River Runner (Geoconnex Demo Version) Scope

This document provides an overview of desired features of an enhancement to the River Runner application that demonstrates more of the capabilities of the NLDI and Geoconnex.

1. In addition to flowlines, we would like points corresponding to additional water data sources to be visualized.
   1. The NLDI includes several endpoints other than flowlines. Endpoints of interest include:
      1. nwissite: NWIS Sites (USGS Streamflow and water quality monitoring locations)
      2. ref\_gages: Reference Gages(An ever-expanding collection of stream monitoring locations from all known sources, including state and local government)
      3. wqp: WQP Sites (All water quality sampling locations available from [www.waterqualitydata.us](http://www.waterqualitydata.us))
      4. wade: WaDE (Water Points of Diversion in the 17 western, prior appropriate states. These points are the approximate locations where water can be withdrawn by water rights holders)
      5. ca\_gages: A collection of streamgages (a subset of ref\_gages) in California

Each endpoint can return a GeoJSON file. For example, just as /flowlines returns the flowlines, the API call:

<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/15022615/navigation/DM/nwissite?f=json&distance=6000>

returns a GeoJSON file of all NWIS points, which can presumably be visualized on a map. The API call can substitute any endpoint name in red with any of the others to return similar GeoJSON files. These can then be visualized, perhaps as separate layers with different symbology represented in a Legend in the app.

1. In addition to the points, ideally additional popup/thumbnail information can be shown about the points. Examples
   1. NWIS Sites. Most NWIS Sites are streamgages. They have URIs pointing to pages like here. <https://waterdata.usgs.gov/monitoring-location/11455420/> If you request the json-ld version of this page, or inspect the source for the “application/ld+json” script block, you’ll see a link to image, which is the most recent hydrograph: <https://waterdata.usgs.gov/nwisweb/graph?agency_cd=USGS&site_no=11455420&parm_cd=00060&period=100>. These are a decent enough summary for demonstration purposes of NWIS I think. Perhaps only the last week of observations e.g. [https://waterdata.usgs.gov/nwisweb/graph?agency\_cd=USGS&site\_no=11455420&parm\_cd=00060&period=](https://waterdata.usgs.gov/nwisweb/graph?agency_cd=USGS&site_no=11455420&parm_cd=00060&period=100)7 (changed “period=” parameter to 7[days])
   2. For the purposes of demonstrating Geoconnex, the popup could include the link of the form [https://geoconnex.us/usgs/monitoring-location/number](https://geoconnex.us/usgs/monitoring-location/%7Bnumber) above the hydrograph, which should function and be clickable to the USGS pages.

1. WQP Sites, with an “identifier” field with IDs that look something like this “USGS-383350121254301”. And a “uri” field that looks something like this: <https://www.waterqualitydata.us/provider/NWIS/USGS-CA/USGS-383350121254301/>" These can be used in web service calls the web services to pull data from each site are documented here. <https://www.waterqualitydata.us/webservices_documentation/>
   1. The Popup could include:
      1. A title saying it’s a “Water Quality Portal site”)
      2. A Site “identifier” from the GeoJSON field of the NLDI API call
      3. A clickable URL of the form https://geoconnex.us/wqp/[NWIS/USGS-CA/USGS-383350121254301/](https://www.waterqualitydata.us/provider/NWIS/USGS-CA/USGS-383350121254301/), where <https://www.waterqualitydata.us/provider/> in the “uri” from the NLDI API call is replaced by <https://geoconnex.us/wqp/> , with a label like “Water Quality Portal Site Metadata”
      4. A clickable URL of the form <https://www.waterqualitydata.us/data/Result/search?siteid=USGS-383350121254301> (this downloads water quality samples from that site) with a label like “Water Quality Sample Data”
   2. Note: there are a LOT of WQP sites that can clutter up the view maybe. Might be worth some kind of subsample.

1. WaDE Sites, with an “identifier” field with IDs that look something like this “NM\_4488”. And a “uri” field that looks something like this: <https://geoconnex.us/wade/sites/NM_4488>  The Popup could include:
   1. A title saying its a “Water Data Exchange Water Point of Diversion”
   2. A Site “identifier” from the GeoJSON field of the NLDI API call
   3. A clickable URL which is the same as the “uri” from the NLDI API
   4. Note: there are a LOT of WaDE sites that can clutter up the view maybe. Might be worth some kind of subsample.

1. We could do some kind of “water cycle simulator”. This could involve an animated bucket full of water at the beginning of the animation. We could assume something like this:
   1. Every time the view passes a WaDE site (which represent points of diversion), some small % of the water in the bucket is depleted. In the case of any flowpaths that end up on the Colorado River It could even be calculated such that bucket is at 1% or so when it gets to Mexico.