

Natural Resource Geographic Information in 2015

Tim Duffy

Scope

Natural Resource data by its very *nature* is fundamentally and significantly geo-referenced. It can be divided into categories describing:

- those *surface* earth resources that can be directly observed (perhaps with some near real time post-processing) and used for the management of, e.g., Forestry, Agriculture, Soils, Surface Water, Biodiversity resources ('ecosystem services' provided such as Biodiversity and carbon sink reserves), urban green spaces, health, heat and flooding sinks,
- Marine health/pollution, and,
- those *sub-surface* resources for which the observed data requires scientific modelling and interpretation in order to describe the resource e.g. Geology, Oil Gas and Mineral Resources, Geothermal energy, Groundwater, Sea Fisheries.

Current Position

Today, with the very high resolution (both in height and horizontal dimension) sensors available for observing an ever increasing number of natural resource types (due to the increasing sophistication of types, of in particular, biological parameter that can be recorded e.g. individual plant health and distribution etc) we are close to a position where we cannot claim ignorance of the existence of data, or that inappropriate data are available. However, cost and ease of access i.e. distribution, of such data remains a factor in limiting its potential use.

Sub-surface resources still require intelligent and expensive raw data collection and interpretation. Until a sensor is invented that can map geology without physically removing the top layer of soil and pesky-in-the-way living matter (I have checked, no sign of such a sensor in the next 6 years, so BGS land survey still has a role!), it is likely to remain less 'real time' than surface observations.

Seismic surveys of course identify many deeply buried natural resources, but they all require modelling and interpretation for the derived information to be appropriate to identifying and managing the resource. Increasingly surface and sub-surface natural resource information is being combined, modelled and used together in 'Earth Systems Science'. As our knowledge of the workings of our planetary system (one rock – third from the sun!) has grown, so has the realisation that separate earth systems are closely interconnected and that their data and models need to be also so. This realisation

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came even before the need to address issues such as the rapidly and increasingly adversely changing Climate natural resource.

Anticipated Changes

Over the next 6 years natural resource sensors of increasingly varied type , and automatic and semi-automatic near real time post-processing of those data, will increase in scope, availability and precision/relevance, and decrease in cost of production and availability to the end user/manager.

Availability to the desktop (of both 'raw' natural resource data and of derived products via intermediary Web Processing Services and applications) for both professional and lay Natural Resource observers will be greatly enhanced through the widespread availability and use of internet (which itself will be faster and cheaper to access) based Web Services. Many of these will be based on the by then maturing 'INSPIRE- inspired' (no pun, it is reality in the EU, and such SDI's are the 'only show in town' for greater data interoperability) OGC/ISO XML based Environmental information web services that will form the backbone of knowledge domain, nation, country, EU and world-wide Internet based Spatial Data Infrastructures (SDIs).Such SDIs will lower the cost of using such data through

- their physical delivery mechanism;
- through their encouragement of 'common data licences';
- through their encouragement of the collation and release of domain 'fusion' data;
- through their encouragement of releasing already existing digital data through an SDI; and
- through their encouragement (sometimes by new legislation/instrument) of lowering the cost/removing existing charges of certain relevant data in certain circumstances.

It is the cumulative effect of all this SDI activity 'pushing at an open door' that leads to organisations releasing digital data web services at a more useful resolution than ever before at zero non-commercial use cost e.g. the recent release by the British Geological Survey of its 1:50,000 Digital Map data as a Web Mapping Service (which will lead to far more potential users being aware of the capability and usefulness of this data).

However, not all is rosy, and issues remain because much existing natural resource data is collected against the country surface topographic reference geographies (precisely because people need to manage the natural resource in the context of human administrative and physical geographies). National Mapping Agencies (NMAs), to use the formal pan-European term, and other core reference dataset owners are sometimes perceived (rightly or wrongly, if wrongly better communication is required) as

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presenting barriers to natural resource organisations wishing to publish what they perceive as ‘their own’ data in web services . This can cause concerns in natural resource data collecting organisations, and may slow the development and roll-out of such web services. This contrasts with the apparent situation in the remotely sensed world where once an area of data (scene) is licensed from a provider, simple post-processing (e.g. cloud removal) is deemed to remove any further derived data licensing issues i.e. the new scene is 100% the copyright of the post-processor.

This issue has to be finally and completely resolved over the next 6 years and I shall assume it is (either perhaps through the core reference dataset owners being allowed to move the charging ‘area of interest’ closer to its full source topographic products and away from ‘other people’s’ ‘derived’ datasets or through the inclusion of low cost additions to all general licensing conditions that clearly and completely remove the derived data issue from the concerns of such organisations.

Impact of Changes upon the geospatial industry and upon customers

Positive:

- Required natural resource datasets will be ubiquitously available, discoverable and digitally accessible at much lower access cost to the customer than before.
- Some forms of data – such as Biodiversity observational data, which lend themselves to public (so called amateur) collection will increase in volume and ‘real time’ usefulness.
- There will no longer be the need for ‘project GIS’ collation of natural resource GIS datasets by consultants etc. as the most up to date information will be discoverable and available direct from the data providers’ web services.

Negative:

- There will be a very wide range of natural resource datasets and derived products available possibly confusing potential customers as to which to use – however the associated SDI infrastructure encouraged Metadata services (Discovery and Dataset) will have encouraged data providers to describe their data and its uses in a much more consistent and useful way than perhaps beforehand.
- If the derived data issues are not resolved there may be fewer available datasets than there could have been.

Scenarios

The management of our natural resources will be more cost effective, timely and able to respond more rapidly to change (and events) than before. The ease of availability of such information to the wider

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public will raise even further the awareness of natural resource issues and the public interest in managing them better.

Such digital information will be being used – because it will be so much more accessible and as web services by definition so much more up to date - in a much wider range of natural resource management systems such as the NERC consortium's Environmental Information System for Planners.

Summary of 5 key points

1. The demand for digital Natural Resource data is growing in a hard pressed for carrying capacity world, as is the demand for greater physical accessibility and lower cost to access such data.
2. The volume of available data is growing 'exponentially' as new sensors collect ever more relevant and ever more real time observational data and new computer networks and affordable computing power are able to handle and make available these volumes.
3. Use of the burgeoning internet and in particular web services on that internet should make this data available and useable at affordable cost.
4. Derived data issues inherited from the use of core reference datasets to help collect natural resource datasets are slowing the wider availability of such data and need to be resolved as soon as possible.
5. More appropriate and effective use of such data in our management systems will lead to better management of our crucial Natural Resources as we go forward struggling with excessive resource consumption in the 21st Century.

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