Digital Transformation in New Zealand

In January 2016, staff from New Zealand's Department of Conservation (DOC) were supplied with tablets and smartphones equipped with Survey123 for ArcGIS, a form-centric mobile data collection application. The Hokitika township biodiversity monitoring field team used this mobile app as well as their current paper-based capture methods to evaluate the potential of digital data collection technologies in their workflows. This undertaking showed that not only can Survey123 improve efficiency and reduce field data capture operational costs, but it can also make captured data available easily and instantly for visualisation and analysis.

Like many other government departments, the New Zealand DOC is going through a digital transformation, replacing paper-based workflows with end-to-end business processes in which information flows instantly across staff teams, departments and – when appropriate – the public. Modern enterprise geographic information system (GIS) technology allows everyone in an organisation to create, access and share information anywhere, anytime and from any device, making their work more efficient and meaningful.

At the New Zealand DOC, wildlife surveys are typically conducted using paper booklets. "The paper-based methodology that we use at the moment is functional, but it requires a massive downstream team to digitise that information. It's sometimes even necessary to go back to the field team to confirm the data because it's unreadable due to smudging or rain," says Benno Kappers, DOC natural heritage information project leader. "Real-time mobile data collection can significantly reduce downstream efforts."

Smartphones Instead of Paper

A pilot programme was initiated to expose the New Zealand DOC staff to using mobile devices for in-field data capture as well as to compare the end-to-end system and organisational processes of both the electronic and traditional paper-based collection methods. Field crews were provided with Android smartphones and tablets. The software on these devices was Esri's Survey123 for ArcGIS, a data gathering mobile app that speeds up the collection process using simple forms. The programme's team visited three remote locations on New Zealand's South Island to survey possum crossings along fixed transects (paths).

Efficiency in the Field

Using a simple spreadsheet and the mobile app's desktop companion tool, Survey123 Connect for ArcGIS, customised forms were created and published in the ArcGIS platform. These forms were then downloaded to the mobile devices to facilitate the collection of information in the field.

Survey123 provided a simple, intuitive interface for users to input field data, which enabled staff to concentrate on making observations rather than on the process of recording them, which was one of the issues with paper-based data collection. Validation rules and expressions configured in the forms reduced the number of user-input errors.

Downstream Gains

Capturing data via traditional paper-based methods involves not just recording field data but also scanning and uploading it to the server, as well as physical logistics such as inventorying and shipping completed booklets. Much of the work in these processes was greatly simplified – if not eliminated – with app-based data collection.

Collecting data through forms on smartphones provided New Zealand DOC with greater control of field-user input. "People became far more concise about what they needed to say," explains Kappers. "That is helpful not only from an efficiency perspective but also from a data management one." Through the use of forms, the data captured was better structured than with paper submissions, and error-prone digitisation processes were eliminated as well.

Real-time Access to Information

Getting feedback on paper-recorded data can take several months. After inputting information into Survey123, captured data was directly transferred back to the ArcGIS platform, where other members of the organisation could access the data in tables, maps and other types

of information products. This real-time integration of field-collected data into an enterprise GIS platform made the storage, quality assurance, analysis and viewing of information more efficient and less costly.

Results

Not only did the new software make the processes that staff undertook more efficient and less costly, it even rendered some processes unnecessary. Many tasks – including printing field booklets for every recorded plot, scanning the pages and uploading the scans to the server; packing, sending and tracking field booklets to the server in Christchurch; and issuing, digitising and performing quality assurance on booklets – have all been made obsolete due to the capabilities of Survey123 for ArcGIS. Additionally, in the pilot programme, these capabilities showed a reduction of 336 staff hours per monitoring method, per season.

Sharing with Citizens and Stakeholders

For the New Zealand DOC, digital data collection with smartphones has been proven to make processes more efficient, in particular in downstream procedures but also in preparation work. In addition, departments can now provide almost-instant feedback on the data that staff supply, and once this data is integrated into online maps it can be shared with numerous citizen groups and stakeholders in the community with an interest in wildlife conservation, natural resource protection and stewardship of the planet. "These measurements that we undertake follow strict national protocols and could all be followed by community groups as well," comments Kappers. "If Survey123 allows us to share these forms with private community groups, the same information management which enables us to start comparing measurements of New Zealand's public land can also be applied to private land parcels. And that is a really valuable contribution to make."

Further Improvements

New features and fixes are added to Survey123 for ArcGIS through monthly upgrades to the product. High-priority items in the road map include adding the ability for field users to capture areas and linear features as well as location data. Additionally, improvements are being made to workflow editing capabilities, including the ability to update existing database records. These two new features will become available in the first half of 2017 across all supported platforms.

All images courtesy of the planning, monitoring and reporting team, Department of Conservation, New Zealand.

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