmaputra	Teesta	India	Sikkim	79	88	95	95	108	100	105	95	108	101
53	03_77D_006	NRSC/ SDC	/Very High Risk		5084	28° 0' 51.84"	88° 33'41.76"	Brahmaputra	Teesta	India	Sikkim	-	22	25	21	21	20	21	20	21	22
54	03_77D_007	NRSC/ SDC	/Very High Risk		5015	28° 0' 26.28"	88° 34'18.48"	Brahmaputra	Teesta	India	Sikkim	-	24	26	24	24	25	22	22	25	24
55	03_77D_008	NRSC		SK_8	5039	28° 0' 26.28"	88° 29'41.64"	Brahmaputra	Teesta	India	Sikkim	46	46	43	43	44	44	43	43	44	43
56	03_78A_001	NRSC/ SDC	/High Risk	SK_9	5371	27° 59'30.12"	88° 48' 55.8"	Brahmaputra	Teesta	India	Sikkim	156	156	185	175	184	186	191	175	191	184
57	03_78A_002	NRSC/ SDC	/Very High Risk		4952	27° 58'56.28"	88° 30'28.08"	Brahmaputra	Teesta	India	Sikkim	-	22	41	42	37	37	30	30	42	37
58	03_78A_003	NRSC/ SDC	/Very High Risk	SK_11	4977	27° 58'31.08"	88° 36'59.04"	Brahmaputra	Teesta	India	Sikkim	58	58	57	33	32	58	57	32	58	47
59	03_78A_005	NRSC			5201	27° 58'31.44"	88° 25'20.64"	Brahmaputra	Teesta	India	Sikkim	-	11	12	12	14	12	13	12	14	13
60	03_78A_006	NRSC			5004	27° 58' 15.6"	88° 25'45.84"	Brahmaputra	Teesta	India	Sikkim	-	11	14	15	14	14	14	14	15	14
61	03_78A_007	NRSC/ SDC	/Very High Risk		4977	27° 57'38.88"	88° 38'57.48"	Brahmaputra	Teesta	India	Sikkim	-	17	17	17	16	16	19	16	19	17
62	03_78A_008	NRSC			4998	27° 57' 3.24"	88° 21'15.48"	Brahmaputra	Teesta	India	Sikkim	-	44	19	19	18	19	18	18	19	19
63	03_78A_009	NRSC		SK_16	5044	27° 56'51.72"	88° 19'52.68"	Brahmaputra	Teesta	India	Sikkim	54	55	58	58	61	64	62	58	64	61
64	03_78A_010	NRSC			5078	27° 57' 0.72"	88° 18'16.92"	Brahmaputra	Teesta	India	Sikkim	-	36	33	33	34	32	29	29	34	32
65	03_78A_012	NRSC			5130	27° 54' 4.32"	88° 46'54.84"	Brahmaputra	Teesta	India	Sikkim	-	26	29	29	30	28	28	28	30	29
66	03_78A_013	NRSC		SK_19	5470	27° 55' 7.68"	88° 9' 39.6"	Brahmaputra	Teesta	India	Sikkim	63	67	75	75	80	79	77	75	80	77

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
67	03_78A_014	NRSC/ SDC	/Very High Risk	SK_20	5234	27° 54'42.84"	88° 11'54.96"	Brahmap-utra	Teesta	India	Sikkim	94	123	154	156	166	169	149	149	169	159
68	03_78A_015	NRSC/ SDC	/Medium Risk		4970	27° 52'23.88"	88° 47' 22.2"	Brahmap-utra	Teesta	India	Sikkim	-	12	10	10	9	8	9	8	10	9
69	03_78A_016	NRSC			5451	27° 53'33.72"	88° 12'47.16"	Brahmap-utra	Teesta	India	Sikkim	-	14	11	11	12	8	9	8	12	10
70	03_78A_017	NRSC			5545	27° 53' 34.8"	88° 11'31.92"	Brahmap-utra	Teesta	India	Sikkim	-	19	#	27	28	26	28	26	28	27
71	03_78A_019	NRSC/ SDC	/Very High Risk		4809	27° 51' 52.2"	88° 51'46.44"	Brahmap-utra	Teesta	India	Sikkim	-	15	609	11	12	7	9	7	12	130
72	03_78A_020	NRSC			5219	27° 52'49.44"	88° 15' 4.68"	Brahmap-utra	Teesta	India	Sikkim	-	14	16	16	13	14	13	13	16	14
73	03_78A_021	NRSC		SK_26	5431	27° 49' 28.2"	88° 14'57.12"	Brahmap-utra	Teesta	India	Sikkim	56	56	86	86	89	84	82	82	89	85
74	03_78A_023	NRSC			4547	27° 40'17.04"	88° 30'46.44"	Brahmap-utra	Teesta	India	Sikkim	-	33	33	25	28	21	14	14	28	24
75	03_78A_026	NRSC			4736	27° 33'44.28"	88° 7' 24.96"	Brahmap-utra	Teesta	India	Sikkim	-	11	12	12	10	7	10	7	12	10
76	03_78A_027	NRSC/ SDC	/Very High Risk		4888	27° 32' 0.6"	88° 5' 8.52"	Brahmap-utra	Teesta	India	Sikkim	-	33	30	30	32	37	37	30	37	33
77	03_78A_031	NRSC			4305	27° 26' 15"	88° 5' 9.6"	Brahmap-utra	Teesta	India	Sikkim	-	14	13	13	9	12	12	9	13	12
78	03_78A_035	NRSC			4998	27° 57' 3.24"	88°21'15.48"	Brahmap-utra	Teesta	India	Sikkim	-	-	7	7	12	12	12	7	12	10
79	227	SDC	Very High Risk		5176	27° 59' 34.8"	88° 32'49.2"	Brahmap-utra		India	Sikkim	-	-	56	47	56	58	54	47	58	54
80	237	SDC	Very Low Risk		5322	27° 59' 34.8"	88° 48' 3.6"	Brahmap-utra		India	Sikkim	-	-	7	7	7	10	9	7	10	8
81	256	SDC	High risk		4615	27° 48' 57.6"	88° 39'25.2"	Brahmap-utra		India	Sikkim	-	-	17	17	15	14	14	14	17	15
82	260	SDC	Medium Risk		5253	27° 53' 38.4"	88° 45'39.6"	Brahmap-utra		India	Sikkim	-	-	39	39	41	40	39	39	41	40
83	292	SDC	Medium Risk		5577	28° 0' 21.6"	88° 39' 18"	Brahmap-utra		India	Sikkim	-	-	4	4	3	4	4	3	4	4

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
84	293	SDC	Very High Risk		5048	27° 57' 3.6"	88° 42' 18"	Brahmap-utra		India	Sikkim	-	-	2	2	2	3	2	2	3	2
85	295	SDC	Very High Risk		4850	27° 55' 12"	88° 40'19.2"	Brahmap-utra		India	Sikkim	-	-	6	6	6	7	7	6	7	6
86	298	SDC	Very High Risk		4508	27° 52' 22.8"	88° 38'16.8"	Brahmap-utra		India	Sikkim	-	-	4	4	6	6	6	4	6	5
87	312	SDC	Medium Risk		5137	27° 42' 3.6"	88° 30' 50.4"	Brahmap-utra		India	Sikkim	-	-	8	8	9	5	3	3	9	7
88	345	SDC	Medium Risk		5108	27° 51' 50.4"	88° 44' 49.2"	Brahmap-utra		India	Sikkim	-	-	18	19	19	18	18	18	19	18
89	515	SDC	Medium Risk		5063	27° 51' 14.4"	88° 48' 21.6"	Brahmap-utra		India	Sikkim	-	-	8	8	8	8	8	8	8	8
90	569	SDC	Medium Risk		5450	28° 0' 7.2"	88° 38' 24"	Brahmap-utra		India	Sikkim	-	-	30	36	30	31	5	5	36	26
91	599	SDC	Very High Risk		4251	27° 41' 42"	88° 42' 57.6"	Brahmap-utra		India	Sikkim	-	-	#	8	8	0	10	0	10	7
92	03_82L_007	NRSC			4163	28° 50' 15"	94° 27' 5.04"	Brahmap-utra	Ding	India	Arunachal Pradesh	-	16	16	16	15	14	18	14	18	16
93	03_83A_003	NRSC			5188	27° 46'12.72"	92° 25'56.64"	Brahmap-utra	Dangme Chhu	India	Arunachal Pradesh	-	24	82	82	82	81	81	81	82	82
94	03_83A_004	NRSC			5109	27° 45'47.16"	92° 25'29.64"	Brahmap-utra	Dangme Chhu	India	Arunachal Pradesh	-	17	16	16	17	17	19	16	19	17
95	03_83A_005	NRSC			4994	27° 45'20.52"	92° 24' 2.52"	Brahmap-utra	Dangme Chhu	India	Arunachal Pradesh	-	13	12	12	12	12	13	12	13	12
96	03_83A_007	NRSC			5028	27° 43'39.36"	92° 26'12.48"	Brahmap-utra	Jia Brali	India	Arunachal Pradesh	-	14	17	17	13	13	11	11	17	14
97	03_91C_026	NRSC			4305	29° 20'18.24"	96° 4' 57.72"	Brahmap-utra	Dibang	India	Arunachal Pradesh	-	28	#	29	20	15	27	15	29	23
98	03_91D_075	NRSC			4274	28° 36' 28.8"	96° 19'14.16"	Brahmap-utra	Dibang	India	Arunachal Pradesh	-	23	#	24	18	18	26	18	26	22
99	03_91H_073	NRSC			4481	28° 3' 15.48"	97° 19'47.64"	Brahmap-utra	Lohit	India	Arunachal Pradesh	-	25	#	20	15	36	25	15	36	24
100	129	SDC	Very High Risk		4895	27° 46'24.17"	92° 19' 1.10"	Brahmap-utra		India	Arunachal Pradesh	-	-	9	9	9	9	9	9	9	9

Note: *G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability, "-"indicates Inventory data Not Available, "#" indicates cloud covered, frozen/ dried lakes*

Table No.5.2: Results of Analysis of Water Bodies within India for the year 2022

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
1	01_42H_001	NRSC		JK_1	4292	36° 52'50.16"	73° 42' 4.68"	Indus	Gilgit	India	Ladakh (POK)	276	276	270	270	272	261	263	261	272	267
2	01_42H_003	NRSC		JK_3	3854	36° 38' 47.4"	73° 38' 50.28"	Indus	Gilgit	India	Ladakh (POK)	97	124	106	107	108	105	104	104	108	106
3	01_43A_001	NRSC		JK_22	3641	35° 59' 42"	72° 36' 45.36"	Indus	Gilgit	India	Ladakh (POK)	203	203	203	202	200	203	201	200	203	202
4	01_43A_002	NRSC		JK_23	3790	35° 56'42.36"	72° 35' 40.92"	Indus	Gilgit	India	Ladakh (POK)	91	91	98	100	79	96	91	79	100	93
5	01_43E_006	NRSC		JK_30	4186	35° 56'43.08"	73° 21' 52.56"	Indus	Gilgit	India	Ladakh (POK)	71	71	70	70	68	68	61	61	70	67
6	01_43E_023	NRSC		JK_47	4155	35° 51' 54"	73° 44' 42.72"	Indus	Gilgit	India	Ladakh (POK)	82	86	87	79	76	80	75	75	87	79
7	01_43M_003	NRSC		JK_120	2663	35° 13'54.84"	75° 37' 49.44"	Indus	Shigar (Indus)	India	Ladakh (POK)	208	187	166	177	172	178	177	166	178	174
8	01_43N_001	NRSC		JK_128	4142	34° 59'28.32"	75° 14' 9.96"	Indus	Shingo (Indus)	India	Ladakh (POK)	127	127	132	132	127	129	127	127	132	129
9	01_52G_001	NRSC		JK_189	5008	33° 59'57.12"	77° 58' 44.04"	Indus	Shyok	India	Ladakh	45	45	42	42	40	47	37	37	47	42
10	01_52G_003	NRSC		JK_191	4533	33° 18'38.52"	77° 59' 49.2"	Indus	Indus	India	Ladakh	1502	1473	1350	808	1313	1313	1421	808	1421	1241
11	01_52I_003	NRSC		JK_195	5159	35° 24' 37.8"	78° 17' 3.84"	Indus	Shyok	India	Ladakh	180	180	167	167	173	158	161	158	173	165
12	01_52I_004	NRSC		JK_196	5141	35° 23'27.96"	78° 13' 7.68"	Indus	Shyok	India	Ladakh	124	124	#	#	#	#	#	0	0	0
13	01_52J_002	NRSC		JK_198	5359	34° 13'59.16"	78° 25' 34.32"	Indus	Shyok	India	Ladakh	67	67	62	62	65	69	66	62	69	65
14	01_52J_005	NRSC		JK_201	5430	34° 11' 9.96"	78° 30' 28.08"	Indus	Shyok	India	Ladakh	44	44	41	41	45	45	51	41	51	45
15	01_52J_006	NRSC		JK_202	5401	34° 10'23.88"	78° 26' 16.08"	Indus	Shyok	India	Ladakh	110	110	104	108	106	104	104	104	108	105
16	01_52J_009	NRSC		JK_205	5576	34° 9' 21.6"	78° 33' 11.52"	Indus	Shyok	India	Ladakh	57	57	62	60	63	60	47	47	63	58
17	01_52K_004	NRSC		JK_212	4293	33° 31'49.08"	78° 54' 37.8"	Indus	Shyok	India	Ladakh	5741	5741	5842	5978	5515	5947	5733	5515	5978	5803

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
18	01_52K_009	NRSC		JK_217	4921	33° 27'51.48"	78° 36' 39.24"	Indus	Shyok	India	Ladakh	204	204	193	198	192	192	197	192	198	194
19	01_52K_010	NRSC		JK_218	5313	33° 27'17.64"	78° 29' 54.24"	Indus	Shyok	India	Ladakh	152	152	150	148	155	156	160	148	160	154
20	01_52K_011	NRSC		JK_219	5314	33° 27'17.64"	78° 29' 54.24"	Indus	Shyok	India	Ladakh	153	153	180	165	167	167	171	165	180	170
21	01_52K_012	NRSC		JK_220	5315	33° 27'17.64"	78° 29' 54.24"	Indus	Shyok	India	Ladakh	154	154	165	146	168	166	173	146	173	164
22	01_52K_014	NRSC		JK_222	4535	33° 15' 6.84"	78° 2' 34.44"	Indus	Indus	India	Ladakh	405	405	442	442	498	479	432	432	498	459
23	01_52K_016	NRSC		JK_224	4675	33° 6' 22.32"	78° 18' 12.96"	Indus	Sutlej	India	Ladakh	507	507	524	523	523	523	520	520	524	523
24	01_52L_001	NRSC		JK_225	4523	32° 53'48.12"	78° 18' 48.6"	Indus	Sutlej	India	Ladakh	14110	14139	13824	13908	13915	14010	13953	13824	14010	13922
25	01_52L_002	NRSC		JK_226	4986	32° 58'54.84"	78° 35' 43.44"	Indus	Indus	India	Ladakh	442	442	400	428	431	455	444	400	455	432
26	01_52L_003	NRSC		JK_227	4985	32° 55'14.88"	78° 36' 0.72"	Indus	Indus	India	Ladakh	648	649	536	556	510	512	504	504	556	524
27	01_42H_005	NRSC		JK_5	2237	36° 14'56.76"	73° 21' 41.4"	Indus	Gilgit	India	Jammu & Kashmir	52	73	66	52	54	48	47	47	66	53
28	01_43G_001	NRSC		JK_67	346	33° 12'47.16"	73° 42' 41.76"	Indus	Jhelum	India	Jammu & Kashmir (POK)	22154	14989	3887	13094	20547	19002	17064	3887	20547	14719
29	01_43J_004	NRSC	5I	JK_82	4078	34° 55'15.24"	74° 31' 14.88"	Indus	Jhelum	India	Jammu & Kashmir (POK)	65	59	50	50	73	73	63	50	73	62
30	01_43J_007	NRSC	6I	JK_85	3708	34° 49'45.12"	74° 3' 42.12"	Indus	Jhelum	India	Jammu & Kashmir (POK)	95	95	96	96	92	88	97	88	97	94
31	01_43J_017	NRSC	3I	JK_95	3580	34° 25'55.56"	74° 55' 27.12"	Indus	Jhelum	India	Jammu & Kashmir	164	164	155	155	158	165	156	155	165	158
32	01_43J_020	NRSC		JK_98	1584	34° 14'59.64"	74° 40' 10.2"	Indus	Jhelum	India	Jammu & Kashmir	191	191	166	166	161	160	169	160	169	164
33	01_43J_021	NRSC		JK_99	1582	34° 7' 6.24"	74° 51' 39.6"	Indus	Jhelum	India	Jammu & Kashmir	1238	1238	999	936	938	914	983	914	999	954
34	01_43J_022	NRSC		JK_100	1583	34° 7' 11.28"	74° 49' 50.52"	Indus	Jhelum	India	Jammu & Kashmir	60	60	54	54	47	61	62	47	62	56
35	01_43K_010	NRSC		JK_111	3946	33° 31' 8.4"	74° 35' 1.32"	Indus	Jhelum	India	Jammu & Kashmir	66	66	72	72	63	63	57	57	72	65

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
36	01_43K_014	NRSC		JK_115	3521	33° 30'47.16"	74° 46' 6.96"	Indus	Jhelum	India	Jammu & Kashmir	112	111	128	128	150	133	139	128	150	136
37	01_43N_020	NRSC		JK_147	4112	34° 41'50.28"	75° 8' 12.84"	Indus	Jhelum	India	Jammu & Kashmir (POK)	63	61	65	65	62	61	63	61	65	63
38	01_43N_022	NRSC		JK_149	4243	34° 39' 59.4"	75° 10' 45.48"	Indus	Jhelum	India	Jammu & Kashmir (POK)	72	73	77	77	69	69	71	69	77	73
39	01_43N_027	NRSC		JK_154	3683	34° 23'17.16"	75° 7' 6.6"	Indus	Jhelum	India	Jammu & Kashmir	48	48	47	47	44	44	49	44	49	46
40	01_43N_030	NRSC		JK_157	3799	34° 8' 21.12"	75° 8' 50.64"	Indus	Jhelum	India	Jammu & Kashmir	86	86	86	86	90	90	88	86	90	88
41	01_43N_032	NRSC		JK_159	3595	34° 5' 37.32"	75° 29' 52.44"	Indus	Jhelum	India	Jammu & Kashmir	49	49	55	59	57	55	53	53	59	56
42	01_43P_002	NRSC		JK_167	669	32° 41'48.84"	75° 8' 44.16"	Indus	Ravi	India	Jammu & Kashmir	52	52	54	54	54	54	55	54	55	54
43	01_52D_001	NRSC		HP_1	780	32° 36'52.92"	76° 1' 53.76"	Indus	Ravi	India	Himachal Pradesh	688	725	626	656	674	606	593	593	674	631
44	01_52H_005	NRSC		HP_6	4286	32° 28'53.76"	77° 36' 52.56"	Indus	Chenab	India	Himachal Pradesh	45	45	60	43	49	52	43	43	60	49
45	01_53A_001	NRSC		HP_9	409	31° 59'21.84"	76° 3' 14.4"	Indus	Beas	India	Himachal Pradesh	21867	16946	11901	13246	18670	21975	16190	11901	21975	16396
46	01_53A_002	NRSC		HP_10	495	31° 23' 7.8"	76° 32' 6"	Indus	Sutlej	India	Himachal Pradesh	13679	10256	#	#	#	#	#	0	0	0
47	01_53E_001	NRSC		HP_12	921	31° 40' 22.8"	77° 4' 44.76"	Indus	Beas	India	Himachal Pradesh	72	72	80	76	69	66	73	66	80	73
48	02_53K_001	NRSC		UK_1	355	29° 34' 10.2"	78° 45' 46.8"	Ganga	Ramganga	India	Uttarakhand	6790	3880	4145	4285	5215	5652	6072	4145	6072	5074
49	02_53K_002	NRSC		UK_2	260	29° 19' 9.84"	78° 55' 13.08"	Ganga	Ramganga	India	Uttarakhand	1597	1597	315	346	750	993	1326	315	1326	746
50	02_53O_001	NRSC		UK_4	1968	29° 23' 9.24"	79° 27' 35.64"	Ganga	Ramganga	India	Uttarakhand	46	46	40	40	35	38	37	35	40	38
51	02_53O_005	NRSC		UK_8	239	29° 8' 6.72"	79° 17' 19.68"	Ganga	Ramganga	India	Uttarakhand	1510	1510	730	382	903	1197	1233	382	1233	889

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha)	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
52	02_53P_001	NRSC		UK_9	210	28° 57'29.88"	79° 50' 32.64"	Ganga	Ganga	India	Uttarakhand	2054	2054	558	721	1973	1720	1487	558	1973	1292
53	02_53P_003	NRSC		UK_11	207	28° 54' 3.6"	79° 37' 22.8"	Ganga	Ramganga	India	Uttarakhand	1078	1078	778	569	760	842	783	569	842	746
54	03_77D_003	NRSC		SK_3	5098	28° 0' 47.52"	88° 45' 20.88"	Brahmaputra	Teesta	India	Sikkim	96	84	99	102	95	101	58	58	102	91
55	03_82O_042	NRSC		AP_49	3093	29° 10'36.48"	95° 36' 56.16"	Brahmaputra	Dibang	India	Arunachal Pradesh	44	44	41	42	38	32	29	29	42	36
56	03_82O_061	NRSC		AP_54	3811	29° 0' 40.32"	95° 53' 5.64"	Brahmaputra	Dibang	India	Arunachal Pradesh	54	54	73	55	47	59	55	47	73	58
57	03_82O_062	NRSC		AP_55	3612	29° 0' 18.36"	95° 54' 19.44"	Brahmaputra	Dibang	India	Arunachal Pradesh	52	52	55	55	46	58	54	46	58	54
58	03_82O_064	NRSC		AP_57	3689	29° 3' 41.76"	95° 15' 45"	Brahmaputra	Dihang	India	Arunachal Pradesh	44	44	47	48	40	36	46	36	48	43
59	03_82P_010	NRSC		AP_67	1676	28° 8' 53.16"	95° 56' 35.88"	Brahmaputra	Dibang	India	Arunachal Pradesh	99	99	57	98	97	91	99	57	99	88
60	03_83A_012	NRSC		AP_77	4287	27° 31' 6.6"	92° 2' 24"	Brahmaputra	Dangme Chhu	India	Arunachal Pradesh	63	63	55	55	54	53	63	53	63	56
61	03_91C_034	NRSC		AP_84	4288	29° 18' 6.48"	96° 4' 55.92"	Brahmaputra	Dibang	India	Arunachal Pradesh	134	134	141	141	139	139	140	139	141	140
62	03_91C_038	NRSC		AP_85	4002	29° 16' 8.4"	96° 9' 24.12"	Brahmaputra	Dibang	India	Arunachal Pradesh	113	113	102	102	97	105	106	97	106	102
63	03_91C_040	NRSC		AP_87	4450	29° 15'19.08"	96° 14' 40.92"	Brahmaputra	Lohit	India	Arunachal Pradesh	94	94	#	73	78	80	86	73	86	79
64	03_91C_042	NRSC		AP_89	4531	29° 14'38.04"	96° 14' 39.12"	Brahmaputra	Dibang	India	Arunachal Pradesh	50	50	54	49	47	50	48	47	54	50
65	03_91C_044	NRSC		AP_90	4230	29° 13'23.16"	96° 16' 41.16"	Brahmaputra	Lohit	India	Arunachal Pradesh	63	63	67	67	61	60	66	60	67	64
66	03_91C_045	NRSC		AP_91	3493	29° 13' 44.4"	96° 11' 29.4"	Brahmaputra	Dibang	India	Arunachal Pradesh	113	113	109	107	106	94	105	94	109	104
67	03_91C_046	NRSC		AP_92	3353	29° 13'32.52"	96° 9' 36"	Brahmaputra	Dibang	India	Arunachal Pradesh	61	61	59	56	54	46	52	46	59	53

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Latitude (N)	Longitude (E)	Basin	River	Country	State/UT	Lake area 2009 (Ha)	Inventory 2011(Ha))	Jun-22(Ha)	Jul-22(Ha)	Aug-22(Ha)	Sep-22(Ha)	Oct-22(Ha)	Minimum Area 2022(Ha)	Maximum Area 2022(Ha)	Average Area 2022(Ha)
68	03_91C_049	NRSC		AP_95	4261	29° 11'46.32"	96° 12' 10.08"	Brahmaputra	Dibang	India	Arunachal Pradesh	57	80	74	74	65	65	70	65	74	70
69	03_91C_064	NRSC		AP_100	3972	29° 4' 45.84"	96° 8' 40.92"	Brahmaputra	Dibang	India	Arunachal Pradesh	89	89	64	78	86	85	94	64	94	81
70	03_91C_069	NRSC		AP_101	3245	29° 3' 36"	96° 8' 40.2"	Brahmaputra	Dibang	India	Arunachal Pradesh	78	78	48	89	87	74	77	48	89	75
71	03_91D_009	NRSC		AP_108	4037	28° 55'40.44"	96° 20' 19.68"	Brahmaputra	Dibang	India	Arunachal Pradesh	47	47	53	53	46	42	49	42	53	49
72	03_91D_010	NRSC		AP_109	3323	28° 55' 8.4"	96° 22' 58.8"	Brahmaputra	Dibang	India	Arunachal Pradesh	46	46	52	50	44	47	47	44	52	48
73	03_91D_022	NRSC		AP_118	3143	28° 52'33.96"	96° 23' 38.76"	Brahmaputra	Dibang	India	Arunachal Pradesh	44	44	#	41	31	25	39	25	41	34
74	03_91D_041	NRSC		AP_135	3526	28° 46'32.52"	96° 31' 53.4"	Brahmaputra	Dibang	India	Arunachal Pradesh	115	115	114	114	117	120	114	114	120	116
75	03_91D_107	NRSC		AP_163	3769	28° 12' 8.64"	96° 53' 51.72"	Brahmaputra	Lohit	India	Arunachal Pradesh	67	67	107	62	67	66	71	62	107	75
76	03_91H_067	NRSC		AP_185	3791	28° 5' 44.52"	97° 17' 20.4"	Brahmaputra	Lohit	India	Arunachal Pradesh	56	56	44	39	35	57	51	35	57	45
77	03_92A_005	NRSC		AP_203	3391	27° 41'23.64"	96° 51' 38.16"	Brahmaputra	Lohit	India	Arunachal Pradesh	50	50	52	52	47	53	51	47	53	51
78	03_92A_006	NRSC		AP_204	1178	27° 41'50.28"	96° 27' 7.2"	Brahmaputra	Lohit	India	Arunachal Pradesh	83	83	76	76	75	75	75	75	76	75
79	03_92E_001	NRSC		AP_206	4206	27° 59'23.28"	97° 22' 8.76"	Brahmaputra	Lohit	India	Arunachal Pradesh	45	45	49	49	45	45	47	45	49	47

Note: *G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability,*
"-"indicates Inventory data Not Available, "#" indicates cloud covered, frozen/ dried lakes

Table No.5.3: Results of Analysis of Transboundary Glacial Lakes and Water Bodies for the year 2022

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
1	01_52P_004	NRSC			5470	GL	32° 23' 7.08"	79° 40' 43.68"	Indus	Indus	China	14	0	0	0	0	1	0	0	0
2	01_53M_001	NRSC	33I		5576	GL	31° 59' 0.96"	79° 57' 30.96"	Indus	Indus	China	11	#	18	19	17	14	12	17	17
3	01_53M_002	NRSC	142I		5468	GL	31° 56' 57.12"	79° 59' 6.72"	Indus	Indus	China	11	10	10	2	10	10	4	10	8
4	01_53M_003	NRSC	110I		5511	GL	31° 56' 16.08"	79° 59' 39.84"	Indus	Indus	China	12	9	9	0	13	11	1	13	8
5	01_62B_002	NRSC	381I		4998	GL	30° 33' 9.72"	80° 24' 6.48"	Indus	Sutlej	China	14	20	20	18	23	22	11	28	21
6	01_62E_007	NRSC	437I		5641	GL	31° 17' 6.36"	81° 1' 53.04"	Indus	Sutlej	China	11	#	13	14	14	11	14	17	13
7	01_62E_016	NRSC	270I		5528	GL	31° 10' 42.6"	81° 9' 6.84"	Indus	Sutlej	China	21	#	20	20	19	17	19	20	19
8	01_62F_007	NRSC			5344	GL	30° 25' 36.48"	81° 52' 13.44"	Indus	Sutlej	China	16	21	22	22	21	20	19	21	21
9	01_62F_009	NRSC	387I		5712	GL	30° 23' 34.8"	81° 57' 48.6"	Indus	Sutlej	China	13	10	26	25	25	24	3	27	22
10	01_62F_010	NRSC	9I	CH_101	5250	GL	30° 23' 11.04"	81° 55' 47.64"	Indus	Sutlej	China	45	71	70	69	67	67	56	69	69
11	01_62J_004	NRSC	446I		5504	GL	30° 22' 33.96"	82° 1' 6.24"	Indus	Sutlej	China	12	10	10	11	12	10	9	10	11
12	02_62B_006	NRSC	495G		5106	GL	30° 24' 8.28"	80° 47' 4.92"	Ganga	Karnali	China	42	#	41	43	40	37	38	42	40
13	02_62F_009	NRSC	536G		5586	GL	30° 18' 7.2"	81° 23' 57.12"	Ganga	Karnali	China	11	10	10	8	11	8	8	11	9
14	02_62F_011	NRSC	362G		5524	GL	30° 17' 49.2"	81° 23' 16.8"	Ganga	Karnali	China	27	26	26	26	26	24	23	27	26
15	02_62F_013	NRSC	256G		5252	GL	30° 15' 56.88"	81° 20' 51"	Ganga	Karnali	China	24	45	45	45	45	43	30	49	45
16	02_62F_014	NRSC	236G		5481	GL	30° 14' 26.88"	81° 19' 53.4"	Ganga	Karnali	China	12	5	6	9	8	7	1	6	7
17	02_62F_015	NRSC	59G		5359	GL	30° 13' 58.8"	81° 20' 57.48"	Ganga	Karnali	China	37	27	27	32	28	22	28	31	27
18	02_71H_004	NRSC			5239	GL	28° 39' 46.08"	85° 28' 31.8"	Ganga	Arun Kosi	China	19	26	26	22	20	26	22	27	24
19	02_71H_005	NRSC			5010	GL	28° 38' 47.4"	85° 29' 37.68"	Ganga	Arun Kosi	China	27	69	69	87	82	66	64	78	75
20	02_71H_006	NRSC			5167	GL	28° 38' 33.72"	85° 28' 22.8"	Ganga	Arun Kosi	China	38	34	35	35	33	33	30	35	34
21	02_71H_007	NRSC		CH_127	5149	GL	28° 37' 25.68"	85° 30' 33.84"	Ganga	Arun Kosi	China	125	118	118	119	122	120	111	124	119
22	02_71H_008	NRSC		CH_128	5152	GL	28° 37' 1.56"	85° 31' 35.4"	Ganga	Arun Kosi	China	95	103	110	115	121	106	100	110	111
23	02_71H_009	NRSC			5448	GL	28° 34' 50.16"	85° 35' 41.28"	Ganga	Arun Kosi	China	31	23	24	21	25	26	22	26	24

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
24	02_71H_010	NRSC			5481	GL	28° 34' 32.16"	85° 34' 59.52"	Ganga	Arun Kosi	China	27	25	25	25	25	24	21	26	25
25	02_71H_011	NRSC	775G		4509	GL	28° 34' 9.48"	85° 27' 24.12"	Ganga	Trishuli	China	19	#	29	28	23	21	22	29	25
26	02_71H_012	NRSC		CH_132	5379	GL	28° 33' 49.68"	85° 36' 14.76"	Ganga	Arun Kosi	China	89	#	158	124	119	130	94	128	133
27	02_71H_013	NRSC	172G		4446	GL	28° 34' 0.12"	85° 27' 50.04"	Ganga	Trishuli	China	21	#	16	17	17	17	13	18	17
28	02_71H_014	NRSC			4458	GL	28° 33' 50.4"	85° 28' 3.36"	Ganga	Trishuli	China	12	9	9	7	10	10	8	10	9
29	02_71H_015	NRSC		CH_135	5367	GL	28° 31' 58.8"	85° 36' 30.96"	Ganga	Arun Kosi	China	515	545	545	496	550	551	469	568	537
30	02_71H_016	NRSC			5305	GL	28° 31' 40.8"	85° 38' 14.64"	Ganga	Arun Kosi	China	33	26	26	24	28	28	26	28	26
31	02_71H_017	NRSC		CH_137	5314	GL	28° 29' 43.44"	85° 38' 9.24"	Ganga	Arun Kosi	China	493	490	490	510	493	489	479	495	494
32	02_71H_018	NRSC	123G		4787	GL	28° 30' 31.68"	85° 29' 36.6"	Ganga	Trishuli	China	20	31	31	32	32	30	25	35	31
33	02_71H_019	NRSC	92G		4674	GL	28° 30' 36.36"	85° 26' 44.52"	Ganga	Trishuli	China	16	#	13	17	10	9	7	16	12
34	02_71H_020	NRSC			5354	GL	28° 29' 11.76"	85° 44' 8.88"	Ganga	Arun Kosi	China	29	69	70	79	71	69	57	74	72
35	02_71H_021	NRSC	76G	CH_141	4463	GL	28° 28' 6.6"	85° 31' 7.68"	Ganga	Trishuli	China	48	44	43	44	44	44	43	44	44
36	02_71H_022	NRSC			5735	GL	28° 27' 41.76"	85° 40' 55.92"	Ganga	Arun Kosi	China	17	20	20	18	18	17	18	20	19
37	02_71H_023	NRSC			5595	GL	28° 26' 42.36"	85° 46' 46.92"	Ganga	Arun Kosi	China	41	61	61	56	55	55	54	59	58
38	02_71H_024	NRSC	155G		4890	GL	28° 25' 35.76"	85° 33' 44.28"	Ganga	Trishuli	China	22	27	26	26	27	26	22	25	26
39	02_71H_025	NRSC	464G		5303	GL	28° 24' 23.4"	85° 35' 16.08"	Ganga	Trishuli	China	12	19	19	19	19	18	14	17	19
40	02_71H_027	NRSC	2G	CH_147	5242	GL	28° 21' 40.32"	85° 52' 12.36"	Ganga	Sun Kosi	China	501	454	455	460	458	453	441	459	456
41	02_71H_029	NRSC	1G	CH_149	5098	GL	28° 19' 14.16"	85° 50' 21.12"	Ganga	Sun Kosi	China	413	524	524	522	542	539	528	538	530
42	02_71H_030	NRSC	598G		5411	GL	28° 19' 28.56"	85° 54' 24.84"	Ganga	Sun Kosi	China	15	14	14	12	13	14	11	14	13
43	02_71H_031	NRSC	78G		5268	GL	28° 18' 54"	85° 56' 50.28"	Ganga	Sun Kosi	China	20	30	26	26	26	28	24	30	27
44	02_71H_032	NRSC			5116	GL	28° 17' 55.32"	85° 49' 8.4"	Ganga	Sun Kosi	China	22	25	27	24	22	24	25	28	24
45	02_71L_004	NRSC	5G	CH_159	5518	GL	28° 23' 40.92"	86° 22' 45.12"	Ganga	Arun Kosi	China	79	120	120	119	123	123	119	132	121
46	02_71L_005	NRSC	282G		5524	GL	28° 23' 33.72"	86° 24' 52.56"	Ganga	Arun Kosi	China	18	19	19	17	18	18	17	19	18
47	02_71L_006	NRSC	3G	CH_161	5365	GL	28° 22' 26.76"	86° 18' 16.56"	Ganga	Arun Kosi	China	379	387	387	387	400	406	394	410	393
48	02_71L_007	NRSC	572G		5576	GL	28° 22' 54.84"	86° 23' 3.84"	Ganga	Arun Kosi	China	15	13	13	12	13	13	11	13	13

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
49	02_71L_008	NRSC	457G		5577	GL	28° 22' 31.08"	86° 15' 27"	Ganga	Sun Kosi	China	24	36	36	34	37	38	38	39	36
50	02_71L_009	NRSC	520G		5546	GL	28° 20' 53.16"	86° 29' 35.16"	Ganga	Arun Kosi	China	38	33	33	28	33	33	32	34	32
51	02_71L_010	NRSC	185G	CH_165	5387	GL	28° 20' 54.96"	86° 13' 30"	Ganga	Sun Kosi	China	47	62	61	56	61	65	62	72	61
52	02_71L_011	NRSC	61G	CH_166	5439	GL	28° 20' 7.44"	86° 11' 30.12"	Ganga	Sun Kosi	China	64	52	54	55	54	53	51	56	54
53	02_71L_012	NRSC	96G		5570	GL	28° 19' 15.24"	86° 9' 30.96"	Ganga	Sun Kosi	China	25	21	21	21	21	21	16	21	21
54	02_71L_013	NRSC	58G	CH_168	5324	GL	28° 18' 12.24"	86° 9' 27.36"	Ganga	Sun Kosi	China	64	60	60	59	58	57	56	59	59
55	02_71L_014	NRSC	240G		5364	GL	28° 17' 43.08"	86° 9' 28.8"	Ganga	Sun Kosi	China	18	16	16	16	16	15	14	16	16
56	02_71L_015	NRSC	284G		5261	GL	28° 17' 38.76"	86° 7' 52.32"	Ganga	Sun Kosi	China	27	22	22	23	24	22	19	23	23
57	02_71L_016	NRSC	570G		5345	GL	28° 16' 12.36"	86° 11' 12.12"	Ganga	Sun Kosi	China	13	#	9	10	13	12	11	12	11
58	02_71L_017	NRSC	179G		5211	GL	28° 15' 11.16"	86° 6' 10.44"	Ganga	Sun Kosi	China	15	13	13	14	16	14	12	14	14
59	02_71L_018	NRSC	651G		5377	GL	28° 14' 44.88"	86° 19' 17.4"	Ganga	Sun Kosi	China	21	15	15	14	15	14	13	17	15
60	02_71L_019	NRSC	323G		5378	GL	28° 14' 56.04"	86° 9' 21.6"	Ganga	Sun Kosi	China	14	12	12	12	12	13	12	14	12
61	02_71L_020	NRSC	156G		5348	GL	28° 14' 23.28"	86° 21' 55.44"	Ganga	Sun Kosi	China	30	30	27	26	27	26	25	29	27
62	02_71L_021	NRSC	438G		5373	GL	28° 14' 33.36"	86° 11' 45.6"	Ganga	Sun Kosi	China	19	17	17	17	17	17	10	17	17
63	02_71L_022	NRSC	715G		5554	GL	28° 12' 26.28"	86° 37' 45.84"	Ganga	Arun Kosi	China	24	27	27	27	27	26	24	26	27
64	02_71L_023	NRSC	39G	CH_178	5106	GL	28° 11' 50.64"	86° 34' 54.12"	Ganga	Arun Kosi	China	116	132	134	128	125	125	118	137	129
65	02_71L_024	NRSC	245G		5263	GL	28° 11' 37.68"	86° 18' 51.12"	Ganga	Sun Kosi	China	23	27	27	24	22	24	18	28	25
66	02_71L_025	NRSC	154G		5357	GL	28° 11' 33.72"	86° 21' 1.8"	Ganga	Sun Kosi	China	16	19	19	18	20	18	17	19	19
67	02_71L_026	NRSC	73G	CH_181	5057	GL	28° 11' 8.52"	86° 31' 54.12"	Ganga	Sun Kosi	China	59	68	67	67	65	65	62	69	66
68	02_71L_027	NRSC	433G		5234	GL	28° 9' 28.8"	86° 32' 7.08"	Ganga	Sun Kosi	China	18	18	18	18	18	18	18	18	18
69	02_71L_028	NRSC	38G	CH_183	5027	GL	28° 8' 8.88"	86° 31' 45.48"	Ganga	Sun Kosi	China	79	104	102	101	100	99	99	102	101
70	02_71L_029	NRSC	747G		5237	GL	28° 6' 52.2"	86° 51' 45.72"	Ganga	Arun Kosi	China	30	52	42	42	53	52	45	54	48
71	02_71L_030	NRSC	242G		5242	GL	28° 4' 22.8"	86° 31' 12.72"	Ganga	Sun Kosi	China	19	21	22	21	23	22	19	24	22
72	02_71L_031	NRSC	52G		4682	GL	28° 4' 48"	86° 3' 56.16"	Ganga	Sun Kosi	China	33	29	29	32	31	30	28	32	30
73	02_71L_032	NRSC	122G	CH_187	5250	GL	28° 2' 40.2"	86° 30' 49.32"	Ganga	Sun Kosi	China	58	50	50	54	57	56	55	57	53

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
74	02_71L_034	NRSC	89G	CH_188	5095	GL	28° 2' 9.6"	86° 29' 46.32"	Ganga	Sun Kosi	China	46	40	56	66	63	66	30	67	58
75	02_71L_033	NRSC	408G		5369	GL	28° 2' 18.96"	86° 42' 34.56"	Ganga	Sun Kosi	China	17	14	15	16	16	15	11	16	15
76	02_71L_035	NRSC	657G		5091	GL	28° 1' 22.8"	86° 43' 14.16"	Ganga	Sun Kosi	China	19	11	11	17	17	19	9	19	15
77	02_71P_001	NRSC			5498	GL	28° 50' 26.88"	87° 30' 28.08"	Ganga	Arun Kosi	China	24	15	15	24	21	19	8	24	19
78	02_71P_017	NRSC			4194	GL	28° 24' 25.56"	87° 45' 54"	Ganga	Arun Kosi	China	17	78	102	0	109	24	9	36	63
79	02_71P_019	NRSC		CH_207	4199	GL	28° 21' 8.64"	87° 52' 30.36"	Ganga	Arun Kosi	China	48	51	51	64	58	56	41	67	56
80	02_71P_020	NRSC			4200	GL	28° 20' 48.84"	87° 53' 6.72"	Ganga	Arun Kosi	China	26	#	122	115	109	105	71	191	113
81	02_71P_022	NRSC	34G	CH_210	5439	GL	28° 13' 45.84"	87° 35' 27.6"	Ganga	Arun Kosi	China	80	84	82	86	82	81	75	85	83
82	02_71P_023	NRSC	124G		5235	GL	28° 14' 8.52"	87° 30' 1.8"	Ganga	Arun Kosi	China	26	17	17	23	21	21	17	23	20
83	02_71P_024	NRSC	576G		5273	GL	28° 13' 41.52"	87° 34' 39.36"	Ganga	Arun Kosi	China	26	22	22	22	22	22	20	22	22
84	02_71P_026	NRSC	322G		5340	GL	28° 12' 23.04"	87° 33' 37.8"	Ganga	Arun Kosi	China	16	13	13	15	12	13	13	16	13
85	02_71P_027	NRSC	82G	CH_215	5389	GL	28° 11' 40.2"	87° 38' 26.52"	Ganga	Arun Kosi	China	49	54	48	51	52	52	52	54	51
86	02_71P_028	NRSC		CH_216	4997	GL	28° 12' 21.6"	87° 3' 7.56"	Ganga	Arun Kosi	China	50	56	64	62	61	58	42	65	60
87	02_71P_029	NRSC	43G	CH_217	5045	GL	28° 10' 42.24"	87° 33' 41.4"	Ganga	Arun Kosi	China	80	105	126	123	113	94	87	108	112
88	02_71P_030	NRSC	166G		5329	GL	28° 10' 21.36"	87° 28' 44.76"	Ganga	Arun Kosi	China	18	20	20	24	18	22	16	27	21
89	02_71P_031	NRSC	141G		5395	GL	28° 10' 3.36"	87° 37' 23.16"	Ganga	Arun Kosi	China	22	21	15	17	16	20	19	21	18
90	02_71P_032	NRSC	564G		5190	GL	28° 9' 49.32"	87° 34' 40.8"	Ganga	Arun Kosi	China	22	18	19	19	11	18	15	20	17
91	02_71P_033	NRSC			4888	GL	28° 9' 36.72"	87° 26' 36.6"	Ganga	Arun Kosi	China	31	21	21	17	8	29	9	28	19
92	02_71P_034	NRSC	726G		5259	GL	28° 9' 18"	87° 36' 46.44"	Ganga	Arun Kosi	China	23	20	24	25	25	19	11	27	23
93	02_71P_036	NRSC	54G		5121	GL	28° 8' 51.36"	87° 28' 6.96"	Ganga	Arun Kosi	China	32	38	37	38	30	37	36	46	36
94	02_71P_038	NRSC	586G		5483	GL	28° 8' 33.36"	87° 6' 42.12"	Ganga	Arun Kosi	China	23	27	27	27	30	30	20	30	28
95	02_71P_039	NRSC	396G		5489	GL	28° 8' 32.64"	87° 6' 19.08"	Ganga	Arun Kosi	China	15	19	19	18	19	19	16	19	19
96	02_71P_041	NRSC	768G		5064	GL	28° 6' 56.16"	87° 35' 12.84"	Ganga	Arun Kosi	China	17	18	18	18	12	17	17	21	17
97	02_71P_042	NRSC	654G		5524	GL	28° 7' 46.56"	87° 4' 55.56"	Ganga	Arun Kosi	China	20	20	20	21	21	20	19	19	20
98	02_71P_043	NRSC	18G	CH_231	5206	GL	28° 5' 36.6"	87° 38' 15"	Ganga	Arun Kosi	China	67	86	85	88	83	80	63	84	84

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
99	02_71P_044	NRSC	557G		5555	GL	28° 6' 540"	87° 4' 34.68"	Ganga	Arun Kosi	China	12	9	9	7	8	8	0	12	8
100	02_71P_046	NRSC	317G		4898	GL	28° 4' 9.84"	87° 8' 13.2"	Ganga	Arun Kosi	China	25	28	28	28	30	26	18	27	28
101	02_71P_047	NRSC	81G	CH_235	5614	GL	28° 4' 9.48"	87° 2' 53.88"	Ganga	Arun Kosi	China	80	95	94	95	95	94	84	95	95
102	02_71P_048	NRSC	283G		5094	GL	28° 3' 6.84"	87° 37' 36.48"	Ganga	Arun Kosi	China	17	18	19	18	18	17	18	19	18
103	02_71P_054	NRSC		CH_242	4859	GL	28° 12' 36"	87° 5' 60"	Ganga	Arun Kosi	China	#N/A	102	101	102	102	97	89	107	101
104	02_72I_004	NRSC	9G	CH_244	5074	GL	27° 56' 45.96"	86° 26' 47.4"	Ganga	Sun Kosi	China	121	190	185	185	184	183	184	221	185
105	02_72I_008	NRSC	99G		5040	GL	27° 55' 44.4"	86° 26' 0.6"	Ganga	Sun Kosi	China	32	36	36	36	34	31	30	33	35
106	02_72M_001	NRSC	737G		5675	GL	27° 59' 21.48"	87° 52' 5.16"	Ganga	Arun Kosi	China	10	7	7	6	6	6	6	7	6
107	02_72M_003	NRSC	823G		5608	GL	27° 58' 5.88"	87° 53' 3.84"	Ganga	Arun Kosi	China	20	18	18	18	14	17	18	19	17
108	02_72M_004	NRSC	336G		5293	GL	27° 57' 46.44"	87° 48' 42.12"	Ganga	Arun Kosi	China	35	56	50	49	55	48	47	50	52
109	02_72M_005	NRSC	139G	CH_251	5141	GL	27° 56' 57.12"	87° 55' 51.96"	Ganga	Arun Kosi	China	71	81	84	82	81	80	74	81	82
110	02_72M_006	NRSC	349G	CH_252	5188	GL	27° 57' 2.16"	87° 54' 31.68"	Ganga	Arun Kosi	China	65	65	66	66	65	65	62	65	65
111	02_72M_007	NRSC	33G	CH_253	4950	GL	27° 55' 35.04"	87° 46' 11.64"	Ganga	Arun Kosi	China	94	105	104	104	109	100	99	106	104
112	02_77D_005	NRSC	499G		5738	GL	28° 3' 52.92"	88° 32' 38.04"	Ganga	Arun Kosi	China	11	7	7	7	7	7	5	7	7
113	02_77D_006	NRSC		CH_261	4894	GL	28° 3' 21.6"	88° 25' 35.4"	Ganga	Arun Kosi	China	80	88	85	86	88	52	78	106	80
114	02_77D_007	NRSC	244G	CH_262	5215	GL	28° 1' 23.88"	88° 21' 16.2"	Ganga	Arun Kosi	China	55	57	53	56	56	55	53	57	55
115	02_77D_008	NRSC	266G	CH_263	5285	GL	28° 1' 6.24"	88° 17' 14.28"	Ganga	Arun Kosi	China	45	49	47	46	49	50	47	51	48
116	02_77D_009	NRSC	71G	CH_264	5296	GL	28° 0' 37.08"	88° 15' 29.52"	Ganga	Arun Kosi	China	58	62	62	63	63	64	60	71	63
117	02_77D_010	NRSC	590G		5127	GL	28° 0' 57.6"	88° 19' 10.92"	Ganga	Arun Kosi	China	34	37	38	37	38	37	36	38	37
118	02_77D_011	NRSC	393G		5305	GL	28° 0' 19.08"	88° 14' 26.88"	Ganga	Arun Kosi	China	39	45	46	46	48	49	42	46	47
119	02_78A_001	NRSC	498G		5201	GL	27° 59' 46.68"	88° 24' 7.2"	Ganga	Arun Kosi	China	16	20	23	24	23	20	11	24	22
120	02_78A_002	NRSC	668G		5397	GL	27° 59' 21.48"	88° 13' 15.96"	Ganga	Arun Kosi	China	17	14	14	12	10	9	8	16	12
121	02_78A_003	NRSC	24G	CH_269	5522	GL	27° 56' 46.68"	88° 4' 30.72"	Ganga	Arun Kosi	China	124	150	150	177	171	171	157	164	164
122	02_78A_004	NRSC	194G	CH_270	5603	GL	27° 55' 58.08"	88° 4' 48"	Ganga	Arun Kosi	China	84	123	119	116	115	120	118	122	119
123	02_78A_005	NRSC		CH_271	5376	GL	27° 55' 41.16"	88° 0' 10.08"	Ganga	Arun Kosi	China	89	111	110	113	112	98	103	112	109

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
124	02_78A_006	NRSC	676G		5743	GL	27° 55' 39"	88° 1' 11.64"	Ganga	Arun Kosi	China	16	16	18	16	16	19	16	18	17
125	03_77H_009	NRSC			5150	GL	28° 14' 54.24"	89° 51' 5.76"	Brahmaputra		China	15	15	15	15	15	15	15	15	15
126	03_77H_010	NRSC			5518	GL	28° 14' 22.92"	89° 57' 46.08"	Brahmaputra		China	13	15	13	14	14	14	12	14	14
127	03_77L_038	NRSC			5521	GL	28° 13' 29.64"	90° 15' 26.64"	Brahmaputra		China	30	13	13	14	14	13	12	14	13
128	03_77L_039	NRSC			5457	GL	28° 12' 19.44"	90° 23' 7.08"	Brahmaputra	Kuri Chhu	China	38	42	42	43	41	42	34	43	42
129	03_77L_057	NRSC			4897	GL	28° 3' 35.28"	90° 36' 12.24"	Brahmaputra	Kuri Chhu	China	36	44	44	45	45	45	39	48	45
130	03_77L_058	NRSC			5016	GL	28° 2' 53.88"	90° 35' 49.2"	Brahmaputra	Kuri Chhu	China	28	32	32	34	33	33	32	33	33
131	03_62J_003	NRSC			5553	GL	30° 48' 40.32"	82° 45' 14.04"	Brahmaputra		China	11	11	11	10	6	4	8	10	8
132	03_62J_004	NRSC			5556	GL	30° 48' 25.56"	82° 44' 58.92"	Brahmaputra		China	14	15	15	15	10	8	11	15	13
133	03_62J_009	NRSC			5624	GL	30° 33' 45.72"	82° 55' 14.16"	Brahmaputra		China	28	24	23	24	24	17	15	27	22
134	03_62J_010	NRSC			5571	GL	30° 33' 3.96"	82° 57' 27"	Brahmaputra		China	27	25	25	23	22	19	20	24	23
135	03_62J_016	NRSC		CH_288	5303	GL	30° 21' 43.92"	82° 3' 17.28"	Brahmaputra		China	44	55	45	51	48	47	47	64	49
136	03_62J_020	NRSC			5603	GL	30° 20' 25.8"	82° 8' 26.16"	Brahmaputra		China	18	15	14	15	15	13	6	15	14
137	03_62J_024	NRSC			5548	GL	30° 18' 35.64"	82° 11' 58.92"	Brahmaputra		China	31	20	20	20	20	18	17	20	20
138	03_62J_025	NRSC			5362	GL	30° 16' 55.92"	82° 10' 2.64"	Brahmaputra		China	19	20	20	23	20	11	15	27	19
139	03_62J_026	NRSC		CH_298	5078	GL	30° 15' 21.6"	82° 12' 34.2"	Brahmaputra		China	103	136	160	137	136	134	134	142	141
140	03_62J_027	NRSC			4781	GL	30° 15' 23.76"	82° 35' 21.12"	Brahmaputra		China	19	22	23	23	24	25	20	23	23
141	03_62J_028	NRSC			5603	GL	30° 13' 18.48"	82° 13' 58.44"	Brahmaputra		China	37	40	44	43	43	41	42	48	42
142	03_62J_031	NRSC		CH_303	4897	GL	30° 6' 14.04"	82° 16' 10.56"	Brahmaputra		China	160	224	240	223	242	205	201	287	227
143	03_62J_032	NRSC		CH_304	4857	GL	30° 4' 42.6"	82° 20' 32.28"	Brahmaputra		China	81	91	101	90	86	83	89	95	90
144	03_62K_005	NRSC			4999	GL	29° 58' 10.2"	82° 29' 39.84"	Brahmaputra		China	21	22	24	21	16	14	22	24	19
145	03_62K_006	NRSC			5101	GL	29° 57' 47.52"	82° 30' 27"	Brahmaputra		China	21	#	26	25	16	23	25	27	23
146	03_62K_007	NRSC			4911	GL	29° 56' 22.56"	82° 36' 7.56"	Brahmaputra		China	25	29	29	29	29	28	25	29	29
147	03_62K_008	NRSC			4968	GL	29° 55' 26.76"	82° 37' 4.44"	Brahmaputra		China	36	42	49	42	41	39	37	42	43
148	03_62K_009	NRSC		CH_313	5079	GL	29° 50' 25.8"	82° 47' 0.6"	Brahmaputra		China	250	314	299	319	313	311	199	319	311

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149	03_62K_010	NRSC			5181	GL	29° 47' 45.96"	82° 51' 10.08"	Brahmaputra		China	41	70	69	66	61	58	51	77	65
150	03_62K_011	NRSC			5136	GL	29° 45' 46.44"	82° 53' 6.36"	Brahmaputra		China	33	45	48	43	45	43	39	47	45
151	03_62K_012	NRSC		CH_316	5368	GL	29° 44' 7.8"	82° 58' 26.04"	Brahmaputra		China	73	91	80	98	89	87	80	92	89
152	03_62K_013	NRSC			5101	GL	29° 41' 17.88"	82° 59' 2.4"	Brahmaputra		China	37	46	47	48	44	43	44	455	46
153	03_62O_031	NRSC			5381	GL	29° 41' 40.2"	83° 1' 33.96"	Brahmaputra		China	28	34	30	30	36	14	26	37	29
154	03_62O_035	NRSC			5256	GL	29° 39' 19.44"	83° 6' 21.24"	Brahmaputra		China	29	33	31	30	33	32	32	34	32
155	03_62O_045	NRSC			5566	GL	29° 13' 17.4"	83° 41' 9.6"	Brahmaputra		China	11	#	9	10	10	8	9	10	9
156	03_71B_001	NRSC			5692	GL	30° 34' 48"	84° 4' 37.2"	Brahmaputra		China	27	29	28	19	25	24	27	27	25
157	03_71C_001	NRSC			5543	GL	29° 54' 51.84"	84° 36' 2.88"	Brahmaputra		China	11	9	9	5	6	5	6	9	7
158	03_71C_002	NRSC			5663	GL	29° 53' 15"	84° 32' 13.2"	Brahmaputra		China	12	10	10	7	7	6	3	10	8
159	03_71C_003	NRSC		CH_396	5412	GL	29° 51' 59.76"	84° 37' 26.4"	Brahmaputra		China	47	49	49	51	50	49	37	50	50
160	03_71C_004	NRSC			5575	GL	29° 51' 22.68"	84° 37' 56.28"	Brahmaputra		China	15	14	14	9	13	12	11	15	12
161	03_71C_005	NRSC		CH_398	5551	GL	29° 50' 43.8"	84° 40' 32.16"	Brahmaputra		China	57	49	49	48	44	44	44	53	47
162	03_71C_006	NRSC			5482	GL	29° 49' 4.8"	84° 41' 27.96"	Brahmaputra		China	22	21	19	17	16	15	5	21	18
163	03_71D_001	NRSC			5454	GL	28° 55' 44.76"	84° 18' 2.52"	Brahmaputra		China	21	20	20	11	20	19	15	19	18
164	03_71D_002	NRSC			5574	GL	28° 54' 30.6"	84° 30' 25.56"	Brahmaputra		China	30	35	35	37	35	31	29	36	35
165	03_71D_003	NRSC			5362	GL	28° 54' 33.84"	84° 20' 51.72"	Brahmaputra		China	11	11	10	3	11	10	10	11	9
166	03_71P_002	NRSC			5537	GL	28° 48' 13.32"	87° 37' 28.2"	Brahmaputra		China	13	13	13	17	17	17	15	17	15
167	03_71P_003	NRSC			5360	GL	28° 47' 47.76"	87° 38' 26.52"	Brahmaputra		China	23	34	25	26	26	26	12	36	27
168	03_71P_004	NRSC			5637	GL	28° 47' 55.68"	87° 36' 12.24"	Brahmaputra		China	12	10	11	11	10	9	1	11	10
169	03_77H_005	NRSC			5113	GL	28° 16' 48"	89° 59' 37.68"	Brahmaputra		China	37	20	20	23	24	25	21	35	22
170	03_77H_012	NRSC		CH_483	4723	GL	28° 14' 25.44"	89° 41' 41.28"	Brahmaputra		China	76	76	76	72	73	69	68	73	73
171	03_77H_013	NRSC		CH_484	4950	GL	28° 12' 32.04"	89° 44' 42.72"	Brahmaputra		China	48	45	45	46	45	44	40	45	45
172	03_77H_015	NRSC			4801	GL	28° 12' 10.44"	89° 42' 46.8"	Brahmaputra		China	12	14	14	14	13	13	13	15	14
173	03_77H_016	NRSC			4929	GL	28° 11' 10.32"	89° 35' 51"	Brahmaputra		China	38	44	44	34	34	33	31	34	38

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174	03_77H_022	NRSC			4936	GL	28° 8' 58.2"	89° 33' 52.56"	Brahmaputra		China	19	20	19	19	28	19	19	20	21
175	03_77H_026	NRSC			5233	GL	28° 7' 24.6"	89° 30' 47.52"	Brahmaputra		China	12	10	10	10	9	10	9	10	10
176	03_77H_027	NRSC			4927	GL	28° 5' 14.28"	89° 28' 50.16"	Brahmaputra		China	21	22	22	22	22	22	14	22	22
177	03_77H_032	NRSC			5056	GL	28° 1' 33.6"	89° 26' 59.64"	Brahmaputra		China	11	12	12	3	6	1	3	12	7
178	03_77J_001	NRSC			5354	GL	30° 30' 7.2"	90° 54' 46.08"	Brahmaputra		China	26	27	27	19	27	23	24	28	25
179	03_77J_002	NRSC			5254	GL	30° 29' 57.12"	90° 56' 52.8"	Brahmaputra		China	12	13	13	4	13	9	7	14	10
180	03_77J_005	NRSC			5766	GL	30° 4' 29.64"	90° 9' 24.48"	Brahmaputra		China	12	14	12	13	13	13	8	13	13
181	03_77K_002	NRSC			5154	GL	29° 54' 43.92"	90° 3' 46.8"	Brahmaputra		China	38	37	37	38	38	35	36	45	37
182	03_77K_003	NRSC			5303	GL	29° 52' 22.08"	90° 0' 28.08"	Brahmaputra		China	14	10	10	10	14	14	9	16	12
183	03_77L_019	NRSC			5681	GL	28° 22' 45.84"	90° 5' 41.28"	Brahmaputra		China	13	15	15	13	13	14	12	15	14
184	03_77L_020	NRSC			4682	GL	28° 20' 3.48"	90° 40' 26.4"	Brahmaputra	Kuri Chhu	China	14	9	9	9	10	11	7	11	10
185	03_77L_022	NRSC			4810	GL	28° 18' 14.76"	90° 44' 27.6"	Brahmaputra	Kuri Chhu	China	12	10	10	10	9	9	11	13	10
186	03_77L_023	NRSC			5489	GL	28° 18' 3.6"	90° 38' 48.84"	Brahmaputra	Kuri Chhu	China	33	29	29	32	26	30	26	29	29
187	03_77L_025	NRSC			5370	GL	28° 18' 0.72"	90° 36' 29.52"	Brahmaputra	Kuri Chhu	China	15	17	19	12	10	12	8	18	14
188	03_77L_028	NRSC			4632	GL	28° 16' 15.24"	90° 43' 19.2"	Brahmaputra	Kuri Chhu	China	12	12	12	14	11	10	12	14	12
189	03_77L_029	NRSC		CH_545	5451	GL	28° 16' 22.8"	90° 35' 24.36"	Brahmaputra	Kuri Chhu	China	45	33	33	42	34	47	36	49	38
190	03_77L_031	NRSC			4698	GL	28° 14' 52.08"	90° 42' 43.2"	Brahmaputra	Kuri Chhu	China	21	18	18	19	13	17	14	17	17
191	03_77L_032	NRSC		CH_547	4669	GL	28° 14' 32.64"	90° 43' 38.28"	Brahmaputra	Kuri Chhu	China	105	90	92	92	92	90	74	98	91
192	03_77L_034	NRSC			5500	GL	28° 14' 31.2"	90° 30' 23.76"	Brahmaputra	Kuri Chhu	China	21	22	21	22	17	21	15	21	21
193	03_77L_036	NRSC			5810	GL	28° 14' 17.52"	90° 29' 45.96"	Brahmaputra	Kuri Chhu	China	31	23	23	24	24	36	21	29	26
194	03_77L_041	NRSC		CH_550	5214	GL	28° 7' 24.6"	90° 34' 0.12"	Brahmaputra	Kuri Chhu	China	56	53	53	65	62	64	61	66	59
195	03_77L_042	NRSC		CH_551	5057	GL	28° 5' 56.4"	90° 44' 23.28"	Brahmaputra	Kuri Chhu	China	57	71	71	66	71	71	55	72	70
196	03_77L_043	NRSC		CH_552	5200	GL	28° 5' 21.84"	90° 47' 18.6"	Brahmaputra	Kuri Chhu	China	181	227	227	256	242	242	220	246	239
197	03_77L_045	NRSC			5224	GL	28° 5' 7.8"	90° 36' 17.64"	Brahmaputra	Kuri Chhu	China	32	33	33	32	27	29	28	34	31
198	03_77L_048	NRSC			4792	GL	28° 3' 48.24"	90° 54' 10.08"	Brahmaputra	Kuri Chhu	China	21	27	26	24	39	27	23	26	29

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
199	03_77L_053	NRSC			4793	GL	28° 3' 12.96"	90° 54' 8.28"	Brahmaputra	Kuri Chhu	China	25	#	31	23	26	24	44	54	26
200	03_77L_056	NRSC			4963	GL	28° 2' 46.32"	90° 55' 6.96"	Brahmaputra	Kuri Chhu	China	16	14	14	14	21	13	10	19	15
201	03_77P_021	NRSC		CH_592	4749	GL	28° 2' 15"	91° 27' 6.48"	Brahmaputra	Dangme Chhu	China	61	55	54	55	50	51	47	59	53
202	03_78A_004	NRSC			5456	GL	27° 57' 55.44"	88° 53' 37.68"	Brahmaputra		China	26	23	24	23	16	16	13	23	20
203	03_78A_011	NRSC			5168	GL	27° 53' 60"	88° 55' 45.84"	Brahmaputra	Amo Chhu	China	14	16	16	16	14	18	7	16	16
204	03_78A_030	NRSC			4447	GL	27° 25' 12.36"	88° 48' 45"	Brahmaputra	Amo Chhu	China	17	16	16	14	15	#N/A	11	16	#N/A
205	03_78E_016	NRSC			5004	GL	27° 53' 2.04"	89° 21' 2.52"	Brahmaputra		China	16	17	17	16	14	15	11	18	16
206	03_78E_017	NRSC		CH_609	5253	GL	27° 52' 35.76"	89° 17' 45.96"	Brahmaputra		China	65	47	47	44	41	45	42	44	45
207	03_78E_018	NRSC			5164	GL	27° 52' 45.12"	89° 19' 28.2"	Brahmaputra		China	24	#	18	19	13	14	14	18	16
208	03_78E_019	NRSC		CH_611	5022	GL	27° 52' 40.44"	89° 18' 43.2"	Brahmaputra		China	60	61	58	61	52	53	51	63	57
209	03_78E_023	NRSC		CH_612	5291	GL	27° 51' 17.64"	89° 15' 59.76"	Brahmaputra		China	38	56	56	54	57	47	57	68	54
210	03_78E_026	NRSC		CH_613	5161	GL	27° 48' 31.32"	89° 13' 37.2"	Brahmaputra	Amo Chhu	China	36	59	50	50	57	45	48	60	52
211	03_82C_011	NRSC			5242	GL	29° 45' 0.72"	92° 46' 40.8"	Brahmaputra		China	12	14	15	15	18	17	10	15	16
212	03_82F_001	NRSC			4822	GL	30° 52' 59.16"	93° 49' 51.24"	Brahmaputra		China	17	14	14	15	14	13	14	15	14
213	03_82F_005	NRSC			4762	GL	30° 32' 6.36"	93° 31' 2.28"	Brahmaputra		China	17	47	42	43	42	40	31	44	43
214	03_82F_007	NRSC		CH_732	4801	GL	30° 31' 13.8"	93° 26' 41.28"	Brahmaputra		China	115	110	110	117	116	114	112	116	113
215	03_82F_009	NRSC			4712	GL	30° 29' 36.6"	93° 21' 27.72"	Brahmaputra		China	20	0	24	24	24	22	22	24	19
216	03_82F_010	NRSC		CH_735	5030	GL	30° 28' 13.08"	93° 31' 59.52"	Brahmaputra		China	44	17	18	17	18	19	10	24	18
217	03_82F_011	NRSC			4720	GL	30° 26' 26.16"	93° 37' 45.84"	Brahmaputra		China	12	3	3	7	12	12	7	13	7
218	03_82F_012	NRSC			4454	GL	30° 21' 27.36"	93° 37' 52.68"	Brahmaputra		China	39	1	19	19	19	19	19	20	15
219	03_82F_013	NRSC			4761	GL	30° 21' 16.92"	93° 31' 40.08"	Brahmaputra		China	10	0	13	13	13	12	3	12	10
220	03_82F_014	NRSC		CH_739	4691	GL	30° 20' 52.08"	93° 30' 24.12"	Brahmaputra		China	49	44	45	45	45	43	37	46	44
221	03_82F_018	NRSC			4554	GL	30° 17' 15.72"	93° 28' 45.12"	Brahmaputra		China	17	#	17	17	17	17	10	17	17
222	03_82F_020	NRSC		CH_745	4110	GL	30° 16' 3"	93° 27' 22.68"	Brahmaputra		China	71	49	70	70	70	70	66	70	66
223	03_82F_021	NRSC			4487	GL	30° 14' 58.56"	93° 36' 49.32"	Brahmaputra		China	11	0	11	12	12	11	9	15	9

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224	03_82F_022	NRSC		CH_747	4200	GL	30° 14' 30.48"	93° 38' 14.28"	Brahmaputra		China	103	110	111	111	112	103	109	112	109
225	03_82F_023	NRSC			4354	GL	30° 13' 57"	93° 34' 35.76"	Brahmaputra		China	11	8	8	8	11	12	10	12	9
226	03_82F_024	NRSC			4197	GL	30° 13' 39.36"	93° 38' 11.04"	Brahmaputra		China	17	117	19	20	20	19	19	23	39
227	03_82F_025	NRSC			4253	GL	30° 12' 29.52"	93° 30' 44.28"	Brahmaputra		China	11	0	14	11	10	11	6	14	9
228	03_82F_026	NRSC			4607	GL	30° 10' 21"	93° 43' 5.52"	Brahmaputra		China	13	10	10	10	10	12	9	14	10
229	03_82G_003	NRSC			4936	GL	29° 47' 24.36"	93° 29' 17.88"	Brahmaputra		China	13	15	18	19	13	22	13	25	17
230	03_82G_004	NRSC			4498	GL	29° 43' 54.12"	93° 29' 52.44"	Brahmaputra		China	38	31	31	30	29	29	29	32	30
231	03_82G_007	NRSC			4994	GL	29° 39' 28.08"	93° 16' 30"	Brahmaputra		China	16	#	12	10	15	10	12	13	12
232	03_82J_001	NRSC			4775	GL	30° 49' 51.6"	94° 0' 32.4"	Brahmaputra		China	31	27	27	29	28	28	28	35	28
233	03_82J_003	NRSC			4161	GL	30° 41' 4.2"	94° 19' 25.32"	Brahmaputra		China	22	9	30	31	28	29	7	42	25
234	03_82J_004	NRSC		CH_834	3957	GL	30° 39' 37.8"	94° 29' 7.8"	Brahmaputra		China	356	495	509	510	596	432	505	557	508
235	03_82J_005	NRSC		CH_835	4134	GL	30° 37' 34.68"	94° 26' 42"	Brahmaputra		China	67	74	74	74	68	71	74	81	72
236	03_82J_006	NRSC			3657	GL	30° 32' 8.88"	94° 45' 38.16"	Brahmaputra		China	41	51	59	59	58	52	48	59	56
237	03_82J_008	NRSC		CH_838	4036	GL	30° 27' 0.72"	94° 36' 14.76"	Brahmaputra		China	156	208	211	212	212	207	209	245	210
238	03_82J_018	NRSC		CH_848	3913	GL	30° 6' 54.72"	94° 11' 17.16"	Brahmaputra		China	99	83	83	77	94	93	78	93	86
239	03_82J_019	NRSC		CH_849	3944	GL	30° 5' 49.56"	94° 16' 10.92"	Brahmaputra		China	45	#	90	85	88	59	80	104	81
240	03_82K_109	NRSC			4356	GL	29° 3' 7.2"	94° 5' 49.2"	Brahmaputra		China	22	22	22	18	20	20	20	24	20
241	03_82L_004	NRSC			4441	GL	28° 54' 20.16"	94° 0' 14.04"	Brahmaputra		China	13	12	12	11	16	17	10	15	14
242	03_82L_006	NRSC			4147	GL	28° 52' 48.36"	94° 2' 22.92"	Brahmaputra		China	13	13	13	13	14	14	13	14	13
243	03_82L_008	NRSC			4342	GL	28° 52' 12.36"	94° 1' 58.8"	Brahmaputra		China	12	11	11	8	12	13	9	12	11
244	03_82L_009	NRSC		CH_971	3893	GL	28° 51' 14.04"	94° 0' 7.2"	Brahmaputra		China	54	60	60	74	67	45	46	76	61
245	03_82N_001	NRSC			5055	GL	30° 35' 27.96"	95° 33' 3.24"	Brahmaputra		China	38	36	36	31	34	32	32	34	34
246	03_82N_004	NRSC		CH_975	4290	GL	30° 36' 3.96"	95° 10' 59.16"	Brahmaputra		China	92	124	118	123	135	48	132	145	110
247	03_82N_008	NRSC			4546	GL	30° 34' 19.2"	95° 15' 15.48"	Brahmaputra		China	18	32	36	35	31	30	26	40	33
248	03_82N_011	NRSC			4997	GL	30° 31' 23.52"	95° 42' 0"	Brahmaputra		China	20	27	22	14	14	16	14	21	19

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249	03_82N_015	NRSC			5090	GL	30° 32' 44.88"	95° 20' 35.52"	Brahmaputra		China	10	5	5	5	6	6	4	7	5
250	03_82N_016	NRSC			5017	GL	30° 32' 24.36"	95° 22' 30.36"	Brahmaputra		China	11	4	4	3	2	#	4	7	3
251	03_82N_018	NRSC			4333	GL	30° 31' 44.4"	95° 6' 23.4"	Brahmaputra		China	11	#	10	10	10	7	4	13	9
252	03_82N_025	NRSC			4764	GL	30° 22' 51.24"	95° 39' 12.96"	Brahmaputra		China	27	24	25	23	24	23	18	24	24
253	03_82N_029	NRSC			4492	GL	30° 16' 4.8"	95° 36' 21.6"	Brahmaputra		China	35	#	43	42	36	39	36	43	40
254	03_82N_030	NRSC		CH_1001	4462	GL	30° 15' 2.88"	95° 36' 13.68"	Brahmaputra		China	132	136	136	138	133	125	80	137	134
255	03_82N_031	NRSC			4409	GL	30° 14' 17.88"	95° 36' 8.28"	Brahmaputra		China	17	#	16	16	16	15	10	16	16
256	03_82N_032	NRSC			4384	GL	30° 13' 44.4"	95° 35' 30.84"	Brahmaputra		China	28	#	39	43	30	23	17	49	34
257	03_82N_033	NRSC		CH_1004	4357	GL	30° 13' 16.68"	95° 35' 0.24"	Brahmaputra		China	89	83	83	89	85	81	71	88	84
258	03_82N_034	NRSC			4181	GL	30° 13' 23.52"	95° 32' 32.64"	Brahmaputra		China	13	#	14	15	15	12	12	18	14
259	03_82N_035	NRSC			4479	GL	30° 10' 50.16"	95° 51' 20.88"	Brahmaputra		China	23	#	22	19	15	17	11	20	18
260	03_82N_037	NRSC			4691	GL	30° 0' 30.96"	95° 54' 54.36"	Brahmaputra		China	13	#	12	10	10	12	10	13	11
261	03_82O_001	NRSC			4348	GL	29° 59' 32.64"	95° 51' 50.4"	Brahmaputra		China	42	42	42	41	47	48	32	42	44
262	03_82O_002	NRSC			4198	GL	29° 58' 57.36"	95° 54' 12.96"	Brahmaputra		China	18	19	19	19	18	20	18	19	19
263	03_82O_003	NRSC			4180	GL	29° 54' 16.92"	95° 54' 31.32"	Brahmaputra		China	15	#	13	17	14	14	13	13	15
264	03_82O_004	NRSC			4148	GL	29° 48' 18.72"	95° 38' 33"	Brahmaputra		China	18	10	10	18	24	22	2	25	17
265	03_83A_001	NRSC			5018	GL	27° 58' 51.6"	92° 39' 3.96"	Brahmaputra		China	52	48	48	46	47	46	40	48	47
266	03_91C_002	NRSC			4691	GL	29° 53' 36.96"	96° 22' 40.44"	Brahmaputra		China	23	#	33	34	32	31	22	34	33
267	03_91C_003	NRSC			4703	GL	29° 52' 59.88"	96° 23' 21.12"	Brahmaputra		China	24	#	31	31	26	28	26	30	29
268	03_91C_004	NRSC			4137	GL	29° 52' 26.76"	96° 19' 29.28"	Brahmaputra		China	21	18	18	19	20	19	15	19	19
269	03_91C_005	NRSC		CH_1056	4926	GL	29° 49' 23.16"	96° 21' 2.52"	Brahmaputra		China	86	#	94	104	97	97	95	103	98
270	03_91C_006	NRSC			5057	GL	29° 45' 11.16"	96° 27' 48.96"	Brahmaputra		China	14	4	4	4	3	4	3	5	4
271	03_91C_007	NRSC			4817	GL	29° 45' 42.48"	96° 22' 26.76"	Brahmaputra		China	11	#	11	9	2	10	7	12	8
272	03_91C_008	NRSC			4899	GL	29° 42' 21.6"	96° 18' 24.84"	Brahmaputra		China	23	#	21	20	18	20	24	25	20
273	03_91C_010	NRSC			4712	GL	29° 39' 49.32"	96° 33' 8.64"	Brahmaputra		China	23	#	21	21	21	21	21	22	21

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274	03_91C_012	NRSC			4663	GL	29° 35' 18.6"	96° 40' 18.84"	Brahmaputra		China	21	17	17	17	12	19	18	20	16
275	03_91C_013	NRSC			4925	GL	29° 33' 38.16"	96° 37' 40.44"	Brahmaputra		China	12	#	#	#	#	#	12	14	#
276	03_91C_014	NRSC		CH_1065	4033	GL	29° 35' 56.4"	96° 8' 28.68"	Brahmaputra		China	65	53	51	48	52	47	40	66	50
277	03_91C_015	NRSC			4421	GL	29° 34' 14.88"	96° 22' 26.04"	Brahmaputra		China	26	21	21	21	15	21	12	23	20
278	03_91C_016	NRSC			4813	GL	29° 32' 36.6"	96° 36' 57.96"	Brahmaputra		China	13	13	13	13	4	10	10	15	11
279	03_91C_019	NRSC			3858	GL	29° 27' 55.08"	96° 30' 4.32"	Brahmaputra		China	17	49	51	49	44	44	46	55	47
280	03_91C_021	NRSC			4093	GL	29° 25' 15.96"	96° 37' 30.72"	Brahmaputra		China	35	31	31	28	32	31	26	32	31
281	03_91C_023	NRSC			4811	GL	29° 23' 8.88"	96° 22' 22.08"	Brahmaputra	Lohit	China	30	19	19	12	14	31	31	31	19
282	03_91C_024	NRSC		CH_1075	3977	GL	29° 17' 53.16"	96° 48' 59.04"	Brahmaputra		China	262	287	291	233	287	289	275	377	277
283	03_91C_025	NRSC		CH_1076	4022	GL	29° 17' 40.2"	96° 50' 3.84"	Brahmaputra		China	95	110	109	102	106	99	100	114	105
284	03_91C_033	NRSC		CH_1079	4278	GL	29° 13' 46.92"	96° 48' 4.68"	Brahmaputra		China	164	138	143	136	146	147	129	147	142
285	03_91C_035	NRSC			4283	GL	29° 13' 20.64"	96° 48' 34.2"	Brahmaputra		China	24	54	56	55	55	34	54	57	51
286	03_91C_036	NRSC			4298	GL	29° 13' 6.96"	96° 48' 52.2"	Brahmaputra		China	16	#	#	#	#	#	53	55	#
287	03_91C_043	NRSC			4429	GL	29° 10' 44.04"	96° 51' 12.96"	Brahmaputra		China	26	11	11	9	5	9	10	14	9
288	03_91C_071	NRSC			4339	GL	29° 2' 31.2"	96° 13' 12"	Brahmaputra	Dibang	China	35	35	35	32	41	37	33	37	36
289	03_91C_074	NRSC		CH_1102	4258	GL	29° 1' 48"	96° 13' 22.8"	Brahmaputra	Dibang	China	47	#	52	51	56	51	39	54	53
290	03_91D_070	NRSC			4126	GL	28° 36' 36.36"	96° 43' 19.56"	Brahmaputra	Lohit	China	12	18	18	12	3	13	13	18	13
291	03_91D_082	NRSC			4550	GL	28° 32' 28.68"	96° 36' 5.04"	Brahmaputra	Lohit	China	31	55	26	23	28	26	23	35	32
292	03_91D_096	NRSC			3794	GL	28° 25' 56.64"	96° 55' 32.52"	Brahmaputra	Lohit	China	38	#	#	#	#	#	39	40	#
293	03_91D_098	NRSC			4197	GL	28° 24' 10.44"	96° 50' 11.76"	Brahmaputra	Lohit	China	13	#	15	8	15	11	6	18	12
294	03_91D_099	NRSC			4406	GL	28° 23' 31.2"	96° 51' 28.44"	Brahmaputra	Lohit	China	30	0	27	26	24	30	30	43	21
295	03_91G_001	NRSC			5147	GL	29° 42' 4.32"	97° 0' 28.8"	Brahmaputra		China	12	9	9	9	5	10	5	11	8
296	03_91G_003	NRSC			5018	GL	29° 28' 1.2"	97° 22' 29.28"	Brahmaputra	Lohit	China	15	21	21	18	12	16	14	25	18
297	03_91G_004	NRSC			5262	GL	29° 29' 48.48"	97° 6' 10.8"	Brahmaputra	Lohit	China	21	32	32	27	23	23	26	36	27
298	03_91G_005	NRSC			5170	GL	29° 24' 7.56"	97° 0' 32.4"	Brahmaputra	Lohit	China	14	#	10	11	7	8	10	11	9

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
299	03_91G_006	NRSC			5028	GL	29° 23' 30.48"	97° 1' 8.76"	Brahmaputra	Lohit	China	27	24	24	19	13	16	15	20	19
300	03_91G_007	NRSC			4785	GL	29° 13' 47.28"	97° 19' 55.92"	Brahmaputra	Lohit	China	11	12	12	11	10	13	9	14	12
301	03_91G_009	NRSC			4637	GL	29° 12' 2.88"	97° 22' 8.4"	Brahmaputra	Lohit	China	16	19	16	17	14	16	8	16	16
302	03_91H_001	NRSC			4429	GL	28° 59' 30.84"	97° 32' 54.24"	Brahmaputra	Lohit	China	13	19	19	13	15	13	12	18	16
303	03_91H_003	NRSC			4439	GL	28° 59' 22.56"	97° 16' 4.08"	Brahmaputra	Lohit	China	10	15	15	10	11	11	9	15	12
304	03_91H_006	NRSC			4620	GL	28° 57' 28.8"	97° 20' 3.84"	Brahmaputra	Lohit	China	17	17	17	16	15	19	14	17	17
305	03_91H_007	NRSC			4635	GL	28° 56' 52.08"	97° 19' 11.64"	Brahmaputra	Lohit	China	27	#	28	35	28	28	20	29	30
306	03_91H_008	NRSC			4755	GL	28° 56' 41.28"	97° 18' 12.6"	Brahmaputra	Lohit	China	40	#	50	42	41	52	40	52	46
307	03_91H_015	NRSC			4553	GL	28° 51' 10.08"	97° 37' 50.88"	Brahmaputra	Lohit	China	14	#	12	8	11	9	8	14	10
308	03_91H_033	NRSC			4389	GL	28° 33' 21.96"	97° 32' 51.72"	Brahmaputra	Lohit	China	13	12	12	9	10	10	9	12	11
309	03_91H_034	NRSC			4629	GL	28° 32' 13.2"	97° 37' 15.6"	Brahmaputra	Lohit	China	13	14	14	13	12	13	11	14	13
310	03_91H_036	NRSC			4457	GL	28° 31' 5.16"	97° 31' 35.76"	Brahmaputra	Lohit	China	19	23	23	18	19	22	15	26	21
311	03_78A_025	NRSC			4888	GL	27° 38' 10.32"	88° 48' 57.96"	Brahmaputra	Amo Chhu	China	10	#	12	7	13	8	7	12	10
312	01_52L_008	NRSC		CH_1	3873	WB	32° 19' 35.04"	78° 43' 25.68"	Brahmaputra	Sutlej	China	50	98	30	4	5	#_Dry	0	0	34
313	01_52N_001	NRSC		CH_3	4964	WB	34° 9' 32.04"	79° 46' 45.84"	Indus	Indus	China	11564	12246	12256	12235	12281	12279	12209	12339	12259
314	01_52O_001	NRSC		CH_4	4242	WB	33° 45' 0"	79° 14' 24"	Indus	Shyok	China	65825	68957	68755	70219	69124	61166	68950	69953	67644
315	01_52O_002	NRSC		CH_5	5262	WB	33° 58' 49.08"	79° 32' 35.52"	Indus	Indus	China	135	82	83	81	108	113	89	127	93
316	01_52O_003	NRSC		CH_6	4252	WB	33° 33' 43.56"	79° 57' 46.8"	Indus	Indus	China	290	183	200	209	187	201	201	221	196
317	01_52O_005	NRSC		CH_8	4358	WB	33° 23' 25.08"	79° 22' 1.2"	Indus	Indus	China	780	760	768	794	835	833	630	822	798
318	01_61B_003	NRSC		CH_28	5074	WB	34° 14' 5.64"	80° 30' 20.88"	Indus	Indus	China	224	232	217	216	217	199	210	239	216
319	01_61C_001	NRSC		CH_29	4526	WB	33° 57' 12.6"	80° 54' 12.96"	Indus	Indus	China	11154	11732	11712	11192	11582	11730	11721	11788	11590
320	01_61C_002	NRSC		CH_30	4494	WB	33° 45' 3.96"	80° 35' 51.72"	Indus	Indus	China	685	865	875	877	877	874	811	883	874
321	01_61C_004	NRSC			4495	WB	33° 45' 16.2"	80° 38' 37.68"			China	21	#	#	#	#	#	0	0	#DIV/0!
322	01_61C_005	NRSC		CH_33	4495	WB	33° 44' 54.96"	80° 38' 29.76"	Indus	Indus	China	139	288	380	382	382	380	390	392	362
323	01_61C_010	NRSC			4495	WB	33° 43' 28.92"	80° 41' 25.08"	Indus	Indus	China	88	112	395	148	162	160	144	161	195

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
324	01_61C_011	NRSC		CH_39	4494	WB	33° 43' 13.44"	80° 43' 16.68"	Indus	Indus	China	403	500	634	653	656	601	502	685	609
325	01_61C_012	NRSC		CH_40	4282	WB	33° 32' 45.24"	80° 9' 21.6"	Indus	Indus	China	290	304	290	299	298	309	302	374	300
326	01_61C_014	NRSC		CH_42	4279	WB	33° 29' 57.12"	80° 20' 60"	Indus	Indus	China	286	326	326	326	295	285	274	304	312
327	01_61C_015	NRSC		CH_43	4280	WB	33° 29' 16.44"	80° 18' 58.32"	Indus	Indus	China	742	816	866	827	827	780	548	859	823
328	01_61C_016	NRSC		CH_44	4289	WB	33° 25' 58.44"	80° 27' 59.76"	Indus	Indus	China	344	382	368	361	355	350	369	396	363
329	01_61C_018	NRSC		CH_46	4291	WB	33° 22' 1.2"	80° 33' 11.16"	Indus	Indus	China	1779	1916	1896	1231	1928	1794	1572	2008	1753
330	01_61C_021	NRSC		CH_49	4349	WB	33° 6' 16.56"	80° 17' 10.32"	Indus	Indus	China	1155	1216	1138	1110	1155	1095	1092	1210	1143
331	01_61C_022	NRSC		CH_50	4339	WB	33° 5' 51.36"	80° 23' 34.08"	Indus	Indus	China	1420	1610	1584	1674	1655	#	1583	1697	1631
332	01_61C_023	NRSC		CH_51	4350	WB	33° 5' 57.48"	80° 10' 38.64"	Indus	Indus	China	623	648	648	663	663	658	616	674	656
333	01_61C_024	NRSC		CH_52	4323	WB	33° 2' 6.72"	80° 34' 51.96"	Indus	Indus	China	4486	5153	5121	5129	5105	5129	4949	5120	5127
334	01_61D_001	NRSC		CH_53	5593	WB	32° 48' 5.4"	80° 29' 0.96"	Indus	Indus	China	63	42	39	35	5	#	33	33	30
335	01_61D_002	NRSC		CH_54	4313	WB	32° 32' 12.12"	80° 13' 42.96"	Indus	Indus	China	1216	1535	1603	1556	1637	1509	1263	1626	1568
336	01_61D_003	NRSC		CH_55	4453	WB	32° 25' 23.52"	80° 51' 55.08"	Indus	Indus	China	69	53	39	50	56	56	41	54	51
337	01_61D_004	NRSC		CH_56	4991	WB	32° 9' 24.84"	80° 18' 11.88"	Indus	Indus	China	550	515	536	541	540	444	520	568	515
338	01_61F_002	NRSC		CH_59	5279	WB	34° 17' 55.32"	81° 12' 5.4"	Indus	Indus	China	59	32	34	59	59	39	42	60	45
339	01_61F_003	NRSC		CH_60	5256	WB	34° 16' 30.36"	81° 3' 7.56"	Indus	Indus	China	570	524	562	574	569	393	550	571	524
340	01_61F_004	NRSC		CH_61	4814	WB	34° 1' 19.92"	81° 36' 47.88"	Indus	Indus	China	36392	35372	39077	36826	39064	39148	3839	42331	37897
341	01_61G_001	NRSC		CH_62	4973	WB	33° 49' 12.72"	81° 38' 40.56"	Indus	Indus	China	85	#	#	#	#	#	56	67	#
342	01_61G_002	NRSC		CH_63	4663	WB	33° 40' 21.72"	81° 22' 16.32"	Indus	Indus	China	1134	1378	1379	1376	1374	1373	1378	1438	1376
343	01_61G_003	NRSC		CH_64	4864	WB	33° 37' 59.88"	81° 23' 14.64"	Indus	Indus	China	85	82	#	#	#	#	42	71	82
344	01_61H_001	NRSC		CH_66	4619	WB	32° 7' 7.68"	81° 16' 9.84"	Indus	Indus	China	282	219	175	311	321	315	309	330	268
345	01_62A_003	NRSC		CH_69	5142	WB	31° 34' 40.08"	80° 59' 22.2"	Indus	Indus	China	1355	1348	1342	1387	1405	879	1339	1415	1272
346	01_62B_001	NRSC		CH_73	4526	WB	30° 49' 22.8"	80° 44' 34.8"	Indus	Sutlej	China	440	242	242	259	273	242	206	267	252
347	01_62E_002	NRSC		CH_77	5139	WB	31° 36' 58.32"	81° 1' 48"	Indus	Indus	China	161	132	117	117	132	126	128	168	125
348	01_62E_003	NRSC		CH_78	5104	WB	31° 27' 30.24"	81° 5' 26.52"	Indus	Indus	China	136	155	163	160	162	147	145	161	157

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
349	01_62E_004	NRSC		CH_79	5161	WB	31° 21' 24.48"	81° 8' 59.28"	Indus	Indus	China	233	260	256	247	260	210	246	252	247
350	01_62E_005	NRSC		CH_80	5174	WB	31° 18' 47.88"	81° 31' 1.56"	Indus	Indus	China	189	207	210	210	213	210	202	234	210
351	01_62E_006	NRSC		CH_81	5055	WB	31° 17' 31.2"	81° 14' 40.92"	Indus	Indus	China	524	537	546	538	538	543	525	542	540
352	01_62E_010	NRSC		CH_85	5233	WB	31° 16' 26.76"	81° 35' 41.64"	Indus	Indus	China	156	148	127	155	164	144	147	157	148
353	01_62E_013	NRSC		CH_88	5345	WB	31° 14' 29.4"	81° 41' 9.96"	Indus	Indus	China	166	142	157	151	168	151	146	172	154
354	01_62E_015	NRSC		CH_90	5415	WB	31° 10' 56.28"	81° 11' 40.2"	Indus	Sutlej	China	51	47	47	46	52	34	34	53	45
355	01_62F_001	NRSC		CH_92	4571	WB	30° 41' 19.68"	81° 13' 55.2"	Indus	Sutlej	China	25486	24655	24135	24888	24395	24899	24525	24695	24594
356	01_62F_002	NRSC		CH_93	4592	WB	30° 48' 6.48"	81° 33' 54.72"	Indus	Sutlej	China	333	320	310	272	263	202	295	344	273
357	01_62F_003	NRSC		CH_94	4586	WB	30° 41' 5.28"	81° 28' 12.36"	Indus	Sutlej	China	40552	41749	41492	41641	41879	17546	41211	41720	36861
358	01_62F_004	NRSC		CH_95	5493	WB	30° 25' 50.88"	81° 25' 58.44"	Indus	Sutlej	China	196	157	157	161	161	184	173	202	164
359	01_62J_001	NRSC		CH_102	4784	WB	30° 38' 15.72"	82° 8' 6.36"	Indus	Sutlej	China	5571	5750	5675	5780	6163	5920	5718	5773	5858
360	02_62B_001	NRSC		CH_106	5216	WB	30° 37' 4.8"	80° 37' 49.44"	Ganga	Karnali	China	67	37	37	40	34	32	28	28	36
361	02_71H_001	NRSC		CH_121	4580	WB	28° 53' 32.28"	85° 35' 8.52"	Ganga	Arun Kosi	China	26825	27331	25876	27425	26892	27065	25887	27733	26918
362	02_71H_002	NRSC		CH_122	4650	WB	28° 43' 24.96"	85° 52' 46.56"	Ganga	Arun Kosi	China	2152	2448	2497	2564	2562	2566	2452	2571	2527
363	02_71H_003	NRSC		CH_123	4649	WB	28° 41' 10.32"	85° 57' 15.12"	Ganga	Arun Kosi	China	166	230	230	226	224	221	217	227	226
364	02_71H_028	NRSC	15G	CH_148	5174	WB	28° 19' 49.08"	85° 52' 7.32"	Ganga	Sun Kosi	China	200	205	205	215	205	202	191	197	206
365	02_71H_035	NRSC		CH_155	4366	WB	28° 10' 57"	85° 55' 22.44"	Ganga	Sun Kosi	China	45	44	44	45	43	45	42	44	44
366	02_71L_001	NRSC		CH_156	5106	WB	28° 53' 12.84"	86° 30' 52.2"	Ganga	Arun Kosi	China	83	80	90	94	95	88	82	111	89
367	02_71L_002	NRSC		CH_157	5261	WB	28° 51' 29.16"	86° 31' 12.36"	Ganga	Arun Kosi	China	72	78	78	77	84	78	75	83	79
368	02_71L_003	NRSC		CH_158	5324	WB	28° 49' 55.92"	86° 31' 21"	Ganga	Arun Kosi	China	258	268	268	274	281	272	252	283	273
369	02_71P_015	NRSC		CH_203	4153	WB	28° 34' 35.76"	87° 32' 38.76"	Ganga	Arun Kosi	China	838	1211	1059	1067	1062	953	932	1230	1070
370	02_71P_016	NRSC		CH_204	4182	WB	28° 29' 56.76"	87° 27' 7.92"	Ganga	Arun Kosi	China	137	163	162	148	156	133	101	164	152
371	02_71P_018	NRSC		CH_206	4199	WB	28° 21' 27.72"	87° 53' 6.72"	Ganga	Arun Kosi	China	51	#	63	60	57	57	55	60	59
372	02_71P_025	NRSC		CH_213	4807	WB	28° 12' 51.12"	87° 28' 5.88"	Ganga	Arun Kosi	China	104	114	102	95	172	130	117	148	123
373	02_71P_035	NRSC		CH_223	5146	WB	28° 9' 7.2"	87° 9' 27"	Ganga	Arun Kosi	China	107	90	90	87	79	94	78	94	88

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374	02_71P_040	NRSC	126G	CH_228	4962	WB	28° 6' 50.04"	87° 39' 19.08"	Ganga	Arun Kosi	China	126	150	155	158	148	157	151	156	154
375	02_77D_001	NRSC		CH_256	4423	WB	28° 24' 16.2"	88° 13' 42.96"	Ganga	Arun Kosi	China	5831	3118	3195	2846	3091	1832	2030	2506	2816
376	02_77D_003	NRSC		CH_258	4364	WB	28° 18' 33.12"	88° 19' 31.08"	Ganga	Arun Kosi	China	119	#	#	#	#	#	53	95	#DIV/0!
377	02_77D_004	NRSC		CH_259	4378	WB	28° 17' 38.04"	88° 7' 15.6"	Ganga	Arun Kosi	China	1875	215	74	160	410	190	574	686	210
378	03_77L_068	NRSC		BH_36	4764	WB	28° 0' 12.6"	90° 54' 18.36"	Brahmaputra	Kuri Chhu	China	86	77	77	70	76	84	71	83	77
379	03_62J_001	NRSC		CH_273	5449	WB	30° 52' 49.8"	82° 51' 33.12"	Brahmaputra		China	147	136	149	143	148	118	138	151	139
380	03_62J_011	NRSC		CH_283	5181	WB	30° 28' 6.6"	82° 3' 33.12"	Brahmaputra		China	401	398	382	382	398	359	388	414	384
381	03_62J_012	NRSC		CH_284	4883	WB	30° 25' 53.4"	82° 21' 42.12"	Brahmaputra		China	165	154	171	171	157	153	144	169	161
382	03_62J_013	NRSC		CH_285	4934	WB	30° 25' 8.04"	82° 18' 7.92"	Brahmaputra		China	854	910	932	960	899	901	910	955	920
383	03_62J_015	NRSC		CH_287	5207	WB	30° 23' 52.08"	82° 11' 32.28"	Brahmaputra		China	70	80	80	84	85	84	76	86	83
384	03_62K_001	NRSC		CH_305	4834	WB	29° 59' 8.16"	82° 32' 4.56"	Brahmaputra		China	370	386	379	378	395	376	376	394	383
385	03_62K_002	NRSC		CH_306	4858	WB	29° 58' 48.36"	82° 35' 17.16"	Brahmaputra		China	45	49	48	48	48	47	48	57	48
386	03_62N_001	NRSC		CH_318	5102	WB	30° 53' 20.04"	83° 34' 48.72"	Brahmaputra		China	14300	14434	14739	14711	14111	14801	14682	15152	14559
387	03_62N_003	NRSC		CH_320	5208	WB	30° 42' 38.16"	83° 36' 30.96"	Brahmaputra		China	57	14	14	8	5	6	4	32	9
388	03_62N_004	NRSC		CH_321	5168	WB	30° 40' 5.16"	83° 37' 30.72"	Brahmaputra		China	878	913	898	872	841	800	763	904	865
389	03_62N_009	NRSC		CH_326	5241	WB	30° 35' 26.88"	83° 31' 7.32"	Brahmaputra		China	288	298	298	298	299	202	220	299	279
390	03_62N_017	NRSC		CH_334	5454	WB	30° 27' 55.44"	83° 59' 4.2"	Brahmaputra		China	77	78	70	81	86	82	78	82	79
391	03_62N_021	NRSC		CH_338	5432	WB	30° 25' 50.88"	83° 59' 48.84"	Brahmaputra		China	197	192	187	196	213	200	180	204	198
392	03_62N_022	NRSC		CH_339	4599	WB	30° 12' 15.12"	83° 14' 31.92"	Brahmaputra		China	198	198	188	190	196	188	162	202	192
393	03_62O_002	NRSC		CH_347	4587	WB	29° 57' 38.52"	83° 16' 11.64"	Brahmaputra		China	58	38	48	54	43	44	38	55	45
394	03_62O_024	NRSC		CH_369	4637	WB	29° 51' 26.64"	83° 15' 5.76"	Brahmaputra		China	721	856	839	841	842	855	825	894	847
395	03_62O_027	NRSC		CH_372	4575	WB	29° 48' 47.16"	83° 39' 15.48"	Brahmaputra		China	47	46	#	#	#	#	37	39	46
396	03_62O_028	NRSC		CH_373	4577	WB	29° 47' 40.92"	83° 33' 20.88"	Brahmaputra		China	887	#	#	#	#	#	230	360	#DIV/0!
397	03_62O_030	NRSC		CH_375	5013	WB	29° 43' 34.68"	83° 6' 16.56"	Brahmaputra		China	97	96	96	111	110	108	97	114	104
398	03_62O_032	NRSC		CH_377	5012	WB	29° 41' 21.48"	83° 11' 24.36"	Brahmaputra		China	49	50	50	59	62	58	52	59	56

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399	03_62O_038	NRSC		CH_383	4893	WB	29° 36' 16.92"	83° 22' 38.28"	Brahmaputra		China	124	143	136	139	146	151	128	135	143
400	03_62O_039	NRSC		CH_384	4555	WB	29° 35' 21.48"	83° 59' 19.68"	Brahmaputra		China	236	298	275	260	260	260	236	332	271
401	03_62O_040	NRSC		CH_385	4896	WB	29° 34' 56.64"	83° 21' 20.16"	Brahmaputra		China	107	135	135	124	122	113	120	134	126
402	03_62O_041	NRSC		CH_386	4963	WB	29° 30' 39.6"	83° 26' 39.48"	Brahmaputra		China	206	219	220	224	224	217	207	221	221
403	03_62O_042	NRSC		CH_387	4964	WB	29° 29' 56.04"	83° 25' 40.44"	Brahmaputra		China	57	62	69	62	64	68	60	62	65
404	03_62O_043	NRSC		CH_388	5285	WB	29° 28' 13.44"	83° 45' 49.68"	Brahmaputra		China	86	60	51	53	59	49	9	70	54
405	03_71B_002	NRSC		CH_392	5388	WB	30° 26' 7.8"	84° 3' 33.12"	Brahmaputra		China	8185	7764	8202	8381	8276	7013	8108	8395	7927
406	03_71C_010	NRSC		CH_403	4561	WB	29° 18' 39.6"	84° 25' 49.44"	Brahmaputra		China	49	33	#	#	#	#	18	33	33
407	03_71C_011	NRSC		CH_404	4684	WB	29° 13' 52.32"	84° 22' 12"	Brahmaputra		China	119	183	183	183	186	137	159	172	174
408	03_71G_001	NRSC		CH_410	5163	WB	29° 53' 34.08"	85° 14' 49.56"	Brahmaputra		China	720	684	666	760	756	670	693	786	707
409	03_71G_006	NRSC		CH_415	5065	WB	29° 39' 11.52"	85° 44' 15.72"	Brahmaputra		China	956	998	899	1040	1006	940	946	1011	977
410	03_71G_007	NRSC		CH_416	5153	WB	29° 39' 14.4"	85° 48' 31.68"	Brahmaputra		China	191	187	194	209	198	200	193	201	198
411	03_71G_008	NRSC		CH_417	5187	WB	29° 33' 30.96"	85° 52' 50.52"	Brahmaputra		China	60	53	53	50	50	57	50	55	53
412	03_71G_009	NRSC		CH_418	5032	WB	29° 31' 32.88"	85° 38' 37.32"	Brahmaputra		China	178	100	100	109	107	72	90	130	98
413	03_71G_010	NRSC		CH_419	4491	WB	29° 20' 49.2"	85° 4' 58.8"	Brahmaputra		China	304	136	176	216	266	180	191	235	195
414	03_71G_011	NRSC		CH_420	4619	WB	29° 7' 19.56"	85° 23' 54.6"	Brahmaputra		China	951	1339	1581	1352	1343	1345	1170	1405	1392
415	03_71G_013	NRSC		CH_422	4543	WB	29° 6' 7.56"	85° 5' 49.56"	Brahmaputra		China	244	250	334	361	331	260	156	282	307
416	03_71G_014	NRSC		CH_423	4606	WB	29° 5' 16.8"	85° 11' 22.56"	Brahmaputra		China	60	148	235	237	234	188	170	182	208
417	03_71K_002	NRSC		CH_425	4974	WB	29° 48' 4.32"	86° 56' 44.16"	Brahmaputra		China	2248	2342	2304	2298	2336	2331	2311	2360	2322
418	03_71K_003	NRSC		CH_426	4982	WB	29° 45' 59.04"	86° 55' 21.36"	Brahmaputra		China	72	95	95	95	97	102	79	98	97
419	03_71K_006	NRSC		CH_429	4847	WB	29° 37' 30.36"	86° 14' 50.28"	Brahmaputra		China	2096	1991	1966	2167	2129	1641	1979	2210	1979
420	03_71K_007	NRSC		CH_430	4752	WB	29° 34' 46.2"	86° 15' 39.6"	Brahmaputra		China	99	54	#	#	#	#	63	112	54
421	03_71K_009	NRSC		CH_432	4750	WB	29° 33' 26.28"	86° 15' 58.68"	Brahmaputra		China	230	160	160	220	211	165	167	267	183
422	03_71K_011	NRSC		CH_434	4761	WB	29° 28' 32.88"	86° 13' 50.88"	Brahmaputra		China	387	111	111	321	303	237	93	595	217
423	03_71O_002	NRSC		CH_438	4909	WB	29° 42' 16.92"	87° 1' 8.4"	Brahmaputra		China	48	42	35	42	34	33	24	36	37

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424	03_71O_006	NRSC		CH_442	4738	WB	29° 33' 21.6"	87° 1' 39"	Brahmaputra		China	104	115	115	122	121	121	107	122	119
425	03_71O_009	NRSC		CH_445	4302	WB	29° 18' 31.68"	87° 11' 22.2"	Brahmaputra		China	2123	2209	2198	2159	2196	2188	2147	2181	2190
426	03_71O_010	NRSC		CH_446	4296	WB	29° 12' 14.4"	87° 23' 29.04"	Brahmaputra		China	813	890	868	873	867	864	855	892	872
427	03_71P_001	NRSC		CH_448	5302	WB	28° 49' 56.64"	87° 33' 36"	Brahmaputra		China	112	126	126	130	128	144	113	146	131
428	03_77B_001	NRSC		CH_452	5039	WB	30° 10' 5.52"	88° 37' 10.92"	Brahmaputra		China	52	55	55	56	51	53	45	51	54
429	03_77B_002	NRSC		CH_453	5019	WB	30° 8' 51.72"	88° 37' 36.12"	Brahmaputra		China	227	172	210	211	205	198	164	216	199
430	03_77C_006	NRSC		CH_460	4514	WB	29° 35' 15"	88° 13' 54.12"	Brahmaputra		China	102	76	76	75	73	72	81	90	74
431	03_77H_001	NRSC		CH_476	4275	WB	28° 49' 46.92"	89° 51' 6.48"	Brahmaputra		China	442	222	232	326	435	429	192	526	329
432	03_77H_003	NRSC		CH_478	4714	WB	28° 24' 1.8"	89° 3' 41.04"	Brahmaputra		China	220	210	265	275	151	132	153	271	207
433	03_77H_004	NRSC		CH_479	4428	WB	28° 19' 37.56"	89° 25' 43.68"	Brahmaputra		China	201	139	173	149	141	142	136	165	149
434	03_77H_007	NRSC		CH_481	4424	WB	28° 16' 25.68"	89° 20' 44.52"	Brahmaputra		China	866	71	70	323	390	299	310	382	231
435	03_77H_008	NRSC		CH_482	4570	WB	28° 13' 37.92"	89° 38' 17.52"	Brahmaputra		China	1268	1205	1204	1272	1317	1276	1275	1293	1255
436	03_77H_018	NRSC		CH_488	4699	WB	28° 10' 50.52"	89° 32' 3.84"	Brahmaputra		China	80	72	72	67	100	89	58	89	80
437	03_77H_020	NRSC		CH_490	4473	WB	28° 8' 59.64"	89° 20' 58.92"	Brahmaputra		China	4588	4499	4475	4719	4794	4284	4559	5046	4554
438	03_77H_023	NRSC		CH_492	5313	WB	28° 8' 14.64"	89° 32' 5.28"	Brahmaputra		China	47	48	48	47	54	53	36	48	50
439	03_77H_030	NRSC		CH_495	4802	WB	28° 1' 32.16"	89° 25' 37.56"	Brahmaputra		China	66	60	60	60	52	61	57	62	59
440	03_77J_003	NRSC		CH_499	5039	WB	30° 28' 45.48"	90° 57' 58.32"	Brahmaputra		China	89	86	86	87	84	81	75	89	85
441	03_77K_009	NRSC		CH_511	3937	WB	29° 28' 1.2"	90° 10' 20.28"	Brahmaputra		China	70	61	61	59	59	58	56	66	60
442	03_77K_015	NRSC		CH_517	4455	WB	29° 7' 33.6"	90° 20' 9.24"	Brahmaputra		China	108	109	109	119	121	127	111	122	117
443	03_77K_017	NRSC		CH_519	4448	WB	29° 0' 39.6"	90° 26' 50.28"	Brahmaputra		China	3853	3652	3682	3909	3727	3677	3681	3757	3729
444	03_77L_001	NRSC		CH_520	4443	WB	28° 57' 20.52"	90° 42' 39.6"	Brahmaputra		China	55435	56718	60023	54260	55734	52461	55259	56947	55839
445	03_77L_003	NRSC		CH_521	4434	WB	28° 56' 57.48"	90° 31' 1.2"	Brahmaputra		China	4065	3947	3877	3804	3892	3956	3699	3817	3895
446	03_77L_006	NRSC		CH_522	4533	WB	28° 53' 40.2"	90° 24' 19.44"	Brahmaputra		China	44	21	21	25	23	30	21	35	24
447	03_77L_007	NRSC		CH_523	4510	WB	28° 49' 27.12"	90° 50' 0.24"	Brahmaputra		China	1478	1316	1297	1347	1491	1291	1287	1355	1348
448	03_77L_008	NRSC		CH_524	4448	WB	28° 49' 31.8"	90° 41' 11.04"	Brahmaputra		China	71	26	41	49	58	82	1	38	51

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449	03_77L_009	NRSC		CH_525	4515	WB	28° 47' 21.12"	90° 53' 38.76"	Brahmaputra		China	522	123	253	602	569	560	559	656	421
450	03_77L_010	NRSC		CH_526	4457	WB	28° 48' 40.68"	90° 29' 34.44"	Brahmaputra		China	47	52	52	51	51	54	45	56	52
451	03_77L_011	NRSC		CH_527	4533	WB	28° 45' 34.92"	90° 50' 49.2"	Brahmaputra		China	1209	1105	1134	1099	1100	1026	1068	1248	1093
452	03_77L_012	NRSC		CH_528	5014	WB	28° 33' 58.68"	90° 23' 47.04"	Brahmaputra		China	28771	29417	29756	30178	29850	26023	27193	29829	29045
453	03_77L_013	NRSC		CH_529	5191	WB	28° 26' 56.04"	90° 15' 24.84"	Brahmaputra		China	319	355	355	359	351	351	340	375	354
454	03_77L_014	NRSC		CH_530	5289	WB	28° 26' 19.32"	90° 10' 24.96"	Brahmaputra		China	48	43	43	43	44	45	36	47	44
455	03_77L_017	NRSC		CH_533	5340	WB	28° 23' 8.52"	90° 19' 9.12"	Brahmaputra		China	74	81	81	72	80	61	80	90	75
456	03_77L_027	NRSC		CH_543	4531	WB	28° 16' 25.68"	90° 44' 12.48"	Brahmaputra	Kuri Chhu	China	163	170	180	189	198	183	161	183	184
457	03_77N_004	NRSC		CH_563	3890	WB	30° 0' 32.4"	91° 51' 39.24"	Brahmaputra		China	1296	1201	1219	1217	1183	1321	1189	1353	1228
458	03_77O_001	NRSC		CH_564	3879	WB	29° 55' 7.68"	91° 5' 22.2"	Brahmaputra		China	181	106	101	74	121	144	49	180	109
459	03_77O_002	NRSC		CH_565	3806	WB	29° 53' 58.56"	91° 10' 0.12"	Brahmaputra		China	91	46	18	4	52	62	28	90	36
460	03_77P_004	NRSC		CH_575	4452	WB	28° 48' 36"	91° 8' 42.72"	Brahmaputra		China	143	188	153	183	174	166	161	220	173
461	03_77P_005	NRSC		CH_576	4619	WB	28° 45' 55.08"	91° 40' 30"	Brahmaputra		China	112	#	114	105	101	122	113	113	111
462	03_77P_006	NRSC		CH_577	4616	WB	28° 39' 46.44"	91° 40' 46.56"	Brahmaputra		China	4566	5172	5196	4733	5143	4492	4125	4432	4947
463	03_77P_009	NRSC		CH_580	5086	WB	28° 32' 46.68"	91° 31' 31.8"	Brahmaputra		China	94	118	116	115	119	109	97	112	115
464	03_77P_012	NRSC		CH_583	4975	WB	28° 31' 43.32"	91° 39' 54.36"	Brahmaputra		China	91	67	67	68	72	83	44	70	71
465	03_77P_013	NRSC		CH_584	5155	WB	28° 31' 48.36"	91° 33' 42.84"	Brahmaputra		China	60	48	48	52	41	31	37	51	44
466	03_77P_016	NRSC		CH_587	4749	WB	28° 19' 48.72"	91° 57' 47.88"	Brahmaputra	Dangme Chhu	China	251	168	184	191	204	165	156	181	182
467	03_77P_017	NRSC		CH_588	4751	WB	28° 17' 49.92"	91° 56' 44.52"	Brahmaputra	Dangme Chhu	China	2345	2100	2302	2383	2196	2190	2032	2187	2234
468	03_77P_018	NRSC		CH_589	4707	WB	28° 6' 57.6"	91° 56' 34.44"	Brahmaputra	Dangme Chhu	China	154	112	112	113	117	106	99	112	112
469	03_77P_019	NRSC		CH_590	4637	WB	28° 3' 31.68"	91° 56' 22.92"	Brahmaputra	Dangme Chhu	China	220	255	255	255	248	250	241	272	253
470	03_77P_020	NRSC		CH_591	4649	WB	28° 5' 16.44"	91° 15' 25.92"	Brahmaputra	Kuri Chhu	China	63	#	53	52	53	58	49	62	54
471	03_77P_023	NRSC		CH_593	4235	WB	28° 1' 55.56"	91° 0' 6.12"	Brahmaputra	Kuri Chhu	China	45	71	71	79	76	55	70	85	70
472	03_78A_018	NRSC		CH_598	4880	WB	27° 51' 19.44"	88° 56' 41.28"	Brahmaputra	Amo Chhu	China	67	56	55	54	59	45	40	56	54
473	03_78E_006	NRSC		CH_604	4572	WB	27° 58' 11.64"	89° 22' 41.52"	Brahmaputra		China	67	48	48	60	62	61	48	61	56

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474	03_78E_009	NRSC		CH_605	4580	WB	27° 57' 37.08"	89° 23' 47.04"	Brahmaputra		China	175	168	188	187	184	137	154	235	173
475	03_78E_010	NRSC		CH_606	4582	WB	27° 57' 48.96"	89° 24' 45.72"	Brahmaputra		China	49	41	45	46	40	25	30	46	39
476	03_78E_012	NRSC		CH_607	4576	WB	27° 56' 32.64"	89° 23' 16.44"	Brahmaputra		China	279	268	272	284	282	81	261	287	237
477	03_78M_003	NRSC		CH_614	4459	WB	27° 54' 3.96"	91° 53' 48.84"	Brahmaputra	Dangme Chhu	China	207	209	215	212	219	212	204	219	213
478	03_78M_016	NRSC		CH_617	4647	WB	27° 50' 30.84"	91° 53' 34.44"	Brahmaputra	Dangme Chhu	China	142	209	145	140	131	151	137	153	155
479	03_82A_002	NRSC		CH_621	4905	WB	31° 7' 12.36"	92° 49' 59.52"	Brahmaputra		China	319	394	380	312	365	358	365	394	362
480	03_82A_003	NRSC		CH_622	4896	WB	31° 6' 33.12"	92° 57' 7.2"	Brahmaputra		China	99	95	95	87	81	88	89	97	89
481	03_82A_004	NRSC		CH_623	5008	WB	31° 6' 0.9"	92° 41' 55.68"	Brahmaputra		China	46	48	48	48	46	51	46	55	48
482	03_82A_007	NRSC		CH_626	4911	WB	31° 2' 10.32"	92° 47' 12.84"	Brahmaputra		China	85	98	98	93	101	94	69	106	97
483	03_82B_002	NRSC		CH_628	4906	WB	30° 58' 33.24"	92° 56' 28.68"	Brahmaputra		China	405	455	465	426	466	411	390	464	445
484	03_82B_004	NRSC		CH_630	4893	WB	30° 56' 56.04"	92° 53' 22.56"	Brahmaputra		China	93	97	97	99	105	97	88	110	99
485	03_82B_005	NRSC		CH_631	4888	WB	30° 56' 4.56"	92° 49' 45.12"	Brahmaputra		China	195	232	208	208	222	202	215	234	214
486	03_82B_006	NRSC		CH_632	4837	WB	30° 56' 1.68"	92° 46' 27.84"	Brahmaputra		China	124	125	114	117	128	105	114	118	118
487	03_82B_007	NRSC		CH_633	4964	WB	30° 53' 40.92"	92° 57' 2.52"	Brahmaputra		China	199	203	183	191	234	231	188	219	208
488	03_82B_008	NRSC		CH_634	4928	WB	30° 53' 45.96"	92° 54' 35.28"	Brahmaputra		China	254	272	250	252	283	290	260	287	269
489	03_82B_009	NRSC		CH_635	4963	WB	30° 54' 21.96"	92° 49' 1.56"	Brahmaputra		China	156	180	165	169	181	167	170	181	172
490	03_82B_010	NRSC		CH_636	4990	WB	30° 52' 42.24"	92° 52' 50.16"	Brahmaputra		China	52	54	39	42	56	51	39	57	48
491	03_82B_014	NRSC		CH_640	4825	WB	30° 29' 36.96"	92° 38' 35.88"	Brahmaputra		China	157	127	137	137	144	134	112	183	136
492	03_82B_015	NRSC		CH_641	5124	WB	30° 20' 56.4"	92° 44' 7.08"	Brahmaputra		China	75	86	86	83	80	87	68	87	84
493	03_82B_020	NRSC		CH_646	4986	WB	30° 12' 59.04"	92° 30' 59.76"	Brahmaputra		China	49	46	46	45	50	49	37	48	47
494	03_82B_021	NRSC		CH_647	5041	WB	30° 12' 46.08"	92° 34' 15.96"	Brahmaputra		China	63	57	57	50	51	49	49	60	53
495	03_82B_028	NRSC		CH_654	4998	WB	30° 2' 58.2"	92° 26' 35.52"	Brahmaputra		China	48	55	52	50	45	54	47	52	51
496	03_82C_010	NRSC		CH_665	4921	WB	29° 46' 44.04"	92° 23' 17.16"	Brahmaputra		China	153	150	150	150	154	153	144	159	151
497	03_82C_016	NRSC		CH_671	4679	WB	29° 39' 59.76"	92° 23' 36.6"	Brahmaputra		China	54	42	42	46	45	52	42	49	45

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498	03_82D_003	NRSC		CH_709	4408	WB	28° 53' 37.32"	92° 7' 43.32"	Brahmaputra		China	50	45	45	53	40	47	37	46	46
499	03_82D_004	NRSC		CH_710	4481	WB	28° 52' 54.84"	92° 9' 54"	Brahmaputra		China	390	372	380	366	375	371	368	371	373
500	03_82D_010	NRSC		CH_716	5043	WB	28° 11' 29.4"	92° 2' 34.8"	Brahmaputra	Dangme Chhu	China	76	40	25	25	19	24	26	48	27
501	03_82E_002	NRSC		CH_720	5008	WB	31° 7' 53.4"	93° 10' 36.48"	Brahmaputra		China	659	720	718	670	675	631	662	694	683
502	03_82E_003	NRSC		CH_721	5027	WB	31° 6' 12.96"	93° 8' 36.6"	Brahmaputra		China	98	95	95	96	97	96	84	96	96
503	03_82E_004	NRSC		CH_722	5049	WB	31° 3' 52.92"	93° 17' 32.64"	Brahmaputra		China	57	47	47	42	44	16	33	44	39
504	03_82E_007	NRSC		CH_725	5043	WB	31° 0' 14.4"	93° 5' 16.08"	Brahmaputra		China	71	67	67	67	67	72	60	68	68
505	03_82F_004	NRSC		CH_729	4508	WB	30° 37' 16.32"	93° 10' 49.8"	Brahmaputra		China	692	700	718	692	703	686	680	718	700
506	03_82F_008	NRSC		CH_733	4828	WB	30° 32' 5.64"	93° 3' 29.16"	Brahmaputra		China	83	84	82	84	84	85	82	96	84
507	03_82F_016	NRSC		CH_741	4632	WB	30° 19' 7.68"	93° 20' 32.64"	Brahmaputra		China	49	49	49	44	46	45	40	48	47
508	03_82F_030	NRSC		CH_755	3485	WB	30° 1' 13.8"	93° 58' 5.16"	Brahmaputra		China	2675	2662	2634	2684	2685	2619	2658	2710	2657
509	03_82G_009	NRSC		CH_770	4580	WB	29° 37' 46.2"	93° 33' 41.4"	Brahmaputra		China	51	42	42	41	42	42	41	43	42
510	03_82G_017	NRSC		CH_778	4437	WB	29° 32' 32.28"	93° 49' 49.44"	Brahmaputra		China	53	54	54	56	54	40	45	53	52
511	03_82G_019	NRSC		CH_780	4460	WB	29° 30' 9"	93° 56' 12.12"	Brahmaputra		China	59	58	58	49	55	35	48	58	51
512	03_82G_023	NRSC		CH_784	4377	WB	29° 30' 45"	93° 37' 11.64"	Brahmaputra		China	84	77	77	71	77	81	58	91	77
513	03_82G_024	NRSC		CH_785	4647	WB	29° 32' 25.8"	93° 20' 42"	Brahmaputra		China	95	97	108	89	90	92	90	96	95
514	03_82G_035	NRSC		CH_796	4386	WB	29° 28' 35.4"	93° 37' 53.04"	Brahmaputra		China	81	86	94	83	84	78	76	91	85
515	03_82G_045	NRSC		CH_806	4523	WB	29° 24' 19.44"	93° 42' 28.44"	Brahmaputra		China	71	70	70	61	70	66	68	77	67
516	03_82G_048	NRSC		CH_809	4663	WB	29° 25' 15.6"	93° 17' 27.6"	Brahmaputra		China	55	43	44	43	46	36	39	47	42
517	03_82G_050	NRSC		CH_811	4734	WB	29° 22' 57.36"	93° 38' 25.08"	Brahmaputra		China	44	40	40	37	36	37	37	39	38
518	03_82G_051	NRSC		CH_812	4735	WB	29° 22' 10.92"	93° 41' 38.04"	Brahmaputra		China	49	46	46	45	45	47	41	46	46
519	03_82G_055	NRSC		CH_816	4619	WB	29° 19' 55.92"	93° 43' 17.04"	Brahmaputra		China	62	49	49	47	47	51	42	52	49
520	03_82G_060	NRSC		CH_821	4577	WB	29° 17' 13.92"	93° 44' 10.68"	Brahmaputra		China	59	56	56	55	49	56	48	61	54
521	03_82G_062	NRSC		CH_823	4925	WB	29° 14' 25.08"	93° 16' 33.6"	Brahmaputra		China	58	51	51	49	53	53	49	53	51
522	03_82G_065	NRSC		CH_826	4148	WB	29° 2' 16.8"	93° 50' 8.52"	Brahmaputra		China	47	42	82	81	83	46	39	71	67

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
523	03_82J_014	NRSC		CH_844	3703	WB	30° 10' 24.6"	94° 20' 44.52"	Brahmaputra		China	183	117	167	133	128	162	72	198	141
524	03_82J_017	NRSC		CH_847	3829	WB	30° 7' 33.24"	94° 5' 24"	Brahmaputra		China	282	272	276	277	277	275	250	284	275
525	03_82J_020	NRSC		CH_850	3852	WB	30° 3' 1080"	94° 14' 53.52"	Brahmaputra		China	439	300	432	397	431	425	284	433	397
526	03_82J_023	NRSC		CH_853	4315	WB	30° 2' 45.96"	94° 9' 24.84"	Brahmaputra		China	105	104	104	108	106	95	97	113	103
527	03_82J_024	NRSC		CH_854	4362	WB	30° 0' 46.44"	94° 28' 17.76"	Brahmaputra		China	67	65	65	55	69	58	58	70	62
528	03_82J_025	NRSC		CH_855	4038	WB	30° 0' 17.64"	94° 23' 1.68"	Brahmaputra		China	59	56	56	61	57	56	56	78	57
529	03_82K_002	NRSC		CH_858	3998	WB	29° 59' 14.64"	94° 26' 7.44"	Brahmaputra		China	75	74	66	60	58	66	61	80	65
530	03_82K_006	NRSC		CH_862	4523	WB	29° 56' 25.8"	94° 35' 18.24"	Brahmaputra		China	52	48	33	35	46	24	40	47	37
531	03_82K_007	NRSC		CH_863	4294	WB	29° 57' 31.68"	94° 17' 30.48"	Brahmaputra		China	130	130	130	121	129	107	122	140	123
532	03_82K_009	NRSC		CH_865	4168	WB	29° 56' 48.84"	94° 21' 28.44"	Brahmaputra		China	116	96	100	93	106	95	94	115	98
533	03_82K_017	NRSC		CH_873	4397	WB	29° 55' 0.48"	94° 16' 46.56"	Brahmaputra		China	151	172	185	178	173	145	163	184	171
534	03_82K_018	NRSC		CH_874	4168	WB	29° 53' 25.44"	94° 34' 12"	Brahmaputra		China	165	175	153	158	153	123	160	177	152
535	03_82K_020	NRSC		CH_876	4364	WB	29° 53' 47.76"	94° 27' 41.4"	Brahmaputra		China	77	76	90	80	77	71	70	88	79
536	03_82K_036	NRSC		CH_892	4251	WB	29° 49' 46.56"	94° 37' 55.2"	Brahmaputra		China	69	63	49	61	60	63	56	62	59
537	03_82K_037	NRSC		CH_893	4147	WB	29° 49' 40.08"	94° 27' 43.2"	Brahmaputra		China	55	57	57	61	53	54	44	56	56
538	03_82K_039	NRSC		CH_895	4128	WB	29° 48' 45.72"	94° 25' 57"	Brahmaputra		China	224	176	186	179	213	207	176	196	192
539	03_82K_040	NRSC		CH_896	4329	WB	29° 48' 28.44"	94° 30' 1.8"	Brahmaputra		China	66	56	56	52	56	32	54	62	50
540	03_82K_042	NRSC		CH_898	4364	WB	29° 46' 44.76"	94° 36' 2.88"	Brahmaputra		China	205	192	192	182	182	183	177	191	186
541	03_82K_045	NRSC		CH_901	4572	WB	29° 49' 0.12"	94° 7' 58.8"	Brahmaputra		China	49	49	49	51	47	48	32	47	49
542	03_82K_049	NRSC		CH_905	4180	WB	29° 46' 31.8"	94° 34' 20.64"	Brahmaputra		China	50	45	45	36	41	37	32	45	41
543	03_82K_060	NRSC		CH_916	4316	WB	29° 32' 43.44"	94° 57' 53.64"	Brahmaputra		China	93	85	64	64	60	66	78	99	68
544	03_82K_068	NRSC		CH_924	4320	WB	29° 32' 40.92"	94° 4' 48"	Brahmaputra		China	52	50	50	51	48	26	44	50	45
545	03_82K_074	NRSC		CH_930	4553	WB	29° 31' 33.96"	94° 3' 26.28"	Brahmaputra		China	88	73	73	75	79	54	77	82	71
546	03_82K_075	NRSC		CH_931	4511	WB	29° 31' 3.36"	94° 7' 14.88"	Brahmaputra		China	118	121	125	116	107	55	107	117	105
547	03_82K_077	NRSC		CH_933	4590	WB	29° 30' 16.2"	94° 7' 58.44"	Brahmaputra		China	100	98	98	98	98	77	95	105	94

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
548	03_82K_080	NRSC		CH_936	4530	WB	29° 28' 21.72"	94° 14' 10.68"	Brahmaputra		China	47	40	52	49	45	34	39	55	44
549	03_82K_103	NRSC		CH_959	3964	WB	29° 17' 42.36"	94° 12' 6.12"	Brahmaputra		China	50	41	41	37	41	39	40	40	40
550	03_82N_019	NRSC		CH_990	4877	WB	30° 28' 24.6"	95° 34' 30.36"	Brahmaputra		China	55	59	59	51	46	53	46	58	54
551	03_82O_016	NRSC		CH_1023	4374	WB	29° 22' 19.56"	95° 52' 18.48"	Brahmaputra	Dihang	China	91	99	100	104	109	49	84	98	92
552	03_82O_029	NRSC		CH_1032	3345	WB	29° 18' 17.64"	95° 38' 20.4"	Brahmaputra	Dihang	China	68	72	72	71	69	73	54	72	71
553	03_82O_044	NRSC		CH_1037	3552	WB	29° 10' 46.92"	95° 29' 6.72"	Brahmaputra	Dihang	China	92	93	93	94	91	88	83	88	92
554	03_82O_047	NRSC		CH_1039	3574	WB	29° 9' 46.08"	95° 29' 27.6"	Brahmaputra	Dihang	China	44	37	44	45	51	47	37	55	45
555	03_82O_054	NRSC		CH_1046	3311	WB	29° 7' 41.88"	95° 26' 17.88"	Brahmaputra	Dibang	China	51	49	49	40	46	52	45	53	47
556	03_91C_029	NRSC		CH_1078	4229	WB	29° 14' 15.72"	96° 49' 25.32"	Brahmaputra		China	216	213	213	207	213	211	211	227	211
557	03_91C_052	NRSC		CH_1085	4591	WB	29° 10' 28.2"	96° 19' 32.16"	Brahmaputra	Lohit	China	64	#	42	46	46	14	31	45	37
558	03_91C_059	NRSC		CH_1089	4303	WB	29° 5' 30.12"	96° 12' 39.24"	Brahmaputra	Dibang	China	98	#	100	99	108	116	75	104	106
559	03_91C_070	NRSC		CH_1098	4252	WB	29° 2' 37.32"	96° 11' 36.6"	Brahmaputra	Dibang	China	57	59	55	55	55	54	44	57	56
560	03_91C_078	NRSC		CH_1106	3694	WB	29° 0' 30.24"	96° 13' 4.44"	Brahmaputra	Dibang	China	48	48	48	48	45	50	33	47	48
561	03_91D_080	NRSC		CH_1135	4295	WB	28° 32' 29.76"	96° 37' 3.36"	Brahmaputra	Lohit	China	45	49	42	37	35	41	33	44	41
562	03_91D_081	NRSC		CH_1136	3356	WB	28° 30' 58.32"	96° 41' 54.24"	Brahmaputra	Lohit	China	304	324	320	318	322	302	311	322	317
563	03_91H_005	NRSC		CH_1170	4123	WB	28° 58' 40.08"	97° 12' 50.76"	Brahmaputra	Lohit	China	58	62	62	64	72	59	59	68	64
564	03_91H_010	NRSC		CH_1175	4433	WB	28° 56' 23.28"	97° 15' 41.04"	Brahmaputra	Lohit	China	79	94	94	85	98	90	86	102	92
565	03_91H_011	NRSC		CH_1176	4494	WB	28° 56' 43.44"	97° 5' 53.16"	Brahmaputra	Lohit	China	50	57	57	60	58	62	52	59	59
566	03_91H_017	NRSC		CH_1182	4590	WB	28° 52' 37.2"	97° 21' 19.44"	Brahmaputra	Lohit	China	46	43	43	37	32	39	29	45	39
567	03_91H_025	NRSC		CH_1190	3741	WB	28° 46' 58.8"	97° 9' 6.84"	Brahmaputra	Lohit	China	85	55	55	46	95	56	22	122	61
568	03_91H_029	NRSC		CH_1194	3325	WB	28° 45' 44.28"	97° 3' 24.12"	Brahmaputra	Lohit	China	50	45	45	42	36	46	36	42	43
569	03_91H_040	NRSC		CH_1205	4324	WB	28° 24' 44.28"	97° 27' 52.56"	Brahmaputra	Lohit	China	51	55	55	50	42	52	49	60	51
570	03_77H_011	NRSC		BH_4	4963	GL	28° 13' 48.72"	89° 53' 15"	Brahmaputra		Bhutan	140	155	156	154	153	152	151	154	154
571	03_77H_017	NRSC			4537	GL	28° 10' 19.2"	89° 50' 54.24"	Brahmaputra	Puna Tsang Chhu	Bhutan	25	26	25	25	25	25	18	25	25

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
572	03_77H_021	NRSC			5135	GL	28° 8' 37.68"	89° 50' 25.8"	Brahmaputra	Puna Tsang Chhu	Bhutan	15	13	13	14	14	13	4	20	13
573	03_77H_024	NRSC			4369	GL	28° 6' 47.52"	89° 54' 33.12"	Brahmaputra	Puna Tsang Chhu	Bhutan	42	46	46	47	46	46	39	46	46
574	03_77H_025	NRSC			4312	GL	28° 6' 19.44"	89° 53' 53.16"	Brahmaputra	Puna Tsang Chhu	Bhutan	26	25	21	25	25	25	18	25	24
575	03_77H_029	NRSC			5049	GL	28° 0' 35.64"	89° 53' 0.96"	Brahmaputra	Puna Tsang Chhu	Bhutan	21	23	23	19	21	24	19	26	22
576	03_77L_030	NRSC		BH_12	5305	GL	28° 16' 43.32"	90° 13' 32.88"	Brahmaputra	Puna Tsang Chhu	Bhutan	79	#	88	89	89	88	89	92	89
577	03_77L_033	NRSC		BH_13	5176	GL	28° 15' 56.88"	90° 4' 7.68"	Brahmaputra		Bhutan	177	232	252	211	221	213	204	225	226
578	03_77L_035	NRSC		BH_14	5486	GL	28° 14' 58.92"	90° 11' 13.56"	Brahmaputra		Bhutan	68	59	59	56	60	61	61	68	59
579	03_77L_037	NRSC		BH_15	5139	GL	28° 14' 15.72"	90° 6' 15.48"	Brahmaputra		Bhutan	542	597	577	615	584	581	574	588	591
580	03_77L_040	NRSC			4515	GL	28° 9' 14.76"	90° 8' 54.6"	Brahmaputra	Puna Tsang Chhu	Bhutan	12	#	#	#	#	#	0	0	#DIV/0!
581	03_77L_044	NRSC		BH_19	4385	GL	28° 6' 20.88"	90° 14' 49.56"	Brahmaputra	Puna Tsang Chhu	Bhutan	123	133	132	133	133	134	121	133	133
582	03_77L_047	NRSC			4364	GL	28° 6' 14.4"	90° 13' 49.08"	Brahmaputra	Puna Tsang Chhu	Bhutan	23	48	41	39	40	44	39	47	42
583	03_77L_049	NRSC			4716	GL	28° 6' 44.28"	90° 1' 35.04"	Brahmaputra	Puna Tsang Chhu	Bhutan	39	38	36	28	28	32	27	36	32
584	03_77L_051	NRSC		BH_22	4548	GL	28° 5' 31.2"	90° 17' 60"	Brahmaputra	Puna Tsang Chhu	Bhutan	143	145	144	143	144	164	129	167	148
585	03_77L_054	NRSC			4717	GL	28° 5' 15"	90° 19' 33.24"	Brahmaputra	Puna Tsang Chhu	Bhutan	17	#	3	1	3	3	5	6	3
586	03_77L_061	NRSC			5038	GL	28° 2' 29.4"	90° 32' 15.72"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	15	616	17	18	16	18	13	18	137
587	03_77L_062	NRSC			5295	GL	28° 2' 50.64"	90° 21' 16.92"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	42	47	47	48	47	47	42	48	47
588	03_77L_063	NRSC			5183	GL	28° 2' 6.36"	90° 37' 29.28"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	30	#	23	13	30	28	19	31	24
589	03_77L_065	NRSC			5025	GL	28° 2' 18.24"	90° 32' 47.76"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	17	14	14	17	17	17	11	23	16

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
590	03_77L_066	NRSC		BH_34	4896	GL	28° 1' 21.36"	90° 42' 29.88"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	148	162	165	155	170	162	155	172	163
591	03_77L_067	NRSC		BH_35	5231	GL	28° 2' 17.88"	90° 21' 50.4"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	78	70	77	84	83	83	71	83	79
592	03_77L_071	NRSC			5228	GL	28° 1' 41.52"	90° 16' 13.44"	Brahmaputra	Puna Tsang Chhu	Bhutan	21	20	20	23	22	22	18	24	21
593	03_77L_072	NRSC		BH_40	5201	GL	28° 0' 55.8"	90° 22' 26.76"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	91	77	96	92	91	88	63	95	89
594	03_77L_073	NRSC			5166	GL	28° 0' 23.04"	90° 34' 21.36"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	12	13	13	10	12	12	9	14	12
595	03_77L_074	NRSC			5324	GL	28° 0' 55.44"	90° 21' 9.36"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	18	17	17	18	17	17	11	17	17
596	03_77L_075	NRSC			4718	GL	28° 0' 11.16"	90° 32' 25.8"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	23	19	19	16	15	22	18	29	18
597	03_77L_078	NRSC			5296	GL	28° 0' 44.64"	90° 16' 46.92"	Brahmaputra	Puna Tsang Chhu	Bhutan	12	15	15	14	14	13	13	15	14
598	03_77L_079	NRSC			5386	GL	28° 0' 21.24"	90° 19' 40.08"	Brahmaputra	Puna Tsang Chhu	Bhutan	30	35	35	35	34	34	31	34	35
599	03_77L_082	NRSC			5019	GL	28° 0' 11.52"	90° 8' 59.64"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	14	14	14	12	12	15	11	14	13
600	03_78E_001	NRSC			5157	GL	27° 58' 54.12"	89° 53' 47.4"	Brahmaputra	Puna Tsang Chhu	Bhutan	26	28	28	31	35	36	31	37	32
601	03_78E_002	NRSC		BH_57	5110	GL	27° 58' 21"	89° 55' 47.64"	Brahmaputra	Puna Tsang Chhu	Bhutan	58	40	40	39	63	64	18	67	49
602	03_78E_003	NRSC			5152	GL	27° 58' 26.4"	89° 53' 44.88"	Brahmaputra	Puna Tsang Chhu	Bhutan	21	22	22	22	23	23	16	27	22
603	03_78E_007	NRSC		BH_60	5008	GL	27° 56' 29.04"	89° 55' 48"	Brahmaputra	Puna Tsang Chhu	Bhutan	61	70	70	61	74	72	62	75	69

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
604	03_78E_008	NRSC			5045	GL	27° 56' 27.6"	89° 54' 20.88"	Brahmaputra	Puna Tsang Chhu	Bhutan	12	12	12	8	12	14	11	13	12
605	03_78E_011	NRSC			4952	GL	27° 55' 48.72"	89° 54' 2.88"	Brahmaputra	Puna Tsang Chhu	Bhutan	13	18	18	22	19	22	17	24	20
606	03_78E_025	NRSC			4341	GL	27° 50' 20.4"	89° 23' 16.8"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	17	14	14	16	13	19	13	17	15
607	03_78E_027	NRSC			4808	GL	27° 41' 13.92"	89° 24' 29.88"	Brahmaputra	Puna Tsang Chhu	Bhutan	13	19	19	18	18	18	15	18	18
608	03_78I_001	NRSC			5129	GL	27° 59' 52.44"	90° 35' 33"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	15	6	6	10	10	14	6	14	9
609	03_78I_004	NRSC			5194	GL	27° 59' 28.32"	90° 25' 6.24"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	36	23	23	34	35	35	20	42	30
610	03_78I_005	NRSC			5338	GL	27° 59' 47.04"	90° 17' 17.16"	Brahmaputra	Puna Tsang Chhu	Bhutan	40	45	45	44	44	42	41	45	44
611	03_78I_006	NRSC			5158	GL	27° 59' 43.08"	90° 15' 38.16"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	16	21	21	22	17	18	16	18	20
612	03_78I_008	NRSC			5252	GL	27° 59' 17.88"	90° 22' 48.36"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	14	13	13	12	13	12	10	13	13
613	03_78I_009	NRSC			5108	GL	27° 59' 6.36"	90° 26' 13.56"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	20	26	26	26	26	25	21	26	26
614	03_78I_011	NRSC			5239	GL	27° 58' 54.48"	90° 22' 52.32"	Brahmaputra	Kuri Chhu	Bhutan	19	23	23	21	20	20	18	20	21
615	03_78I_014	NRSC			5087	GL	27° 59' 13.2"	90° 7' 48.72"	Brahmaputra	Puna Tsang Chhu	Bhutan	21	19	19	20	14	19	13	22	18
616	03_78I_015	NRSC			5116	GL	27° 58' 55.2"	90° 14' 38.76"	Brahmaputra	Puna Tsang Chhu	Bhutan	16	15	15	15	15	15	15	16	15
617	03_78I_018	NRSC		BH_99	5083	GL	27° 58' 37.92"	90° 13' 56.28"	Brahmaputra	Puna Tsang Chhu	Bhutan	63	66	66	68	67	68	59	69	67
618	03_78I_019	NRSC			5224	GL	27° 58' 7.68"	90° 24' 42.48"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	18	24	24	24	23	23	20	23	24

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
619	03_78I_020	NRSC			5331	GL	27° 58' 13.8"	90° 19' 49.8"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	18	18	18	22	22	23	20	24	21
620	03_78I_022	NRSC			5048	GL	27° 56' 32.64"	90° 45' 22.32"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	16	17	17	9	8	16	10	17	13
621	03_78I_023	NRSC		BH_104	5055	GL	27° 56' 22.56"	90° 32' 5.28"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	51	59	59	65	61	69	47	62	63
622	03_78I_025	NRSC			5194	GL	27° 57' 7.92"	90° 15' 18.72"	Brahmaputra	Puna Tsang Chhu	Bhutan	12	13	13	14	14	13	12	15	13
623	03_78I_026	NRSC			5233	GL	27° 56' 26.88"	90° 23' 49.2"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	17	13	13	18	15	19	15	18	16
624	03_78I_028	NRSC			4792	GL	27° 55' 32.88"	90° 33' 17.64"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	24	23	23	14	30	28	16	30	24
625	03_78I_036	NRSC			5028	GL	27° 55' 51.96"	90° 12' 32.76"	Brahmaputra	Puna Tsang Chhu	Bhutan	11	12	12	12	12	13	8	13	12
626	03_78I_037	NRSC			5159	GL	27° 55' 10.2"	90° 24' 25.92"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	11	15	15	15	15	12	7	18	14
627	03_78I_038	NRSC			5143	GL	27° 55' 28.56"	90° 15' 30.6"	Brahmaputra	Puna Tsang Chhu	Bhutan	11	10	10	8	9	10	9	11	9
628	03_78I_040	NRSC			5167	GL	27° 55' 13.44"	90° 15' 46.44"	Brahmaputra	Puna Tsang Chhu	Bhutan	22	21	21	18	21	22	21	22	21
629	03_78I_043	NRSC			5000	GL	27° 53' 44.88"	90° 33' 7.2"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	28	21	21	20	20	23	17	24	21
630	03_78I_046	NRSC			5168	GL	27° 54' 21.96"	90° 16' 32.16"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	20	22	22	22	22	22	19	22	22
631	03_78I_051	NRSC		BH_132	5074	GL	27° 53' 26.16"	90° 17' 24.36"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	103	127	127	121	127	114	113	129	123

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
632	03_78I_054	NRSC			5138	GL	27° 52' 59.88"	90° 17' 53.16"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	14	15	15	15	17	15	12	18	15
633	03_78I_057	NRSC			5060	GL	27° 52' 24.24"	90° 18' 11.88"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	33	45	45	44	45	49	39	49	46
634	03_78I_058	NRSC			5041	GL	27° 52' 34.32"	90° 16' 50.52"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	16	26	26	26	26	23	26	29	25
635	03_78I_064	NRSC			4976	GL	27° 51' 41.04"	90° 17' 42.36"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	19	20	20	20	20	20	18	21	20
636	03_78I_065	NRSC			4668	GL	27° 49' 18.84"	90° 48' 36"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	13	14	14	10	11	13	9	15	12
637	03_78I_067	NRSC			4918	GL	27° 50' 44.16"	90° 18' 9"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	20	21	21	22	21	20	23	25	21
638	03_78I_072	NRSC			4788	GL	27° 49' 7.32"	90° 23' 39.12"	Brahmaputra		Bhutan	11	13	13	11	10	15	8	14	12
639	03_78M_013	NRSC			4232	GL	27° 53' 43.08"	91° 14' 54.96"	Brahmaputra	Puna Tsang Chhu	Bhutan	11	#	6	5	6	8	6	9	6
640	03_77H_019	NRSC			4804	GL	28° 10' 21.36"	89° 41' 3.48"	Brahmaputra	Puna Tsang Chhu	Bhutan	10	10	10	3	7	10	3	10	8
641	03_77L_077	NRSC		BH_45	5136	WB	28° 0' 54.36"	90° 12' 37.08"	Brahmaputra	Puna Tsang Chhu	Bhutan	51	46	46	53	53	57	49	57	51
642	03_78E_028	NRSC		BH_72	2161	WB	27° 38' 21.12"	89° 44' 24.36"	Brahmaputra	Puna Tsang Chhu	Bhutan	47	41	41	42	45	48	26	51	43
643	03_78E_029	NRSC		BH_73	4250	WB	27° 38' 37.68"	89° 27' 39.96"	Brahmaputra	Puna Tsang Chhu	Bhutan	45	33	33	39	43	37	23	45	37
644	03_78I_048	NRSC		BH_129	4169	WB	27° 52' 0.84"	90° 48' 58.32"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	52	51	51	47	65	52	47	55	53
645	03_78I_056	NRSC		BH_137	4794	WB	27° 51' 42.48"	90° 35' 27.6"	Brahmaputra	Manas Chhu & Mangde Chhu	Bhutan	76	77	77	76	72	81	67	81	77
646	03_78I_085	NRSC		BH_166	4764	WB	27° 47' 58.56"	90° 13' 50.16"	Brahmaputra	Puna Tsang Chhu	Bhutan	70	72	72	74	74	74	69	78	73
647	03_78M_010	NRSC		BH_188	4496	WB	27° 52' 37.92"	91° 38' 1.68"	Brahmaputra	Dangme Chhu	Bhutan	50	35	45	47	43	43	27	49	43

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
648	03_78M_019	NRSC		BH_194	4697	WB	27° 50' 49.92"	91° 34' 59.88"	Brahmaputra	Dangme Chhu	Bhutan	55	56	49	50	51	51	52	64	51
649	03_78M_020	NRSC		BH_195	4157	WB	27° 50' 15.72"	91° 36' 18.36"	Brahmaputra	Dangme Chhu	Bhutan	65	67	69	71	75	65	58	75	69
650	03_78M_022	NRSC		BH_197	4549	WB	27° 50' 2.04"	91° 33' 12.96"	Brahmaputra	Dangme Chhu	Bhutan	67	68	68	74	70	72	62	87	70
651	02_62J_002	NRSC			5021	GL	30° 8' 56.04"	82° 9' 42.12"	Ganga	Karnali	Nepal	16	9	9	17	16	13	13	17	16
652	02_62K_006	NRSC	70G		5053	GL	29° 49' 18.48"	82° 42' 41.4"	Ganga	Karnali	Nepal	18	50	20	20	20	19	20	20	20
653	02_62O_002	NRSC	410G		5495	GL	29° 12' 3.24"	83° 41' 2.76"	Ganga	Kali Gandak	Nepal	25	23	23	18	19	18	20	23	22
654	02_71H_034	NRSC	320G		4745	GL	28° 17' 32.28"	85° 10' 12.72"	Ganga	Trishuli	Nepal	21	22	18	10	10	12	12	21	19
655	02_72I_009	NRSC			5292	GL	27° 55' 2.64"	86° 27' 59.04"	Ganga	Sun Kosi	Nepal	11	18	17	17	9	18	12	29	19
656	02_72M_008	NRSC	376G		4722	GL	27° 52' 48.72"	87° 48' 17.28"	Ganga	Tamor Kosi	Nepal	43	38	37	38	38	36	30	37	33
657	02_72M_012	NRSC	69G		4932	GL	27° 48' 57.6"	87° 44' 56.04"	Ganga	Tamor Kosi	Nepal	18	16	17	17	13	15	12	17	15
658	02_62F_006	NRSC			5444	GL	30° 20' 46.68"	81° 51' 38.88"	Ganga	Karnali	Nepal	17	15	15	15	15	14	13	15	14
659	02_62F_007	NRSC			5179	GL	30° 20' 18.96"	81° 54' 39.96"	Ganga	Karnali	Nepal	25	12	8	12	12	26	22	29	26
660	02_62F_008	NRSC			5620	GL	30° 19' 24.24"	81° 49' 56.28"	Ganga	Karnali	Nepal	15	7	7	11	11	11	5	11	8
661	02_62F_010	NRSC			5502	GL	30° 18' 25.56"	81° 51' 55.44"	Ganga	Karnali	Nepal	11	11	10	10	9	10	8	10	9
662	02_62F_016	NRSC	591G		5359	GL	30° 13' 0.48"	81° 48' 5.04"	Ganga	Karnali	Nepal	29	14	14	16	16	16	11	16	14
663	02_62G_002	NRSC	599G		4822	GL	29° 55' 17.76"	81° 1' 50.52"	Ganga	Karnali	Nepal	16	19	19	19	19	7	15	18	17
664	02_62G_003	NRSC	589G		3603	GL	29° 53' 50.64"	81° 34' 43.68"	Ganga	Karnali	Nepal	17	33	33	33	30	31	33	35	34
665	02_62J_001	NRSC			5182	GL	30° 11' 46.68"	82° 7' 55.2"	Ganga	Karnali	Nepal	11	5	5	8	5	2	5	9	7
666	02_62K_001	NRSC	329G		4404	GL	29° 59' 35.88"	82° 11' 49.2"	Ganga	Karnali	Nepal	26	24	31	30	28	9	19	27	24
667	02_62K_003	NRSC	546G		4571	GL	29° 55' 50.16"	82° 12' 22.68"	Ganga	Karnali	Nepal	43	43	34	39	44	35	43	46	45
668	02_62K_011	NRSC	612G		4673	GL	29° 14' 57.12"	82° 33' 49.68"	Ganga	Bheri	Nepal	26	28	28	31	27	21	15	30	25
669	02_62O_004	NRSC	299G		5529	GL	29° 7' 19.2"	83° 44' 18.6"	Ganga	Kali Gandak	Nepal	11	19	19	23	16	11	8	22	18
670	02_62O_005	NRSC	609G		5450	GL	29° 2' 46.32"	83° 40' 27.48"	Ganga	Kali Gandak	Nepal	15	14	14	11	12	11	11	13	12
671	02_62P_001	NRSC	258G		4472	GL	28° 47' 17.52"	83° 19' 51.24"	Ganga	Bheri	Nepal	52	45	45	45	44	29	41	45	44
672	02_62P_003	NRSC	4G	NP_36	4937	GL	28° 41' 31.92"	83° 51' 9"	Ganga	Trishuli	Nepal	315	328	299	341	338	338	333	371	350

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
673	02_71D_001	NRSC			4111	GL	28° 39' 46.44"	84° 28' 17.76"	Ganga	Trishuli	Nepal	20	25	24	17	24	24	18	26	24
674	02_71D_002	NRSC			4063	GL	28° 39' 24.48"	84° 27' 28.8"	Ganga	Trishuli	Nepal	10	6	5	5	7	8	3	9	5
675	02_71D_003	NRSC	67G		3668	GL	28° 35' 46.68"	84° 37' 39.72"	Ganga	Trishuli	Nepal	32	26	24	27	20	24	20	27	25
676	02_71D_004	NRSC	16G	NP_45	4064	GL	28° 29' 19.68"	84° 29' 8.52"	Ganga	Trishuli	Nepal	74	100	98	128	98	97	97	101	98
677	02_71H_036	NRSC	195G		5024	GL	28° 9' 50.76"	85° 37' 49.08"	Ganga	Trishuli	Nepal	15	14	13	13	13	12	8	13	12
678	02_71L_033	NRSC	408G		5369	GL	28° 2' 18.96"	86° 42' 34.56"	Ganga	Sun Kosi	Nepal	17	14	15	16	16	15	11	16	14
679	02_71L_035	NRSC	657G		5091	GL	28° 1' 22.8"	86° 43' 14.16"	Ganga	Sun Kosi	Nepal	19	11	11	17	17	19	9	19	16
680	02_72I_001	NRSC			533	GL	27° 59' 55.32"	86° 50' 8.16"	Ganga	Sun Kosi	Nepal	12	13	13	12	12	12	12	13	13
681	02_72I_002	NRSC	645G	NP_58	4854	GL	27° 58' 30.72"	86° 40' 52.32"	Ganga	Sun Kosi	Nepal	68	45	46	42	57	57	38	56	49
682	02_72I_003	NRSC	319G	NP_59	4762	GL	27° 57' 3.6"	86° 41' 22.92"	Ganga	Sun Kosi	Nepal	45	42	43	43	43	42	39	43	42
683	02_72I_005	NRSC	483G		4715	GL	27° 56' 35.88"	86° 42' 40.68"	Ganga	Sun Kosi	Nepal	19	#	22	27	16	14	23	27	25
684	02_72I_006	NRSC			4741	GL	27° 56' 32.28"	86° 41' 55.32"	Ganga	Sun Kosi	Nepal	16	17	18	18	18	18	16	19	18
685	02_72I_007	NRSC	785G	NP_62	4540	GL	27° 55' 25.32"	86° 47' 11.76"	Ganga	Sun Kosi	Nepal	48	18	47	49	47	52	27	60	48
686	02_72I_010	NRSC	263G		5125	GL	27° 54' 57.96"	86° 28' 39"	Ganga	Sun Kosi	Nepal	14	14	14	14	14	14	14	15	14
687	02_72I_011	NRSC	1G	NP_64	5034	GL	27° 53' 58.2"	86° 55' 15.96"	Ganga	Sun Kosi	Nepal	107	169	174	174	174	173	171	181	174
688	02_72I_012	NRSC	113G		4409	GL	27° 52' 27.84"	86° 35' 10.68"	Ganga	Sun Kosi	Nepal	40	40	41	41	42	42	35	41	39
689	02_72I_013	NRSC	694G		5497	GL	27° 51' 24.84"	86° 56' 13.56"	Ganga	Sun Kosi	Nepal	18	18	18	17	15	18	17	19	18
690	02_72I_014	NRSC	6G	NP_67	4574	GL	27° 51' 41.04"	86° 28' 35.04"	Ganga	Sun Kosi	Nepal	134	167	169	168	167	166	165	168	167
691	02_72I_015	NRSC	814G		5416	GL	27° 51' 0"	86° 55' 42.96"	Ganga	Sun Kosi	Nepal	36	44	44	40	44	45	42	49	46
692	02_72I_016	NRSC	739G		5231	GL	27° 50' 18.6"	86° 56' 7.8"	Ganga	Sun Kosi	Nepal	30	28	28	30	29	29	17	30	25
693	02_72I_017	NRSC	49G		5018	GL	27° 50' 45.96"	86° 27' 49.32"	Ganga	Sun Kosi	Nepal	14	7	7	11	11	15	6	15	11
694	02_72I_018	NRSC	776G		5370	GL	27° 49' 57.72"	86° 55' 1.92"	Ganga	Sun Kosi	Nepal	31	35	33	33	33	32	22	34	28
695	02_72I_019	NRSC	757G		5510	GL	27° 48' 20.16"	86° 58' 24.96"	Ganga	Sun Kosi	Nepal	17	17	17	17	17	16	14	17	15
696	02_72I_020	NRSC	763G		5436	GL	27° 47' 56.04"	86° 57' 56.52"	Ganga	Sun Kosi	Nepal	29	21	21	20	20	19	16	20	18
697	02_72I_021	NRSC	764G		5276	GL	27° 47' 38.04"	86° 54' 38.52"	Ganga	Sun Kosi	Nepal	18	20	21	20	19	19	16	19	18

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
698	02_72I_022	NRSC	287G		5344	GL	27° 47' 33"	86° 50' 21.12"	Ganga	Sun Kosi	Nepal	16	30	31	31	32	31	24	32	27
699	02_72I_023	NRSC	227G	NP_76	5232	GL	27° 46' 59.16"	86° 57' 24.84"	Ganga	Sun Kosi	Nepal	81	88	87	88	89	86	84	89	86
700	02_72I_024	NRSC	358G		5165	GL	27° 47' 23.28"	86° 37' 11.64"	Ganga	Sun Kosi	Nepal	35	28	19	39	32	34	22	41	32
701	02_72I_025	NRSC	66G	NP_78	4884	GL	27° 46' 44.4"	86° 36' 48.96"	Ganga	Sun Kosi	Nepal	108	132	145	147	114	145	142	148	145
702	02_72I_026	NRSC	112G		5188	GL	27° 46' 39.72"	86° 38' 31.92"	Ganga	Sun Kosi	Nepal	30	18	40	30	29	24	10	33	26
703	02_72I_027	NRSC	41G	NP_80	4977	GL	27° 45' 17.28"	86° 57' 28.8"	Ganga	Sun Kosi	Nepal	82	88	84	87	88	52	60	87	79
704	02_72I_028	NRSC	146G		4408	GL	27° 44' 33.36"	86° 50' 39.48"	Ganga	Sun Kosi	Nepal	21	26	25	25	18	25	25	25	25
705	02_72I_030	NRSC	480G		4624	GL	27° 42' 41.04"	86° 35' 56.76"	Ganga	Sun Kosi	Nepal	11	7	7	9	11	11	0	13	4
706	02_72I_031	NRSC	14G		4777	GL	27° 41' 15"	86° 51' 29.52"	Ganga	Sun Kosi	Nepal	32	26	26	31	33	31	27	32	30
707	02_72M_009	NRSC	51G	NP_86	4932	GL	27° 52' 13.08"	87° 52' 3.36"	Ganga	Tamor Kosi	Nepal	65	65	67	68	60	64	65	68	66
708	02_72M_011	NRSC	86G		4865	GL	27° 50' 39.48"	87° 4' 50.88"	Ganga	Arun Kosi	Nepal	38	#	43	42	51	41	40	42	41
709	02_72M_013	NRSC	518G		5233	GL	27° 49' 44.76"	87° 5' 41.64"	Ganga	Arun Kosi	Nepal	12	12	12	12	9	9	9	12	10
710	02_72M_014	NRSC	47G		5217	GL	27° 47' 44.16"	87° 58' 27.48"	Ganga	Tamor Kosi	Nepal	21	22	22	21	21	22	23	23	23
711	02_72M_015	NRSC	115G		4969	GL	27° 47' 34.08"	87° 56' 1.32"	Ganga	Tamor Kosi	Nepal	13	13	14	13	13	13	10	13	11
712	02_72M_016	NRSC	7G	NP_92	4572	GL	27° 47' 54.6"	87° 5' 33.36"	Ganga	Arun Kosi	Nepal	161	231	201	200	222	197	217	235	225
713	02_78A_007	NRSC	429G		5618	GL	27° 50' 11.4"	88° 4' 39.36"	Ganga	Tamor Kosi	Nepal	16	15	15	15	15	15	15	16	15
714	02_78A_008	NRSC	199G		5032	GL	27° 32' 44.88"	88° 2' 57.84"	Ganga	Tamor Kosi	Nepal	28	26	24	24	23	23	24	26	24
715	02_62F_019	NRSC	144G	NP_12	5039	WB	30° 7' 46.56"	81° 46' 44.76"	Ganga	Karnali	Nepal	58	74	74	73	65	65	59	70	65
716	02_62J_003	NRSC	254G	NP_19	4854	WB	30° 4' 40.8"	82° 7' 35.04"	Ganga	Karnali	Nepal	49	57	59	58	66	58	61	93	68
717	02_62K_010	NRSC		NP_28	2975	WB	29° 31' 50.16"	82° 5' 29.04"	Ganga	Karnali	Nepal	1051	843	970	1039	1068	1046	939	1073	1031
718	02_62K_012	NRSC		NP_30	3653	WB	29° 11' 47.76"	82° 56' 54.6"	Ganga	Bheri	Nepal	469	492	481	482	475	477	465	510	485
719	02_62P_004	NRSC		NP_37	807	WB	28° 13' 1.2"	83° 56' 43.8"	Ganga	Trishuli	Nepal	406	375	375	382	360	370	350	407	370
720	02_63M_002	NRSC		NP_41	112	WB	27° 37' 15.96"	83° 6' 6.12"	Ganga	Rapti	Nepal	153	#	#	#	#	#	73	91	84
721	02_71D_007	NRSC		NP_48	700	WB	28° 10' 31.8"	84° 5' 57.84"	Ganga	Trishuli	Nepal	300	288	288	284	287	275	265	318	288
722	02_71D_008	NRSC		NP_49	639	WB	28° 9' 13.68"	84° 6' 43.56"	Ganga	Trishuli	Nepal	98	101	91	89	92	76	85	101	90

Sl. No.	Lake ID	Agency	Rank of Vulnerability	UID	Elevation (m)	Lake type	Latitude(N)	Longitude(E)	Basin	River	Country/UT	Inventory 2011 (Ha)	Jun-22 (Ha)	Jul-22 (Ha)	Aug-22 (Ha)	Sep-22 (Ha)	Oct-22 (Ha)	Minimum 2022 (Ha)	Maximum 2022 (Ha)	Average 2022 (Ha)
723	02_72E_001	NRSC		NP_57	1554	WB	27° 36' 6.48"	85° 9' 25.2"	Ganga	Bagmati	Nepal	158	89	132	149	130	147	94	135	124

Note: *G stands for Ganga, I for Indus and B for Brahmaputra under the rank of vulnerability, "-"indicates Inventory data Not Available, "#" indicates cloud covered, frozen/ dried lakes*

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