



PACIFIC REGION TECHNICAL NOTES

80-030

September 19, 1980

WEST COAST MAPS STATIONS

Garry Toth, Meteorologist
Pacific Weather Centre, Vancouver

INTRODUCTION

Three MAPS (Modular Acquisition Processing System) weather observing stations have been installed at Saturna Island (WEZ), Lawn Point (WPI) and Kindakun Point (WQS). A fourth will soon be installed at Cape St. James. These stations, often referred to as DCP's (Data Collection Platforms) are unmanned and battery-powered. They have the following instrumentation:

1. Temperature thermistor;
2. Pressure transducer;
3. 45B anemometer.

WQS has in addition:

4. Relative humidity measurement system;
5. Tipping bucket rain gauge.

A schematic diagram of a DCP is included as Figure 1.

POWER SUPPLY AND DATA TRANSMISSION

Each DCP has a solar charged battery power supply and a radio transmitter. Weather observations are not taken on the hour — rather, because of the GOES WEST schedule which must be followed, they are taken and transmitted to the satellite at the following times:

WEZ: Hour + 25 min.
WQS: Hour + 26 min.
WPI: Hour + 32 min.

The fact that the observations are not taken on the hour may be occasionally important in forecasting.

The NESS ground station at Wallops Island, Virginia then processes and relays these data through Washington to Toronto, where they are converted to SA format for inclusion in the SA collection of the immediately following hour. This process includes WEZ and WPI in the SA runs each hour. However, at the time of writing of this report (Sept. 17, 1980), WQS is still not available in SA format, but will supposedly become available in the near future. The data from all three stations (plus other MAPS stations in Canada) are available in unconverted form under the header SXCN42 KWBC (See Tech. Info Bulletin #15 for details).

The DCP is totally dependent on its own batteries for power. The manufacturer states that eight hours of sunlight per week will maintain the batteries at full charge, and calculates that the DCP should operate for 70 days with no sunlight at -40° C before losing power completely.

THE LOCATIONS OF THE MAPS STATIONS

Diagrams showing the sites of each of the three MAPS stations currently operating are included as Figures 2, 3 and 4. The following paragraphs quoted directly from the AES siting reports (which are also the source of the diagrams) provide more detail about the locations.

SATURNA ISLAND (Figure 2)

Very good exposure on the grounds of the East Point Light Station on the eastern tip of Saturna Island. Exposure is excellent in all directions except in the SE-SW quadrant as the terrain rises to 30 m and somewhat shelters the prevailing southerly winds.

The DCP is located on a grassy, plateau-like area that drops 4 metres to the beach. A small bush (4m) lying 6m to the north of the DCP is the only obstruction within 100m of the station. The station is bounded by Tumbo Channel and Tumbo Island to the northwest, Boundary Pass to the north and Haro Strait to the east. The surrounding area to the west is a wildlife reserve and is heavily wooded.

LAWN POINT (Figure 3)

The site is located on the west coast of Vancouver Island about 19km NNW of the Brooks Peninsula. The tower is on a flat, grass-covered finger of land which runs out in a southwesterly direction. Exposure is excellent from SE-S-N-NW. (Some hillocks to the WSW block somewhat that direction). The land mass to the NE is mountainous and covered by dense rain forest. The entrance to Quatsino Sound lies about 5km to the north.

KINDAKUN POINT (Figure 4)

The site is located on an outcropping of rock on the southwestern tip of Kindakun Point at the northwestern entrance of Kano Inlet. Kano Inlet is about 5km. wide at the mouth. The shoreline from the site runs generally northeastward for 8km to the mouth of Rennel Sound. Exposure is open to the Pacific Ocean from SSE-W-N. The land is rocky and covered by rain forest. Trees rise to 20-25 m to the northeast and the mountains in the Queen Charlottes range rise to 800 metres.

SOME GENERAL COMMENTS ON MAPS INSTRUMENTS AND MEASUREMENTS

The temperature and pressure measurements are generally accurate for forecast applications. One point to remember is that the pressure value depends on the temperature, so a missing or incorrect temperature will cause a missing or incorrect pressure.

The U45 anemometer is a mechanical wind mass sensor — it measures accumulated wind "mileage" past the cups and outputs a ten-minute mean wind speed and direction. It does not measure the instantaneous wind and so gives no gust information. The wind direction is given by the system as one of sixteen discrete directions. The anemometer is perched on standard 10 metre towers at WEZ and WPI, and on a 12 metre tower at WQS.

The relative humidity sensor uses a human hair shielded from both wind and precipitation as its basic component. The RH calculated by this sensor is accurate for forecast applications. According to the manufacturer, the sensor will fail in dry weather (i.e., if it is exposed to a relative humidity less than 35% for one day or longer).

The tipping bucket rain gauge is felt to provide a good rough estimate of rainfall amounts. Strong winds blowing the rain around are one source of error in the rainfall amounts. A snow gauge can be attached but this will not be done on the coast.

SURVIVABILITY OF MAPS EQUIPMENT

The three MAPS stations are the first such sites on the west coast, so only educated guesses can be made concerning how well they will stand up to the environment. Strong winds, salt spray and sand blasting all affect the sites to some degree, and the operation of the stations during the next few years will determine just how serious these problems may be. The towers are constructed on wooden platforms (concrete at Saturna Island) and are supported by guy wires at two levels, and it is expected they will withstand high winds. The instrument and battery boxes are designed to be waterproof, and are constructed of corrosion-resistant fibreglass. The towers are grounded with two three-metre ground rods. Temperature extremes on the coast are not large and will not affect the power output of the batteries. Birds (nests, droppings, etc.) may prove to be some problem to moving parts or the solar panels. However, the solar collector panels are designed so that partial obscuration by foreign material will slow but not stop the charging of batteries in the sunlight. In general, some regular maintenance will be required but exact maintenance schedules have not been worked out.

A LOOK AT THE FUTURE

Briefly, the general feeling among instruments people is that it will not be possible in the near future to include sensors measuring quantities like cloud height and visibility in any battery-powered system such as MAPS because the power requirements of such sensors are simply too great. Such sensors will be included in a new generation of MARS-type automatic stations which will operate using external power. These are currently in the design stage.

Locally, WEZ and WPI have no RH sensor or rain gauge, while WQS has a full complement of 5 instruments. There is no plan to add the missing sensors to WEZ and WPI although there would be no problem in doing so, assuming the sensors would be available from the manufacturer. If enough requests for the extra information were made, then perhaps the decision would be made to install the extra sensors.

REFERENCES

1. Technical Information Bulletin #15;
2. Zephyr, May-June 1980.

A TYPICAL 'MAPS' STATION

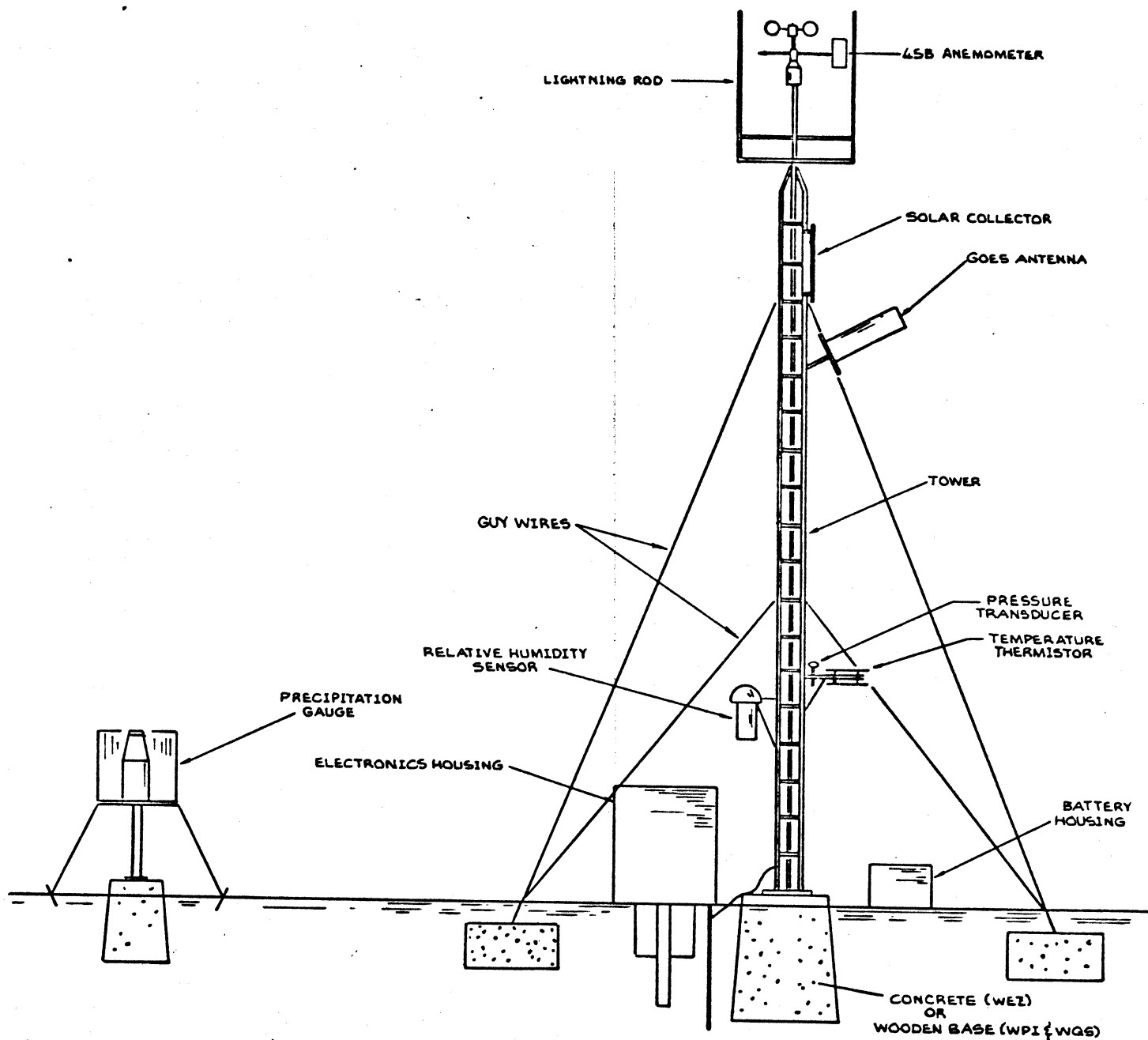


FIGURE 1.



Environment Canada
Atmospheric Environment

Environnement Canada
Environnement Atmosphérique

SATURNA ISLAND, B.C.

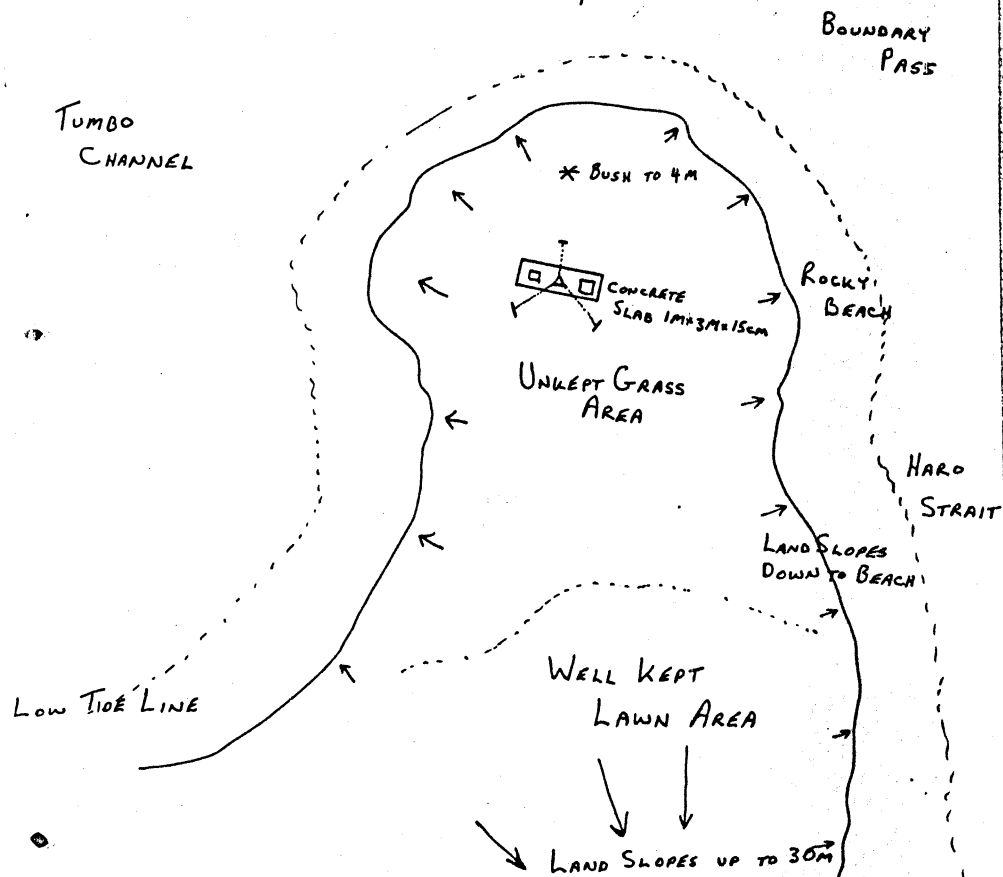
SUPPLEMENTARY INFORMATION
RENSEIGNEMENTS SUPPLÉMENTAIRES

FIGURE 2

NOT TO SCALE

DATE

MAY 1, 1980



PERFORMANCE ASSESSMENT REPORT: SURFACE WEATHER OBSERVATION PROGRAM
RAPPORT D'ÉVALUATION DU RENDEMENT: PROGRAMME D'OBSERVATIONS MÉTÉOROLOGIQUES EN SURFACE
LIGHTHOUSE AND KEEPERS' DWELLINGS
AT CREST OF HILL.

AE 0061-9466 (November 1973)



Environment Canada
Atmospheric Environment

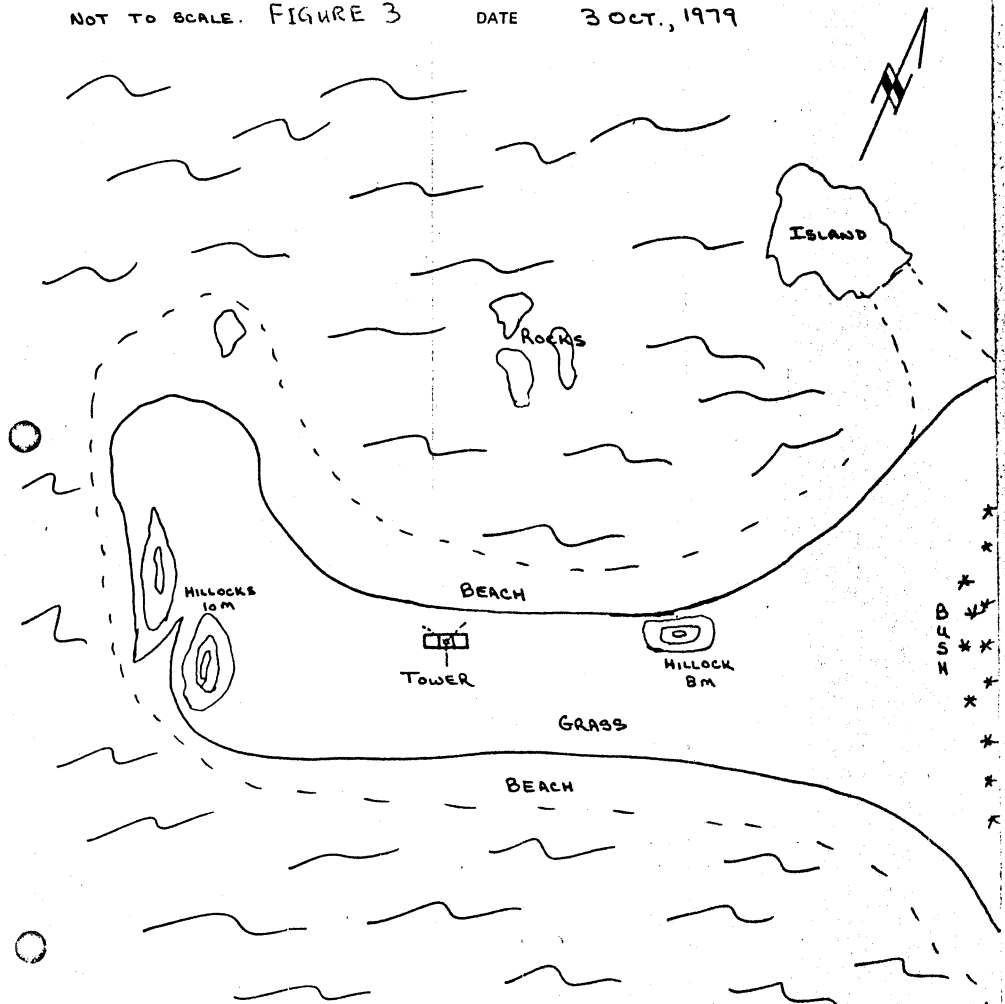
Environnement Canada
Environnement Atmosphérique

LAWN POINT, B.C.

SUPPLEMENTARY INFORMATION
RENSEIGNEMENTS SUPPLÉMENTAIRES

NOT TO SCALE. FIGURE 3

DATE 3 OCT., 1979



PERFORMANCE ASSESSMENT REPORT: SURFACE WEATHER OBSERVATION PROGRAM
RAPPORT D'ÉVALUATION DU RENDEMENT: PROGRAMME D'OBSERVATIONS MÉTÉOROLOGIQUES EN SURFACE

AE 0061-9466 (Novembre 1973)

CANADA DEPARTMENT OF THE ENVIRONMENT
ATMOSPHERIC ENVIRONMENT SERVICE

SUPPLEMENTARY INFORMATION

KINDAKUN POINT, B.C.

FIGURE 4

DATE OCT 12 1979

