

MESSAGING THROUGH RELAYS AND THE NATIONAL TRAFFIC SYSTEM

An important skill for Emcom and
fun activity for Amateurs



Messaging through Relays and the National Traffic System

- Message Relay and the National Traffic System – A History, How it Works, An Activity for Today?
- The Radiogram: Background, Why, How, Other formats?
- Sending and Receiving Record Traffic – Traffic Nets, Digital Traffic Network, Winlink
- Resources



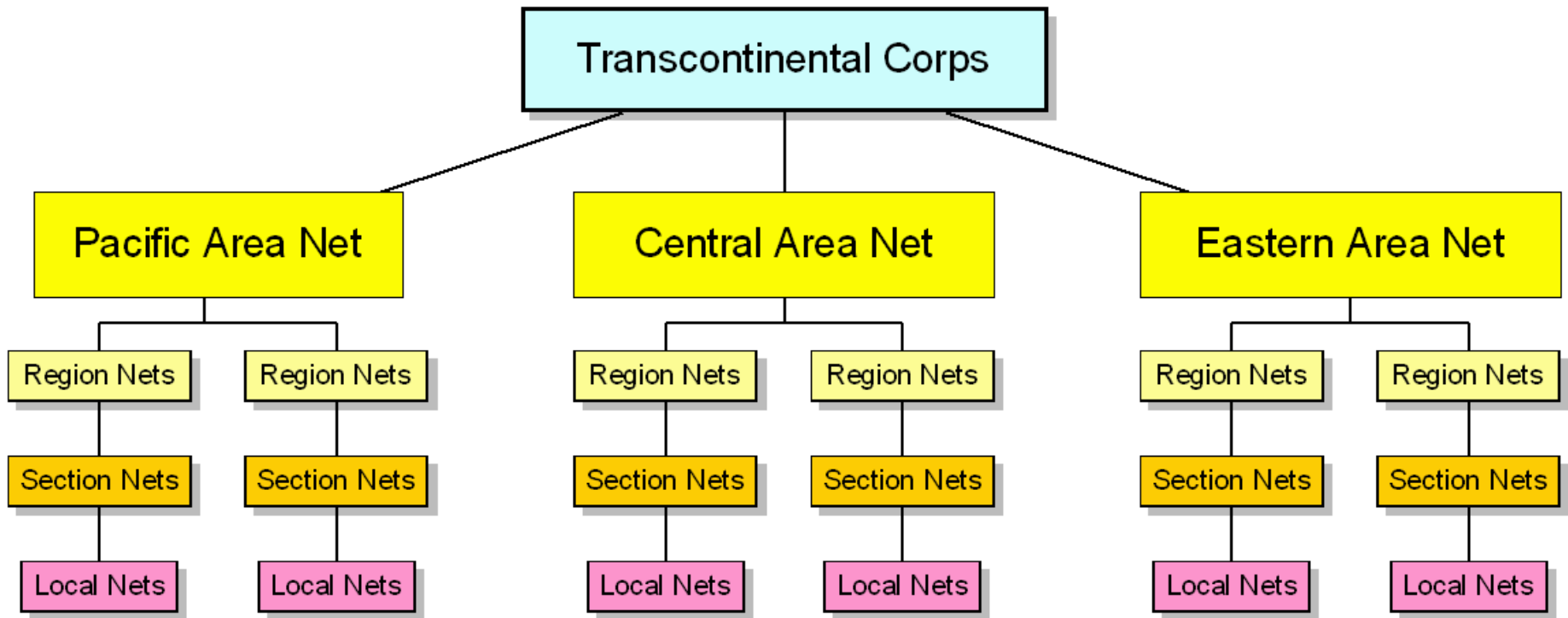
Message Relay and the 21st Century

- Message relaying during early 1900s
- Founding of ARRL in 1914 to organize networks
- With expanding demand following WWII the National Traffic System (NTS) was formed in 1949 using layers of nets following organized sequence and manned by many operators committing to at least one net session per week.
- Addition of digital modes in 1980s and 1990s and a parallel digital network
- How about today?



Traffic Routing

ARRL National Traffic System (Manual Nets)



While there are only three Area Nets, there are many more Region, Section and Local nets than we could show here due to space limitations.

Messaging and the Radiogram

- **Radiograms:** similar to a telegram in format, used globally
- Contains a plain text message with relevant metadata (header or preamble)
- Provides a record of a message which can be easily referenced
- Provides an audit of transmission and delivery which can be used for tracking as needed.
- The ARRL has provided a radiogram form which is used to create and relay a formal written message which can be routed by a network of amateur radio operators through traffic nets of the National Traffic System (NTS).



THE AMERICAN RADIO RELAY LEAGUE
RADIOGRAM
 VIA AMATEUR RADIO



NUMBER	PRECEDENCE	HX	STATION OF ORIGIN	CHECK	PLACE OF ORIGIN	TIME FILED	DATE
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TO

TELEPHONE NUMBER

THIS RADIO MESSAGE WAS RECEIVED AT

AMATEUR STATION _____ PHONE _____

NAME _____

STREET ADDRESS _____

CITY, STATE, ZIP _____

REC'D	FROM	DATE	TIME	SENT TO	DATE	TIME
-------	------	------	------	---------	------	------

THIS MESSAGE WAS HANDLED FREE OF CHARGE BY A LICENSED AMATEUR RADIO OPERATOR, WHOSE ADDRESS IS SHOWN IN THE BOX AT RIGHT ABOVE. AS SUCH MESSAGES ARE HANDLED SOLELY FOR THE PLEASURE OF OPERATING, NO COMPENSATION CAN BE ACCEPTED BY A "HAM" OPERATOR. A RETURN MESSAGE MAY BE FILED WITH THE "HAM" DELIVERING THIS MESSAGE TO YOU. FURTHER INFORMATION ON AMATEUR RADIO MAY BE OBTAINED FROM ARRL HEADQUARTERS, 225 MAIN STREET, NEWINGTON, CT 06111

THE AMERICAN RADIO RELAY LEAGUE, INC. IS THE NATIONAL MEMBERSHIP SOCIETY OF LICENSED RADIO AMATEURS AND THE PUBLISHER OF QST MAGAZINE. ONE OF ITS FUNCTIONS IS PROMOTION OF PUBLIC SERVICE COMMUNICATION AMONG AMATEUR OPERATORS. TO THAT END, THE LEAGUE HAS ORGANIZED THE NATIONAL TRAFFIC SYSTEM FOR DAILY NATIONWIDE MESSAGE HANDLING.

PRINTED IN USA



The ABC's of Message Relay

- **A**ccuracy: the exact same from origination to destination
- **B**revity: Shorter is faster
- **C**larity: recipient must be able to understand in order to take any action.



ITU Phonetics

A Alpha

B Bravo

C Charlie

D Delta

E Echo

F Foxtrot

G Golf

H Hotel

I India

J Juliet

K Kilo

L Lima

M Mike

N November

O Oscar

P Papa

Q Quebec

R Romeo

S Sierra

T Tango

U Uniform

V Victor

W Whiskey

X Xray

Y Yankee

Z Zulu



Introductory Words/Phrases

Number

Initial(s), Letter Group

Figures

Mixed Group

Mixed Group Figures

Amateur Call

I Spell

I say again

Break

End

Roger

Affirmative / Negative



Radiogram Form Detail (3 of 6)

THE AMERICAN RADIO RELAY LEAGUE		RADIOGRAM		VIA AMATEUR RADIO		
NUMBER	PRECEDENCE	STATION OF ORIGIN	CHECK	PLACE OF ORIGIN	TIME FILED	DATE
704	R	W6SCF	21	LA HONDA CA	1830Z	JAN 16

Number

- Assigned by the message originator
- No standard way of numbering messages
 - Consecutive (1, 2, 3..., starting over at the new year or monthly)
 - Order by month & number (507 = 7th you originated in May; 11244 = 244th message you originated in November)

Precedence (E, P, W, or R)

- E = Emergency (Always spelled out, life or death urgency in a declared emergency)
- P = Priority (official traffic in a declared emergency)
- W = Health & Welfare (used only in a declared emergency)
- **R = Routine (everything else – most frequently used)**

Radiogram Form Detail (4 of 6)

THE AMERICAN RADIO RELAY LEAGUE							
RADIOGRAM							
VIA AMATEUR RADIO							
NUMBER	PRECEDENCE	HX	STATION OF ORIGIN	CHECK	PLACE OF ORIGIN	TIME FILED	DATE
704	R	C	W6SCF	21	LA HONDA CA	1830Z	JAN 16

(Optional) HX or Handling Code – A, B, C, D, E, F or G

- A. Collect landline delivery authorized within ___ miles of addressee or unlimited if blank (A150 = collect call authorized w/in 150 miles; A = collect call authorized regardless of miles)
- B. Cancel message if not delivered within ___ hours of filing time & service originating station (B72 = cancel if not delivered within 72 hrs and send message to originator to notify them)
- C. Confirmation of delivery requested by originating station (“TOD YOUR 704 JAN 16 2030 PST XRAY 73” or if issues “ARL SIXTY SEVEN 704 PHONE 775 555 1234 INCORRECT NO REPLACEMENT FOUND SENT RADIOGRAM INSTEAD XRAY 73”)
- D. Report your identity & time/date rec’d message plus time/date delivered or sent to another
- E. Delivering station to get reply from addressee and send to originator as a new message
- F. Hold delivery until ___ (numbered day of month) – great for birthday or anniversary messages (F14 = deliver on 14th of the month; F1 = deliver on the 1st of month after date filed)
- G. Delivery by mail or toll call not required, service originating station (often ignored).

Radiogram Form Detail (5 of 6)

THE AMERICAN RADIO RELAY LEAGUE							
RADIOGRAM							
VIA AMATEUR RADIO							
NUMBER	PRECEDENCE	HX	STATION OF ORIGIN	CHECK	PLACE OF ORIGIN	TIME FILED	DATE
704	R	C	W6SCF	21	LA HONDA CA	1830Z	JAN 16

Station of Origin: Call sign of station who put the message into NTS format; If WA6YJR prepares message 1207 for a fellow ham, then puts it onto an NTS packet BBS for relay to Vermont, the originator is... WA6YJR. If KI6PGA prepares message 23 for her non-ham neighbor and then gives it to WA6YJR to relay, the originator is... KI6PGA.

Check: The word count in body text only (do not count the address or signature); precede with “ARL” if any of the ARL numbered texts are used (i.e., ARL7).

Place of Origin: The city & state where the message was written.

(Optional) Time Filed: This is not used much but is required if Handling “B” is requested. 24-hr format & time zone (UTC or “Zulu” time is preferred.)

Date: Month (non-numeric – abbreviated) & day number message was created (i.e., JAN 16).

Radiogram Form Detail (1 of 6)

TO JOHN Q DOE
123 NORTH MAIN ST
PAHRUMP NV 89060

TEL. NUMBER 775 555 1234

THIS RADIO MESSAGE WAS RECEIVED AT
AMATEUR STATION _____ TEL. NUMBER _____
NAME _____
STREET ADDRESS _____
CITY, STATE, ZIP _____

To: Full name (and call sign if going to a ham.) Street address spelling out any directional (NORTH, EAST, etc.) or PO Box, city, state (abbreviated) & *zip code*. Note: Digital and packet NTS messages are routed via zip code.

Telephone Number: Be sure to include the area code and double-check the number. Most radiograms are delivered by phone calls.

This Radio Message was received at: The delivering station will complete this with its identification, date received, and location. This information can be used by the addressee to send a reply.

More received-from detail will go in the "REC'D" block after body text and signature.

If the delivering station cannot complete the call, they will try to look up the addressee in the phone directory so it's important to provide as complete information as possible.

Radiogram Form Detail (2 of 6)

TEL. NUMBER	778 555 1234	CITY, STATE, ZIP			
DONT	WORRY	X	WE	ARE	
FINE	X	ALL	ROADS	CLOSED	
BY	DOWNED	TREES	AND	WIRES	
X	WILL	CALL	WHEN	WE	
CAN	SALLY DOE 650 555 7890				
REC'D FROM	TIME	DATE	SENT TO	TIME	DATE

Text: 25 words maximum, 5 per line.

Punctuation is not used except:

- “X” is used to denote a period. It is counted as a separate word. “X” is never the last group of the text.
- “R” is used in place of a decimal in mixed figure groups, as in 7013R5 (7013.5), or 146R670 (146.670). Since the “R” is part of the group it does not qualify as a separate group for the check.
- OTHER PUNCTUATION is spelled out as in “QUERY” for a question, “DASH” to separate special number or mixed groups, “EXCLAMATION”, “COMMA”, etc. (Hyphens are NOT used in telephone number groups or anywhere else in the text.) Such punctuation words are separate groups and ARE counted for the check.

Signature: There is no “Signature” field, just write-in below text; Name & call sign of author – include phone number if not a ham or if not known on an NTS net.

ARRL Numbered Texts

Purpose and how counted

- ARL Numbered Texts replace common phrases in message body text (i.e., Happy Birthday, Greetings by amateur radio, etc.)
- Use of ARL texts reduce total message word count – faster and more consistent transmission of text
- ARL texts are translated before delivery of message to addressee
- ARL text numbers are always spelled-out in words (i.e., ARL SEVEN or ARL FORTY SIX)
 - ARL FORTY SIX is counted as 3 words
 - Several ARL texts can be strung together: ARL ONE ARL SIX
- Message word count (check) is written as “ARL#” (i.e., ARL4 or ARL15) to alert operators that message includes at least one ARL numbered text.

ARRL NUMBERED TEXTS

- **One Group** – For Possible **RELIEF EMERGENCY** Use
- **ONE** Everyone safe here. Please don't worry.
- **TWO** Coming home as soon as possible.
- **THREE** Am in _____ hospital. Receiving excellent care and recovering fine.
- **FOUR** Only slight property damage here. Do not be concerned about disaster reports.
- **FIVE** Am moving to new location. Send no further mail or communication. Will inform you of new address when relocated.
- **SIX** Will contact you as soon as possible.
- **SEVEN** Please reply by Amateur Radio through the amateur delivering this message. This is a free public service.

Radiogram Form Detail (6 of 6)

REC'D FROM	TIME	DATE	SENT TO	TIME	DATE
			RENO WA6XYZ	1840 PST	JAN 16

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REC'D: Call sign from whom you received the message and date & time of receipt. Time may be either your local time (PST/PDT) or Zulu time. Make sure date agrees with time (Zulu is 8 hours ahead of PST – can cause date to roll forward).

SENT: Call sign you sent or passed the message to, or to whom you delivered it, with date & time. Also good to note delivery method for your own reference (i.e., via phone or left on Tom's voicemail). Always leave your call back number if message was left on voicemail!

The ICS-213 Format

General Message (ICS 213)

[Load ICS213 INITIAL Data](#)

[Form Instructions](#)

1. Incident Name:

2. To (Name/Position):

3. From (Name/Position):

4. Subject:

5. Date:

6. Time:

7. Message:

Be Brief and Concise

8. Approved by:

Position / Title:

ICS 213 Format for DTN/Winlink

RRI Radiogram ICS-213							Read Help and Instructions!	
Number <input type="text" value="25"/> <input type="checkbox"/> SVC	Precedence <input type="text" value="R"/> EMERGENCY <input type="text" value="P"/> <small>Precedence R can be used at this time</small>	Handling Instructions <input type="text" value="NONE"/> <input type="text" value="HXC"/>	Station Of Origin <input type="text" value="KW1U"/> <small>Overwrite if different.</small>	Check <input type="text" value="0"/>	Place of Origin <input type="text"/>	Time <input type="text" value="2058Z"/>	Date <input type="text" value="AUG 30"/>	
						<input checked="" type="radio"/> UTC Time <input type="radio"/> Local Time <input type="radio"/> No Time		
To (Name): <input type="text" value="FIRST AND LAST NAME MINIMUM"/>				Position (Title & Agency): <input type="text"/>				
Address: <input type="text" value="OPTIONAL"/>								
City / Town: <input type="text" value="VERIFY YOUR SPELLING"/>				State or Province: <input type="text" value="ST"/>		Zip: <input type="text" value="USA/CAN"/>		
Phone: <input type="text" value="555 444 6789"/>		Extension: <input type="text" value="NUMBERS"/>		E-mail: <input type="text" value="EMAIL IF KNOWN"/>				
From (Name): <input type="text" value="FIRST AND LAST NAME MINIMUM"/>				Position (Title & Agency): <input type="text"/>				
Sender's preferred Contact information: <input type="text"/>								
Subject: (optional) <input type="text" value="OPTIONAL"/>				Date/Time originated: <input type="text" value="e.g. YYYYMMDDTTTTZ"/>				
Message Text Check: <input type="text" value="0"/>								
<div style="border: 1px solid gray; padding: 10px; min-height: 100px;"> SUGGESTION IS NO MORE THAN 25 GROUPS (WORDS) </div>								
Message Routing (Received from call sign / DTG): <input type="text" value="RX FROM CALL SIGN / DTG"/>				Message Routing (Transmitted to call sign / DTG): <input type="text" value="TX TO CALL SIGN / DTG"/>				
Click here to preview for accuracy BEFORE you SUBMIT								

ICS 213 to Radiogram

General guidelines

ICS 213 field	Equivalent radiogram field
1. Incident Name (Optional)	Not transferred
2. To (Name and Position)	Addressee section
3. From (Name and Position)	Signature
4. Subject	Addressee section OP NOTE, along with an indicator the radiogram is carrying an ICS 213. For example: OP NOTE ICS 213 MESSAGE SUBJECT SHELTER SUPPLY REQUEST
5. Date	Date
6. Time	Time filed
7. Message	Text section
8. Approved by (Name and Position/Title)	If necessary, place in signature OP NOTE. For example: JANE DOE OPERATIONS SECTION CHIEF OP NOTE APPROVED BY JOHN SMITH INCIDENT COMMANDER
9. Reply	Not transferred
10. Replied by (Name, Position/Title, Signature)	Not transferred
Fields on a radiogram but not on an ICS 213	
Precedence and Handling Instruction	Use the appropriate precedence and, if warranted, handling instruction, such as HXC if you need delivery confirmation.
Station of Origin	The amateur radio operator introducing this radiogram into the traffic system should use their call sign.
Place of Origin	Use the incident location or source (City ST) of the ICS 213, if known, and add, "VIA MARS". If location/source not, use the location of the amateur radio operator introducing this radiogram into the traffic system, again adding, "VIA MARS".
Addressee section OP NOTE	Include an OP NOTE here indicating that the radiogram is carrying an ICS 213 form, even if no subject or incident name is included: OP NOTE ICS 213 MESSAGE

Getting messages into the System

NTS traffic is passed using various operating modes and bands

The primary means to pass traffic are:

- CW Nets using HF Frequencies
- Phone Nets using VHF and HF Frequencies

In parallel with the Traffic Nets are the Digital Traffic Stations

- Packet at VHF Frequencies
- Pactor or VARA at HF Frequencies
- Digital traffic operates 24x7

Winlink – Winlink Express



Traffic Nets in Western Mass

- MARIPN M-Sa 1700L 3978 Khz
- Western Mass Net M-F 1800L 146.91 K1FFR Rptr
- MARI CW Daily 1900L 3565 Khz
- HHTN Su-F 2200L MMRA / Mt Greylock
- First Region Net Daily 1400/1530L 3950 Khz
- (during DST 1445/1615L)
- 1RN CW Daily 1945/2130L 3598 Khz
- WMEN Sun 0830 3944 Khz

Filling In

[IN (part)] WORD AFTER _____; Respond with group or part requested

[IN (part)] WORD BEFORE _____; Respond with group or part requested

[IN (part)] ALL AFTER _____; Respond with all groups after the one specified to the end of the message, unless limited

[IN (part)] ALL BEFORE _____; Respond with all groups in the message to the group specified, unless limited

[IN (part)] BETWEEN _____ AND _____; Respond with group(s) between blanks, observing limits

[IN (part)] CONFIRM _____; Respond "**CONFIRM**" or "**AFFIRMATIVE**" if group(s) correct. Otherwise voice the correct group(s), (spelling helps)

(part name); Simply state the part name, thus asking for a repeat of that part. Respond by re-sending the requested part;

[IN (part)] SPELL [PHONETICALLY]..., may be used ahead of fill requests. Respond by spelling word groups with "I spell"

KW1U DTN Hub for New England

- VHF Packet 145.090 24/7
- HF Pactor (1,2,3) or VARA HF scanning multiple bands 24/7 Check with Kw1u@arrl.net for frequencies

Digital Message Format

- ST xxxxx @ NTSzz xxxxx = zip code zz = state code (ie NTSMA)
- (Subject line) City/town Phone area code + exchange or amateur call sign
- Radiogram
- /ex (to indicate end of message) on a line by itself

Example

ST 54457@NTSWI

NEKOOSA 715 886

NR 232 R HXG W1RVY ARL 10 SOUTHBRIDGE MA FEB 25

KRISTINE BATKA NX9K

8271 HOLLYWOOD ROAD

NEKOOSA WI 54457

715 886 4111

BT

ARL FORTY SEVEN 2289 K1BML

FEB 24 1920 X 73

BT

ERIC W1RVY

/EX

NTS via WINLINK

- Winlink = Email to any email address
- To enter NTS or DTN: (ie no email address) entire radiogram in body of email
- Address to NTS:xxxxx@NTSzz or kw1u@winlink.org
- Winlink Express RRI Radiogram template

Is NTS Relevant Today?

- Public service per FCC Part 97 one of reasons for existence.
- Training in handling “record” messages with opportunities for practice, giving a sense of pride in being able to relay a message from origination to destination accurately and efficiently. This could be especially useful in a disaster. Remember when disaster hits is not the time to be (re)learning.
- Opportunities to develop skills as a Net Control, managing stations, traffic, getting messages where they need to go.
- Opportunities to experience various modes used in relaying message traffic: Voice, CW, Packet, Pactor, VARA
- It’s a fun amateur radio activity!

Resources

- <http://www.arrl.org/nts-manual>
- <http://www.arrl.org/table-of-contents-nts-methods-and-practices-guidelines>
- <https://wma.arrl.org/blog/2018/12/05/formal-messaging/> follow link to EMA NTS site
- <https://ema.arrl.org/national-traffic-system/nts-resources/>
- For info on Digital NTS traffic contact Marcia at kw1u@arrl.net

ARRL Radiogram Form

Preamble: Message number, precedence, HX (optional handling code), station of origin, check (text word count), place of origin, time filed (optional), and date.

Addressee: Name, call sign (if a ham), full street address, city, 2-letter state abbreviation, zip code (very important) & telephone (be sure to include area code).

This Radio Message was received at: Delivering station identification and location.

Text: 25 words maximum, 5 per line; Use "X" for a period (.) and "QUERY" for a question mark (?). Last word in salutation (i.e., "73", "Love", etc.)

Signature: (Write-in above REC'D block) Name & call sign of person who wrote the message – include full phone number if not a Ham or if new to NTS.

REC'D & SENT: Record the names and call sign of the person who rec'd the message from and/or sent/forwarded the message to, along with the date & time (PST/PDT or Z).

NUMBER		PRECEDENCE		HX	STATION OF ORIGIN		CHECK	PLACE OF ORIGIN		TIME FILED	DATE						
704		R		C	W6SCF		21	LA HONDA CA		1830Z	JAN 16						
TO JOHN Q DOE						THIS RADIO MESSAGE WAS RECEIVED AT											
123 NORTH MAIN ST						AMATEUR STATION _____ TEL. NUMBER _____											
PAHRUMP NV 89060						NAME _____											
_____						STREET ADDRESS _____											
TEL. NUMBER 775 555 1234						CITY, STATE, ZIP _____											
DONT		WORRY		X		WE		ARE									
FINE		X		ALL		ROADS		CLOSED									
BY		DOWNED		TREES		AND		WIRES									
X		WILL		CALL		WHEN		WE									
CAN		_____		_____		SALLY DOE		650 555 7890									
REC'D FROM			TIME			DATE			SENT TO			TIME			DATE		
_____			_____			_____			RENO WA6XYZ			1840 PST			JAN 16		
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Traffic Nets in Eastern Mass

- Mass Rhode Island Phone Net MARIPN 1700 M-Sa 3978 Khz
- Mass Rhode Island CW Net MARI 1900 Dy 3565 Khz
- Cape and Islands Traffic Net CITN 1930 MTuThF 147.375 PL 110.9
- Eastern Mass 2 Meter Net EM2MN 2000 Dy 145.230 PL 88.5
- Central Mass 2 Meter Net CM2MN 2100 Dy 146.97 PL 114.8
- Heavy Hitters Traffic Net HHTN 2200 Su-F MMRA Network
- First Region Net 1400/1530 Dy 3950 Khz
- 1RN CW Net 1945/2130 Dy 3598 Khz
- Packet BBS KW1U 24/7 145.090 Mhz
- HF Pactor / VARA – KW1U scanning multiple bands 24/7 – check with KW1U@arri.net for frequencies