

sent 12/17/93

**Instrumentation to Improve the Washington Regional Seismograph Network
1434-92-G-2195 S.D. Malone and R.S. Crosson, P.I.s**

1993

Geophysics Program
University of Washington
Seattle, WA 98195
(206) 543-8020
e-mail: steve or bob@geophys.washington.edu
Oct 1, 1992 - Sept. 30, 1993

This contract is for the purchase and installation of four new, high quality broad-band digital seismograph stations as an addition to the Washington Regional Seismograph Network. It also includes funding for the development of the data acquisition process and integration of these data into the routine data collection and analysis procedures. Three of the four stations funded under this contract have been installed and are operating. A similar prototype station began operating in the previous contract period. On completion 6 months from now, there will be 7 high quality seismograph stations operating in the Pacific Northwest (five stations operated by us, one by USNSN (NEW), and one by IRIS-USGS (COR)).

Instrumentation to Improve the Washington Regional Seismograph Network
1434-92-G-2195 S.D. Malone and R.S. Crosson, P.I.s

Geophysics Program
University of Washington
Seattle, WA 98195
(206) 543-8020
e-mail: steve or bob@geophys.washington.edu
Oct. 1, 1992 - Sept. 30, 1993

Introduction

This contract is for the purchase and installation of four new, high quality broad-band digital seismograph stations as an addition to the Washington Regional Seismograph Network (WRSN). It also includes funding for the development of the data acquisition process and integration of these data into the routine data collection and analysis procedures. In addition to the four stations supported under this contract, a prototype station (LON), situated on the same pier as the DWWSSN station at Longmire WA (near Mount Rainier), has been operating for the entire contract period. By the end of the contract period, there will be a total of 7 high quality seismograph stations operating in the Pacific Northwest (5 operated by the WRSN, one by USNSN; NEW and one by IRIS-USGS; COR).

Progress

During this contract period, we completed installation of three new broad-band three-component stations. Two of these (LTY at Liberty, WA and SSW at Satsop, WA) time-stamp, digitize, and record data on-site. Data of interest are periodically retrieved from each site to the UW over phone lines. Station SSW has the highest dynamic range, since it has 24 bits/sample as compared to 16 bits/sample at LTY and LON. We are evaluating recordings from these instruments to determine how to optimize the recovery of useful data. The third station, near Tolt, Washington (TTW), also uses a 3-component broadband sensor and digitizes and time-stamps data on-site, but all of the digital data is continuously telemetered to the UW Seismology Lab by radio and recorded there. Eventually, the data from this site will be reformatted into USNSN format and transmitted to the National Seismic Network in Golden, CO via satellite. Station TTW is currently being operated in a test mode. Figure 1 shows the current network configuration. Table 1 gives the locations of the installed broad-band stations. Selection of an additional broad-band site near Port Townsend in Puget Sound is still pending.

Using an adaptation of the IRIS *GOPHER* dial-up system, we are routinely recovering broad-band data from Liberty, Satsop, and Longmire (LON) and archiving it with our short-period network data. We are working towards closer integration of the two data types. One of our students, Gia Khazaradze, has developed a technique to generate synthetic Wood-Anderson records from the broad-band data. This will allow us to determine local magnitudes from the broad-band data.

TABLE 1
WRSN 3-component Broadband Stations Operating as of 9/30/93

STA	LAT	LONG	EL	NAME
LON	46 45 00.0	121 48 36.0	0.853	Longmire
LTY	47 15 21.2	120 39 53.4	0.970	Liberty
SSW	46 58 20.4	123 26 01.8	0.120	Satsop
TTW	47 41 40.7	121 41 20.0	0.542	Tolt Reservoir, WA

In the previous contract period, we developed and tested a SEED writer for trace data from our analog telemetry network. Because all of the analog data is digitized and time-stamped simultaneously, header information is minimized. During this contract period, we expanded the SEED writer to incorporate data from both broad band and short-period stations. The broadband data, digitized and time stamped at each individual station, is combined with data from our analog stations (digitized and time stamped at the UW) to form a single SEED file. These SEED files will eventually be stored at the IRIS Data Management Center where they will be easily available.

We have completed all hardware requirements for installation of the VSAT communications link from Seattle to the USNSN; through which we plan to receive data from the USNSN station at Newport, WA (NEW) and possibly other stations. NEW is a high-quality, low-noise site and is the only station in Washington east of 118° N longitude. It provided valuable short-period information to the WRSN via telephone lines for many years until the phone line to the UW was terminated in 1987 (data is now telemetered to the NEIC).

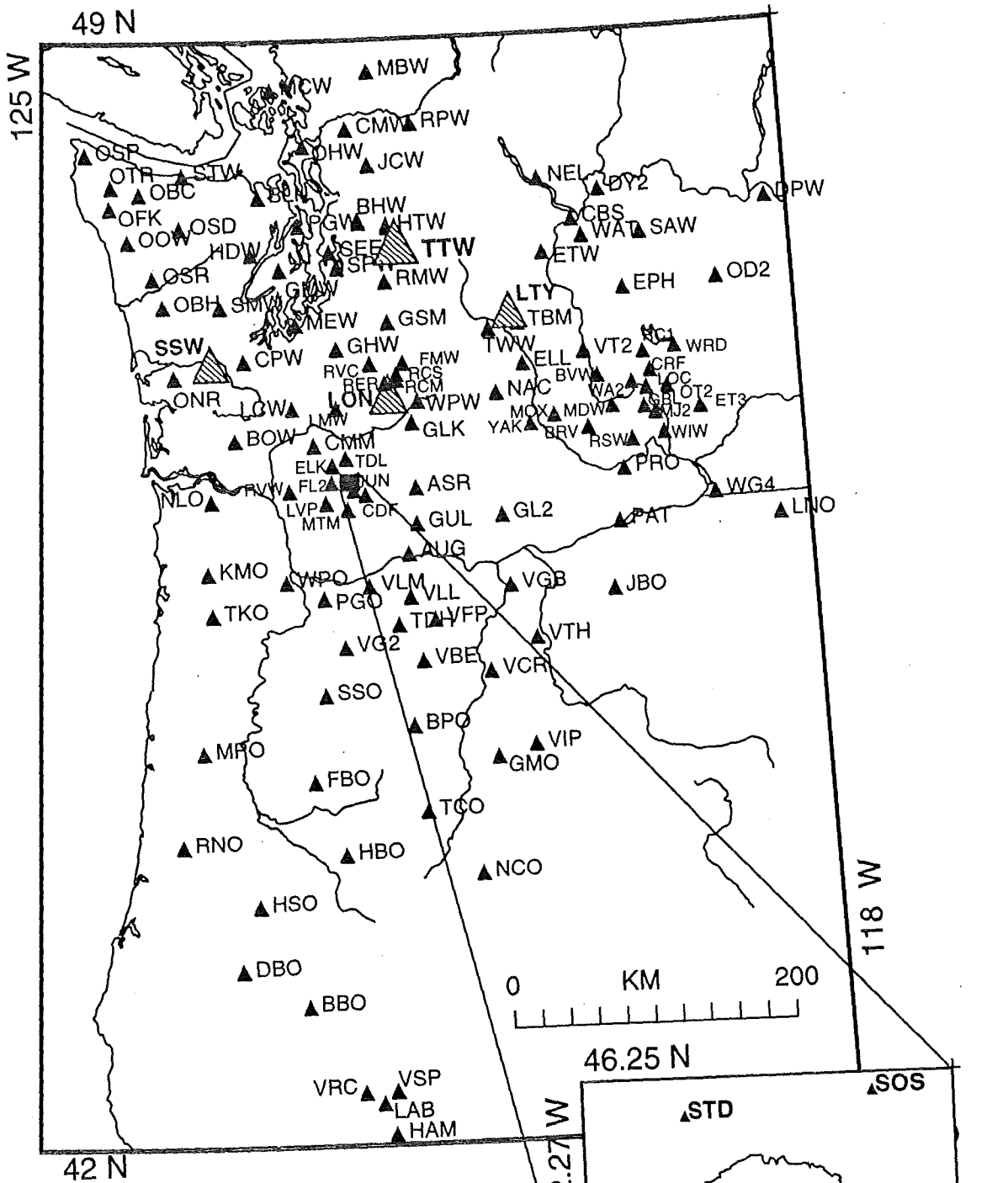


Figure 1: Stations either operating at the end of the third quarter, 1993, or installed early in the fourth quarter. Broad-band stations are shown as larger shaded triangles. Short-period station RCM was installed at Camp Muir on Mt. Rainier 3rd quarter. New short-period stations in southern Oregon installed in October are HAM (Hamaker Mt.), LAB (Little Aspen Butte), VSP (Spencer Mt.), and VRC (Rainbow Creek).