

# DXing ‘Over Your Shoulder’ with Beverages

A Comparison Test: March 2005

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Over the past 15 years, I’ve been using relatively short Beverages, *unterminated*, at my home QTH in Oklahoma, USA. These low wires (average height about 6 to 8 feet) vary in length from 450 to 750 feet. I’ve found that such wires were useable directional antennas with very good lobes off of each end. For about four of those years, I operated a “half-wagon wheel” of Beverages of that general length with the wires running East, SE, South, SW and West from a central point in my back yard. At the time, I was primarily interested in SWBC DXing on the Tropical Bands (from 2.5 to 5.5 MHz.) and could use each antenna “directly,” of course: for example, I could use the SE wire to look to my southeast for South America and for southern Africa. Happily, I could also use that SE antenna “over the shoulder” to look to my *northwest* along my Great Circle route to East and South Asia. In essence, by leaving the Beverages unterminated and thus bi-directional, I was operating quite nearly as if I had twice as many Beverages spread out in a full wagon wheel.

Using a simple unterminated single-wire Beverage antenna<sup>1</sup> as a bi-directional device is well known in the literature, of course, and carries with it at least two inherent penalties:

- By its nature, an unterminated Beverage is bi-directional and thus *does not reject anything* off the backside
- The signals coming “over the shoulder” from the normal backside of the antenna travel the length of the Beverage, going away from the receiver, hit the far end and are reflected back to the receiver. There is an **inherent signal loss** in this reflection and longer trip. Authorities and modeling programs differ slightly as to how much the “backside” signal is attenuated, but most tend to focus on **4 to 6 dB**.

Over the past year, my Northwest MW DXing buddies and I have become quite interested in reverting to “12 Volt DC DXing” from automobiles and campsites on the Pacific seashore. Our beloved Grayland Motel is for sale and we are anticipating the loss of that near-perfect layout, with antennas of optimum length running in the correct directions and terminated virtually in the surf at high tide. In the near future, we foresee many situations where we will be able to get our vehicles quite close to the shore, but where we will be so close that there simply is not room to run a Beverage out toward the sea. There are a number of familiar venues, however, where we could be DXing very near the shore itself and run antennas directly away from the beach inland through the scrub or forest laying behind the beach itself. Unterminated, we could then use these antennas to DX the far Pacific shore “over the shoulder.”

As we discussed this idea, there was quite a bit of disagreement as to just how much loss this “over the shoulder” approach might entail. Some of us held with the published “4 to 6 dB” figure.... and felt this to be a negligible amount, while others held with equal sincerity that the loss could be much greater. I volunteered to run a field test this winter in my home area of central Oklahoma where the roads run, literally, straight for mile after mile and where the Southern Prairie is more or less one big flat cow pasture.... ideal for testing directional antennas.

## Test Arrangement

My automobile/DX shack was parked at the crest of a very gentle hill, with the antennas extended North and South from the vehicle, along the roadside tree line and suspended from the lower branches. The road runs absolutely North-South. The antennas were two new 500 foot Beverages. When laid side-by-side, one wire was about 3 feet longer than the other, but was not trimmed (the South antenna was the longer). The slope of the hill was equal in both directions and was such that the far end of each antenna was about ten feet lower than the automobile. The Beverages each went to one of a matched pair of new impedance transformers, then through

identical 6' lengths of coax to an antenna switch and thence to an NRD-535 which was used to compare signal strengths on each antenna for a number of stations.

The stations to be measured were selected to be spread across the MW dial and to be those laying directly to the North or South of my location. Each station that was measured put in a moderately strong signal, varying in strength from 1280-Arkansas City, KS which came in at around S-8 to 640-Norman, OK, which put in an S-9+10 dB signal.

The tests were run at solar noon, with no thunderstorms present or audible on the band. The signals were exceptionally steady and were each the only signal audible on the channel. The signal strengths were measured twice, about 10 minutes apart and are (both) presented below in a relativist chart.

## Stations to the SOUTH

Frequency	Location	North	South	Comments
640 kHz.	Norman, OK	equal, equal	equal, equal	Absolutely equal on both antennas!
1000 kHz.	Oklahoma City, OK	---	+6 dB, +6 dB	
1450 kHz.	Shawnee, OK	---	+3 dB, +3 dB	

## Stations to the NORTH

Frequency	Location	North	South	Comments
580 kHz.	Topeka, KS	---	+6 dB, +3 dB	Wow, the reverse of expectations
900 kHz.	Wichita, KS	equal, equal	equal, equal	
1070 kHz.	Wichita, KS	+3 dB, + 5 dB	---	As expected
1280 kHz.	Arkansas City, KS	---	+6 dB, +4 dB	Again, the reverse!
1330 kHz.	Wichita, KS	---	+3 dB, +3 dB	The reverse!
1580 kHz.	Blackwell, OK	---	+3 dB, +3 dB	The reverse!

NOTE: Two tests were also done to the side of the antennas: 1600 kHz., Cushing, OK to the due East came in about 3 dB better on the North antenna; 960-Enid OK, to the West-Northwest also came in better on the North antenna by about 2 or 3 dB.

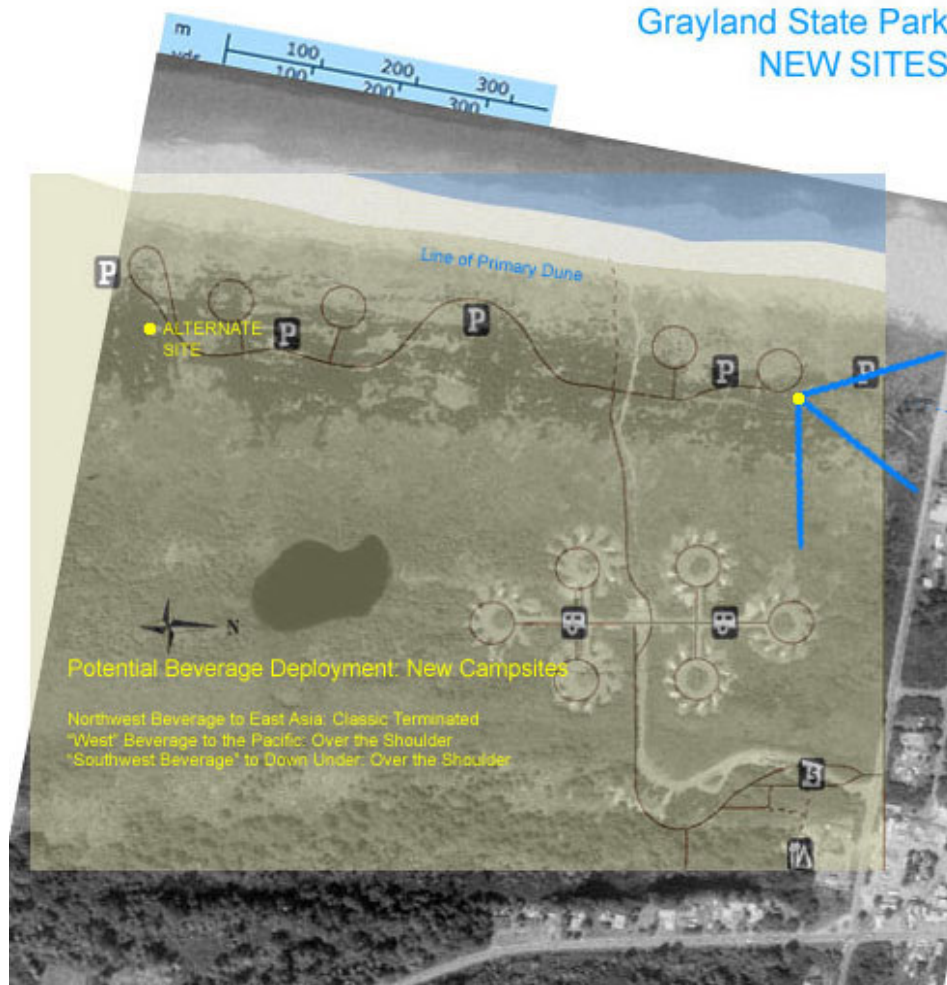
## Discussion

With the exception of the slope of the ground (DX shack at crest of gentle hill, each antenna sloping parallel to the ground downward about ten vertical feet over the 500 foot length) the two antennas were virtually identical, but running in opposite directions. Given that the signals were fairly equal on both antennas and that the measuring instrument (NRD 535 S-Meter) was fairly crude, precise results were not expected. In fact, the relative strength measurements of the stations to the SOUTH were about exactly what I expected: two of the three stations were stronger on the southerly antenna by 3 to 6 dB. The measurements of stations to the North, however, presented a real surprise: four (580, 1280, 1330 and 1580) were 3 to 6 dB stronger on the South Beverage that pointed *away* from them. This was so surprising to me that I exchanged the two lead-in + impedance transformer combinations prior to taking the second set of measurements. The results were identical except for a 3 dB drop in the 580 kHz. reading.

One could still argue that, for some reason, the southern Beverage was just “working” better. That was my reason to measure the only two nearby signals that come in from nearly straight East and West. As you see from the note above, the two side signals were both received better on the *North* antenna!

Just exactly why these anomalous readings came about could be the subject of endless speculation. Happily, that discussion is not at all relevant to the purpose of this particular field test. The goal was to determine whether the backside losses of relatively short Beverages were negligible or large enough to be significant when forced to DX “over the shoulder.” **Based on this comparison test, I feel comfortable using a short Beverage and DXing over my shoulder, when better, more classic arrangements are not possible.**

## In Practice



Above is a two-layer photo-montage of the new campsites now under construction at Grayland Beach State Park on the Pacific Coast on Washington State. Foot and vehicular traffic on the beach, even at night, prevents us from running antennas on the beach itself. As you may note from the montage, the new campsites are too close to the beach to allow us to deploy a full array of classic “direct” terminated Beverages from any single new campsite in the park.

The array of blue lines at the upper-right of the montage indicate a deployment of the three beverage pattern that we find most effective for DXing from the Pacific Coast (NW, West, SW). Each antenna, as indicated is 500 feet long. The antenna running to the NNW is a classic terminated Beverage, the other two are “Over the Shoulder” unterminated affairs.

Finally, some readers will surely ask why we do not simply adopt more compact beach-side antennas, such as the K9AY, Flag or KAZ large loops. We have done some rather careful comparisons between these antennas and our normal Grayland Beverage array and have repeatedly found that the Beverages were superior. This was true even when the same antenna comparisons had been judged “similar/equal” at inland locations. Additional comparisons will be made this summer and fall.

The author would like to correspond with anyone who knows of, or who has actually performed similar tests of “over the shoulder” Beverages. Please contact him at [bjohn@provalue.net](mailto:bjohn@provalue.net).

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<sup>1</sup> Victor Misek, John Devoldere and others have published several similar designs for true bi-directional or switchable direction Beverages. These usually entail either two parallel antenna wires or coaxial cable lead-ins running to each end of the antenna. These designs may be quite suitable for long-term fixed installations; the interest here, however, is in investigating the use of a single lead-in and a simple, single-wire Beverage.