Working (HF) DX

Ed Callaway N4II

N4II@arrl.net

South Florida DX Association

W6RGG operating from BS7H (Scarborough Reef, in the South China Sea) in 2007

What is DX?

- A collection of operating awards programs
  - DXCC (DX Century Club – ARRL)
  - IOTA (Islands On The Air – RSGB)
  - WPX, WAZ and WAC (Worked Prefixes, Worked All Zones and Continents – CQ Magazine)
  - Etc.
- All loosely based on working people far away
- Why? DX is!

Prerequisite

- The best station you can manage
  - The most Tx power
  - The best antennas
  - The best receiver (you have to hear 'em to work 'em)
  - A high-quality signal
    - Good keying on CW
    - Good (intelligible) audio processing on SSB
    - Low-distortion digital symbols

What's Needed to Work DX?

- Somebody has to be there (in the DX entity)
- You have to be here (in your own DX entity)
- The DX has to be on the air
- You have to be on the air ("in the chair")
- Both have to be on the same band and mode
  - Extra Class license a big help
- Both have to be able to hear the other guy
- You want to work the DX, but…
- *The DX has to want to work you.*

Nirvana

- The ideal situation is to find a rare DX station all alone, without a crowd

- Even with the Internet and the DX cluster system (in which DX sightings are instantly relayed to hungry DXers worldwide), it can still be done

- The key is information:
  - Advance knowledge of activity
  - Knowledge of the operator's habits
  - Knowledge of propagation

Information and References

Daily (email):
- *The Daily DX*

Weekly (email):
- *QRZ DX*
- *OPDX Bulletin*
- *425DX News*
- *DXNL*
- *ARRL DX Bulletin*
- *DX Italia*

Bimonthly (snail mail):
- *DX Magazine*

Text:
- *The Complete DXer*, by Bob Locher, W9KNI

…just to name a few.

Pileups

- Like getting a celebrity's autograph, working DX often requires working through a crowd of other like-minded individuals

- Wading through a pileup is a necessary, if not always pleasant, task to work DX

- With practice, however, the competitive aspect can be an attraction in itself

Typical DX Pileup QSO

DX: TU DX4DX

You: W4MOT   ← the bait

DX: W4MOT 5NN   ← taking the hook…

You: R 5NN TU   ← reeling in…

DX: TU DX4DX   ← landed!

Minimum information sent = maximum number of satisfied DXers!

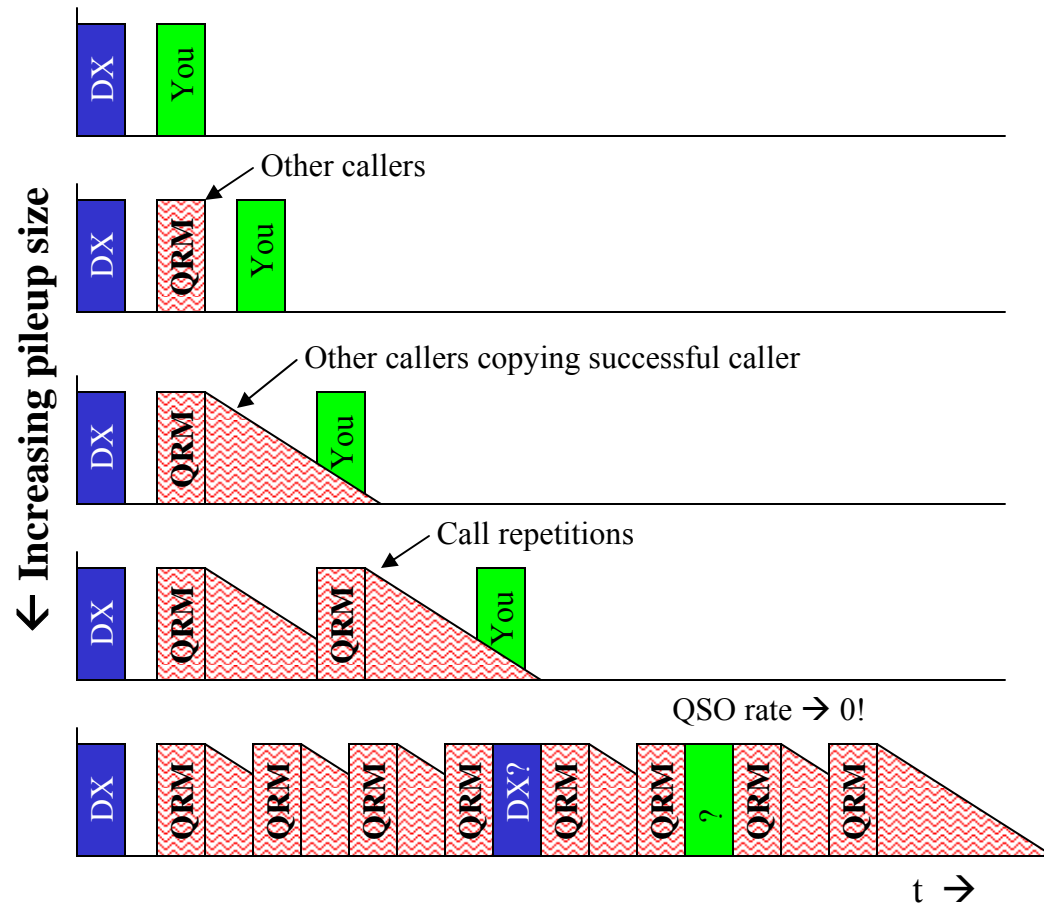# Designing the bait, or how to get him to select your call out of the mess

- *Listen* to the DX for instructions
  - Directional CQs, call areas, frequencies, etc.
- *Listen* to the pileup, especially for successful callers – who are they, and what did they do?
  - Type of call
  - Timing of the call
  - Carrier frequency of the call

Type of Call – Some Variables

- Speed of transmission
  - Slow, due to poor condx?
  - Fast, for a quick QSO?
  - His speed?
  - Caller's speed?
- Structure of the call
  - Once, twice, or thrice?
  - Include his call?
- Repetitions
  - How long to wait?
  - Are later calls different?

Call Timing

- The goal is to make your call so that it is the first one the DX hears through the QRM

- If you don't have a "big gun" station, or if condx favor others, a delayed call can be effective
  - Amount of delay based on caller's estimate of his S/QRM ratio *at the DX station*

- If not controlled by the DX, though, things can get out of hand

- Rhythm of the DX is important to maintain control of the pile

← Increasing pileup size

DX | You

DX | QRM | You
Other callers

DX | QRM | You
Other callers copying successful caller

DX | QRM | QRM | You
Call repetitions

DX | QRM | QRM | QRM | QRM | DX? | QRM | QRM | ? | QRM | QRM
QSO rate → 0!

t →

Carrier Frequency: Working "Split"

- A point is reached, however, when the pile is too large to maintain a reasonable QSO rate
  - The DX usually notices this because his replies to callers are unanswered – no one can hear him!
- A good DX op will then work "split": separate transmit frequencies for DX and callers
  - Announces "up" or "up x [kHz]" or "dwn" after every QSO, meaning that the DX will be listening there
  - May be a single frequency, or a band of frequencies
    - "up 1" or "up 5-10"
- Opportunity: Plan ahead, and be the first to call from "up 1" when the DX announces this transition

Split

- Split operation keeps the QSO rate up, because:
  - callers can hear the DX (even mistimed calls don't QRM the DX)
  - and (if the DX spreads the callers out in frequency) the DX can hear the callers better
- For the caller, though, the one-dimensional timing problem (when to call?) is now a two-dimensional time-frequency problem (when to call, and on what frequency?)
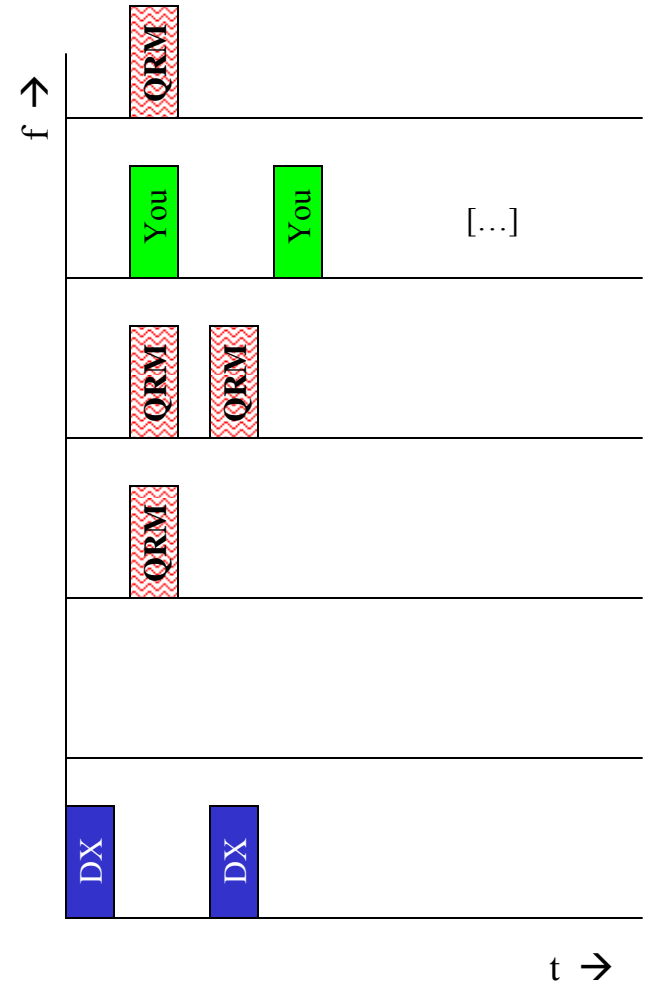
Split Strategy

- If the pile isn't *too* large, the DX may stay on a single split Rx frequency – at least for a while – working all who come
  - The goal is then to zero-beat the previous caller
- However, for the biggest piles (and the juiciest DX), so many others will zero-beat the previous QSO that the DX can hear nothing there, and is forced to change his receive frequency after every QSO
  - The goal is then to predict where the DX will listen next, and call there ("Where is he listening?" "QSX?")

Modeling the DX's Behavior

- When working split, the frequency at which the DX will be listening is usually unknown, and often varies with time, so the caller must predict it

- Fortunately, the behavior of most people is predictable

- By listening to the pile and noting the frequency of each successful caller in order, a history can be created and the next frequency predicted
  - Note that being able to hear the *pile*, not only the DX, is a critical part of this process
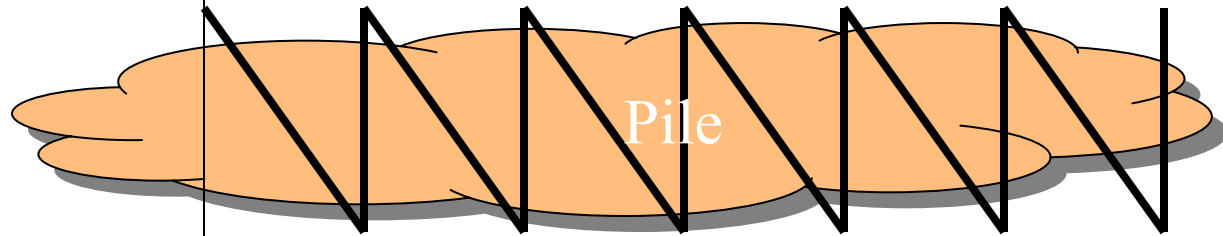 - Dual-receiver radios therefore popular
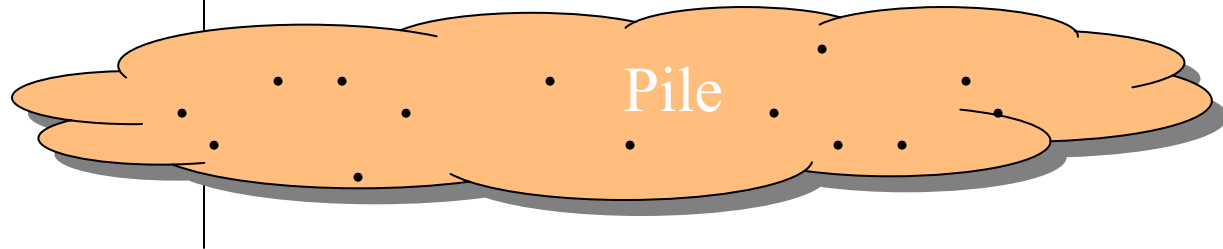
Types of Tuning Behavior

Tune up, then down
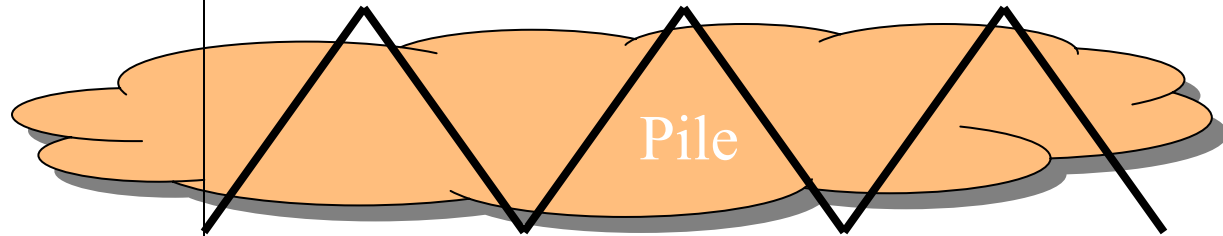
Pile

Tune up, then reset
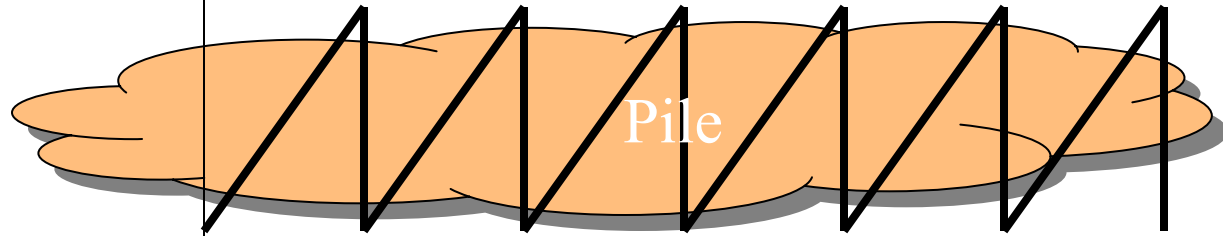
Pile

Tune down, then reset

Pile

Random (the worst, and fortunately rarest, case)

Pile

Miscellaneous Behaviors I've Heard

- On SSB, one guy would listen to the (unsplit) pile for several minutes, and (apparently) write down several calls he heard, then call each in sequence. Caught me off guard when he called us "cold" a few minutes later…

- One guy would work split and say "up 5", but would listen down 5 instead as a means of reducing the pile. Apparently you had to know his personal quirk in order to work him…

- On BPSK31, one DXpedition would make two QSOs simultaneously, by working two split piles (up 1 and up 2) and using the simultaneous decode feature of most PSK software. Doubled the QSO rate…

Mode-specific strategies

- On RTTY,
  - overlapping signals are frequently not decodable, so many DX work at the top of the pile, frequency-wise, where the callers thin out
  - Start your call with <LFCR> and end with a space, to separate yourself from the rest
- On SSB, brute force seems to win out over everything else
  - At least, everything else I've tried
  - Suggestions welcome

Conclusion: Supremacy of the DX

- One rule above all: Follow the instructions of the DX

  – W4 QSL cards worth much less than, say, BS7H cards

- The DX is responsible for maintaining order on frequency, not you!

  – Don't "police" the band

- And please, **don't transmit** when the DX is transmitting…or during a QSO with someone else!

Thank you!