Practice, Pathways and Lessons Learned from Building a Digital Data Flow with Tools: Focusing on alien invasive species, from occurrence via measures to documentation

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Abstract

The SLU Swedish Species Information Centre (SSIC, SLU Artdatabanken) accumulates, analyses and disseminates information concerning species and habitats occurring in Sweden. The SSIC provides an open access biodiversity reporting and analysis infrastructure including the Swedish Species Observation System, the Swedish taxonomic backbone Dyntaxa, and tools for species information including traits, terminology, quality assurance and species identification.*[1] The content is available to scientists, conservationists and the public. All systems, databases, APIs and web applications, rely on recognized standards to ensure interoperability. The SSIC is a leading partner within the Swedish Biodiversity Data Infrastructure (SBDI).

Here we present a data flow (Fig. 1) that exemplifies the strengthening of the cooperation and transfer of experiences between research, community, non-governmental organizations (NGOs), citizen science and governmental agencies, and also presents solutions to current data challenges (e.g., data fragmentation, taxonomic issues or platform relations). This data flow aimed to facilitate the process for evaluating and understanding the distribution and spread of species (e.g., invasive alien species). It provides Findable, Accessible, Interoperable and Reusable (FAIR) data and links related information between different parties such as universities, NGOs, county administrative boards (CABs) and environmental protection agencies (EPAs). The digital structure is built on the national Swedish taxonomic backbone Dyntaxa, which prevents data fragmentation due to taxonomic issues and acts as a common standard for all users. The chain of information contains systems, tools and a linked data flow for reporting observations, verification procedures, and it can work as an early warning system for surveillance regarding certain species. After an observation is reported, an alert can be

activated, field checks can be carried out, and if necessary, eradication measures can be activated.

The verification tool that traditionally has been focused on the quality of species identification has been improved, providing verification of geographic precision. This is equally important for eradication actions as is species accuracy.

A digital catalogue of eradication methods is in use by the CABs but there are also recommendations on methods for 'public' use, and collaboration between Invasive Alien Species (IAS) coordinators in regional CABs is currently being developed. The CABs have a separate tool for documentation of eradication measures and, if/when measures are carried out (by CABs), this information can be fed back from the CAB-tool into the database in SSIC where it is possible to search for, and visualize, this information. Taxonomic integrity over time should be intact and related to the taxon identifier (ID) provided by Dyntaxa. However, metadata, such as geographic position, date, verification status, mitigation results, etc., will be fully used when reporting under the IAS Regulation 1143/2014 (EU).

The development of the digital structure is a collaboration with the Swedish Environmental Protection Agency (Naturvårdsverket) and the Swedish Agency for Marine and Water Management (Havs-och Vattenmyndigheten).

Keywords

verification, information process, digital structure

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Conflicts of interest

The authors have declared that no competing interests exist.

Endnotes

*1 https://artfakta.se/artbestamning

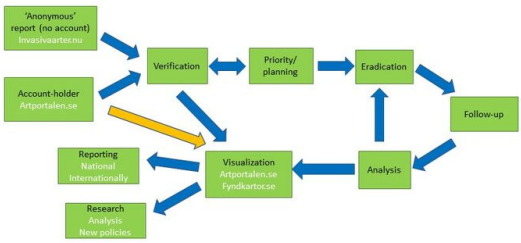

Figure 1.

Dataflow from reporting through verification and action to feedback and visualization of observations.