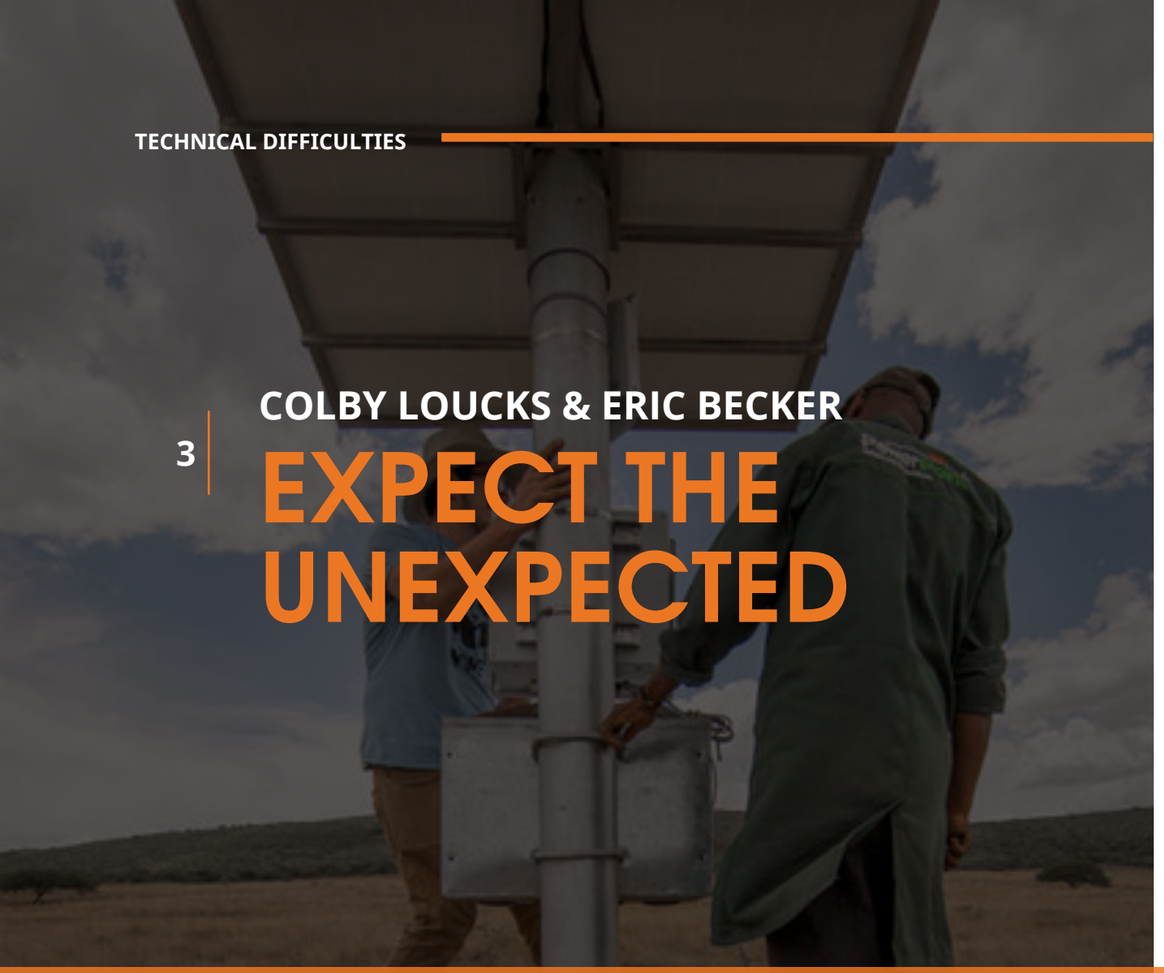

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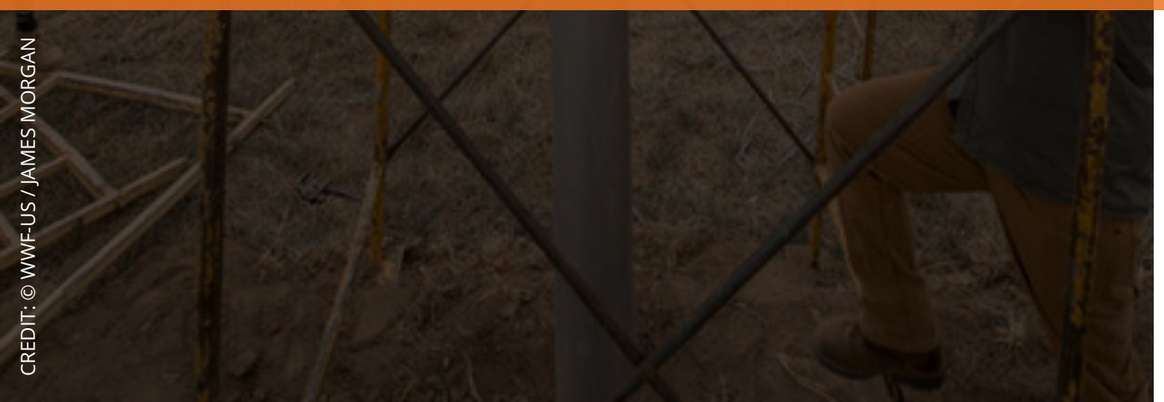
COLBY LOUCKS & ERIC BECKER

EXPECT THE UNEXPECTED

'When planning ahead for challenges you may encounter, it's also worthwhile to remember that the local people you work with on the ground will always have the best understanding of the environments' realities. Building and supporting capacity locally, relying on their expertise, and learning from their experiences and previous challenges will only strengthen your plans, and possibly help you avoid irreparable failures.'

Colby Loucks & Eric Becker



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In this final part of their case studies, **Colby Loucks** and **Eric Becker** reflect on how wildlife and weather can cause unexpected challenges in the field, and share advice on planning your conservation tech work with the unexpected in mind.

Simple and affordable grease can prevent wildlife from climbing poles supporting your technology.

Beyond the challenges of technological failings and infrastructure, conservationists working on the ground will also be familiar with the unique challenges posed by wildlife and the environment itself. When it comes to adapting to these issues as they arise, taking the time to understand the realities on the ground is still essential.

In many cases, we've found that low-tech, local solutions have helped with failures caused by wildlife. For example, after installing a system of masts that held technology and communications equipment at some rhino reserves in Kenya, baboons began climbing the towers and eventually broke a solar panel that provided power. In addition, openings in the tower structure allowed bees to build nests in the towers.

Our partners at the Kenya Wildlife Service found innovative and relatively easy solutions to these challenges, such as greasing the poles to prevent baboons from climbing them and filling in all equipment openings with expandable caulk to keep out insects. Insects and spiders pose a major problem to enclosures, battery boxes, camera traps, and any other equipment with openings. Making sure you cover any opening with screen mesh in the first place can help alleviate this issue and save you the trouble of sending out rangers covered head to toe to knock bees out of enclosures, or worse, tech systems shorting out and needing troubleshooting and repairs because insects have damaged it.

We've also faced issues with elephants knocking down masts as they sought to rub against them. And in some cases, elephants were knocking down poles that were connected through a fiber optic network, meaning that repairs were quite complicated and time-consuming, and required a certain level of on-the-ground expertise to fix. Solving this problem required a bit more effort than merely putting grease onto equipment, but it was still resolved with a fairly low-tech solution: installing 'elephant fences' around every permanent technology installation, and strapping the fiber optic gear to sturdy trees instead of masts.

Planning to encounter failures in conservation tech work means accepting that wildlife and the environment will continually surprise you, presenting new challenges that you never would have anticipated while engineering a tool in the comfort of a workshop, or strategizing the tool's deployment while in an office in the middle of the city. When planning to put solar panels into action in the field, few would expect baboons to take over those panels for their own purposes. You learn from these experiences on the ground, you

solve them with what's available to you, and you get better at anticipating surprising challenges the next time around.

While it can be difficult to anticipate just how wildlife will damage, repurpose, or otherwise disrupt your technology, anticipating challenges caused by environmental factors like weather is a bit easier if you take the time to understand the location you'll be working in. Like problems with wildlife, some of this knowledge can only be acquired from experience and time on the ground - reading about a rainy season is very different from finding yourself with equipment completely soaked through by floods and rain, with no chance of drying out in such wet conditions.

When selecting the right technological tools and forming a deployment strategy, make sure you ask yourself questions about the environment at every step of the way. Does this region have a rainy season? A dry season? Will that impact either your technology or the wildlife you're trying to study or protect? Are there times of year when other researchers and conservation teams avoid certain regions because of difficult or impossible working conditions? Are there times when certain parks or protected areas might be completely closed because of weather conditions? What are the major environmental challenges in the area, like wildfires or floods? What are the highest (and lowest) temperatures your equipment will likely be exposed to, and will that impact their performance? Is your tool's enclosure designed in a way that will trap heat and cause problems, or do you know if your batteries can withstand cold temperatures over long stretches of time? Considering these questions far in advance of deployment will help you choose the right tools, plan ahead for malfunctions caused by environmental factors, and form strategies for protecting technology from issues like water damage and high temperatures.

> Some of this knowledge can only be acquired from experience and time on the ground.

It's also helpful to build setbacks into your project plan and budget, because even the best research and planning in the world won't stop unexpected challenges entirely. The total cost and time needed to achieve success of technology solutions that work in the field is likely to be much greater than anticipated. A large number of potential pitfalls, delays, and unexpected costs result from the hurdles of working with and integrating technology components like radio, radar, batteries, machine learning algorithms, and software, and from the human elements of conservation tech work, like managing personnel and training teams on the ground.

Example of an elephant fence to deter elephants from destroying technology equipment in Ol Pejeta Conservancy, Kenya. The fence is electrified, and is high enough that elephants cannot step over it, keeping them a safe distance away from the mast, solar panels, and other technology.

A low-tech way to dry out wet equipment, assuming conditions are dry enough to build a fire.

When planning ahead for challenges you may encounter, it's also worthwhile to remember that the local people you work with on the ground will always have the best understanding of the environments' realities. Building and supporting capacity locally, relying on their expertise, and learning from their experiences and previous challenges will only strengthen your plans, and possibly help you avoid irreparable failures.

ABOUT THE AUTHORS

COLBY LOUCKS

VICE PRESIDENT, WILDLIFE CONSERVATION PROGRAMME WWF-US

Colby Loucks leads WWF's Wildlife Crime Technology Project, harnessing new technologies and the internet to improve our ability to track and manage wildlife, stop poaching, and reduce human-wildlife conflict. Colby has expertise in GIS, conservation biology, and landscape ecology.

ERIC BECKER

CONSERVATION ENGINEER, WWF-US

Eric Becker researches and develops sensor based systems to detect poachers in protected areas in Africa and Asia to stop wildlife crime. Eric also leverages advancements in the Internet of Things to find energy-efficient, low-cost methods and systems to scale up technologies to solve the planet's most urgent issues.