A MCI tool for BSS based on DwC standards

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Background

The MCI score is a indicator that can be calculated for a set of invertebrate observations, typically for a site. Each individual invertebrate taxa is given a score (through a lookup), and the score for the site is calculated as weighted average based on the individual scores, taken into account the number of individual per observations.

Two types of scores and hence indicators can be calculated: for "hard-bottom" and "soft-bottom" environments. These are provided as separate scores per taxa.

Idea / Proposal

- Develop a demonstration tool that automatically calculates MCI based on
  - a set Invertebrate Occurrence datasets provided GBIF/BSS compliant - perhaps as a occurrence.txt DwC file or this file through an IPT server; and
  - a MCI score dataset also provided GBIF/BSS compliant data source - perhaps as a identification.txt DwC file or this file through an IPT server
- Note: Critically, the source datasets need to include NZOR IDs!
- Develop the demonstration tool backend in R, with front end clients:
  possibly a r-shiny UI,
  possibly a QGIS implementation,
  possibly a Excel plugin???

Note (Brent): The Fisheries Centre has successfully deployed R-based information delivery systems for MPI, using Shiny. See: http://shiny.rstudio.com/gallery/

It has also now been used in the Climate Centre to provide interactive climate forecasts for an industry sector. The use of Shiny, & therefore R, to drive such systems is new, & largely comprised building prototypes for proof of concept. Work is ongoing with Shiny for a few projects - the protoypes have worked well & been very well received (see below). There is also a NIWA Shiny server staff can use to serve their Shiny applications to the web. Associated with Shiny, is R-leaflet, a tool enabling R to drive conventional, interactive web mapping applications. See: https://rstudio.github.io/leaflet/ and try the R-driven interactive map (down the page a bit), which is conveniently showing NZ.

Here is one response from MPI regarding one system we put together, (very nice to get such client feedback!!):

"That is awesome!
Just had the whole team crowded around my computer wishing we could have that set up for all of our stocks!!
Words used included 'amazing' and 'awesome'.
Love the ability even just to download the projection plots as they are, I suppose being able to download a table of the stock status at each year of the projection could come in handy (.e.g %B0 for each year...)
We'll have more of a play and let you know if anything else comes up.
Thank you!!!!"

While Shiny is not the only (or perhaps even the best) way to build such web applications, it is the best way for R users to build such applications using R, without learning java, javascript & a new suite of web & web mapping tools. The deciding factor on the use of Shiny for the Fisheries staff was to build on their existing R expertise, to develop new ways of delivering information directly to our clients.

If there is interest, we can provide a presentation to the NIWA R-users group on Shiny (VC'd ??), and if staff from outside Wellington are interested, we can host an introductory workshop on setting up & developing Shiny applications in NIWA.

Steps

1. Michelle to send around the invertebrate species list & score sheet she has and team to check.
2. Michelle to compile institutional score sheets to enable comparisons between scores to be made, & ideally reconciled to a national standard
3. Check this list against TRS and NZOR and update both -> to have unique identifiers for each taxa.
4. Find a way to store taxa-score lookup table in DwC compatible format.
5. Write a R based procedure that:
   a. connects to set of DwC data sources (or other agreed data format)
   b. connects to a user-selected taxa-score data source
   c. does the calculation and writes a file (maybe also DwC compliant??)
6. Write a "web wrapper" for above, including a taxa-score pick list