raw data and low-resolution data simultaneously. Low-resolution data can be reviewed rapidly to assist in identifying sequences of high-resolution data for detailed analysis;

o Metadata requirements and recording protocols should be established and documented. Metadata will be especially useful in the identification of subsets of data for detailed analysis;

o Calibration of acoustic systems is required for the quantitative use of acoustic data and is recommended for all studies. Calibration should be conducted as it is described in Demer *et al.* (2015);

o Ping synchronization is also critical to acoustic instruments. In general, the master synchronization pulse should be provided by the scientific echosounder, and all other acoustic instruments should be set up as slaves. Custom electronics may be required to address specific timing or pulse form needs. It may be necessary to turn off some vessel acoustic instruments during scientific data collection; and,

o Biological sampling must be consistent with survey objectives. Gear selectivity and temporal and spatial resolution will be of particular concern in this regard. It is important to ensure that sampling gear and protocols for fishing are consistent with the research/survey information needs.

6. References

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