Author's Commentary on "The Extended Project"

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Long-term Studies

Long-term ecological studies are often large in scale, with replication over time and space to account for variables in moisture and temperature regimes, soil characteristics, fluctuating insect and disease populations, mobile predators, and missing data points. However, location-specific management data helps realize maximum contribution from natural resources, including forests (Warren 1979). Like other research, lengthy studies call for attention to detail, correctly calibrated and maintained instrumentation, and legible and accurate notes.

Measurements in a natural environment are subject to growing season changes; work is often compressed or statistically blocked to minimize these variations. The life of some studies, especially those that involve populations of trees, may exceed the professional career of a single individual. Researchers rely on the well-prepared notes and analyses of their predecessors to accurately interpret the current status.

Because of the particularly long-term nature in a forested environment and perhaps as a result of the growing public visibility of all things ecological, employers (both industrial and academic) are seeking a revised set of skills and competencies from recent graduates of professional programs. The need for competence in communication, ethics, collaborative problem solving and managerial leadership has greatly increased (Sample et. al. 2000).

Forest development in naturally seeded areas over time can be studied in two ways. The ideal way is to monitor stands from pre-harvest conditions (Are there enough seed-producing trees? How many seedlings are established before those trees are removed?) until the next regeneration period, and then repeat. This system is easy to implement in biomass plantations where rotations (regeneration to regeneration

period) are one to five years. It becomes inconvenient with Southern pines (15-30 years) and very difficult with longer lived (150-300 years) species common in northern climates. The other method is to study a "chronosequence." By examining a host of forests at different ages and stages of development, one can draw inferences. As no two sites can be identical in soil, climate, moisture regime, fertility levels, browsing and disease stresses, this approach cannot provide all of the information needed.

Maple's study uses a combination of the two methods. By using the different cutting treatments, they are viewing different stages of development. More information is gained by his students building on the data and interpretations of their predecessors. Each student must trust that those before collected accurate data and reliable information. Coufal (1999) affirms that more is needed: In its institutional life and professional activities, forestry must reaffirm that integrity is the requirement, excellence the standard, rationality the means, community the context, civility the attitude, openness the relationship, ethics the basis, and responsibility the obligation upon which its own existence and knowledge of itself depends.

This case

Jane is in an awkward position. Maple is well respected at IBU, and she has information that his long-standing project could be seriously flawed. She does not know him well enough to ascertain if a confrontation of this sort will be detrimental to her success in this new environment. What if this kindly old gentleman turns into a vicious, nasty character when threatened? Further, while she knows something is amiss with the study, she is a new student and still a novice in this field. She cannot judge the seriousness of the problem or suggest an alternative course of action.

Everyone involved had similar expectations (Questions 1 and 2): forthright communication to enable all participants to do their jobs. Jane (and Ilex, when she was a student) expected to be trained as a reputable scientist and her crew to be schooled in proper technique. Maple had an obligation to provide this guidance to all three parties. Ilex may be the one most severely affected. She is still building her career, and now she has learned her foundation is questionable. Jane, on the other hand, asked questions from the beginning. She has the option of leaving the project and continuing work on another, or even working with a different professor at IBU or

elsewhere.

Maple (Question 3) really may have intended this project to be a simple case study for demonstration of concepts and theories to be followed by a carefully surveyed and monitored experiment. Exposure may cause "unfavorable reflection on the profession" (Association of Registered Professional Foresters of New Brunswick code of ethics). Nevertheless, it was Maple's decision to keep this study active, and it was his responsibility to see it was maintained. It would have been reasonable to expect each student to check each marker and replace or reinforce if necessary as the study progressed. When original reports made no mention of surveying equipment or desired precision of measurement, students along the way should have inquired. However, they were researchers-in-training and may not have the skills to recognize this situation was out of the ordinary - they rightfully relied on the expertise of Maple and presumably other committee members for assistance.

Questions 4-6 are very interesting. While much of this case was fictionalized, the real publications actually were limited to master's theses, because the professor questioned the quality of data collection by his students. He viewed master's work as learning opportunities, a means to demonstrate hypothesis development and testing, and a practical application of the scientific method. Even with the flaws introduced by their collective sloppiness, these goals were accomplished.

But what if they had presented or published? It would be too late for retractions or corrections submitted to conference proceedings or journals. The assessment that Jane and Maple agreed upon is appropriate. He can address potential error, explain how they compensated, and stress the importance of investment in good quality markers. This assessment could be published as a paper, research note or letter to the editor (whichever that particular journal prefers).

Question 7 State and national forest organizations have codes of ethics that stress honest and open communication (Society of American Foresters [SAF], Indiana SAF, Association of Registered Professional Foresters of New Brunswick, Mississippi State Board of Registration for Foresters) and consultation and cooperation with matters beyond their own competence.

Forty years ago, surveying equipment was far less accurate than it is today. A licensed surveyor could instruct the current researchers on they types of equipment that might have been used then (and accepted degree of precision for each).

Further, this crew could use modern equipment to quite precisely pinpoint each existing stake, allowing Jane to determine the ranges of abundance and diversity per unit area. A reputable biometrician could assist with these statistical analyses.

If this approach does not work, the area could be (and probably should have been) designated for demonstration and teaching to introduce incoming students to these concepts, rather than as a research tool. Once the decision was made to continue past the pilot status, Maple should have invested in high-quality markers that could be reliably located at each measurement interval.

References

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