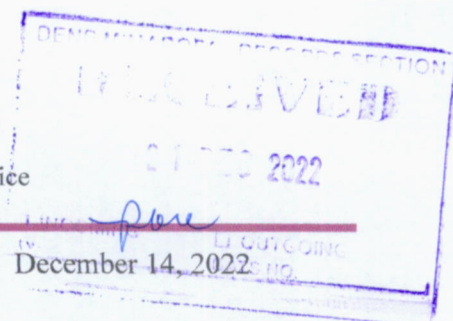




Republic of the Philippines  
Department of Environment and Natural Resources  
MIMAROPA Region  
Provincial Environment and Natural Resources Office



## MEMORANDUM

**FOR :** The Regional Executive Director  
MIMAROPA Region

**THRU :** The OIC-ARD for Technical Services  
DENR MIMAROPA

**FROM :** The OIC, PENR Officer  
Oriental Mindoro

**SUBJECT :** **SUBMISSION OF MONTHLY REPORT ON DATA  
GENERATED FROM THE SCIENCE-BASED REAL-TIME  
WATERSHED MONITORING INSTRUMENTS FOR THE  
MONTH OF DECEMBER 2022**

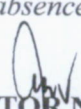
Submitted is the monitored and analyzed data generated from the installed watershed instruments within Mag-Asawang Tubig and Bongabong Watersheds. A total of five (5) instruments within the watersheds were installed to provide early warning to nearby communities.

Based on the data gathered, there is a decrease in water level due to minimal rainfall. Further, there is a minimal increase in the temperature of about 10% as compared in the first and second quarter. The unpredictability of weather systems has a significant impact on these fluctuating water level readings during this period.

Attached are the narrative report and data generated for this month.

For information and record.

*For and in the absence of the OIC, PENR Officer:*

  
**NESTOR N. CUASAY**  
DMO IV/Assistant MSD  
In-charge, Office of the PENRO



DENRPENR02212000046

TSD-CDS:act



December 14, 2022

**MEMORANDUM**

**FOR :** The Regional Executive Director  
MIMAROPA Region

**TRHU :** The OIC, PENR Officer  
Oriental Mindoro

**FROM :** The Database Manager IT Specialist  
CDS Personnel, PENRO Oriental Mindoro

**SUBJECT :** **SUBMISSION OF MONTHLY REPORT ON DATA  
GENERATED FROM THE SCIENCE-BASED REAL-TIME  
WATERSHED MONITORING INSTRUMENTS FOR THE  
MONTH OF DECEMBER 2022**

This is to submit the monitored and analyzed data generated from the installed instruments of watershed in Province of Oriental Mindoro.

At present, the downstream (Automated Weather Station: Department of Agriculture Compound, Victoria, Oriental Mindoro), midstream (Automated Weather Station: Macatoc Elementary School, Victoria, Oriental Mindoro), and upstream (Automated Weather Station: Bongabong, Oriental Mindoro) watershed instruments are all operational.

The Ground Water Level Monitoring Station in MinSU Compound is also now functioning; however, the Automated Water level Station in Calapan City need's replacement of battery and a purchase request was already done and at present waiting for the replacement.

For information and record.

  
**ALISTER EARL M. MEMAN**



**MONTHLY REPORT ON DATA GENERATED FROM THE SCIENCE-BASED REAL-  
TIME WATERSHED MONITORING INSTRUMENTS  
DECEMBER 2022**

## **I. INTRODUCTION**

### **Mag-Asawang Tubig Watershed (Victoria, Oriental Mindoro)**

The Mag-asawang Tubig Watershed (MTRW) is one of Oriental Mindoro's key watersheds, with 12,533 hectares proposed for rehabilitation in the 2013-2019 PDPFP. It is an important watershed because it provides irrigation to 40,000 hectares of rice fields in the flood basins of the Mag-asawang Tubig and Bucayao rivers. These two large rivers are linked by the Panggalaan River, which originates in Mag-asawang Tubig and flows through Calapan City before discharging to Calapan Bay.

The watershed is also expected to support the proposed hydroelectric power plant which is another vital support mechanism for the development and progress of the province and the whole island.

The Municipality of Victoria is 34 kilometers-about half an hour travel from Calapan City, the provincial capital of Oriental Mindoro, Victoria is bounded on the north by the Municipality of Naujan, on the southeast by the Municipality of Socorro, and on the southwest by the Municipality of Sablayan, one of the Municipalities of Occidental Mindoro. The town's geographical location is approximately 130° 11' latitude and 121° 17' longitude.

### **Status of Watershed Instruments Installed**

At the moment, the downstream (Automated Weather Station: Department of Agriculture Compound, Victoria, Oriental Mindoro), midstream (Automated Weather Station: Macatoc Elementary School, Victoria, Oriental Mindoro), and upstream (Automated Weather Station: Bongabong, Oriental Mindoro) watershed instruments are all operational; data from the downstream and midstream are available including the upstream.

The Ground Water Level Monitoring Station in MinSU Compound is also now functioning; however, the Automated Water level Station in Calapan City need's replacement of battery and a purchase request is done and as of present waiting.

## **II. DATA ANALYSIS**

### **Mag-Asawang Tubig River Watershed (MATRW)**

As stated earlier, Mag-Asawang Tubig River Watershed has two (2) AWS, one (1) GWMS, and one (1) AWLS.

Below is the Summary of the data from the watershed monitoring station in Mag-Asawang Tubig River Watershed for November 21, 2022 to December 14, 2022.

Due to a problem encountered (drained battery) from the Automated Water Level Station (AWLS), in Abaton Maidlang Bridge, Parang Calapan City, Mag-Asawang Tubig River Watershed, there were no data available to analyze. At present a purchase request is done and until now waiting for the replacement.



**Table 1.** Summary of data from Automated Water Level Station (AWLS), Abaton Madlang Bridge, Parang Calapan City, Mag-Asawang Tubig River Watershed for November 2022.

Watershed Monitoring Instrument Parameter	Number of Instruments Installed	Period Covered	Average	Maximum	Minimum
Streamflow Level (m)	1	November 21, 2022 – December 14, 2022	No data available	No data available	No data available

In the mid-week of November 2022, the installed battery of the AWLS in Abaton Maidlang Bridge, Parang Calapan City, was totally drained, due to the urgency an inspection and maintenance were done to dismantle the battery, and request was made for an urgent replacement as soon as possible.

For the meantime, the battery was recharged with the intention of putting it back at the AWLS station to assure continuity of the data, but the following day the battery gave up and drained. As of present the purchase requested for the replacement of the battery is still on going.

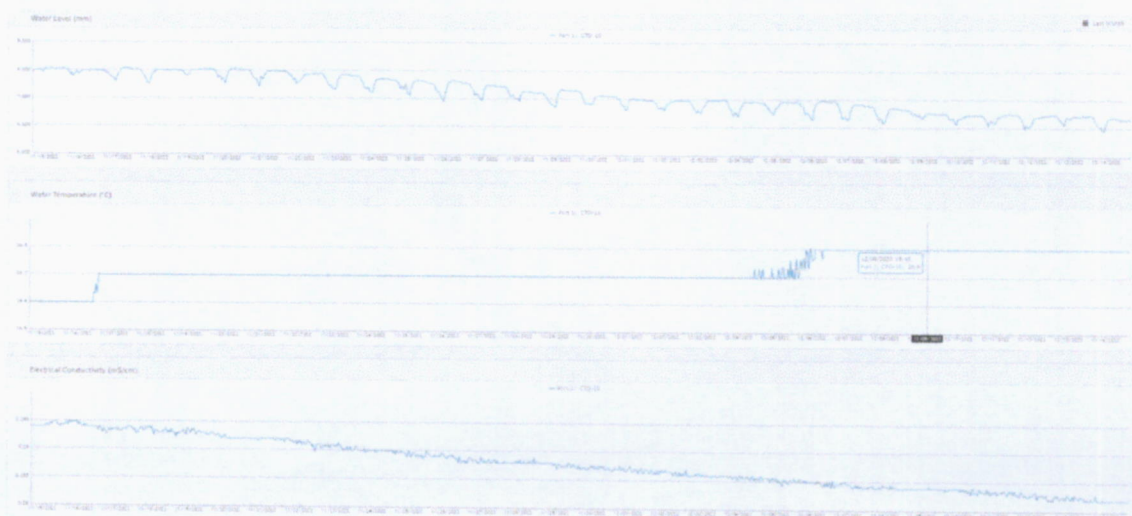
**Table 2.** Summary of data from Ground Level Water Station (GLWS), (MinSU Compound) Victoria, Mag-Asawang Tubig River Watershed for December 2022.

Watershed Monitoring Instruments Parameter GWMS MINSU	Number of Instruments	Period Covered	Average	Maximum	Minimum	Remarks
Groundwater level (mm)	1 (MinSU)	November 21-December 14,2022	7002.94	8064	5893	
Groundwater Temperature (°C)	1 (MinSU)	November 21-December 14,2022	26.74	26.8	26.7	
Conductivity (mS/cm)	1 (MinSU)	November 21-December 14,2022	0.286	0.292	0.282	

The groundwater level (mm) averages to 7002.94 mm for period of November 21, 2022 to December 14, 2022, the maximum level reaches 8064 mm and the minimum groundwater level is 5893 mm. The battery condition per mV (Battery Voltage) in minimum is 8007 mV.

The Figure 1. below shows the trends of the data trough graph indicating the different perimeter corresponds to groundwater level, groundwater temperature, and electrical conductivity.

**Figure 1.** Monthly Water level (mm) in MinSU Compound, Mag-Asawang Tubig River Watershed for November 21, 2022 – December 14, 2022.





**Table 3.** Summary of data from Automated Weather Station (AWS), DA Compound, Brgy. Alcate, Victoria, Mag-Asawang Tubig River Watershed for December 2022.

Watershed Monitoring Instruments Parameter AWS-DA compound	Number of Instruments	Period Covered	Average	Maximum	Minimum	Remarks
Rainfall (mm)	1	November 21-December 14, 2022	0.0912	17.2	0	
Air temperature (°C)	1	November 21-December 14, 2022	26	32.7	20.2	
Relative Humidity (%)	1	November 21-December 14, 2022	95.0259	101.7	58.6	
Wind Velocity (m/s)	1	November 21-December 14, 2022	0	0	0	
Wind Direction (AWS DA Victoria)	1	November 21-December 14, 2022	0	0	0	
Solar Radiation (W/m <sup>2</sup> )	1	November 21-December 14, 2022	117.82	788.1	0	
Soil Moisture (%)@10m	1	November 21-December 14, 2022	-0.1892	48.4	-43.1	negative value indicates that there is an error on reading of the sensor
Soil Moisture (%)@30m			0	0	0	

Based on the AWS on Table 3. the average rainfall of 0.0912 mm and maximum rainfall of 17.2 mm, this indicate that rainfall event is lesser from November 21- December 14, 2022 compared last month, the amount of water along the downstream is minimum high level.

**Table 4.** Summary of data from Automated Weather Station (AWS), Macatoc Elementary School, Victoria, Mag-Asawang Tubig River Watershed for December 2022.

Watershed Monitoring Instruments Parameter AWS-Macatoc Elementary	Number of Instruments	Period Covered	Average	Maximum	Minimum	Remarks
Rainfall (mm)	1	November 21, 2022 – December 14, 2022	0.0678	18.4	0	
Air temperature (°C)	1	November 21, 2022 – December 14, 2022	27.29	33.6	22.8	
Relative Humidity (%)	1	November 21, 2022 – December 14, 2022	95.698	108.5	57.4	
Wind Velocity (m/s)	1	November 21, 2022 – December 14, 2022	0.1525	1.5	0	
Wind Direction (AWS Macatoc)	1	November 21, 2022 – December 14, 2022	80.86	358	0	
Solar Radiation (W/m <sup>2</sup> )	1	November 21, 2022 – December 14, 2022	120.83	780.9	0	
Soil Moisture (%)@10m	1	November 21, 2022 – December 14, 2022	0	0	0	negative value indicates that there is an error on reading of the sensor
Soil Moisture (%)@30m			10.120	17	-8.6	

Based on the AWS on Table 4. the average rainfall of 0.0678 mm and maximum rainfall of 18.4 mm, this indicate that rainfall event is minimal from November 21- December 14, 2022, the amount of water along the midstream is also at in minimal level.



## Bongabong River Watershed (BRW)

**Table 5.** Summary of data from Automated Weather Station (AWS), DENR CENRO Roxas Brgy Hagan, Bongabong, Oriental Mindoro ranger Station), Bongabong River Watershed for December 2022.

Watershed Monitoring Instruments Parameter AWS-Bongabong	Number of Instruments	Period Covered	Average	Maximum	Minimum	Remarks
Rainfall (mm)	1	November 21, 2022 – December 14, 2022	0.057	10.4	0	
Air temperature (°C)	1	November 21, 2022 – December 14, 2022	26.57	34.9	21.5	
Relative Humidity (%)	1	November 21, 2022 – December 14, 2022	82.374	93	53.8	
Wind Velocity (m/s)	1	November 21, 2022 – December 14, 2022	1.72	6.1	0	
Wind Direction (AWS Bongabong)	1	November 21, 2022 – December 14, 2022	102.80	359	0	
Solar Radiation (W/m <sup>2</sup> )	1	November 21, 2022 – December 14, 2022	116.85	359	0	
Soil Moisture (%) @10m	1	November 21, 2022 – December 14, 2022	-27.21	0	-43	negative value indicates that there is an error on reading of the sensor
Soil Moisture (%) @30m		November 21, 2022 – December 14, 2022	-9.92	6	-33.5	negative value indicates that there is an error on reading of the sensor

Based on one-unit Automated Weather Station in Bongabong River Watershed an average rainfall of 0.057 mm and maximum rainfall of 10.4 mm, this indicates that rainfall event is moderate and tolerably from November 21, 2022 to December 14, 2022, this indicate that the amount of water along Bongabong River Watershed is in minimum level.

The air temperature at Bongabong River Watershed averages with 26.57°C, the warmest air temperature is with 34.9°C while the coolest temperature was recorded with 21.5°

The correlational analysis of the Bongabong River Watershed cannot be applied since only one AWS was installed. However, the rainfall and air temperature can be correlated since the AWS collects both data.

## Observation

A total of four (4) watershed monitoring instruments (1 AWSLS, 1 GWMS, and 2 AWS) in Mag-Asawang Tubig River Watershed, and only one (1) Automated Weather Station in Bongabong River Watershed were installed in the Watershed are of Oriental Mindoro.

Base on the gathered data there is a decrease in water level due to minimal rainfall, the temperature increases and the area is same cooler compared to previous month. The water level decrease in minimal level but still considered high compared during first and second quarter. The unpredictable change in the weather systems have a great effect to these changeable reading of water level during this period, the easterlies, shearline, low pressure areas, monsoon, and tropical cyclones has a great effect to this scenario.

Also, a problem was encountered on the Automated Water Level Station in Abaton Maidlang Bridge, Parang, Calapan City a procurement of new battery was requested for replacement of the drained battery. While the remaining installed watershed instruments within the province has a complete raw data provided.

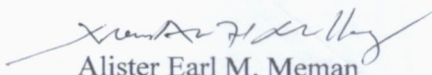
The watersheds showed that rainfall is minimal, not enough rainfall was measured within the given period of reading. Further, the groundwater level is also in minimum level thus rainfall is frequent within the period of observation rainfall is moderate.

### **Recommendations**

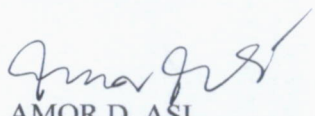
Since the stationary watershed monitoring instruments has already been developed, still unpredictable event may come anytime, a religiously monitoring is to be considered to eliminate future error during this period. The data to be gathered is vital for the success and meaningful purpose of the program. The installed instruments from upper to lower area of the watershed in particular gives a localized interpretation to the different parameter, which able locality understand and have enough time for decision making such as early evacuation, to prevent casualties brought by any natural disasters such as flooding and soil erosions.

Also, the data gathered from this instrument can contribute to the projects of different agencies programs such as upland development, flood mitigation, disaster management and mitigation (landslide and erosion control) and coastal management.

Prepared by:

  
Alister Earl M. Meman  
Database Manager IT Specialist

Noted by:

  
AMOR D. ASI  
Chief, Conservation and Development Section





*Automated Weather Station (AWS) at Macatoc Elementary School, Victoria, Oriental Mindoro.*



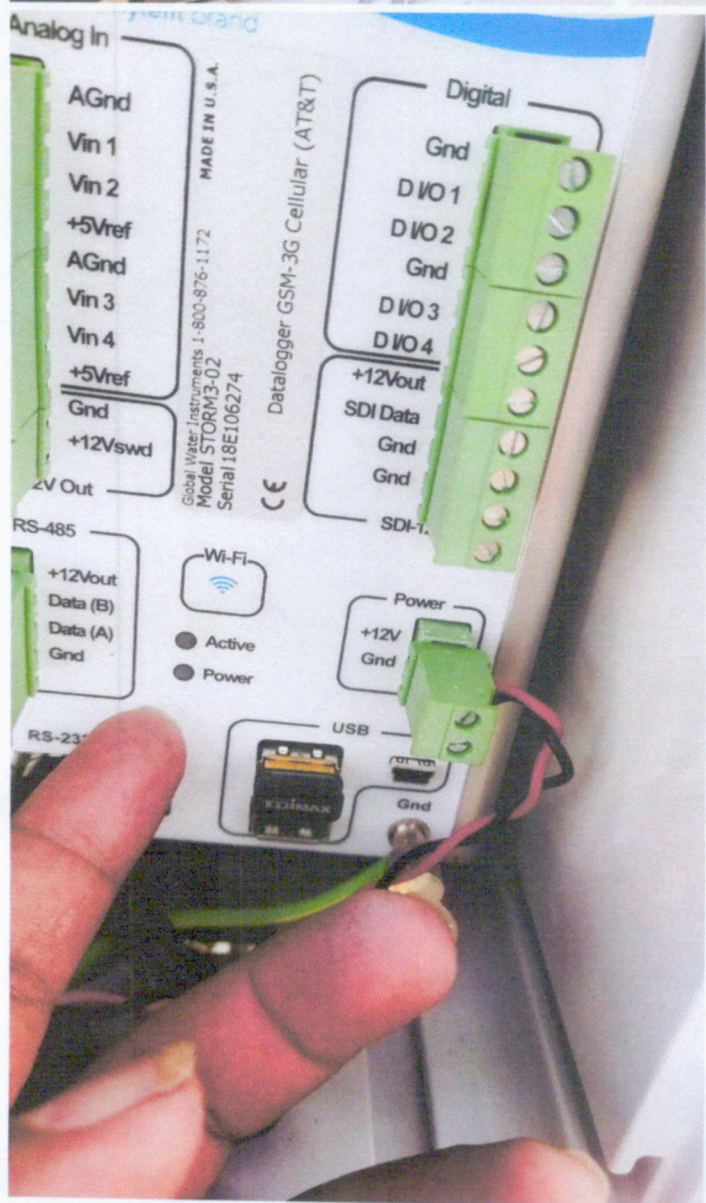
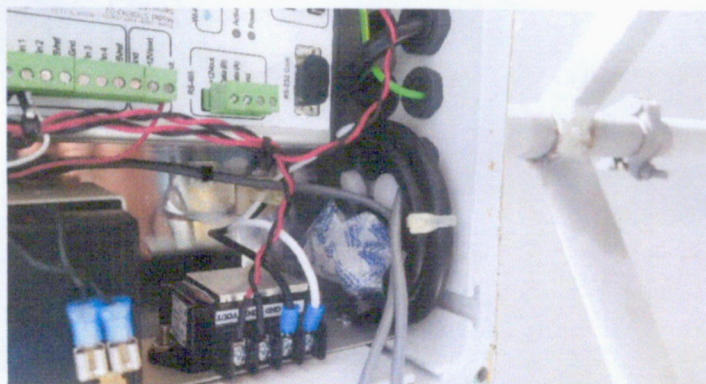


*Automated Weather Station (AWS) at Department of Agriculture Compound, Barangay Alcate, Victoria, Oriental Mindoro*



*Automated Weather Station (AWS) at Macatoc Elementary School, Victoria, Oriental Mindoro.*





*Automated Water Level Station (AWLS) at So. Abaton, Barangay Parang, Calapan City, Oriental Mindoro*