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## HYDROLOGY & WATER RESOURCES SERVICES DIVISION NATIONAL CENTER FOR HYDROLOGY & METEOROLOGY THIMPHU: BHUTAN

Status and River Level Trends:

Monday, August 19, 2019

Issued at: 10:00 AM

Glacier Lake Outbrust Flood (GLOF) Early Warning System 1. Punatshang Chhu Sub Basin

| SI Nos. | River Basin<br>Number       | Basin Name                                    | Name of River                                       | Station Name                                      | Highest Water<br>Level Recorded                  | Alert Water<br>Level                          | Alerm Water<br>Level                                                               | Water Level (m)<br>recorded at 9 AM<br>Yesterday | Water Level(m)<br>recorded at 9<br>AM Today   | Water Level Rise<br>(+)/Fall (-) in meters<br>during last 24 Hrs<br>ending at 9 AM Today | Downstream Settlement                                                                        |       |                                                                           |
|---------|-----------------------------|-----------------------------------------------|-----------------------------------------------------|---------------------------------------------------|--------------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------|
| 1       |                             |                                               |                                                     | Luggay Tsho                                       |                                                  | 7.80                                          | 10.00                                                                              | 6.69                                             | 6.69                                          | 0.00                                                                                     |                                                                                              |       |                                                                           |
| 2       |                             |                                               |                                                     | Thorthormi Tsho                                   |                                                  | 7.50                                          | 5.00                                                                               | 5.87                                             | 5.87                                          | 0.00                                                                                     |                                                                                              |       |                                                                           |
| 3       |                             |                                               |                                                     | Rapstreng Tsho                                    |                                                  | 7.40                                          | 5.00                                                                               | 6.33                                             | 6.32                                          | -0.01                                                                                    | Thanza, Tenchey, Lhedi and Lunana area and Downstream of Pho Chhu and Puna-Wangdue<br>Vallev |       |                                                                           |
| 4       |                             |                                               | Pho Chhu                                            | Bay Tsho                                          |                                                  | 7.40                                          | 5.00                                                                               | 6.52                                             | 6.49                                          | -0.03                                                                                    | ,                                                                                            |       |                                                                           |
| 5       | Basin ll                    | Punatshang<br>Chhu                            |                                                     | Thanza                                            |                                                  | 7.70                                          | 8.70                                                                               | NR                                               | NR                                            | #VALUE!                                                                                  |                                                                                              |       |                                                                           |
| 6       | Dasin n                     |                                               | Chhu                                                | Chhu                                              |                                                  | Tarina Wachey                                 |                                                                                    | 8.50                                             | 10.50                                         | 7.02                                                                                     | 6.99                                                                                         | -0.03 | Pho Chhu Valley (Tamidamchu, Wolathang, Samidingkha, Khawajara, Shengana, |
| 7       |                             |                                               |                                                     | Dangsa                                            |                                                  | 5.50                                          | 7.00                                                                               | 4.87                                             | 4.79                                          | -0.08                                                                                    | Khuruthang) Puna-Wangdue Valley and Downstream                                               |       |                                                                           |
| 8       |                             |                                               | Mo Chhu                                             | Taksemakhang                                      |                                                  | 7.50                                          | 8.50                                                                               | 5.96                                             | 5.87                                          | -0.09                                                                                    |                                                                                              |       |                                                                           |
| 9       |                             |                                               |                                                     | Io Chhu Tashithang                                |                                                  | 9.00                                          | 10.50                                                                              | 7.50                                             | 7.05                                          | -0.45                                                                                    | Gasa,Mo Chhu Valley,Puna-Wangdue Valley and Downstream                                       |       |                                                                           |
| 10      |                             |                                               |                                                     | Yebesa                                            |                                                  | 5.00                                          | 7.00                                                                               | 2.49                                             | 2.30                                          | -0.19                                                                                    |                                                                                              |       |                                                                           |
|         | Approximate                 | Lead Time for <b>E</b>                        | Vacuation after                                     | he detection of flood at                          | Four lake Sensor                                 | •                                             | Approximate Lead Time for Evacuation after the detection of flood at Dangsa Sensor |                                                  |                                               |                                                                                          |                                                                                              |       |                                                                           |
| Sl Nos  | Name of Place<br>Downstream | Approx. Distance<br>from Sensor (Bay<br>Tsho) | Approx. Distance<br>from Sensor<br>(Rapstreng Tsho) | Approx. Distance from<br>Sensor (Thorthormi Tsho) | Approx. Distance<br>from Sensor<br>(Luggey Tsho) | Approx.<br>Tme<br>available for<br>Evacuation | SI Nos                                                                             | Name of Place<br>Downstream                      | Approx. Distance<br>from Sensor<br>(Bay Tsho) | Approx. Time for<br>Flood to reach at the<br>Place                                       | Approx. The available for Evacuation                                                         |       |                                                                           |
| 1       | Thanza                      | 1.5 km                                        | 2.8 km                                              | 3.3 km                                            | 6.7 km                                           |                                               | 1                                                                                  | Wolathang                                        | 5.8 km                                        | 30 minutes                                                                               | 30 minutes                                                                                   |       |                                                                           |
| 2       | Tenchey                     | 2.9 km                                        | 4.1 km                                              | 4.6 km                                            | 8.2 km                                           | 20-60                                         | 2                                                                                  | Samdingkha                                       | 12.0 km                                       | 55 minutes                                                                               | 55 minutes                                                                                   |       |                                                                           |
| 3       | Tshojo                      | 8.1 km                                        | 10.0 km                                             | 10.5 km                                           | 13.8 km                                          | minutes                                       | 3                                                                                  | Punakha Dzong                                    | 20 km                                         | 90 minutes                                                                               | 1 hours 30 minutes                                                                           |       |                                                                           |
| 4       | Lhedi                       | 16.7 km                                       | 17.6 km                                             | 18.5 km                                           | 21.8 km                                          |                                               | 4                                                                                  | Khuruthang Town                                  | 24 km                                         | 120 minutes                                                                              | 2 hours                                                                                      |       |                                                                           |
| 5       | Puna-Wangdue<br>Valley      | 100 km                                        | 100 km                                              | 100 km                                            | 100 km                                           | 5-7 hours                                     | 5                                                                                  | Bajo Town                                        | 30.5 km                                       | 145 minutes                                                                              | 2 hours 25 minutes                                                                           |       |                                                                           |
|         |                             |                                               |                                                     |                                                   |                                                  |                                               | 6                                                                                  | Wangdue Bridge                                   | 33 km                                         | 150 minutes                                                                              | 2 hours 30 minutes                                                                           |       |                                                                           |

NOTE: The above distance were Calculated from basic tools in the Google Earth Map, thus diastance were approximate only.

Glacier Lake Outbrust Flood (GLOF) & Rainstorm Flood Early Warning System. 2. Chamkhar Chhu and Mangdue Chhu Sub Basin

| SI Nos. | River Basin<br>Number                                           | Basin Name | Name of River                       | Station Name    | Highest Water<br>Level Recorded<br>(m) | Alert Water<br>Level (m) | Alerm Water<br>Level (m)                                       | Water Level (m)<br>recorded at 9 AM<br>Yesterday | Water Level(m)<br>recorded at 9<br>AM Today | Water Level Rise<br>(+)/Fall (-) in meters<br>during last 24 Hrs<br>ending at 9 AM Today | Downstream Settlement                                                                                                                               |                                                                 |      |      |      |      |       |                                                                              |
|---------|-----------------------------------------------------------------|------------|-------------------------------------|-----------------|----------------------------------------|--------------------------|----------------------------------------------------------------|--------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|------|------|------|------|-------|------------------------------------------------------------------------------|
| 1       |                                                                 |            | Manas Chamkhar Chhu<br>Mangdue Chhu | Tshampa         |                                        | 5.00                     | 6.50                                                           | 4.48                                             | 4.44                                        | -0.04                                                                                    | Chokortoe Pry School,Kurjey Village,Wangdicholing,Chamkhar Town,Gangrithng Pry<br>School,Gvelkhar Village and Downstream settlement under Zhemeane. |                                                                 |      |      |      |      |       |                                                                              |
| 2       |                                                                 |            |                                     | Khagthang       |                                        | 5.50                     | 6.00                                                           | 4.92                                             | 4.83                                        | -0.09                                                                                    |                                                                                                                                                     |                                                                 |      |      |      |      |       |                                                                              |
| 3       | Basin III                                                       | Manas      |                                     |                 | Kurjey                                 | 5.72                     | 3.30                                                           | 5.00                                             | 2.59                                        | 2.47                                                                                     | -0.12                                                                                                                                               | School, Sychinal Vinage and Downsteam sedenkin under Eakingung. |      |      |      |      |       |                                                                              |
| 4       |                                                                 |            |                                     | <b>M</b> 1 (11) | N 1 611                                | Manadas China            | Manadas Chias                                                  | Manadau China                                    | Manadau China                               | Manadas Chha                                                                             | Jongthang                                                                                                                                           |                                                                 | 5.90 | 7.00 | 5.18 | 5.07 | -0.11 | Bjizam Community, MHPA Dam, Power House and Downstream settlement of Trongsa |
| 5       |                                                                 |            |                                     | Bjizam          | 5.52                                   | 4.20                     | 5.50                                                           | 2.95                                             | 2.79                                        | -0.16                                                                                    | and Zhemgang                                                                                                                                        |                                                                 |      |      |      |      |       |                                                                              |
|         |                                                                 |            |                                     |                 |                                        |                          |                                                                |                                                  |                                             |                                                                                          |                                                                                                                                                     |                                                                 |      |      |      |      |       |                                                                              |
|         | Approximate Lead Time for Evacuation of Chamkhar Chhu Sub Basin |            |                                     |                 |                                        |                          | Approximate Lead Time for Evacuation of Mangdue Chhu Sub Basin |                                                  |                                             |                                                                                          |                                                                                                                                                     |                                                                 |      |      |      |      |       |                                                                              |

| Approximate Lead Thile for Evacuation of Chamkhar Child Sub Dash |                             |                                             |                   |                           |                      | Approximate i.e.au Time for Evacuation of Mangude Clinu Sub Dash                        |                             |                                             |         |           |                   |  |  |
|------------------------------------------------------------------|-----------------------------|---------------------------------------------|-------------------|---------------------------|----------------------|-----------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------|---------|-----------|-------------------|--|--|
| App                                                              | roximate Lead Ti            | me for Evacuati                             | on after the dete | ction of Flood at the Tsl | hampa AWLS           | Approximate Lead Time for Evacuation after the detection of Flood at the Jongthang AWLS |                             |                                             |         |           |                   |  |  |
| Sl Nos                                                           | Name of Place<br>Downstream | Approx.Distance<br>from the<br>Tshampa AWLS | Distance from     | Elevation                 | Approx. Lead<br>Time | SI Nos                                                                                  | Name of Place<br>Downstream | Approx.Distance<br>from the Tshampa<br>AWLS |         | Elevation | Approx. Lead Time |  |  |
| 1                                                                | Khagthang                   | 20.3 km                                     | 20.3 km           | 3704 m                    | 27 minutes           | 1                                                                                       | Bjizam                      | 18.5 km                                     | 18.5 km | 2223 m    | 34 minutes        |  |  |
| 2                                                                | Chorkhor Toe PS             | 4.5 km                                      | 24.8 km           | 2904 m                    | 34 minutes           | 2                                                                                       | Dam Site                    | 7.8 km                                      | 26.3 km | 1848 m    | 50 minutes        |  |  |
| 3                                                                | Kurjey                      | 12.4 km                                     | 37.2 km           | 2771 m                    | 60 minutes           | 3                                                                                       | Power Plant                 | 20.4 km                                     | 46.7 km | 1024 m    | 88 minutes        |  |  |
| 4                                                                | Wangdicholling              | 5.7 km                                      | 42.9 km           | 2600 m                    | 79 minutes           |                                                                                         |                             |                                             |         |           |                   |  |  |
| 5                                                                | Bumthang                    | 1 km                                        | 43.9 km           | 2562 m                    | 83 minutes           |                                                                                         |                             |                                             |         |           |                   |  |  |
| 6                                                                | Gangrithang PS              | 0.3km                                       | 44.2 km           | 2552 m                    | 84 minutes           |                                                                                         |                             |                                             |         |           |                   |  |  |
| 7                                                                | Gyelkhar                    | 1.7 km                                      | 45.9 km           | 2538 m                    | 91 minutes           |                                                                                         |                             |                                             |         |           |                   |  |  |

## 3. River Level Status of Gauging Station

| SI Nos. | Station Type | River Basin<br>Number | Basin Name       | Name of River                  | Station Name             | Highest<br>Water Level<br>Recorded<br>(m) | Water Level (m)<br>recorded at 9<br>AM Yesterday | Water Level(m)<br>recorded at 9 AM<br>Today | Water Level Rise<br>(+)/Fall (-) in<br>meters during<br>last 24 Hrs<br>ending at 9 AM<br>Today | Weather Condition | Downstream Settlement                                                  |                                                                         |
|---------|--------------|-----------------------|------------------|--------------------------------|--------------------------|-------------------------------------------|--------------------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|
| 1       | AWLS         |                       |                  |                                | Dodena                   |                                           | 2.14                                             | 2.08                                        | -0.06                                                                                          | Sunny             | Thimphu Valley and Downstream                                          |                                                                         |
| 2       | Principal    |                       |                  | Thim Chhu                      | Lungtenphu               | 2.82                                      | 1.59                                             | 1.45                                        | -0.14                                                                                          | Sunny             | × •                                                                    |                                                                         |
| 3       | Principal    |                       |                  |                                | Damchu                   | 6.00                                      | 3.10                                             | 2.99                                        | -0.11                                                                                          | Sunny             | Chukha and Downstream                                                  |                                                                         |
| 4       | Secondary    | Basin l               | Wang Chhu        | Haa Chhu                       | Haa                      | 2.60                                      | 1.37                                             | 1.24                                        | -0.13                                                                                          | Sunny             | Haa and Wang Chhu Downstream                                           |                                                                         |
| 5       | Principal    |                       |                  | Pa Chhu                        | Bonday                   |                                           | 1.57                                             | 1.41                                        | -0.16                                                                                          | Sunny             | Downstream of Paro Valley and Wang Chhu Basin                          |                                                                         |
| 6       | Principal    |                       |                  | Amo Chhu                       | Dorokha                  |                                           | 3.35                                             | 3.35                                        | 0.00                                                                                           | Cloudy            | Samtse, Phuntsholing and Downstream                                    |                                                                         |
| 7       | Secondary    |                       |                  |                                | Droyagang                | 7.07                                      | 3.66                                             | 3.47                                        | -0.19                                                                                          | Light Rain        | Phunsholing and Downstream                                             |                                                                         |
| 8       | Secondary    |                       |                  | Pho Chhu                       | Samdingkha               | 6.10                                      | 4.40                                             | 4.20                                        | -0.20                                                                                          | Sunny             | Puna-Wangdue Valley and Downstream                                     |                                                                         |
| 9       | Principal    |                       |                  | Mo Chhu                        | Yebesa                   | 3.94                                      | 2.47                                             | 2.27                                        | -0.20                                                                                          | Sunny             | Mo Chhu Valley and Downstream                                          |                                                                         |
| 10      | Secondary    |                       |                  | hhu                            | Wangdue Bridge           |                                           | 3.40                                             | 3.05                                        | -0.35                                                                                          |                   | PHPA I, PHPA II and Downstream                                         |                                                                         |
| 11      | Principal    | Basin II              | Punatshang Chhu  |                                | Wangdue Rapid            | 7.82                                      | 4.00                                             | 3.58                                        | -0.42                                                                                          | Sunny             |                                                                        |                                                                         |
| 12      | Principal    | Dasin ii              | I unatshang Chhu | Punatshang Chhu                | Turitar Sunkosh          | 6.68                                      | 3.95                                             | 3.65                                        | -0.30                                                                                          | Partly Cloudy     | Downstream of Dagana and Lhamoizingkha                                 |                                                                         |
| 13      | Secondary    |                       |                  |                                | Sunkosh Bridge           |                                           | 3.10                                             | 2.80                                        | -0.30                                                                                          | Cloudy            | Downsteam of Dugant and Laurozzingena                                  |                                                                         |
| 14      | Principal    |                       |                  |                                | Kerabari                 | 11.90                                     | 6.15                                             | 6.02                                        | -0.13                                                                                          | Light Rain        | Lhamoizingkha and Downstream                                           |                                                                         |
| 15      | Secondary    |                       |                  | Mao Chhu                       | Sherzhong                |                                           | 4.05                                             | 4.15                                        | 0.10                                                                                           | Rainny            | Gelelephu Valley and Downstream                                        |                                                                         |
| 16      | Principal    |                       |                  | Mangdue Chhu                   | Bjizam                   | 5.35                                      | 2.95                                             | 2.80                                        | -0.15                                                                                          | Sunny             | MHPA Dam, Power House and Downstream of Trongsa & Zhemgang             |                                                                         |
| 17      | Secondary    | I                     |                  |                                | Dakpai Chhu              | 2.26                                      | 1.48                                             | 1.45                                        | -0.03                                                                                          | Cloudy            | Downstream of Zhmgang and Panbang                                      |                                                                         |
| 18      | Principal    |                       |                  |                                | Tingtibi                 | 7.45                                      | 4.24                                             | 4.04                                        | -0.20                                                                                          | Cioudy            | Downstream of Zinngang and Fanoang                                     |                                                                         |
| 19      | Principal    |                       |                  | Chamkhar Chhu                  | Kurjey                   | 4.00                                      | 2.60                                             | 2.47                                        | -0.13                                                                                          | Sunny             | Chamkhar Valley, Zhemgang and Downstream                               |                                                                         |
| 20      | Principal    |                       | Manas            |                                | Shingkhar<br>(Bemethang) |                                           | 2.43                                             | 2.33                                        | -0.10                                                                                          |                   | Zhemgang and Downstream                                                |                                                                         |
| 21      | Principal    |                       |                  |                                | Sumpa                    | 7.65                                      | 4.90                                             | 4.64                                        | -0.26                                                                                          | Sunny             | Lhuntse Downstream, Kurizampa, KHPA and Downstream along the Kuri Chhu |                                                                         |
| 22      | Secondary    |                       |                  | Kuri Chhu                      |                          | Khoma                                     | 5.30                                             | 2.32                                        | 2.10                                                                                           | -0.22             | Sunny                                                                  | Enuncse Downstream, Kurtzampa, KrrPA and Downstream along the Kurt Chnu |
| 23      | Secondary    |                       |                  |                                | Autsho                   | 8.48                                      | 4.88                                             | 4.54                                        | -0.34                                                                                          | Cloudy            | Kurizampa,KHPA and Downstream along the Kuri Chhu                      |                                                                         |
| 24      | Principal    | Basin III             |                  | Manas                          |                          | Kurizampa                                 | 18.45                                            | 9.10                                        | 8.67                                                                                           | -0.43             | Cloudy                                                                 | KHPA and Downstream along the Kuri Chhu                                 |
| 25      | Principal    |                       |                  | Kholong Chhu                   | Muktirap                 | 6.00                                      | 2.95                                             | 2.44                                        | -0.51                                                                                          | Sunny             | Doksum, Kholong Chhu Hydro Power Project and Downstream of Gongri Chhu |                                                                         |
| 26      | Secondary    |                       |                  |                                | Doksum                   |                                           | 4.39                                             | 4.35                                        | -0.04                                                                                          | Sunny             | Kholong Chhu Hydro Power Project and Downstream of Gongri Chhu         |                                                                         |
| 27      | Secondary    |                       |                  | Drangme Chhu<br>Ngara Ama Chhu | Chazam                   |                                           | 9.35                                             | 8.85                                        | -0.50                                                                                          | Sunny             | Downstream Settlement of Kuri-Gongri and Panbang                       |                                                                         |
| 28      | Principal    |                       |                  |                                | Ozorong                  | 6.75                                      | 3.25                                             | 2.12                                        | -1.13                                                                                          | Summer            | Downstream of Kuri-Gongri and Panbang                                  |                                                                         |
| 29      | Secondary    |                       |                  |                                | Sheri Chhu               | 2.58                                      | 1.62                                             | 1.59                                        | -0.03                                                                                          | Sunny             | Downsteam of Kar-Gongri and Panoang                                    |                                                                         |
| 30      | Principal    |                       |                  |                                | Panbang                  | 12.48                                     | 6.64                                             | 6.45                                        | -0.19                                                                                          | Rainny            | Manas and Downstream                                                   |                                                                         |
| 31      | Principal    | 1                     |                  |                                | Pangzam                  |                                           | 6.30                                             | 6.45                                        | 0.15                                                                                           | Cloudy            | Bangtar Settlement and Downstream                                      |                                                                         |
| 32      | Principal    |                       |                  |                                | Bangtar                  |                                           | 2.69                                             | 2.62                                        | -0.07                                                                                          | Cloudy            | Downstream of Bangtar Settlement                                       |                                                                         |

NOTE The Water Level are relative Gauge Hight of the Observation site reference to the Site Specific and doesnot represent the actual water depth.

ALARM NR Represent that the Data has not been reported or Not Updated

ISSUED BY: FMCR,HWRSD,NCHM