

Protocol Development: Lessons Learned

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Lessons Learned – Top 10

10) Look **VERY CLOSELY** at any water resources meeting agenda... you could be amazed at the places where your name crops up!



Lessons Learned – Top 10

9) Always conduct pilot testing, even if adopting an established protocol

- Environmental responses may differ by habitat or region
- Holes in procedures may be uncovered
- Provides essential data for evaluating the metrics
- Allows calculation of an accurate implementation budget



Lessons Learned – Top 10

8) Examine correlations between metrics

- Highly correlated metrics are probably redundant
- Removing highly correlated metrics is the easiest way to lower costs without losing information



Lessons Learned – Top 10

- 7) After pilot study, evaluate whether your objectives are met
 - Return to your conceptual model
 - Return to your goals and objectives
 - Are there any important data gaps?



Lessons Learned – Top 10

6) Conduct a power analysis

- AMS, MDD, linear trends
- Don't just stop at one method; different analyses have different goals
- Be prepared to drop metrics that are too variable to be informative
- But... check your assumptions, and look for ways to reduce variability before making changes (e.g., changing methods or using stratification in the analysis)



Lessons Learned – Top 10

5) Consider the impacts of your measurements

- The first objective is to do no harm!
- Are you visiting sites too often?
- Are there visible signs of trampling or compaction?
- You may have to sacrifice some statistical power to ensure that your permanent sites remain representative and minimally impacted
- NETN rejected annual visits to sites in its forest protocol, and may do the same with wetlands



Lessons Learned – Top 10

4) If something looks wrong, get advice!

- Talk to partners, cooperators, other NPS staff, statisticians, and your technical advisors
- Don't move forward until you are satisfied that your concerns are addressed
- But... be open to multiple ways of reaching the same goal



Lessons Learned – Top 10

3) If something looks right, get advice!

- External and internal reviews are crucial for validating the methods and getting support from parks
- Others may pick up on problems that you missed, and save you from a disaster down the road



Lessons Learned – Top 10

2) Don't be afraid to make big changes

- The first few years of full-scale protocol implementation are still evaluation years
- Just as with large-scale drug trials, subtle problems that can't be seen during pilot testing may appear early in a monitoring program
- Don't be so afraid of losing a few years of data that you are unwilling to make essential changes
- Do everything possible to minimize the impact of changes (e.g., double sample using two protocols)



Lessons Learned – Top 10

1) Collaborate as much as possible

- Use existing protocols whenever possible, and build partnerships with the people who developed them
- If developing a new protocol, engage other programs and organizations who may be interested in it, and keep asking them for feedback throughout the process
- Protocols that are compatible over a wide area and many programs will provide more useful management info
- All of us are smarter than any one of us!