Trial and pilot fieldwork

Designing and scheduling trial and pilot fieldwork projects is a great way to test your planned workflows and better estimate your overall project requirements. Depending on the scale of your planned fieldwork, your trial may involve just one fieldworker (you) and either geographic constraints or a subset of your time.

Consider planning a curbside heritage building assessment for a small city with 15,000 residences. Assume it takes five minutes to complete the assessment—confirm the address against existing records, fill in a form that describes the condition, take photos. A few back-of-the-envelope calculations show that the whole city could be covered by about 15 fieldworkers in two weeks. With those kinds of numbers, this project sounds easy.

Yet, to add substance to this estimate, it would be important to do a field trial. Employing 15 people for a short time, or fewer people for a longer time, represents a significant investment in people and technology. It's important to get it right.

Performing a data capture trial for, say, two hours (at different times of the day) in different localities in the city (inner urban, suburban, semirural) will go a long way toward getting a better estimate of average and peak data capture times. In inner urban areas, travel time between residences will be negligible, but on the outskirts of the city, the fieldworker may need to drive between residences. After conducting these trials, you may determine that, because of traffic, it is impossible to meet the five-minute completion time estimate; it's more like 10 minutes. Restricting the day's work hours to omit peak traffic times will also help, so more appropriate resourcing might be 10 fieldworkers for four weeks.

Don't forget to put your technology choices to the test during the pilot. Train this small group of fieldworkers with the view that when things scale up, they will form a part of your pyramid training scheme. These people can work with and train others. Encourage them to provide feedback and make suggestions for improvements to the fieldwork process. Be prepared to change or fix things on the run. While you have these early adopters in the field, test the changes and validate that they do make the fieldwork better. This will save you headaches in the long run.

Allow time for tea

NAME: Marika **ROLE:** GIS specialist
INDUSTRY: Population census **CIRCA:** 2010

Several years ago, I participated in a field trial for a population census, with a small group of test field enumerators. Our primary goal was to test the questions listed on the form with real people and in the working environment (not behind a desk in the office). But what we quickly learned was that keeping to the planned time allotment was going to be tough.

In this trial, the enumerators were members of the government department responsible for the project. They were going to experience the process that they had commissioned and get firsthand experience of what their teams would encounter in the field. A few members of the team who put together the device, app, and form of choice tagged along to observe, advise, and troubleshoot. This census was for a country in the Middle East, and the form could be viewed in English or Arabic.

We split into two teams of four and were sent to an inner urban area with mostly small apartment blocks and some single household residences. My group approached the first apartment building, and after quickly identifying the correct building in the app, morale was high.

Then the designated team leader pressed the intercom button for the first apartment. No one was home. The response to the pressing of the second button was a rushed, somewhat agitated flurry of words and a hang-up. With a little dent in our morale, we pressed the third button. After a quick explanation, we were let in and greeted kindly by a woman who was the head of the household.

We were welcomed into the living room, tea was served, and many minutes of discussion (in Arabic) ensued before an enumeration device was even touched. Discussion eventually came around to the census, and the form was completed. There were many children in the family, so the multilevel form that accommodated capturing related records for each child got a thorough workout. When testing in the office, choosing to add just one record is too easy. But if you are completing the trial honestly, you can't do that when four small children are sitting there in front of you.

Now, this was a trial, and I do suspect somebody from the team knew somebody from the family, which contributed to the chatter, but 30 minutes later when we emerged from that one household, there was silent realization in the eyes of all our team members that this fieldwork was going to take a lot longer than originally calculated.

Notes

Plan a trial

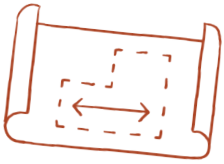
Answer the following questions to help plan your trial project. Knowing the answers to these questions can help you better group activities according to the resources—human and technological—that you have.

How many sites, features, or activities can be done in a day, week, or month?

How long does an activity take?

Days | Weeks | Months | Years

Do all activities consist of the same steps?



How do the activities need to be completed?

In sequence | In parallel

Who performs the activities at a specific location?

Same person | Different specialists

If fieldwork is to be broken into geographic areas, how do you define them?

Conventional street addresses | Custom-designed polygons

Risk assessment

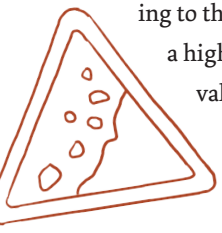
In many industries, fieldworkers must follow risk assessment procedures in the field. On construction sites, potential risks are discussed at daily toolbox talks, and methods to avoid risk are highlighted.

Formal documentation may not be a requirement in your industry, but integrating the documentation of a fieldwork risk assessment into your field GIS is a good way to ensure your teams plan their work before they head out. Also, in case something goes wrong, you will have documentation that describes the actions taken to minimize the risk.

To assess risk, potential hazards are identified, the likelihood of occurrence and potential outcome of each hazard are rated, and depending on the outcome, mitigation measures are put in place to reduce the risk.

These ratings can be readily illustrated with a risk matrix.

To use this matrix, for each hazard identified, choose the likelihood of occurrence, and multiply the corresponding value by the value corresponding to the potential outcome. A resultant value of 15 or greater is considered a high risk, a resultant value of 5 or lower is considered a low risk, and a value in between is considered medium. Depending on the project, the organization, or requirements from external agencies, all risks may need to be mitigated to a specific level.



For example, consider the potential hazards during a fieldwork project in the Nevada desert to perform an environmental survey of the route for a proposed pipeline infrastructure project. In this project, assume that all risks must be mitigated to a level of medium. Risks in this project may include being bitten by a rattlesnake and dehydration from the hot conditions. The likelihood of being bitten by a rattlesnake may be an even chance (3), but with a potential outcome of fatality (5). The likelihood of dehydration may be

Risk matrix

			Potential outcomes				
			Minor injury	Injury needing medical treatment	Injury needing 1–5 days off work	Serious injury or long-term sickness	Fatality
			1	2	3	4	5
Likelihood	Near impossible	1	Low	Low	Low	Low	Low
	Unlikely	2	Low	Low	Medium	Medium	Medium
	Even chance	3	Low	Medium	Medium	Medium	High
	Likely	4	Low	Medium	Medium	High	High
	Near certainty	5	Low	Medium	High	High	High

Using the risk matrix for a potential hazard, multiply the value for the likelihood of occurrence by the value of the potential outcome to determine the gravity of risk.

a near certainty (5), with a potential outcome of injury needing medical treatment (2).

With a resultant score of 15, our rattlesnake risk is too high, and mitigation measures must be put in place. Education for the fieldwork team on how to identify preferred rattlesnake habitat and how to act when a rattlesnake is spotted, along with clear directions for taking the bite victim to a hospital, may allow you to change the likelihood to unlikely (2) and the potential outcome to an injury requiring time off work (3). With these scores, the risk would be considered medium.

Our dehydration risk, with a score of 10, is already medium, but mitigation measures of hats, sunscreen, water allocations, and breaks in the shade can help your fieldworkers and readily bring the risk down to low.

It's not just people who are affected by the heat. Computers, tablets, and phones don't take well to hot environments. Working in short blocks of time

and resting in the shade are good for humans, animals, and computers. Some modern smartphones, tablets, and computers will even alert you when they are overheating. Consider having a dry zone in your portable ice chest (if you have one), or, at the very least, have somewhere shady for you and your equipment to rest.

Even without making a habit of assessing risk, ensuring personal protection and safety should come naturally. If not, the environment sure has ways to remind you. Risks associated with extreme weather—heat, cold, wind, and water—can form some of the more memorable moments of fieldwork.

Working on and around water adds its own set of risks. Whether you are on a boat in a lake measuring water quality, wading through wetlands searching for a specific wildlife habitat, or just needing to continue your work through the daily afternoon rainstorms in the wet season, planning how to use technology in the wet is critical. Your average consumer smartphone is not up to the challenge of being dropped in a puddle (or lake) or having buttons pressed with wet hands. A waterproof case for an iPad may be enough, but consider mounting your device to the boat, land vehicle, or pole to minimize the chance of dropping your valuable data capture into a watery abyss.

Horseback rescue

NAME: Jane **ROLE:** Paleontologist intern **CIRCA:** 2006
INDUSTRY: Paleontology and geology

The biggest lesson I learned while doing fieldwork with Petrified Forest National Park in northeastern Arizona is how important it is to have daily safety meetings and to exercise caution every time you're going out in the field.

During my summer with the park service, my team and I were tasked with surveying fossil material throughout the Arizona desert. It was