The SkyWave
Vilas County Amateur Radio Club

Demmer Three Lakes Library Presentation

Final VCARC preparations are being made for a Ham Radio presentation at the Demmer Library in Three Lakes, WI. The Ham Radio presentation is tentatively planned for April 22, 2026, at 1:00 pm at the Library.

VCARC plans to feature a “live” Ham Radio station, ARRL videos, and promotional material. We will also discuss how ham radio helps in the community and how to get your Ham Radio license.

The VCARC presentation will kick off the Library’s 2026 Hobby Program.

(Continued on Page 2)

VCARC MONDAY NIGHT 2 METER NET

The VCARC 2 Meter Net meets every Monday night starting at 7:30 PM local time. Net Control is via the W9VRC Eagle River repeater on 145.150/ PL 114.8.

Echolink is also available for Ham Operators outside of the Eagle River repeater coverage area.

A digital Net immediately follows. Fred KD9CCE, RayBob KD9DDE and Kyle AB9AX are Net Controls.

VCARC APRIL MEMBERSHIP MEETING

The next VCARC Membership meeting will be held on Wednesday April 15, 2026, starting at 6:00 pm at God’s Gathering Place at 1695 Hwy. 45N Eagle River, WI. All are welcome to attend.

The April Meeting Tech Talk will be presented by Fred KD9CCE discussing installing a APRS solar powered digipeater. Please join us for this interesting and informative presentation.

VCARC APRIL BREAKFAST

A VCARC Breakfast is planned for April 18 at 9:00 AM at the Friendship House Restaurant in Eagle River WI. Please contact RayBob KD9DDE via rmh2992@aol.com if you are planning to attend.

VCARC MARCH MEETING HIGHLIGHTS

March 11, 2026, 6:00 PM – The Meeting was called to order by Bob KC9RF.

Treasurers Report (March Ending)

Beginning Balance	6751.82
Expenses:	0.00
Membership Dues	105.00
Donations	0.00
Ending Balance	6856.82

Old Business

Discussion about the range of the Eagle River Repeater since the replacement of the Diamond antenna with the Hustler G6. Tom W9TBZ will look into software that shows range with antenna height and gain at certain specific parameters such as antenna gain and repeater wattage, average height above ground etc. Findings will be discussed at the April meeting

Echolink is running well. Tom W9TBZ will add Chrome remote desktop software to the Echolink laptop for ease of service. He will also look at removing the CW ID from Echolink at our local location.

New Business and Announcements

The club will be sending a check to Wisconsin Digital Network as a donation requested by Brad Pointon Communications for work, he did on the Eagle River Repeater. A copy of the letter will be sent to Brad as well.

The motion to adjourn was made at 6:30 PM.

VCARC NEWS

Included is the VCARC Meeting and Event Schedule for 2026. Please consider volunteering for one or more of the scheduled events.

VCARC/ Member Activities	Date(s)
April Member Meeting	**04/08/26**
Demmer Library Hobby Day	04/22/26
May Board Meeting	05/13/26
Dayton Hamvention	05/15 - 05/17/26
June Member Meeting*	**06/10/26**
InSayner Bike Ride Support	06/13/26
ARRL Field Day 2026	**06/27- 06/28/26**
July Member Meeting	**07/08/26**
August Board Meeting	08/12/26
September Board Meeting	09/09/26
Wisconsin POTA Contest	09/19/26
WI ARES/ RACES Conference	10/10/26
October Member Meeting	**10/14/26**
November Board Meeting	11/11/26
December Board Meeting	12/09/26

* Field Day Discussions and Preparation

Demmer Three Lakes Library Presentation

The presentation corresponds with the Demmer National Library Week. It also corresponds to Earth Day 2026.

Everyone is invited to attend. For more information, please contact Bob KC9RF or RayBob KD9DDE

The VCARC Breakfast Club at the Friendship House Restaurant in Eagle River March 21, 2026

Pictured are: Virgina N9GCJ, Greg N9GJ, Kyle AB9AX, Dave N9DBS, RayBob KD9DDE, Tim KC9JCH, and Tony KC9SZW.

VCARC 2026 Membership Dues Being Accepted

Membership Renewals are now being accepted. The Annual Membership cost is $20 per Individual and $25 for a Family Membership. Please send renewals and new applications to VCARC P.O. Box 1141, Eagle River, WI 54521.

ARRL NEWS

Start Planning For Field Day 2026

It's not too early to gear up and get ready for ARRL Field Day! Field Day 2026 takes place June 27 – 28 and will bring together more than 30,000 amateur radio operators for one of the most popular on-the-air events in the US and Canada.

This year's Field Day theme is "Amateur Radio: A National Resource." Combined with the ARRL Year of the Club, it provides the perfect opportunity for radio clubs to set up stations in public places to demonstrate ham radio's science, skill, and service to our communities and our nation.

All of the information you need to get started can be found on the Field Day web page, including how to join the ARRL Field Day Facebook Group, where you can share your plans, tips, and tricks for a successful Field Day.

The overall objective for Field Day is to contact as many stations as possible on the 160-, 80-, 40-, 20-, 15- and 10-meter HF bands, as well as all bands above 50 MHz, and to learn to operate in less-than-optimal conditions. Many clubs choose to set up in camp-style fashion with portable equipment, temporary antennas, and off-grid power sources.

Field Day is open to all amateurs in the areas covered by the ARRL/RAC Field Organizations and countries within IARU Region 2 (North and South America).

The VCARC will be operating its Annual Field Day Station in Sugar Camp at the Municipal complex. All are welcome to attend! More information to follow.

AMATEUR RADIO FD★26 A NATIONAL RESOURCE

ARRL CONTESTS AND SPECIAL EVENTS

The following are upcoming ARRL Contests and Special Events in the Wisconsin and the Upper Peninsula Michigan Areas.

Cyphercon (Special Event)
Apr 1-Apr 3, 1500Z-2300Z, W9C, Milwaukee, WI. 18.100 14.074. QSL. Jake Barbieur, PO Box 481, Richland Center, WI 53581. https://cyphercon.com

Michigan QSO Party (Contest)
Contest Objective: For amateurs outside the state of Michigan to make contact with as many Michigan stations as possible. Non-Michigan stations may work only Michigan stations, while Michigan stations may contact anyone.

Date: Saturday April 18, 2026
Contest Period: 1200 EDT (noon in Detroit, MI) to 2400 EDT (midnight in Detroit, MI)

Sponsor: Mad River Radio Club

ARRL Rookie Roundup (Contest)
Mission: To encourage newly licensed operators ("Rookies") in North America (including territories and possessions) to operate on the HF bands and experience competitive Amateur Radio operating.

Experienced operators ("Non-Rookies") are strongly encouraged to participate and help new operators – either on the air or in person.

Objective: Rookies exchange information with as many other stations as possible on the 80-, 40-, 20-, 15-, and 10-meter HF bands. Rookie entrants are encouraged to read "HF Contesting – Good Practices, Interpretations and Suggestions."

Dates:
Sunday, April 19, 2026, using SSB.
Sunday, August 16, 2026, using RTTY.
Sunday, December 20, 2026, using CW

Contest Period: 1800 to 2359 UTC

WISCONSIN AREA HAMFEST CALENDER

If you are looking for a new piece of radio equipment or just trying to get rid of that "Old Boat Anchor" a Hamfest is a great way to accomplish both.

The following are the upcoming Wisconsin and the Upper Peninsula Michigan Area Hamfests.

Madison Area Repeater Association Hamfest
Date: 04/18/2026
Location: Mandt Community Center
400 Mandt Parkway Stoughton, WI 53589
Sponsor: Madison Area Repeater Association
Website: http://w9hsy.org

ORC 46th Annual Spring Indoor SwapFest
Date: 04/25/2026
Location: Cedarburg, WI
Sponsor: Ozaukee Radio Club Incorporated
Website: https://ozaukeeradioclub.org/

A.R.A.C. Hamfest
Date: 05/02/2026
Location: Head of the Lakes Fairgrounds.
4700 Tower Ave. Superior, WI 54880
Sponsor: A.R.A.C - Arrowhead Radio Amateur Club
Website: http://THEARAC.ORG

Green Bay Hamfest
Date: 05/30/2026
Location: Our Saviour Lutheran Church
120 South Henry Street Green Bay, WI 54301
Sponsor: Green Bay Mike & Key Club
Website: www.k9EAM.org

LARS 2026 Yooper Hamfest
Dates: 06/05/2026 and 06/06/26
Location: Luce County Fairgrounds
11555 N. County Road 399 Newberry, MI 49868
Sponsor: Luce County Amateur Radio Society
Website: http://w8nby.org

Riverland ARC Hamfest
Date: 06/06/2026
Location: La Crosse American Legion
711 6th St S La Crosse, WI 54601
Sponsor: Riverland Amateur Radio Club
Website: http://rarc.qth.com

TECH TALK

Repeater Coverage and Antennas

Amateur radio repeater coverage has always been an interesting subject to discuss. Why does one repeater have a better coverage area than another? How come I can connect to a repeater one day and not another? This Tech Talk article will help address many of those questions and situations.

Amateur radio repeaters and coverage areas can vary greatly depending on such factors as:

- Repeater/ Field Transceiver antenna height
- Surrounding Terrain elevations
- Atmospheric conditions
- Objects between the Repeater and the Field Transceiver
- Repeater/ Field Transceiver antennas
- Effective Radiated Power (ERP) of the Repeater and Field Transceiver

Antenna Height

With any type of VHF/ UHF communications, repeater or simplex, “Height is Might” when it comes to signal coverage areas.

When determining the communication range of a VHF/ UHF repeater or simplex communications, the first consideration is the line of site between the repeater and the corresponding field transceiver Since VHF/ UHF radio waves are generally line of site (LOS), a simple calculation can be performed to determine that distance.

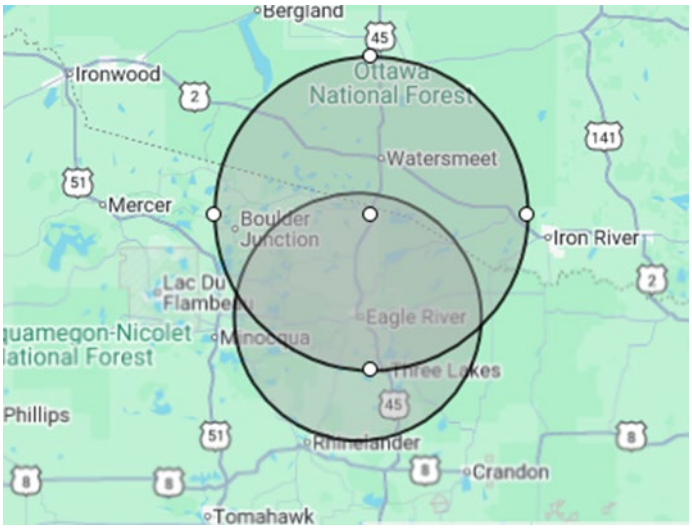
The Table below indicates the Line-of-Site (LOS) communication between two points at various repeater and field transceiver antenna heights.

A field transceiver antenna height of 5 feet is typical of a hand held or mobile radio. 20 feet is typical of a base station antenna height used in this example.

Estimated Line of Site (LOS) Table

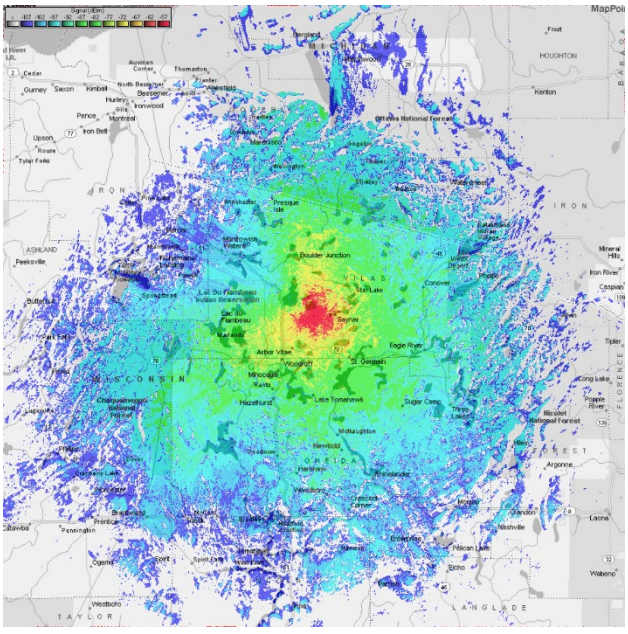
Repeater Ant.	XCVR Ant.	Est. LOS Distance	XCVR Ant.	Est. LOS Distance
50 Ft	5 Ft.	13 Miles	20 Ft.	16 Miles
85 Ft	5 Ft.	16 Miles	20 Ft.	19 Miles
100 Ft	5 Ft.	17 Miles	20 Ft.	20 Miles
150 Ft	5 Ft.	20 Miles	20 Ft.	23 Miles
160 Ft	5 Ft.	21 Miles	20 Ft.	24 Miles
200 Ft	5 Ft.	23 Miles	20 Ft.	26 Miles
250 Ft	5 Ft.	25 Miles	20 Ft.	28 miles
300 Ft	5 Ft.	27 Miles	20 Ft.	30 Miles
350 Ft	5 Ft.	29 Miles	20 Ft.	32 Miles
400 Ft	5 Ft.	31 Miles	20 Ft.	34 Miles

Based on the Estimated Line-of-Sight Table the Eagle River and the Land of Lakes repeaters have the following estimated coverage areas for base station antennas mounted at 20 feet.



The above repeater area coverage map does not account for factors such as terrain, obstructions between the repeater, or the repeater effective radiated power.

The image below is a more sophisticated repeater area coverage map from the WECOMM/Sayner repeater. This map incorporates the repeater’s antenna height, effective radiated power, surrounding terrain and other factors.



The WECOMM/Sayner repeater has exceptional repeater coverage area, due to both site elevation and antenna height.

April 2026

The VCARC is in the process of performing a similar repeater coverage area map for both the Eagle River and Land of Lakes repeaters. This provides guidance for future VCARC repeater system enhancements.

Surrounding Terrain Elevations
Surrounding terrain elevations can also have a significant impact on communication with a VHF/ UHF repeater. The terrain elevation in one's area can assist or hinder your ability to communicate with any given repeater. The Table below indicates the terrain elevation above sea level for the Eagle River area repeaters and field transceiver locations.

Typical Elevations Above Sea Level

Municipality	Elevation
Conover	1,657 Ft.
Eagle River	1,647 Ft.
Land of Lakes	1,755 Ft.
Minocqua	1,598 Ft.
Rhinelander	1,449 Ft.
Three Lakes	1,657 Ft.
Crystal Falls MI	1,480 Ft.

It should be noted that area elevations can vary by 30 to 50 feet locally at each Municipality. If a repeater site is located at a significantly higher elevation, it will likely have a broader range considering the differences in elevation between the repeater and field transceiver.

Objects Between the Repeater and Transceiver
Objects between the repeater and the field transceiver can a have a significant effect on the ability to communicate. In urban areas, this is primarily due to buildings and other taller structures. In the Northwoods it's trees.

Leaves and in particular pine needles have a heightened radio wave absorption rate due to sap and water. This can often explain the common observation that repeater communications can be seasonal.

For reliable repeater communications, it is recommended for both the repeater and the field transceiver antenna to be located above the tree canopy. Unfortunately, this is not practical for mobile operation and can be difficult for many base station locations.

Generally, a higher gain, directional antenna and increased transceiver power can provide some additional coverage.

Atmospheric Conditions (Ducting)
Tropospheric ducting is a weather-related VHF/UHF and microwave radio propagation phenomenon. This is where temperature inversions trap signals in atmospheric layers extending communication range beyond line of sight.

A layer of warm air traps cold, dense air below it, creating a "duct" that refracts signals back towards the Earth's surface.

VHF/ UHF/ microwave ducting can be localized or regional contingent upon the weather conditions. It is especially noticed locally if the field transceiver is on the fringe of the repeater's coverage area. Signals can be greatly enhanced by ducting.

Repeater and Field Transceiver Antennas
Repeater and field transceiver antennas are available in a variety of configurations, dimensions and gain.

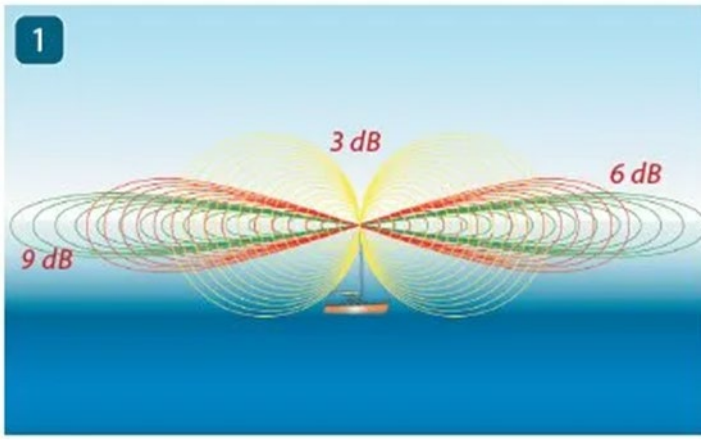
The most commonly used antenna for repeater operation is a vertical antenna. This provides omni directional coverage and convenience compared to a beam antenna.

As the description suggests, a vertical antenna is vertically (not horizontally) polarized. Beam antennas can be mounted for either vertical or horizontal polarization. A 10 to 20 dB signal loss can be expected when operating an antenna cross polarized.

Repeater, Base and Mobile Antennas (Selected)

Antenna	dBd Gain	Comments
Hustler G 144B Vertical 9.75 Ft.	6.0 -	Present Eagle River repeater antenna
Diamond X700HNA Vertical 24 Ft.	9.3 13.0	Previous Eagle River repeater antenna
Comet Vertical 10 Ft.	6.0 -	Present Land of Lakes repeater antenna
Diamond X700HNA Vertical 24 Ft.	9.3 13.0	Previous Land of Lakes repeater antenna
Generic ¼ wave Vertical 19 inches	0.0 -	Mobile antenna 2-meter only
Diamond NR770HB Vertical 40 in.	0.9 3.4	Mobile antenna 2 meter/ 70 cm
Diamond X30A Vertical 4.5 Ft.	3.0 5.5	Typical base antenna 2 meter/ 70 cm
J Pole Vertical 5.75 Ft.	2.5 -	Low radiation angle 2 meter
Hustler G6 270R Vertical 7.6 Ft.	6.0 6.0	Premium base antenna 2 meter/ 70 cm
Diamond A144S5 5 Element Beam	6.95 -	Typical beam antenna 2 meter only

Vertical VHF/ UHF repeater and field transceiver the greater dB gain of the vertical is accomplished by flattening out the antenna pattern. This is illustrated below for a 3 dB, 6 dB and 9 dB antennas.



Note: A quarter wave (19 inch) 2-meter antenna has a 0 dB gain (2.15 dBi). Common for mobile use.

A 3 dB antenna is typically used for close-in base station communications. The antennas are relatively short in length (4.5 feet), provide good gain and minimizes signal nulls.

A 6 dB antenna yields good overall coverage in hilly and forested areas. It is a balanced solution between antenna gain and terrain. It will generally fill in nulled coverage areas better than a higher gain antenna.

A 9 dB antenna is best suited for flatter terrain and providing extended range. However, 9 dB antennas may overshoot stations in hilly terrain and stations close in to the repeater antenna.

Effective Radiated Power

Effective Radiated Power (ERP) in amateur radio is the actual power radiated by an antenna system, calculated by the transmitter output power minus transmission line/connector losses multiplied by the antenna's gain relative to a dipole.

ERP specifically measures the highest signal intensity in the antenna's radiation pattern (main lobe).

Effective Radiated Power also helps when comparing signal strength and determines safety exposure.

The greater the effective radiated power, the better penetration coverage in deeply forested areas and areas with other obstacles. At some point, however, this will have a diminishing return.

ERP (dBd) is used in practical applications for VHF/UHF, referencing a standard dipole antenna.

EIRP (dBi) is often used in manufacturer specifications and regulatory compliance, referencing an ideal isotropic antenna.

In summary, for VHF/ UHF field work or repeater planning, dBd (ERP) is the standard, while dBi (EIRP) is typical of general antenna specs.

Factors that determine ERP include:

Effective Radiated Power (dBd)

ERP Factor		Comments
Transmitter Power	-	Output in watts to the duplexer
Antenna Gain	-	Based on antenna model selected
Duplexer Losses	1.5 dB	Typical for a repeater installation
Coax Losses	- dB	Varies based on coax type selected and length
Misc. Losses	0.5 dB	Coax switches, jumpers, connectors, etc. Typical

As indicated in the above table, duplexers can pose a significant loss when calculating ERP. An alternate to duplexers are separate repeater transmit and receive antennas.

Based on the above factors, the Eagle River and Land of Lakes repeaters possess the following ERP:

VCARC Repeater Estimated ERP (dBd)

ERP Item	Eagle River Repeater	Land of Lakes Repeater
Transmitter Power	50 watts	50 watts
Antenna Gain	6.0 dBd	6.0 dBd
Duplexer Losses	1.0 dB	1.5 dB
Coax Losses	0.5 dB	1.0 dB
Misc. Losses	0.5 dB	0.5 dB
Estimated ERP	125 Watts	100 Watts
Antenna Height	85 Ft. AGL*	160 Ft. AGL*

* Above ground level

In Summary

There are a myriad of factors that can effect amateur radio repeater coverage areas. However, the main influencer is the antenna elevation “Height is Might”.

April 2026

Vilas County Amateur Radio Club

An ARRL Affiliated Organization

VCARC OFFICERS and COMMITTEES

President	Bob Barnum, KC9RF
Vice President	Kirby Giampa W8DCD
Secretary	Marie Beckholt, KD9VUB
Treasurer	RayBob Heuer, KD9DDE
Board Member	Ray Protich WB9OCO
W9VRC Trustee	Tom Bahr W9TBZ
Newsletter	Bob Barnum, KC9RF, Ray Protich WB9OCO

CONTACT INFORMATION

Mailing Address:
W9VRC
Vilas County Amateur Radio Club
P.O. Box 1141
Eagle River, WI 54521

Website: https://vcarc.net/

MEMBER AND BOARD MEETINGS

VCARC Member and Board Meetings are held on the 2nd Wednesday of each month starting at 6:00 PM. The Member Meetings can be attended either in person or via Zoom. The Board Meetings are Zoom only. Please check the Member Activity Schedule for the dates each meeting is held. Zoom logins will be sent out to those on the VCARC email list.

VCARC REPEATER INFORMATION

The VCARC operates W9VRC/R amateur radio repeaters in Eagle River and Land O' Lakes Wisconsin. The VCARC operates a weekly Informational Net every Monday night starting at 7:30 PM local time. Net Control is via the Eagle River repeater. A digital Net immediately follows.

Repeater Information	Eagle River Repeater	Land O' Lakes Repeater
Frequency	145.150 (-)	145.390 (-)
PL Tone	114.8	114.8
Operating Modes	Auto C4FM/ Analog	Auto C4FM/ Analog
Echolink	Node 691369	-
Wires X	-	Room 8011
Yooper Net (IRARC)	-	Room 65384
ARES/ RACES	Back up for W9RRA/R	-

THE SKYWAVE NEWSLETTER

The SkyWave is the Official publication of the Vilas County Amateur Radio Club. If you wish to contribute articles or other newsworthy items regarding Amateur Radio for publication, please contact Bob KC9RF at rwb1636@gmail.com or Ray WB9OCO at WB9OCO@gmail.com.