I should have this handy for as we talk about it and write these up on the board. Then we should combine them to make our own list.

From: Bond, ALEXANDER L., and I. L. Jones. "A practical introduction to stable-isotope analysis for seabird biologists: approaches, cautions and caveats."*Marine Ornithology* 37 (2009): 183-188.

**What are the issues with stable isotope analysis and the possible resolutions?**

1. Lipids
   1. Lipid Extraction: Need a math model for each study
   2. Feathers and egg albumin and blood = no extraction
   3. Blood, muscle, liver, egg yok, blood of procellariforms = yes extraction
2. Tissue preservation
   1. Formalin, genetic buffers, ethanol = affect stable isotopes
   2. Freezing and drying do not affect stable isotopes
3. Discrimination factors
   1. Use decision-tree for discrimination factors for non-marine birds
   2. Address physiology (captive vs. wild conditions affect isotope signature)
      1. Diet must be held constant for period of time
      2. Different tissues have different discrimination factors
         1. Feathers reflect the time of growth
         2. Blood shows previous 2 weeks
4. Comparisons among and within food webs
   1. Food web knowledge needed
   2. Verify diet with a gut content analysis
   3. Evaluate all potential food items
   4. Compare similar tissue types
   5. Account for differences in breeding and wintering diets
5. Isotope mixing models
   1. Model depends on quality of input, that is, really good discrimination factors
   2. Evaluate all potential prey items on in isotope space but also include proportion of prey consumed
6. Tissue heterogeneity
   1. Within a single tissue, different isotope values can be found
   2. Must evaluate tissue heterogeneity for each study
7. Reconstructing historical diet
   1. Either the diet or the isotopic signature of the prey item may have changed
   2. If you look at stable isotopes in historical prey specimens, you must account for the effects of preservation method
   3. The CO2 in the atmosphere and water/ocean have changed over time and could affect the stable isotope signature in prey and predator, must account for that
8. Counfounding biology
   1. Effects of foraging area (marine isoscape varies by latitude),
   2. body condition (nutritive stress affects stable isotopes) and
   3. metabolic rate (hard to compare adult with chick)

For: Ben-David, Merav, and Elizabeth A. Flaherty. "Stable isotopes in mammalian research: a beginner's guide." *Journal of mammalogy* 93.2 (2012): 312-328.

What issues are the same? What suggestions are the same?

What are different issues and different methods of addressing potential issues?