

FINAL TECHNICAL REPORT: 1998

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FINAL TECHNICAL REPORT
USGS Grant 1434-HQ-96-GR-02714
Rapid Strong-motion data in the Puget Sound urban area

Abstract

This is the final technical report for USGS Joint Operating Agreement 1434-HQ-96-GR-02714 "*Rapid Strong-motion data in the Puget Sound urban area*". This agreement began in May 1996, and funded installation of three strong-motion instruments in the Puget Sound area and the development of software and procedures for receiving data from these instruments in real time. Additional instruments were funded under joint operating agreement 1434-95-A-1302, "Pacific Northwest Seismograph Network (PNSN) Operations".

The PNSN installed six strong motion stations during 1997, and four additional stations during 1998. By the end of the contract period, real-time data was being acquired automatically and merged into PNSN trace data files, and software to rapidly compute engineering parameters from the data and present them via the world-wide web had been written and installed.

Results

The PNSN selected wide-dynamic-range strong-motion IDS-24 accelerograph units produced by Terra Technology Inc. of Redmond, Washington. The instruments were installed, and data telemetered in real-time to the PNSN. Figure 1 shows the locations of PNSN strong-motion stations operating at the end of June, 1998. An EARTHWORM module called ref2uw was written to allow strong-motion data to be routinely merged into PNSN trace-data files. Ref2uw is available via the *Council of the National Seismic System* (CNSS) web-site. Our data analyst regularly picks arrivals on the strong motion instruments. Strong motion data recorded by the PNSN is available by request.

The first significant earthquake to be recorded by the PNSN strong motion network was a magnitude 4.9 crustal event located within the Puget Basin near Bremerton, WA on June 23, 1997. Other earthquakes with strong motion data of interest are listed on the PNSN strong-motion web page:

<http://www.geophys.washington.edu/SEIS/PNSN/SMO/>

The PNSN strong-motion network will eventually cover the urban corridor from Eugene, OR to Bellingham, WA, and include rapid calculation and broadcast of strong-motion earthquake parameters. The PNSN is working with regional utilities and industries that can provide assistance in siting, telemetry, instrumentation or cooperative operations.

Table 1 lists strong-motion, three-component stations operating at the end of June, 1998, in Washington and Oregon and providing data in real or near-real time to the PNSN. Several of these stations also have broad-band instruments, as noted. The first column in the table gives the 3-letter station designator, followed by a symbol designating the funding agency; stations marked by a percent sign (%) were supported jointly by this agreement and by USGS joint operating agreement 1434-HQ-98-AG-01937. Additional columns give station north latitude, and west longitude (in degrees, minutes and seconds), station elevation in km, and comments indicating landmarks for which stations were named. The "SENSOR" field designates what type of seismic sensor is used; A = Terra-Tech SSA-320 SLN triaxial accelerometer/Terra-Tech IDS24 recording system A20 = Terra-Tech SSA-320 triaxial accelerometer/Terra-Tech IDS20 recording system BB = Guralp CMG-40T 3-D broadband velocity sensor. The "TELEMETRY" field indicates the type of telemetry used to recover the data. C = continuously telemetered via dedicated telephone lines, D = dial-up, I = Internet.

TABLE 1
Strong-motion three-component stations operating at the end of the second quarter 1998.

STA	F	LAT	LONG	EL	NAME	SENSORS	TELEMETRY
ERW	%	48 27 14.4	122 37 30.2	0.389	Mt. Erie, WA	A,BB	C
ELW	%	47 29 38.8	121 52 21.6	0.267	Echo Lake, WA	A20	C
MPL	%	47 28 08.2	122 11 06.2	0.122	Maple Valley	A	C,D
NOWS	%	47 41 12.0	122 15 21.2	0.00	NOAA, Bldg 3	A20	I
QAW	%	47 37 53.2	122 21 15.0	0.140	Queen Anne	A	C
SEA	%	47 39 18.0	122 18 30.0	0.030	Seattle	A,BB	C,D
SPW	%	47 33 13.3	122 14 45.1	0.008	Seward Park, Seattle	A,BB	C
UPS	%	47 15 56.1	122 28 58.4	0.113	U. Puget Sound	A	D,I

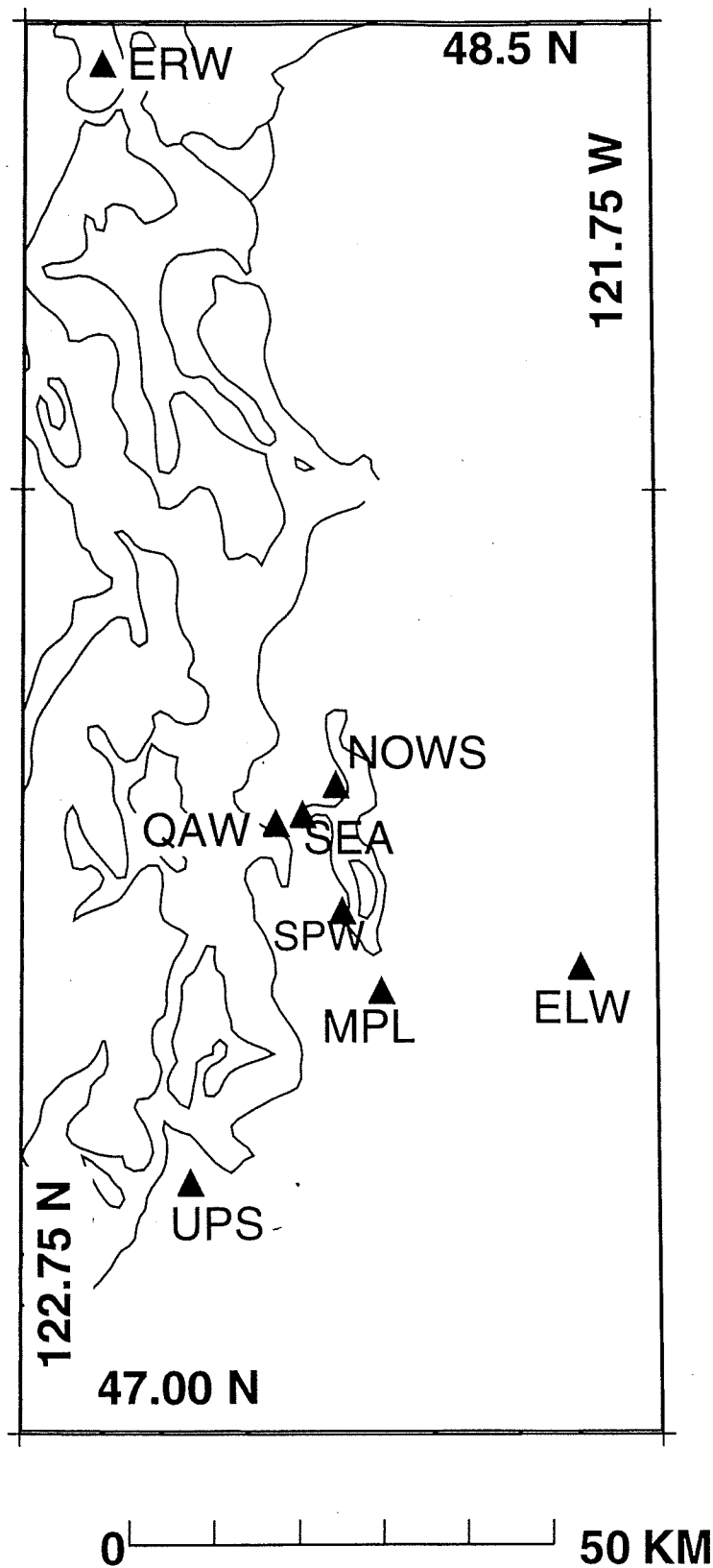


Figure 1. June 1998; Three-component strong-motion seismograph stations operated by the PNSN with real-time telemetry.