

Environmental and Fauna Hardening

NetOps VIII Workshop

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Environmental Hardening

- Protect your field site from the elements:
 - Snow and Ice
 - Flooding
 - Lightning
 - Temperature
 - Fire
 - Corrosion





Problem: Snow and Ice

Big concern at higher latitudes







Snow and Ice Load Damage

Can crush enclosures, PV frames, and vaults

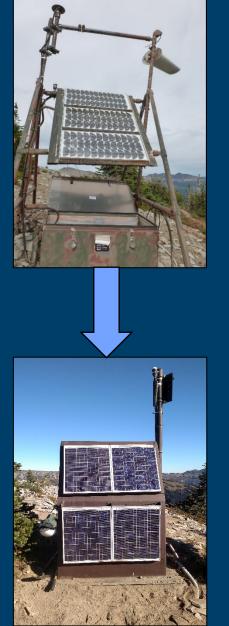






Solutions: Better Enclosures, Reinforced PV Frames

- Fiberglass Enclosures (AVO and CVO)
- Large volume allows for up to 20 batteries to maintain power through winter
 - Currently CVO uses 8-10 100 A-hr batteries at all sites with Air Cells for backup at some stations.
- Additional equipment can be added without increasing footprint of the site.
 - gas monitoring, camera, rain gauge, etc.





Problem: Frost Jacking



- Direct instrument burial
- Decouple pad from vault walls



Problem: Flooding



- Seal openings
- Install drain
- Bilge pumps
- Dessicant for small volumes



Problem: Lightning



- Grounding protection
- Avoiding long conductors
- Site selection



Fauna (and Flora) Hardening

- Protect your field site from animals, insects:
 - Bears
 - Rodents
 - Insects
 - Other animals (goats, cows, etc.)
 - ... and People
- Plant overgrowth





Problem: Bears

They are curious and persistent!







Problem: Bears





Bear Solutions

- Run cables inside masts.
- Bury all conduits.
- Minimize "handles" for grabbing.
- Bury or cover vaults.







Problem: Rodent Chewing



- Bury cables or run in conduit.
- Steel wool, fiberglass, copper wool, drier sheets
- Wipe with alcohol
- Seal enclosures.



Problem: Vandalism



- Hide stations
- Signage
- Community Education
- Cost of doing business



Problem: Plant overgrowth

- Build high towers
- Clear trees
- Try other radios
- Move stations





Key Takeaways

- Follow best practices.
- Learn and adapt to your local situation.
- Keep trying new things.



That's all folks!

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