River Network Centrelines

My original data request of 04/10/2012 is here:

> http://data.gov.uk/data-requests/river-network-centrelines

(I have appended comments re the unsuitability of the water theme in OS VectorMap District.)

I should clarify that, although I've submitted this in the form of a data request per the ODUG process, my main intention is simply to highlight a dataset that I think is a good candidate for open data release. I don't personally have a business proposition in mind that relies on release of this data.

The following notes are in support of a benefits case for release of basic EA/OS river network data for England and Wales. I have not attempted to put any particular figure on the economic or social benefits of releasing this dataset, as I do not see any credible method for doing so with confidence. However I have commented on the context in which wider re-use of the data might create value, and sketched out some scenarios and use cases.

1. The UK National Ecosystem Assessment (NEA) sets out estimates of the contribution that ecosystem services make to the national economy in terms of a sustained flow of income.

Chapter 22 (Economic Values from Ecosystems) is probably the closest we have to a document that articulates robust methods for valuing the ecosystem on a basis that fits with Treasury thinking. Specific comments on river systems include:

> "Planned river quality improvements may generate values up to £1,100 million p.a. However, climate change-induced losses of water availability are valued at £350 million to £490 million p.a.." (p 1068)

> "We find that increasing distance from natural amenities such as rivers, National Parks or National Trust sites is associated with a fall in house prices…. while the data is not accurate enough to allow analysis of precisely what can be seen from any given house, moving from a property near to (but without a direct view of) a river to one, say, 1 km away, will lower the price of otherwise identical properties by some 0.9% (or, on average, £1,750). Clearly, homeowners place substantial values upon such environmental amenities." (p 1099)

A NEA working paper 'Economic Analysis of Cultural Services' (Mourato et al. 2010) includes additional detail on the relationship between proximity of rivers and house price differentials.

The NEA approach gives us a basis for thinking about the economic value of the river network itself. In other chapters the NEA has much to say about the contribution of the river network to health, education and recreation.

Unfortunately the NEA does not provide any guidance on valuing the availability of information about the river network. Logically it must be some fraction of the estimates in the NEA; either a maximisation of those estimates if the NEA assumes perfect information, or an increase on those estimates if the NEA assumes the status quo.

However in order to develop that idea we have to look at the current impacts of limited availability of river network mapping and speculate on the potential impacts of wider availability.

2. Following are once a month participation counts from the 2011-2012 Sport England Active People Survey, for sports usually associated with the river network:

angling	980,100
canoeing and kayaking	147,800
rowing	60,100

This is one indicator of the size of the core potential user base for location information about the river network.

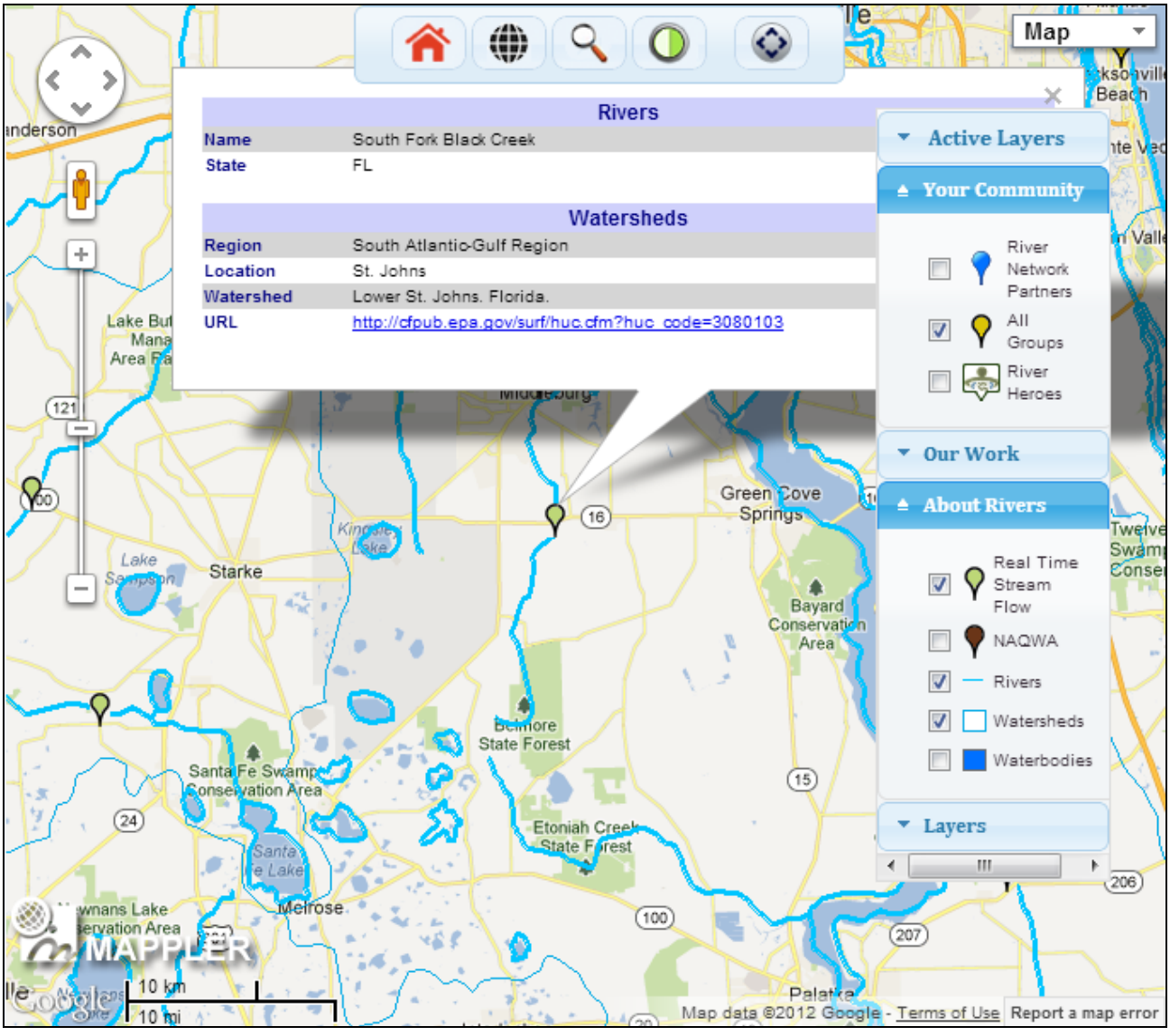
3. The UK Rivers Network lists over a hundred local community river groups:

http://www.ukrivers.net/network.html

These are mostly groups of volunteers involved in protecting and restoring their local rivers. Have a look at a few of their websites. Wouldn't it make their work easier if they had an authoritative map of the river network that they could share freely with their members?

Now compare the website of the River Network, the equivalent national coordinating body in the United States: http://www.rivernetwork.org/rivermaps

The River Network mapping client is frankly a bit rubbish. However they have full spatial data for the river network, linked to real-time flow data from the USGS and pollution data from the EPA:



4. We also have an example of good practice from the UK. In June the Canal & River Trust took over (from British Waterways) responsibility for 2,000 miles of waterways in England and Wales.

One of their first actions was to release, under the Open Government Licence, their spatial datasets. This includes canal centrelines and network junction points, towpaths, aqueducts and bridges:

> http://www.geostore.com/environment-agency/WebStore?xml=environment-agency/xml/ogcDataDownload.xml

Google has undertaken to add most of this data to Google Maps so that the public can plan journeys that include canal and river towpaths as well as roads.

Effectively this means we have open mapping data for man-made waterways in England and Wales, alongside open data for the road and rail networks. Only the river network is missing.

5. OpenStreetMap, the well-known collaborative project to create a free worldwide map, includes an ongoing effort to digitise United Kingdom Waterways:

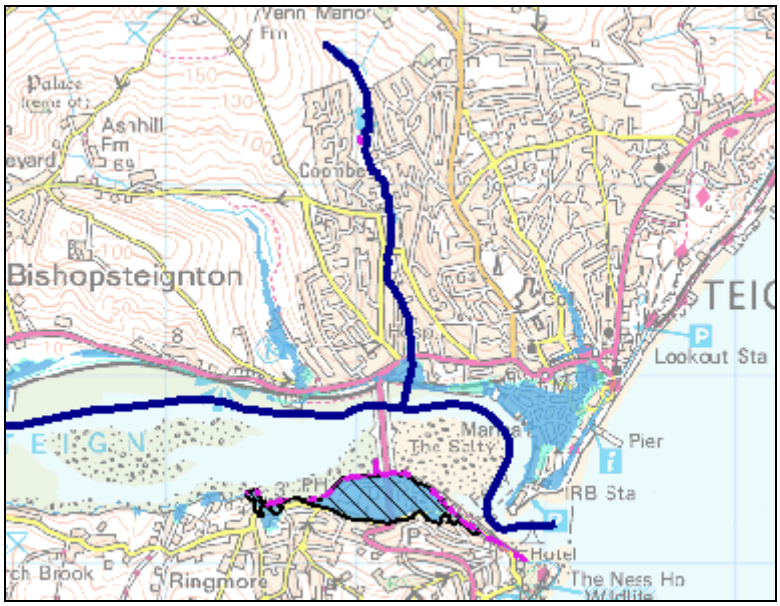
> http://wiki.openstreetmap.org/wiki/WikiProject_United_Kingdom_Waterways

As you can see they have made some progress, mainly in respect of canals, but there is still a massive amount of work left to do before OSM has a proper map of the river network.

I have mixed feelings about this OSM activity. It's a noble effort but it also seems like a waste of resources to duplicate information that is already held by the public sector. OSM contributors provide their labour voluntarily but there most be an opportunity cost to their spending so many hours replicating existing data.

6. There seems to be good evidence that a lack of basic mapping of the river network is even undermining public outreach efforts by Defra and the Environment Agency.

The EA's 'What's In Your Back Yard' maps include basic centrelines for main rivers, but without nodes or name attributes:



However consider the EA's website material on outdoor recreation:

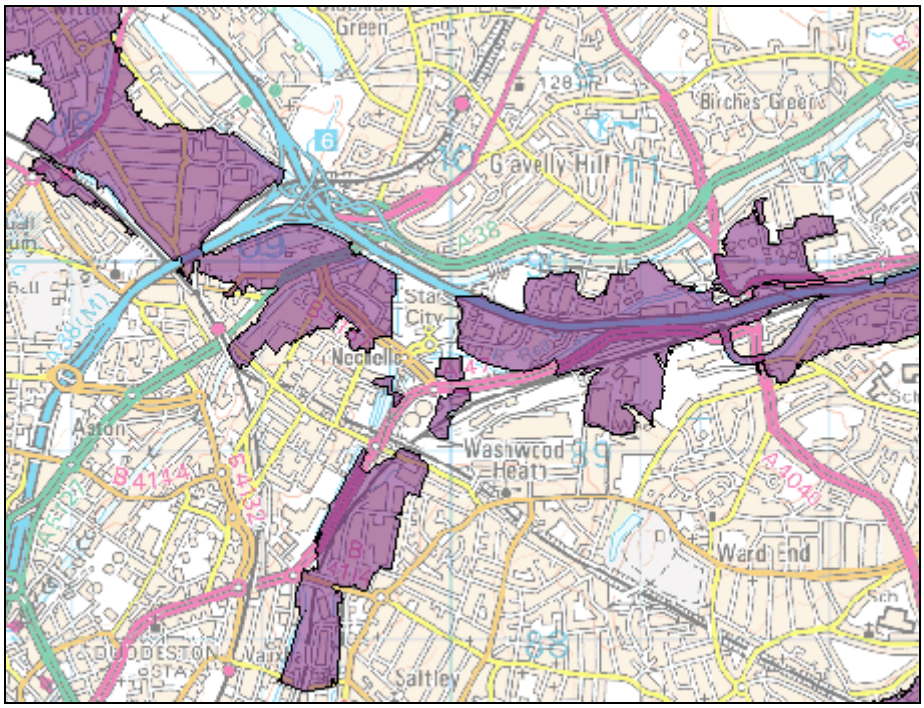
http://www.environment-agency.gov.uk/homeandleisure/recreation/default.aspx

There is plenty of information about fishing, boating, water safety; but only text with a few pictures. Even the 'About Environment Agency waterways' pages don't actually show the public those waterways on a map.

Or have a look at Defra's Love Your River campaign, which "aims to highlight the link between river health and water use, so that people understand and value water and take action to improve their local rivers and the environment around them." Would it not engage the public more if we could see our local rivers at a glance?

7. One open question is the extent to which lack of available mapping of the river network undermines public understanding of alerts and warnings during flood events. I'm unsure whether there has been any community research on this.

If the Environment Agency tells me there's a Severe Flood Warning "on the River Rea at Vauxhall, Saltley & Nechells", does it matter if I can locate the River Rea on a map? I can see the general area they're talking about:



but should I not have some understanding of the source of the risk as well? Where does the River Rea actually run? (And do I need to cross it on my way home?)

8. There is a similar scenario common within the insurance industry. Most underwriters have access to the necessary data to determine whether a property is within the fluvial flood plain. However they do not usually have the additional information to tell them the proximate source of risk, i.e. the name and location of the nearest river.

This information is available commercially within the Detailed River Network product, but that is designed for more technical uses and unlikely to be available on the desktop of the average household underwriter. A simple map of the river network would make it much easier for the underwriter to understand the flood risk in real-world terms and discuss it with their policyholder or broker contact – more so if that map is already widely known to the public.

9. I understand river network mapping as basic information infrastructure. I don't think we are likely to see many innovative products or services with river network mapping as the only or distinguishing feature. The more likely result of open data release is that the market will invent products with the river network as a base layer, attributed and overlaid with other data for either illustrative or analytic purposes.

That means the extent of re-use will depend on the availability or creation of complementary datasets, following the principle that packages of open data, or open data combined with existing commercial data, have a multiplier effect.

For example release of river network mapping would be a necessary pre-requisite to open data release of real-time river level data. It might also provide the basis for better mapping of small-scale hydropower sites, or drive community awareness of pollution incidents as it has in the US.

At the moment environmental information is a relatively undeveloped area of UK open data policy. Release of river network mapping could deliver underpinning benefits beyond those outlined above.

Owen Boswarva, 19/12/2012
owen.boswarva@gmail.com