



PACIFIC REGION TECHNICAL NOTES

82-016

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Supplementary Data from Lightstations for the
West Coast Aviation Observing Network

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INTRODUCTION

Weather observations on the west coast of British Columbia are taken by four different agencies, Canadian Coast Guard (CCG), Canadian Air Transportation Administration (CATA), Dept. of National Defense (DND), and Atmospheric Environment Service (AES), ostensibly for these basic purposes; marine activities, aviation and weather analysis/forecasting (see Figure #1). Each type of observation contains a distinct set of parameters which may or may not be common to the other two, each has a different reporting format or code, and each has its own collection and distribution network.

Within the aviation and synoptic weather network, see Figures 2 and 3, there are deficiencies in many areas of British Columbia but the convoluted and weather prone coast line presents a particular need. The requirement for improved aviation weather services is well documented both in accident statistics and in the recent Dubin Report. CATA has been responding to that need to the limit of budgetary constraints, having only this spring opened two new contract weather stations, one at Powell River and a second at Squamish. Two more sites are being considered for this year, one at Chetwynd and another at Bella Coola.

One way to provide additional aviation weather data along the coast with only a moderate increase in cost, would be to have some of the lightstations (lighthouse weather reporting stations) now taking only marine or synoptic reports to commence taking aviation weather observations as well. These would be of greatest assistance in areas which are particularly prone to bad flying weather and for which aviation reports are not now received. It is this aspect of the observing program that will be primarily addressed in this Technical Note.

LIGHTSTATIONS

There are 43 lightstations on the west coast, most are at remote, strategic locations for marine navigation (see Figure 4). Since several air routes follow the coast line many are also in key positions for aviation operations. Most lightstations have two person operations, exceptions are Porlier Pass, Albert Head, Amphitrite, Active Pass, and Gallows Point which are one person stations. In most cases the lightkeepers live on site with their families, exceptions are Sandheads, Sisters, and Triple Island.

All synoptic and aviation program lightstations have wind systems, but only three of which are capable of showing peak gusts. Only five of the sites have barometers. All have psychrometers for providing temperature and dew point. Of the 23 lightstations involved only in the marine reporting program, six do not have anemometers and only provide estimated winds. One lightstation has a recording rain gauge (Amphitrite) and two have sunshine recorders (Estevan Point) and (Merry Island).

There are eight Coast Guard Marine Radio Stations which collect the weather reports from the lightstations by means of VHF radio. The reports are then transmitted on the Government Data Network System (GDNS) using Telex 2000 equipment at 60 WPM. The routing is through Ottawa to Montreal where it is put into the AES communications system. The cumbersome method of data transmission sometimes results in delays of up to two hours in the receipt of information. Action is now being taken to install Infomode 200R teletype equipment at Marine Radio Stations so that reports can be input directly to the AES circuits.

EVALUATION AND PRIORITY OF LIGHTSTATIONS

A survey was conducted to determine areas along the coast where aviation weather observations were deficient, and establish a priority list for weather prone or critical decision areas. The information was obtained from flight dispatchers and senior pilots of several airline companies and charter operators, through local weather offices. Coast Guard helicopter pilots, some FSSs, and the Pacific Weather Centre were also sources of information. The following priorities were established by region.

SOUTH COAST

1. Chatham Point - has a lot of air traffic passing its location. The weather between Chatham Point and Alert Bay is frequently different than indicated by reporting stations further south. The aviation weather reporting program at this site should receive top priority for expansion. Improved instrumentation should also be considered for an expanded program.

2. Estevan Point - has an automatic weather station, but it does not have cloud height or visibility sensors. Since the Estevan lightstation has an excellent exposure and is located at a strategic location for flights along the west coast of Vancouver Island, it would be advantageous to obtain aviation observations from this site. If full reports are not possible, perhaps sky and visibility observations could be appended to the Meteorological Automatic Reporting Station (MARS II).

3. Spring Island - is also identified as a high priority location for aviation and marine observations, because of the relatively good coastal exposure and because it fills a large gap between Tofino and Cape Scott. Unfortunately, since the removal of the lightstation there is no government agency in the area to take reports. It may be possible to recruit a local resident to take observations under contract and this should be investigated.

4. Nanaimo Harbour - weather conditions are often not well represented by the observations taken at Cassidy Airport because of local topographical influences. The Harbour has a large volume of float plane movements and representative aviation weather reports would considerably enhance the operation. Aviation reports for Gallows Point or Entrance Island should be given priority consideration. Some instrumentation would be required at Gallows Point.

5. Victoria Harbour - is not well represented by reports taken at Gonzales partly because of the distance (about 2 miles) between their locations and partly because Gonzales is located on a 100 metre hill. However, some information is better than no information at all, which is the situation on weekends and during early morning hours since the one man site only produces full aviation reports from nine to five, Monday to Friday. The site is equipped with a MARS I unit to take automatic readings during the remainder of the period, but it is not fitted with visibility or cloud height sensors. The ideal situation would be to have daylight observations taken seven days per week from a harbour location. Short of that rather expensive proposition, it would be advantageous to have Gonzales commence aviation observations at 6 or 7 a.m. and extend coverage to weekends.

6. Pachena Point - would be a good location from which to receive aviation weather reports to fill the large gap between Sooke and Amhitrite, which is on a well travelled route.

7. Merry Island - likewise fills a large hole along the mainland coast and it would be advantageous to expand the aviation program at this lightstation as well.

8. Cape Scott - could provide aviation observations with their daylight synoptic reports with little additional effort.

9. Carmanah - aviation reports would also be an asset. The lightstation currently provides only marine reports and would require additional instrumentation.

CENTRAL COAST

1. Egg Island - is probably one of the most indicative sites in the area because of its exposure. A high priority should be given to expanding the aviation program during daylight hours because of its strategic location along a very busy air route. Improvements in instrumentation should also be considered.

2. Dryad Point and Pointer Island - are also important Central Coast reporting points. Much of the air traffic in the area uses Bella Bella which is in close proximity to Dryad Point. Pointer Island provides a good indication of area conditions. Both are currently providing some aviation reports, but it would be advantageous to expand the programs to cover most of the daylight hours. Improved instrumentation should also be considered.

3. Addenbroke Island - is another lightstation where an expansion of the aviation program should receive a high priority because of the strategic location along a busy coastal route.

NORTH COAST

1. Green Island - is an important location for weather in Portland Inlet, where wind conditions in winter can be especially strong. Here again the expansion of the lightstation aviation program during daylight hours should be given high priority, along with improved instrumentation. In addition a requirement has been stated for observations at the junction of Portland Canal and Observatory Inlet, which gets a lot of air traffic from both Terrace and Prince Rupert. Provision of data at this location will be difficult unless a suitable contractor could be found.

2. Masset - has a considerable volume of air traffic. Operations would be considerably enhanced at this location if Langara Lightstation were to provide aviation observations coincident with their synoptic programs. A contract observer at Masset should also be considered.

3. Ethelda Bay - is an important enroute indicator along the coast route and a high priority should be placed on expanding the aviation weather program to all daylight hours.

4. Bonilla Island - is an important indicator of North Coast conditions and also a convenient location for timing weather systems moving from the Queen Charlottes to the mainland. An expansion of the weather observing program at this location would also be beneficial.

5. Triple Island - could provide an important additional service by adding an aviation observation to their daylight synoptic reports.

6. McInnes Island - could provide a similar service to that suggested for Triple Island.

SUMMARY

Supplementary aviation weather data can be provided by lightstations at a modest cost. To this extent, this note has evaluated and ranked the usefulness of each lightstation for the aviation weather observing program. Further to this evaluation, a working group has been established amongst AES, CCG, and CATA to explore the avenues for implementing the recommendations of this report.

Figure 1

Pacific Region Real Time
Weather Reporting Network

1. AES staff or automatic station
2. FSS staff CATA
3. CCG staff
4. DND staff
5. contract staff (CATA)
6. contract staff (AES)
7. AES/FSS staff
8. AES staff funded by CATA

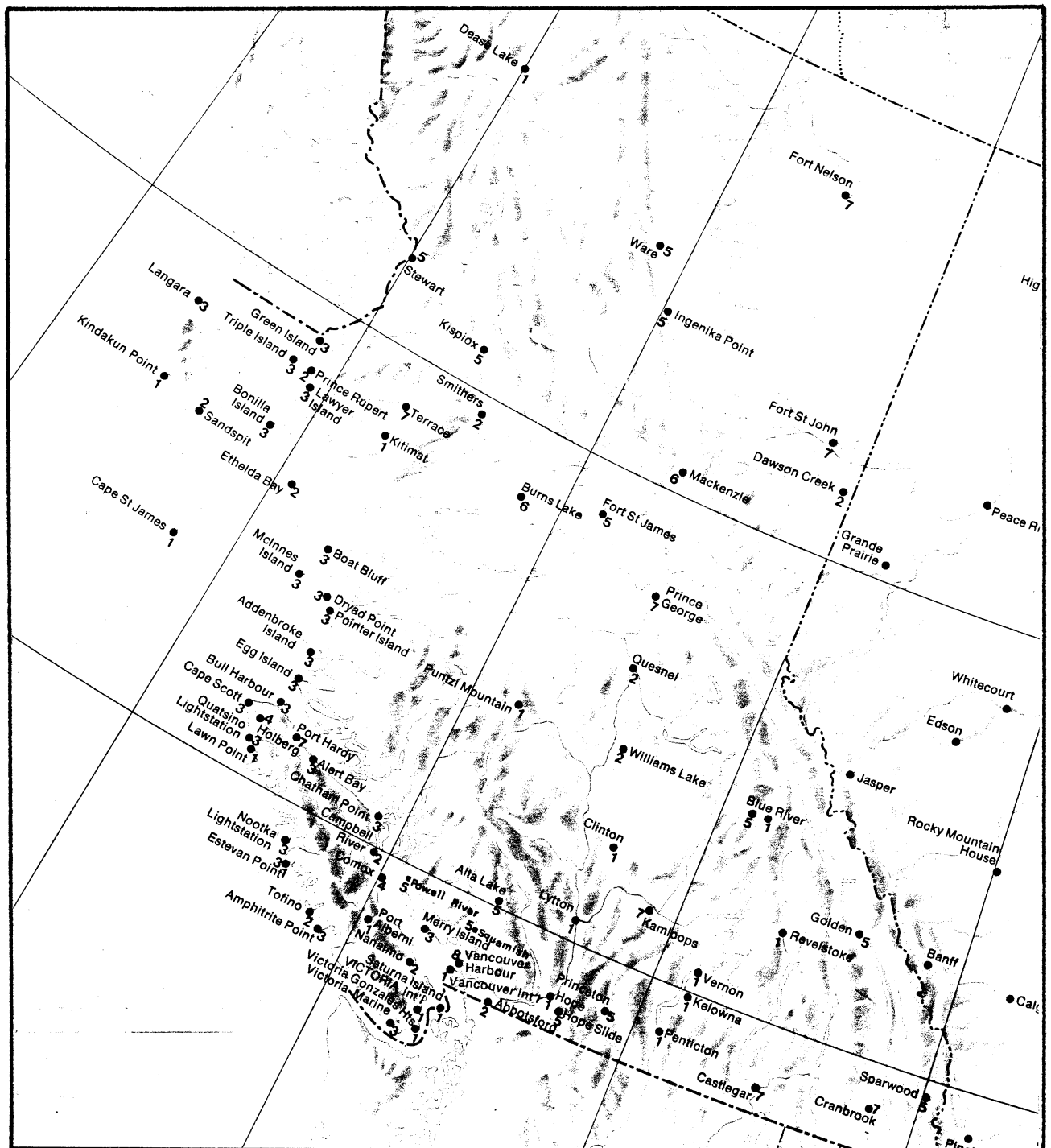


Figure 2

Aviation Weather Network

- Obs. by CATA or CATA contract
- △ Obs. by CCG
- Obs. by AES
- ◐ Joint AES/CATA programs
- ◑ Obs. by DND

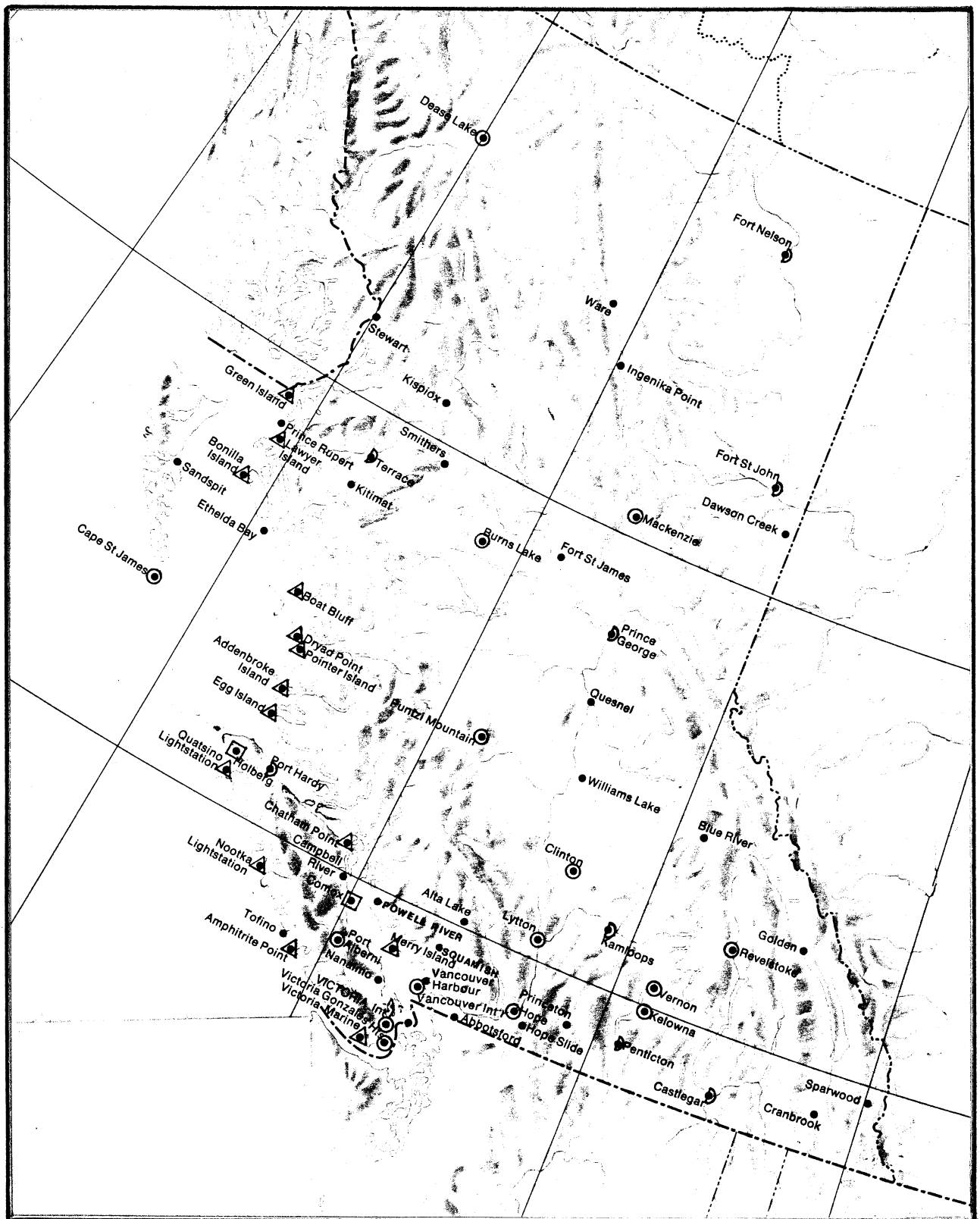
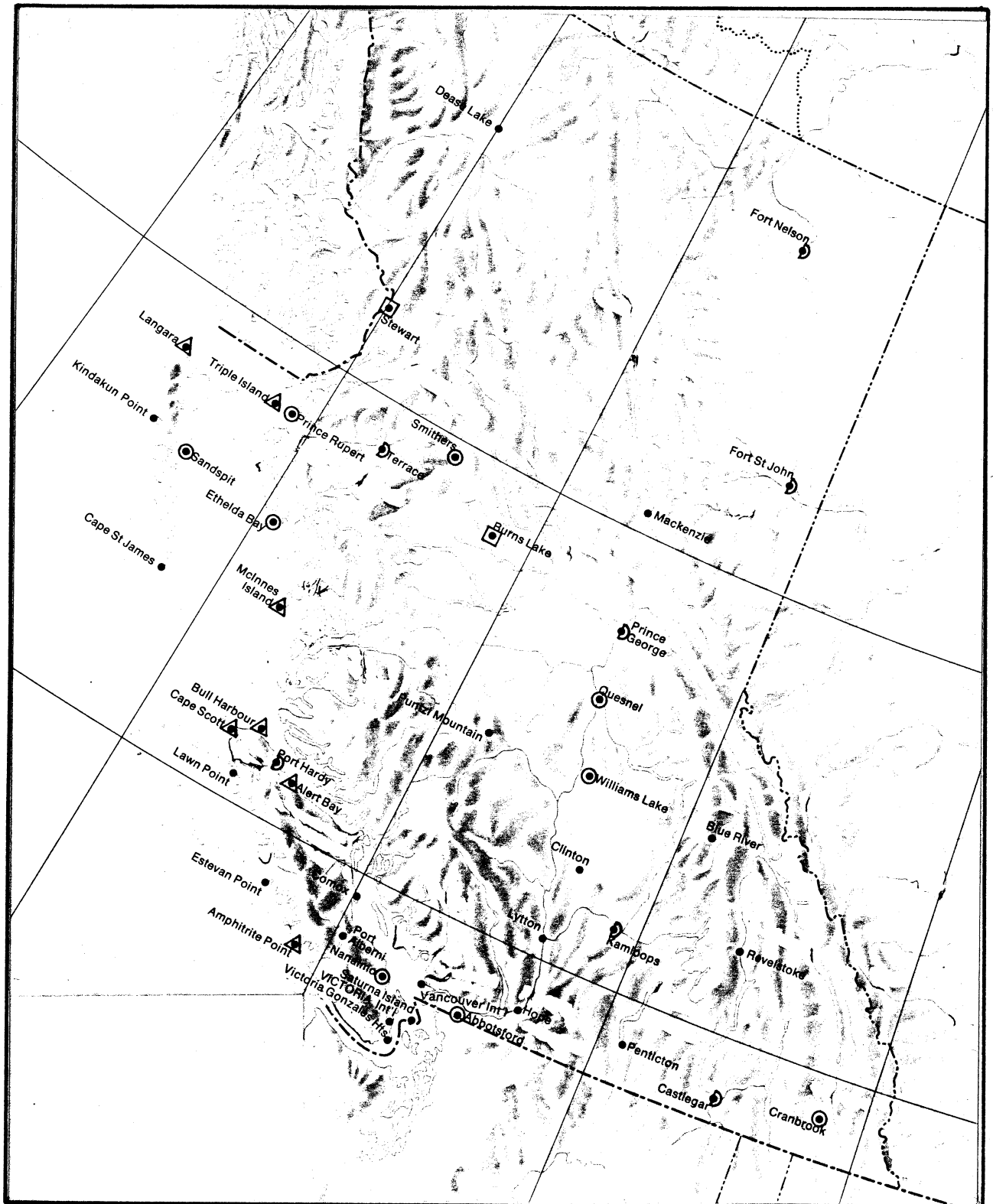


Figure 3

AES Synoptic Network

- Obs. by AES or AES contract
- ⊙ Obs. by FSS
- ◐ Part program by FSS
- △ Obs. by CCG
- ◻ Obs. by CATA contract



Canadian Coast Guard Light Stations

[illegible]