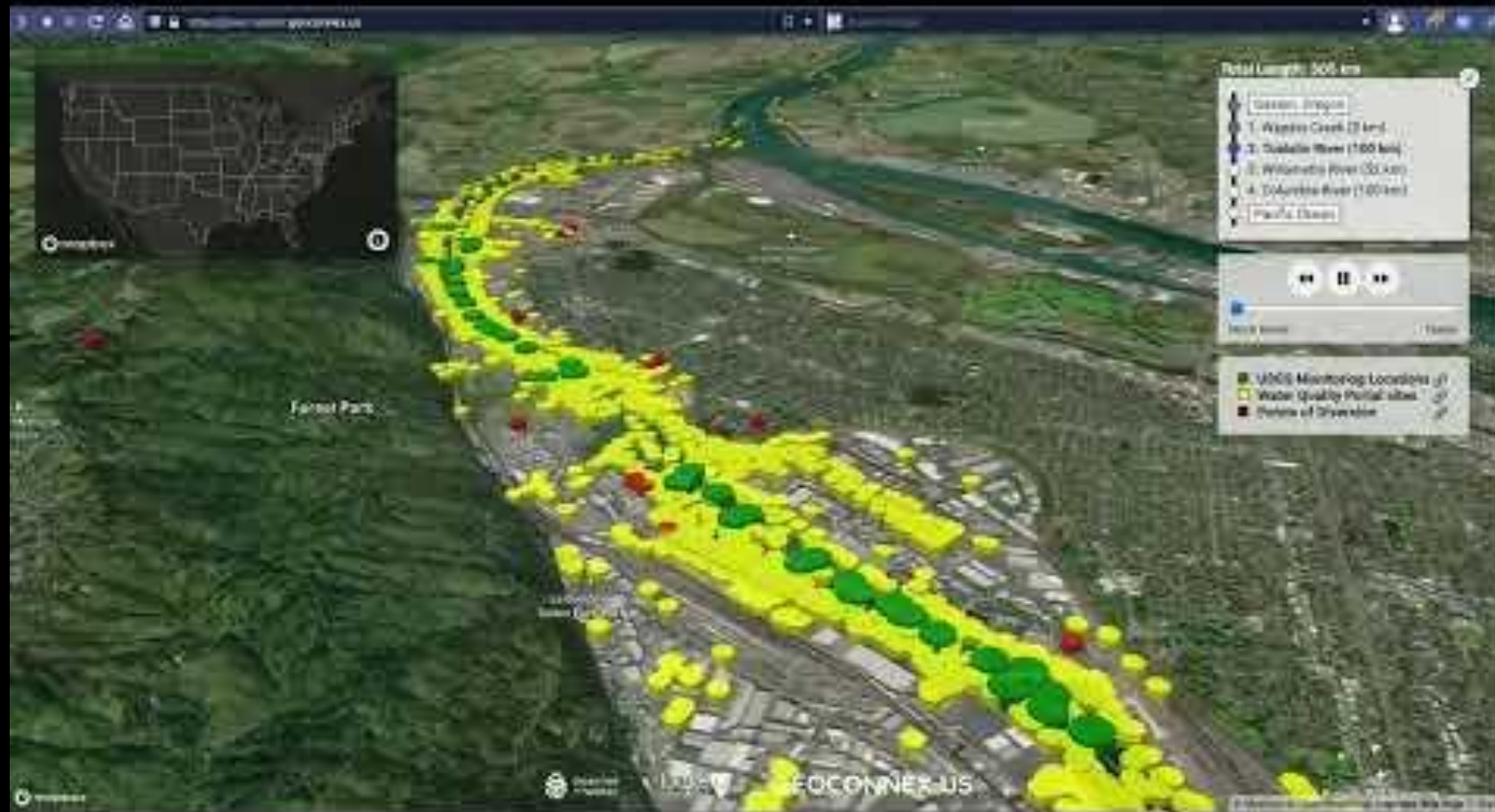


The Internet of Water in New Mexico: geoconnex.us and the NLDI



Internet
of Water



river-runner.geoconnex.us

Kyle Onda (konda@lincolninst.edu)
Associate Director, Internet of Water



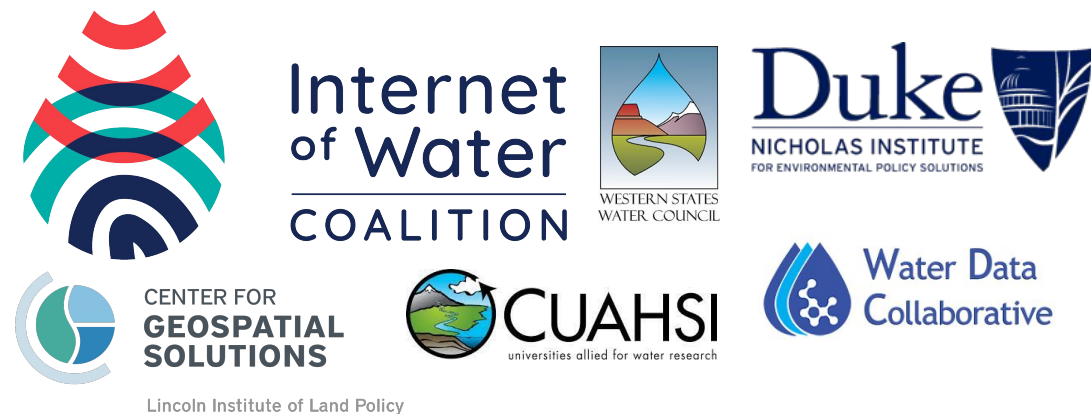
CENTER FOR
**GEOSPATIAL
SOLUTIONS**



LINCOLN INSTITUTE
OF LAND POLICY



The Internet of Water: A vision for modern water data infrastructure connecting water data across the US so that it is Discoverable, Accessible, and Interoperable



A formal Coalition of organizations providing technology research, development, and socialization enabling the vision

A community of practice implementing the ideas developed in the Coalition, sometimes formalized as projects



NLDI



Outline

- What is geoconnex
- What is the NLDI
- Piloting in New Mexico
- Future Work

“As a user of water data, I need to discover and access water information **relevant** to the environmental feature I care about from **all the organizations** that hold data about it, so I don’t have to have **special knowledge** to access some information and so I **don’t miss some potentially relevant** information.”

Dave Blodgett (USGS)

[Second Environmental Linked Features Experiment:](#)

<https://docs.ogc.org/per/20-067.html>

water data carrboro nc

All Images News Maps Shopping More Settings Tools

About 872,000 results (0.47 seconds)

waterdata.usgs.gov › nc › nwis

USGS Current Water Data for North Carolina

Daily Streamflow Conditions. Select a site to retrieve data and station information. Stream gage levels in North Carolina, relative to 30 year average.

Missing: carrboro | Must include: carrboro

Statewide Streamflow Table · Streamflow · NC real-time streamflow

waterdata.usgs.gov › nwis › inventory

usgs 0209746515 university lake bl sr 1005 nr carrboro, nc

Our hydrologic monitoring stations continue to send data in near real-time to NWISWeb, and we are continuing critical water monitoring activities to protect life ...

waterdata.usgs.gov › nc › nwis › current

Current Conditions for North Carolina: Streamflow - USGS ...

USGS Water Resources of the South Atlantic Water Science Center: the place to start for all USGS water information in the SAWSC. Real-time data Streamflow || ...

Missing: carrboro | Must include: carrboro

www.townofchapelhill.org › government › water-quality

Other Monitoring & Resources | Town of Chapel Hill, NC

USGS's North Carolina Water Science Center creates annual data reports. ... USGS 0209746515 UNIVERSITY LAKE BL SR 1005 NR CARRBORO, NC

www.waterqualitydata.us › provider › NWIS › USGS-NC

Water Quality Portal Data Sites for USGS-NC

MILES CREEK AT RT 664 NEAR UNION LEVEL, VA - USGS-0207966575 ... UNIVERSITY LAKE BL SR 1005 NR CARRBORO, NC - USGS-0209746515 / lake

Currently...

A mix of structured and unstructured data

Dominated by USGS – administered systems

Dominated by state-wide views

Missing important topics and data providers



Water data carrboro nc



Water data relevant to Carrboro, NC, 27510. Morgan Creek Watershed

Stream-
flow

Precip-
itation

Water
Quality

Drinking
Water
Quality

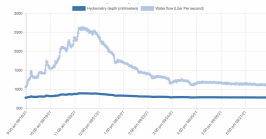
Water
Use

Streamflow near Carrboro NC

USGS Gages

[Morgan Creek](#)

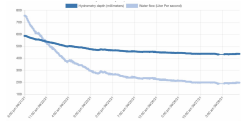
[Booker Creek](#)



NC Department of Emergency Mgmt Gages

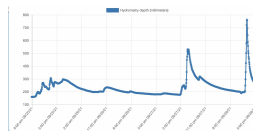
[Station 1234B](#)

[Station 45x](#)



Orange Water and Sewer Authority Gages

[OWASA University Lake](#)



Haw River Keeper

The Vision

Data that is...

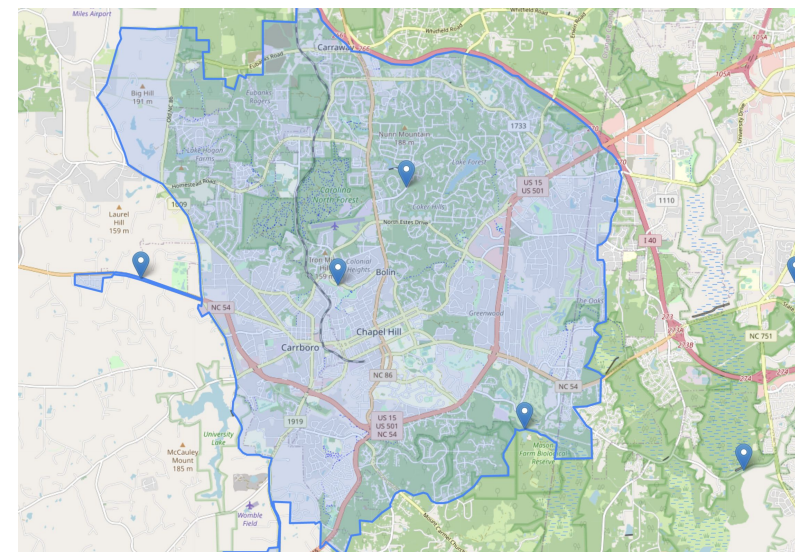
DISCOVERABLE

Spatially - indexed

Topically - organized

Site-level granularity

No prior knowledge of water data
providers required



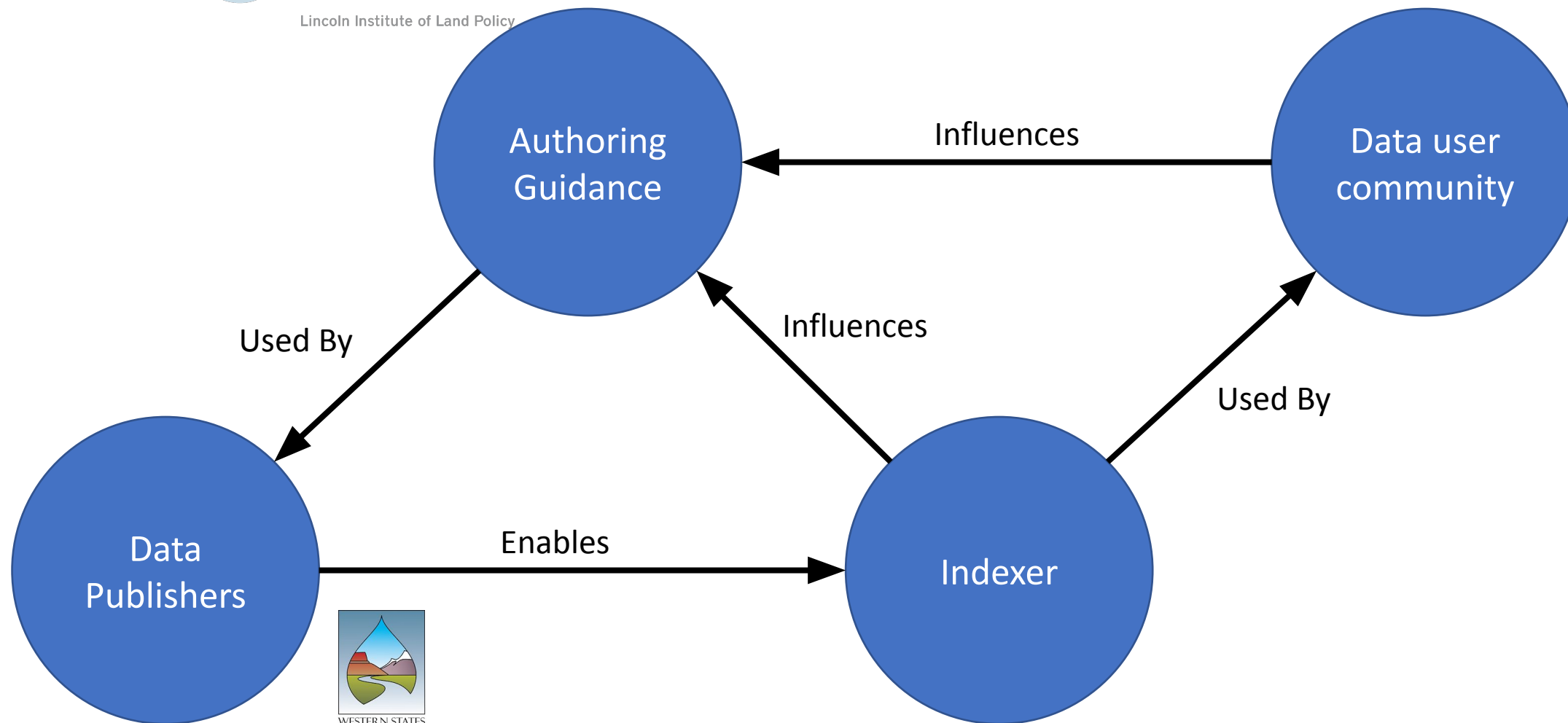
geoconnex.us Community

- Funded By:  Internet of Water COALITION   science for a changing world
- Developed by:  CENTER FOR GEOSPATIAL SOLUTIONS  science for a changing world
Lincoln Institute of Land Policy
- Operated by:  CENTER FOR GEOSPATIAL SOLUTIONS Lincoln Institute of Land Policy
- Data contributed (so far) by:  science for a changing world  Water Data Collaborative  WESTERN STATES WATER COUNCIL
 CUAHSI universities allied for water research  UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 CALIFORNIA Water Boards  New Mexico Water Data



CENTER FOR
**GEOSPATIAL
SOLUTIONS**

Lincoln Institute of Land Policy



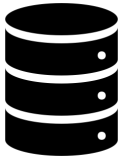
Workflow Vision (WaDE example)

I want **all** real-time, historical, and model/forecast data from hydrologically relevant in the **past 30 days** regarding:

- Precipitation
- Diversion
- Flow/stage
- GW Pumping

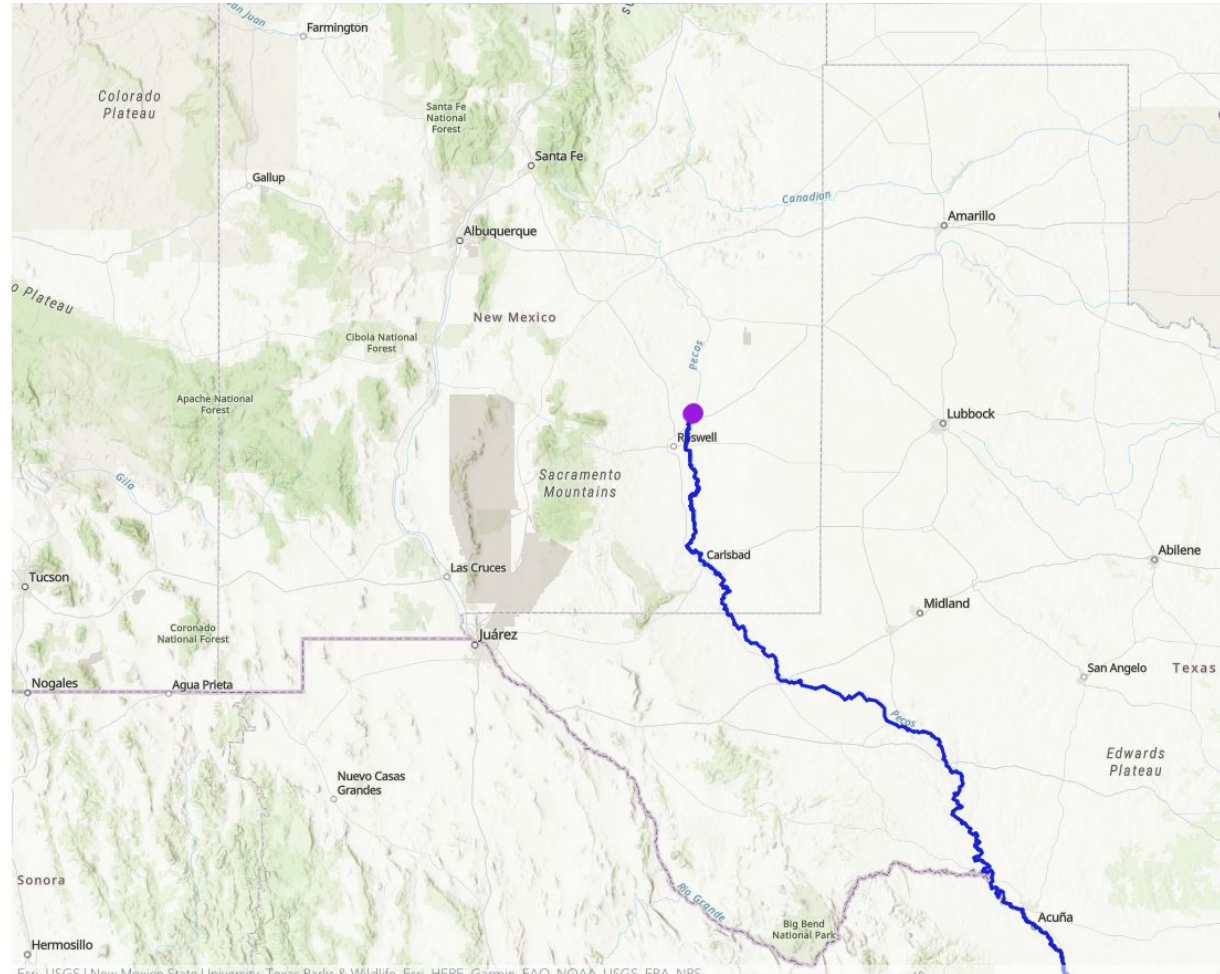


WESTERN STATES
WATER COUNCIL



Water
diversions time
series data

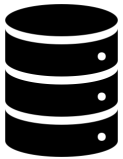
Dashboard



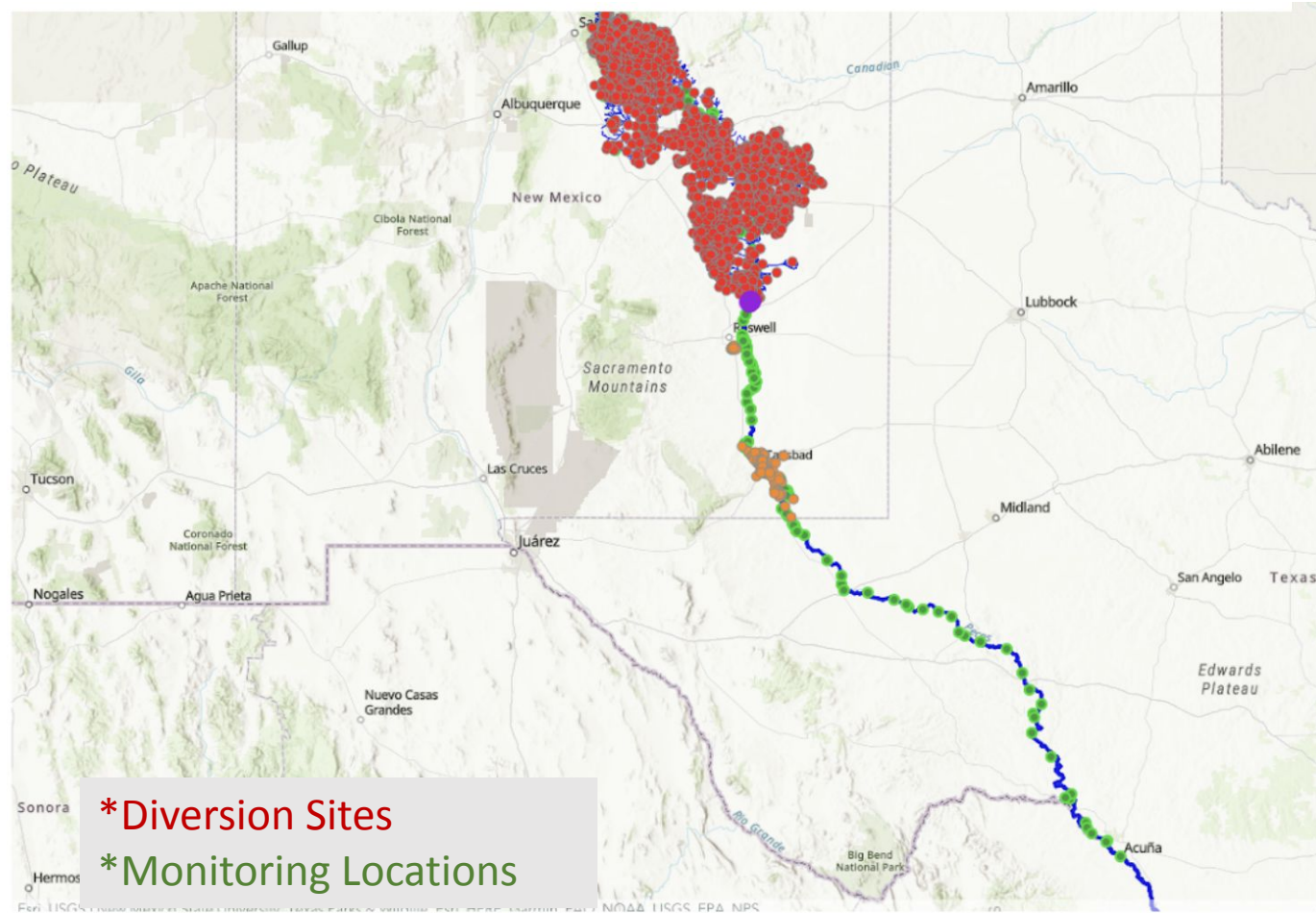
Workflow Vision (WaDE Example)



WESTERN STATES
WATER COUNCIL



Water
diversions time
series data



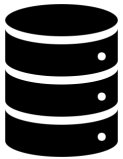
Network
Linked
Data
Index

Workflow Vision (Development by WaDE)

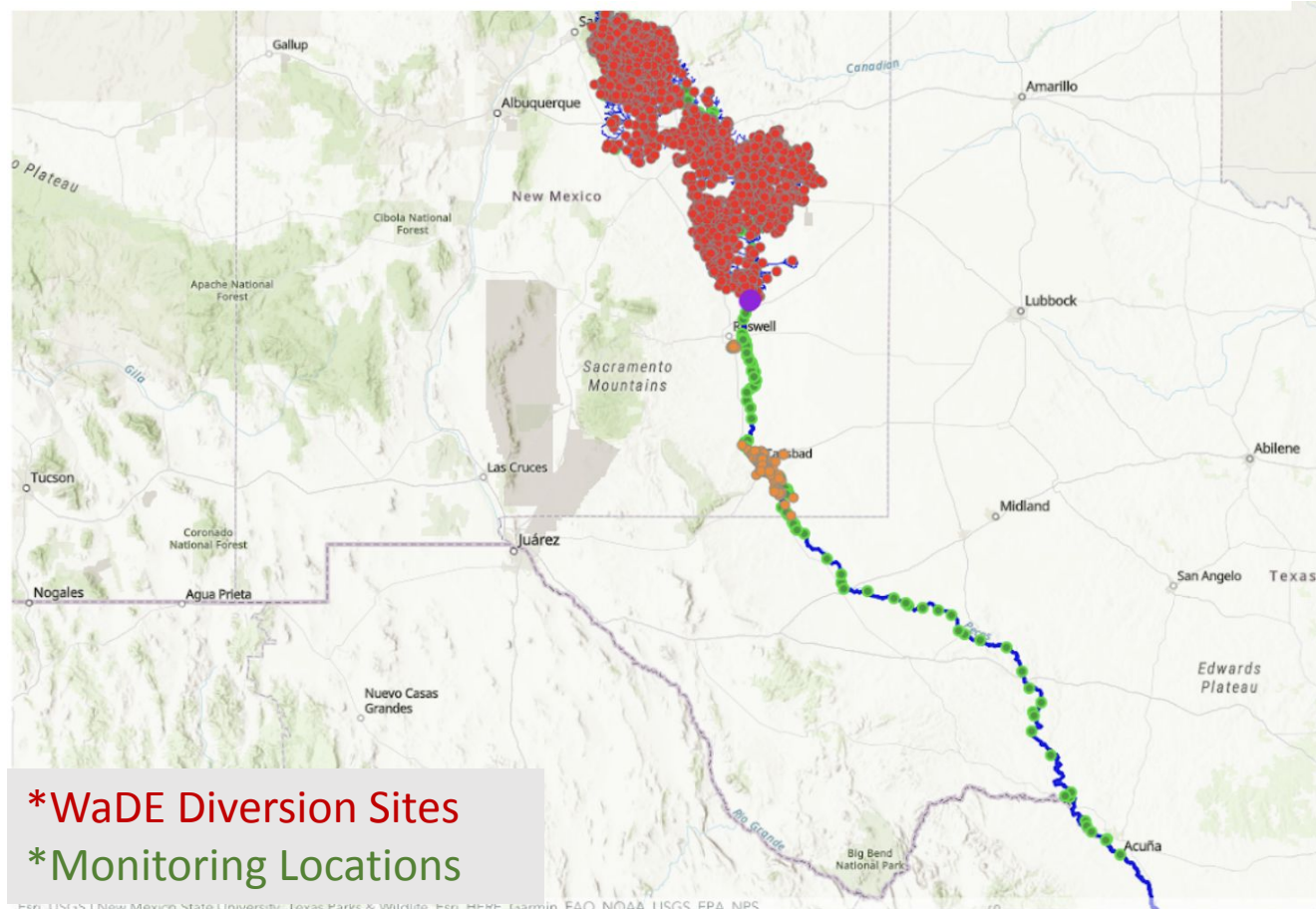
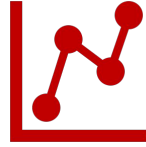
Network
Linked
Data
Index



WESTERN STATES
WATER COUNCIL



Water
diversions time
series data



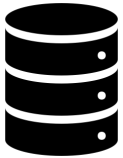
*WaDE Diversion Sites

*Monitoring Locations

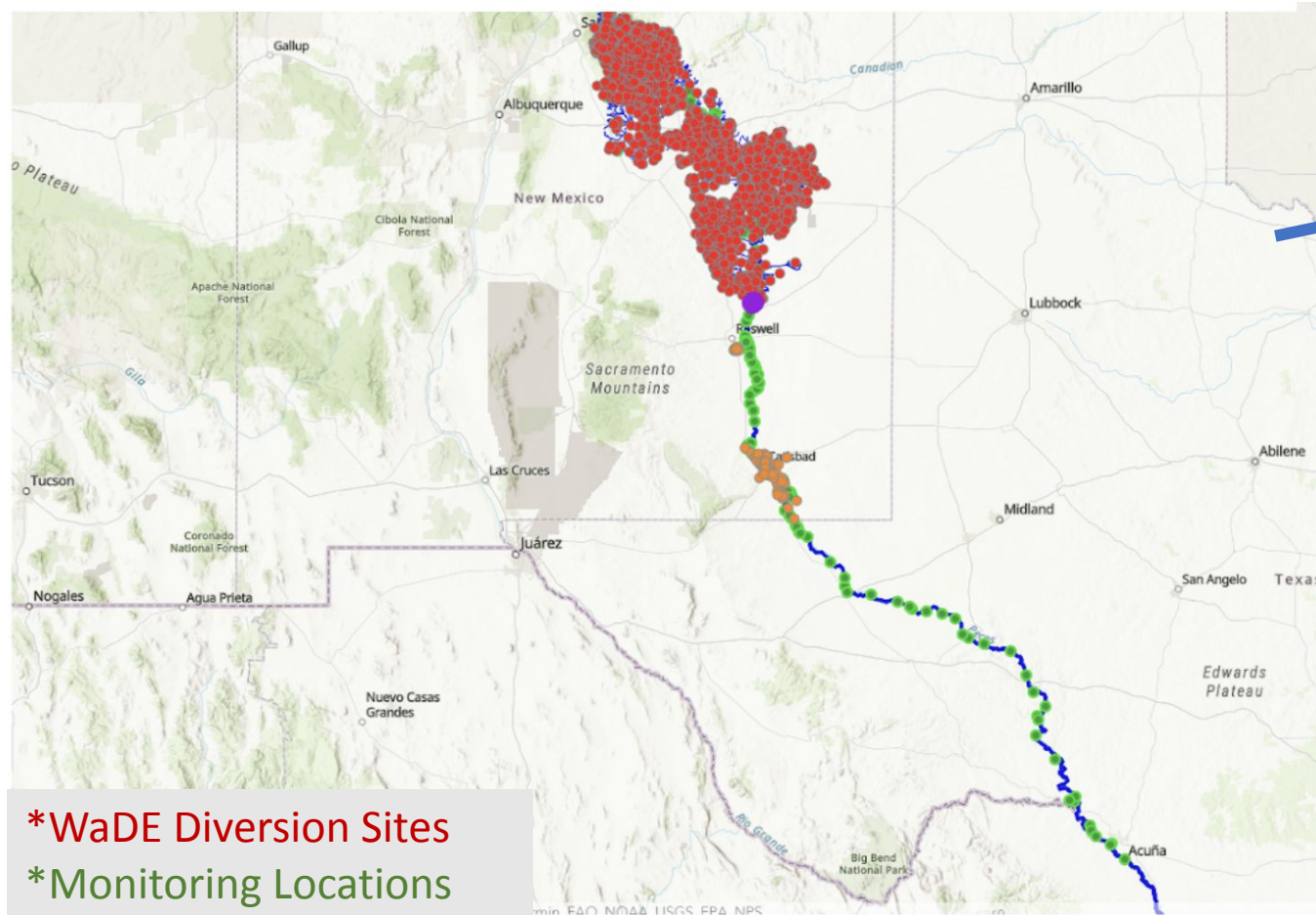
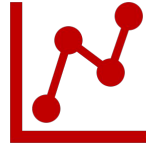
Workflow Vision (WaDE Example)



WESTERN STATES
WATER COUNCIL



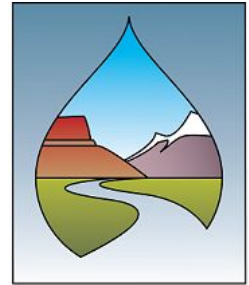
Water
diversions time
series data



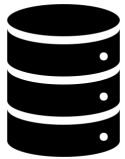
Network
Linked
Data
Index

geoconnex
knowledge
Graph

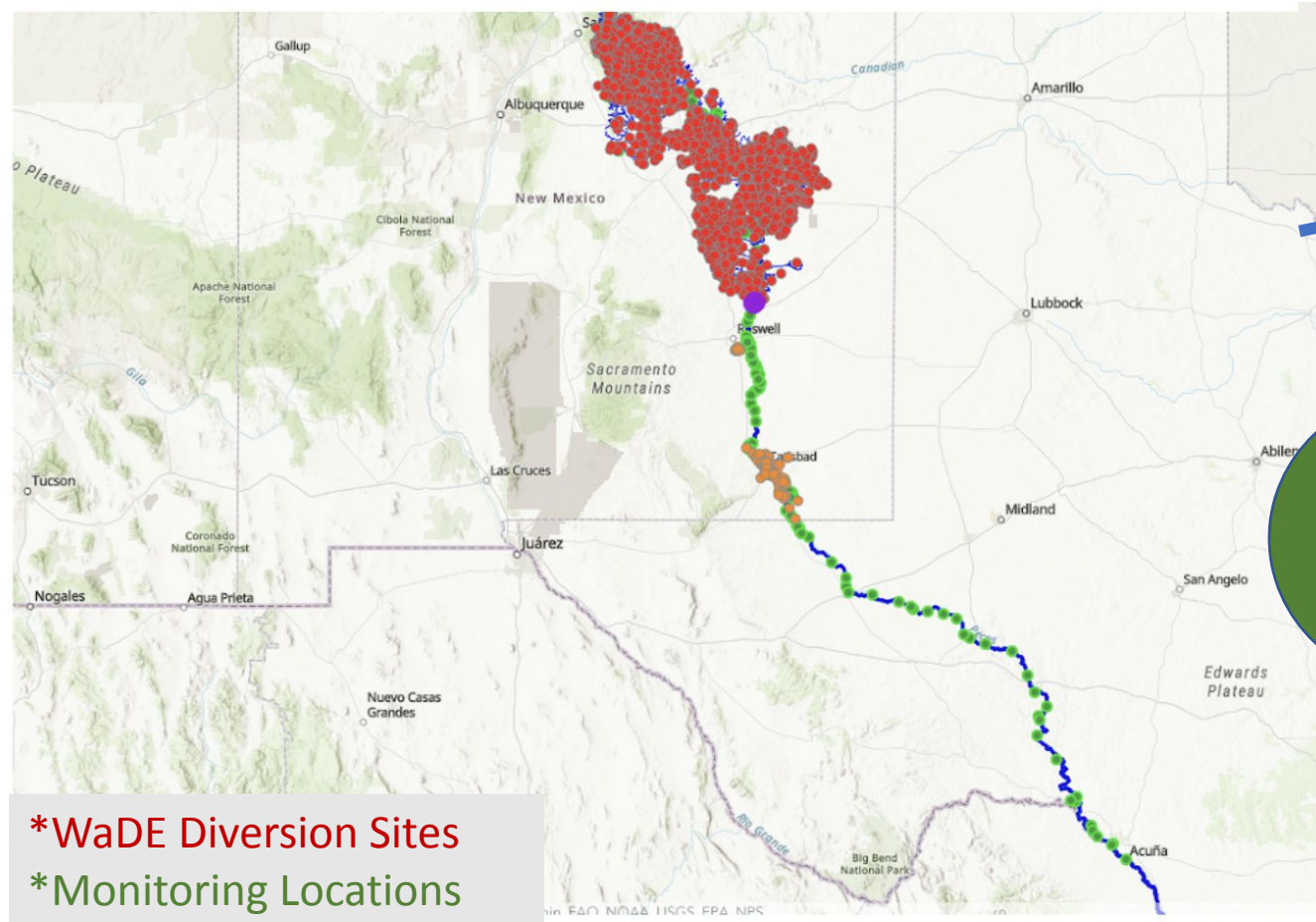
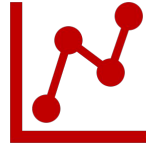
Workflow Vision (WaDE Example)



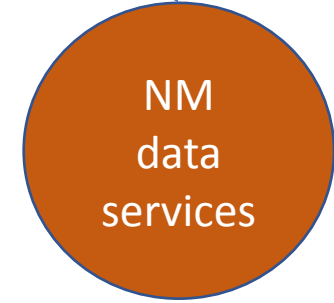
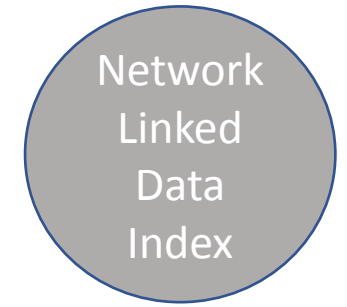
WESTERN STATES
WATER COUNCIL



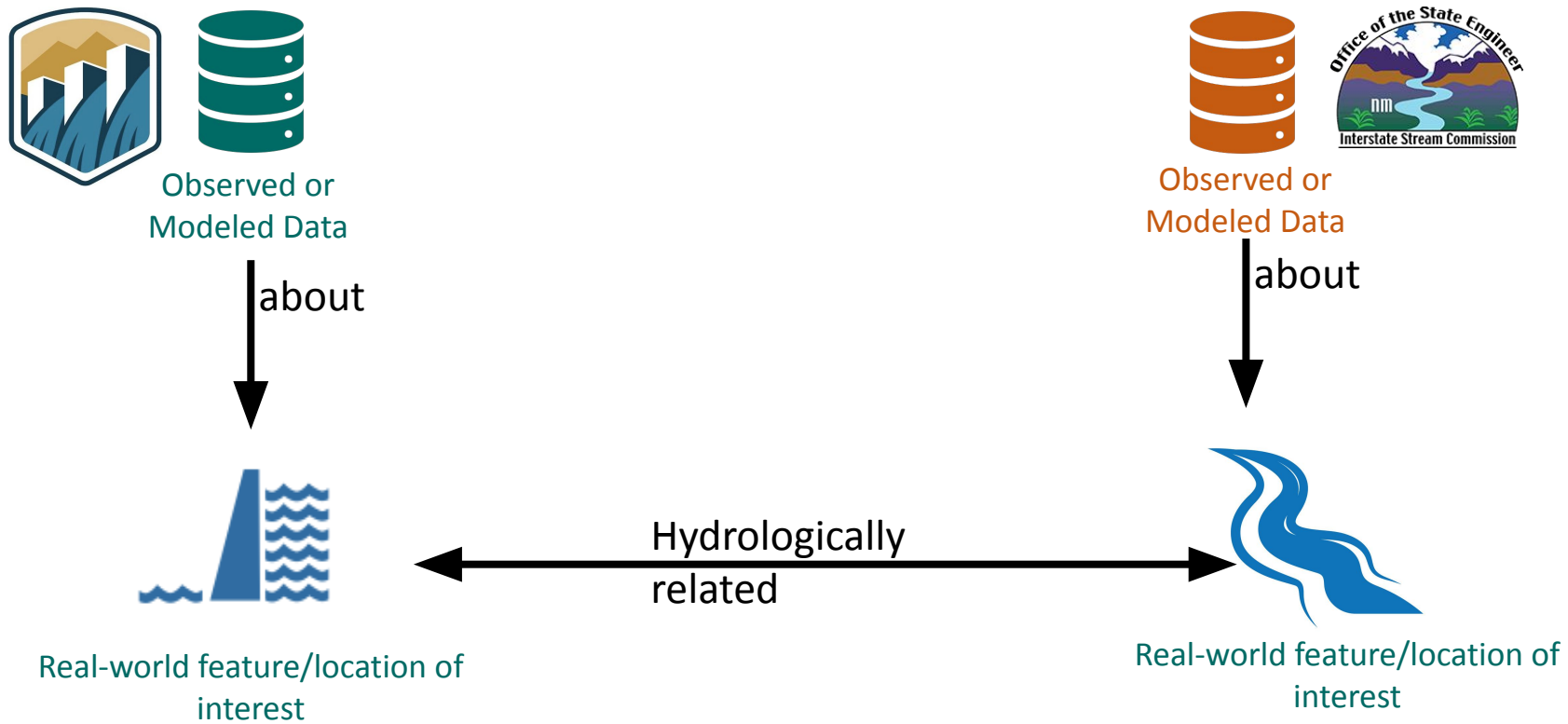
Water
diversions time
series data



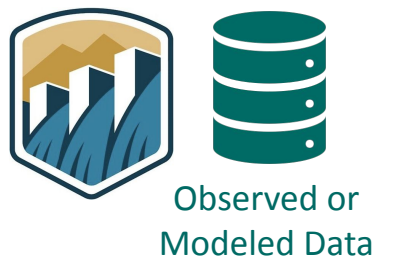
*WaDE Diversion Sites
*Monitoring Locations



Geoconnex – enabling conditions for a knowledge graph of water-related data **without** centralizing data governance and storage



Geoconnex – enabling conditions for a knowledge graph of water-related data **without** centralizing data governance and storage

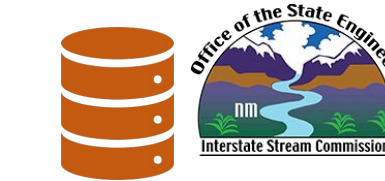


Observed or Modeled Data

about

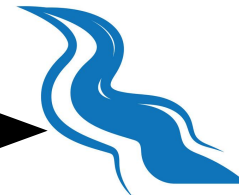


Real-world feature/location of interest



Observed or Modeled Data

about



Real-world feature/location of interest

Real-world feature/location of interest

“SW/GW interaction”



Real-world feature/location of interest

“upstream”

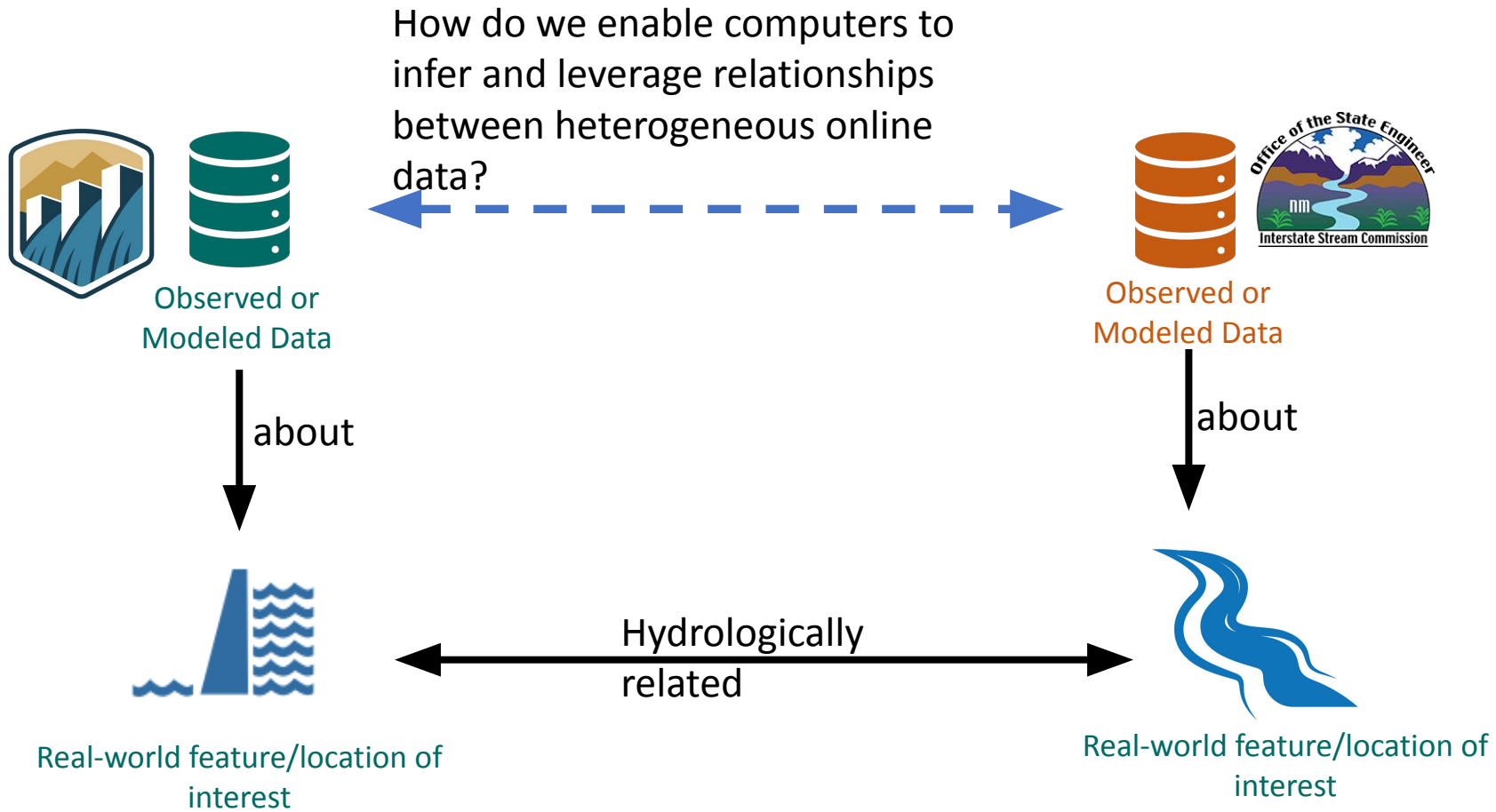


“upstream”

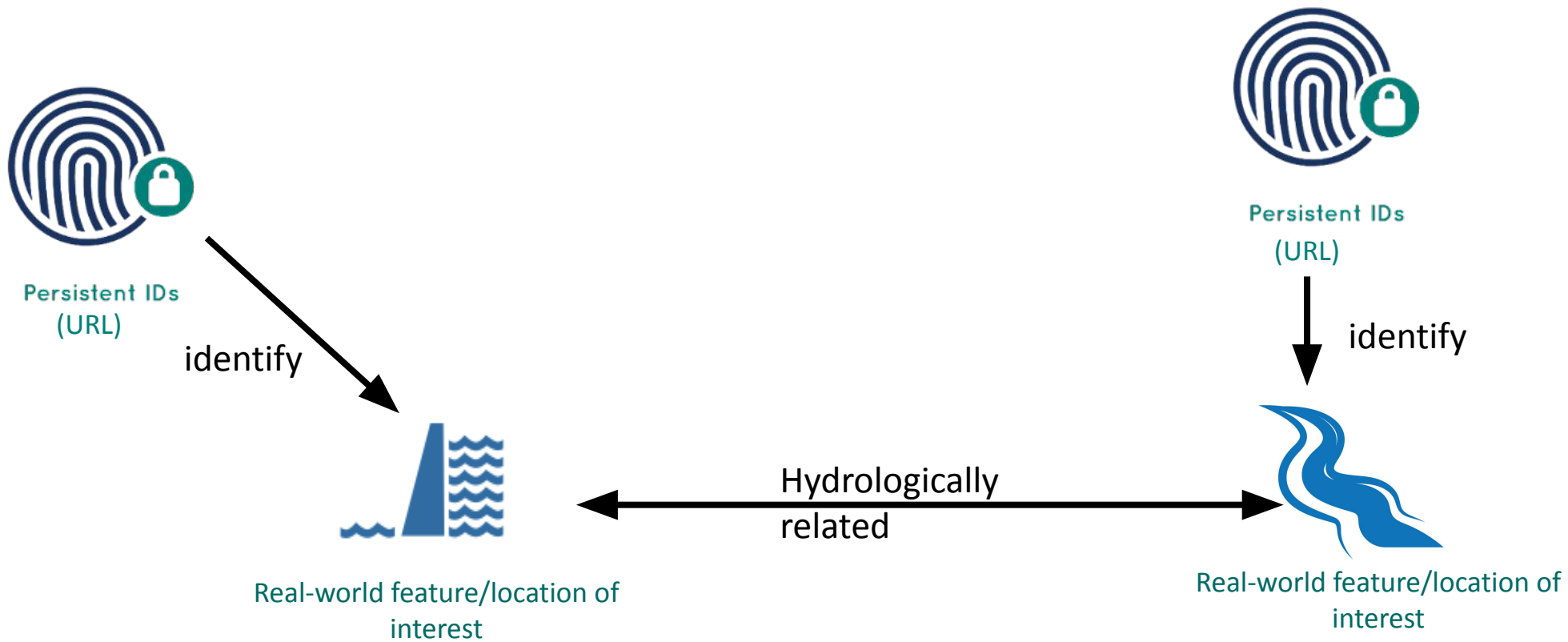
Real-world feature/location of interest

Hydrologically related (eg “upstream”)

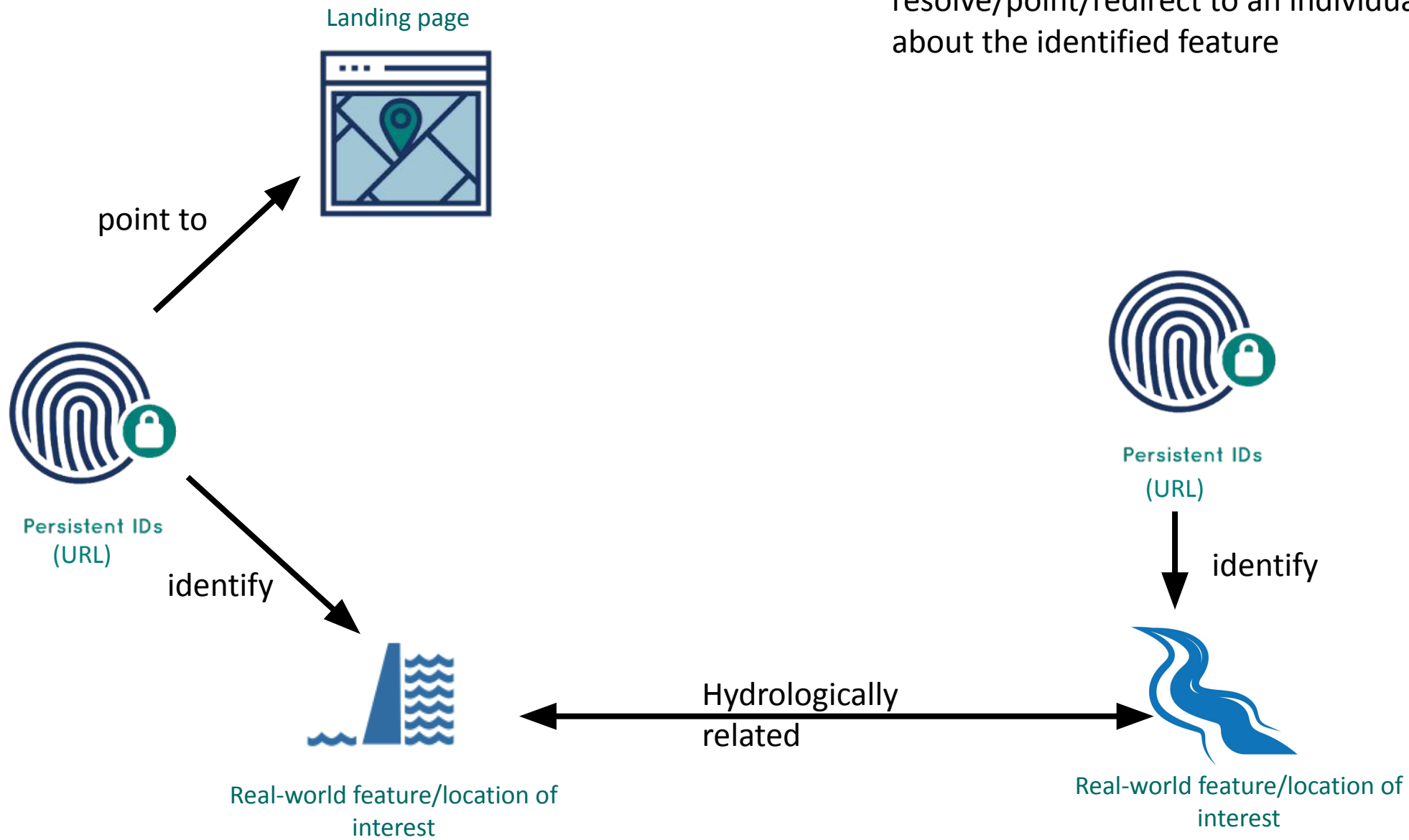
Geoconnex – enabling conditions for a knowledge graph of water-related data **without** centralizing data governance and storage



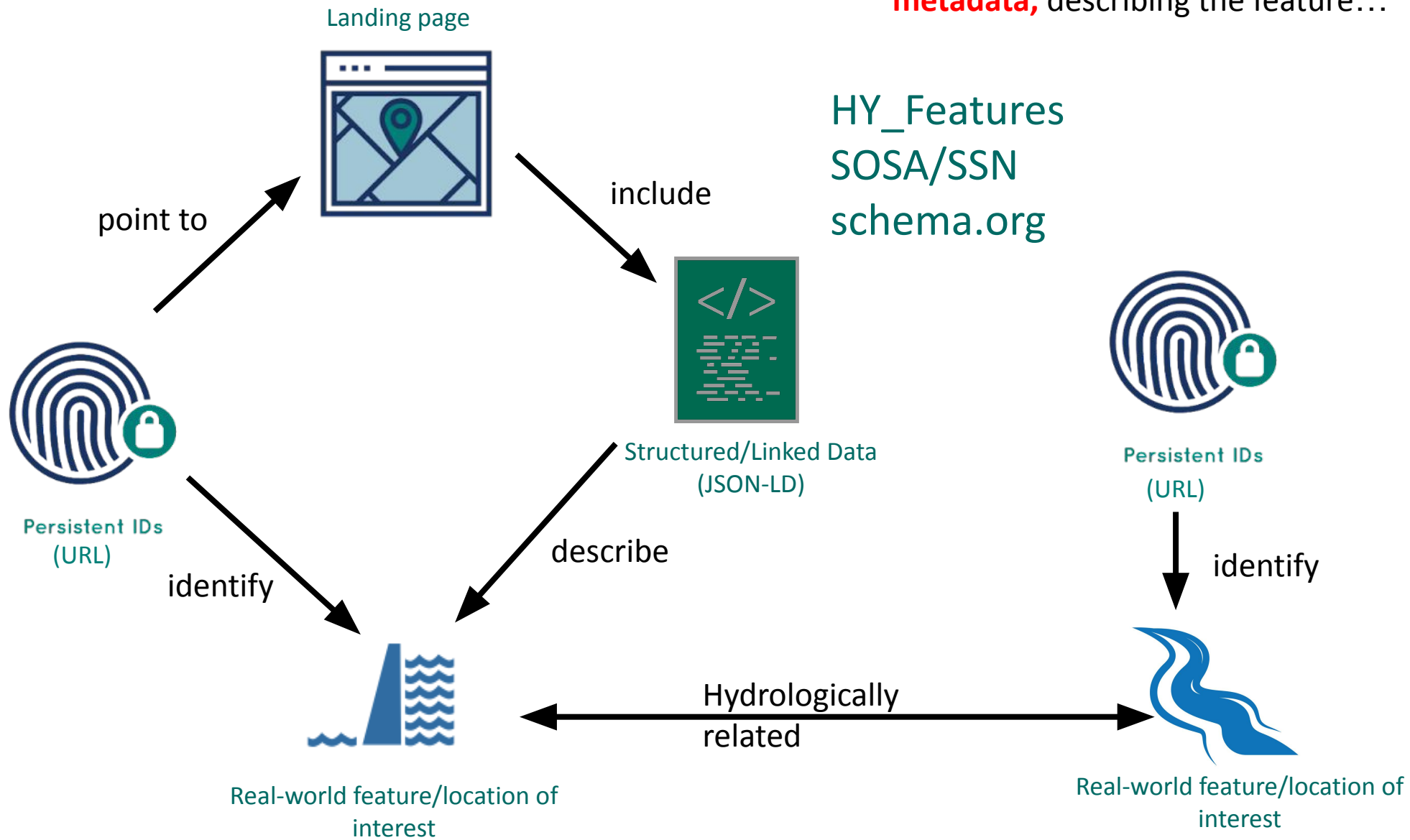
Requirement 1: All sites and environmental features should have universal, **persistent identifiers**



Requirement 2: Each individual persistent identifier should resolve/point/redirect to an individual **landing page** (webpage) about the identified feature

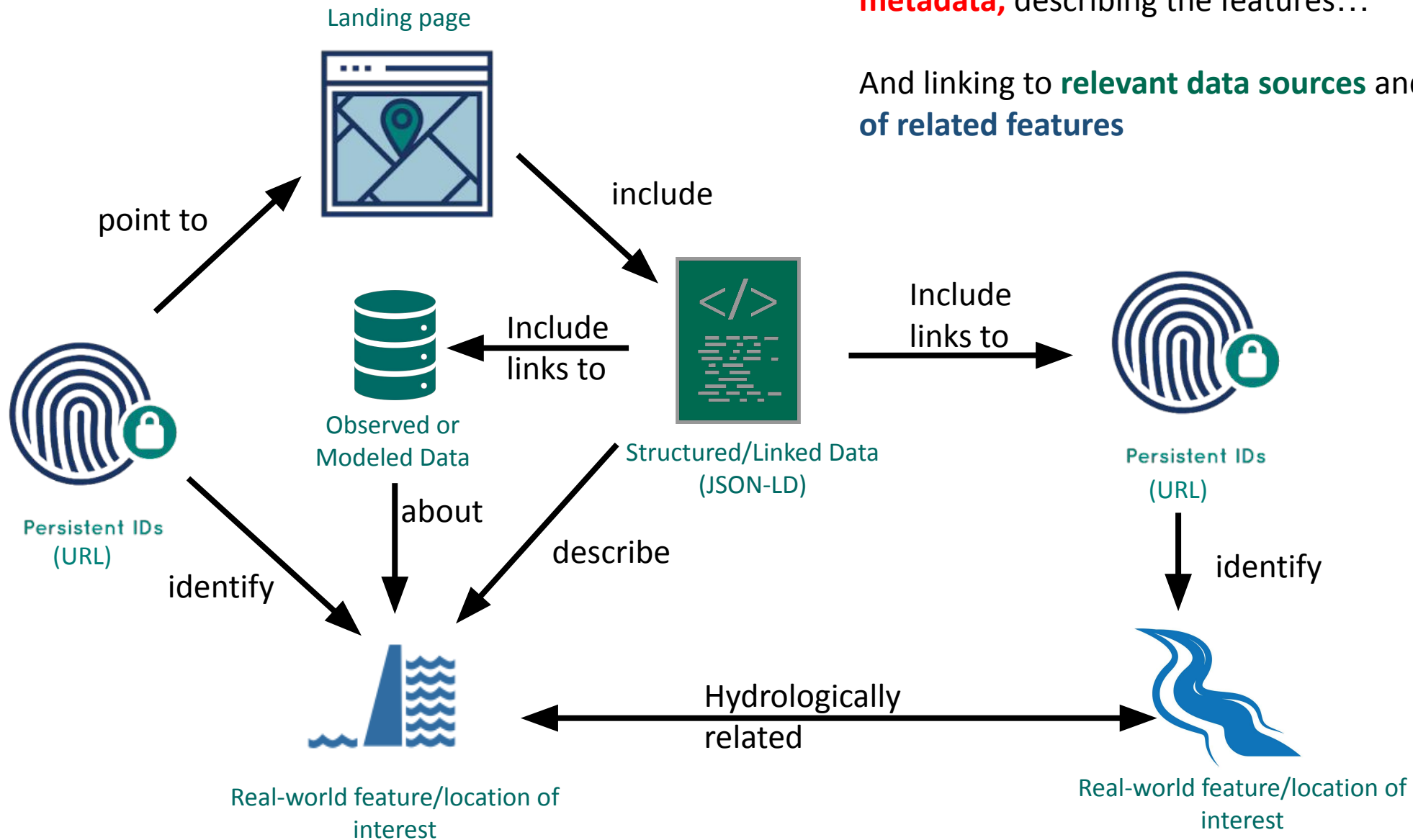


Requirement 3: Landing pages should embed **structured metadata**, describing the feature...



Requirement 3: Landing pages should embed **structured metadata**, describing the features...

And linking to **relevant data sources** and the **persistent identifiers of related features**



<https://geoconnex.us>
(persistent identifier registry and resolver)



<https://geoconnex.us/sitemap.xml>



Reference
Features

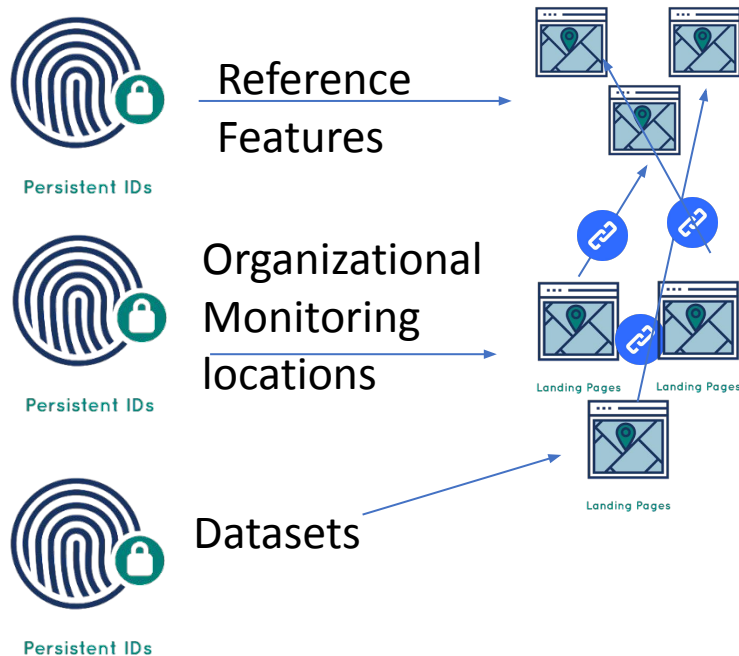


Special features common
across organizations (e.g.
NHD, mainstem rivers, PLSS,
HUCs, census geographies)

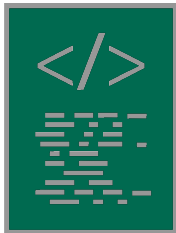
<https://geoconnex.us>
(persistent identifier registry and resolver)



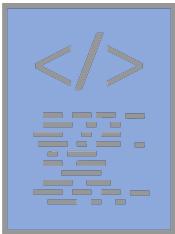
<https://geoconnex.us/sitemap.xml>



Embedded
JSON-LD



"I am a **gage**"
"I'm from **USGS**"
"I am on **this spot** on NHDPlusV2
"**USGS** has near-real-time data [here](#) formatted [like so](#)

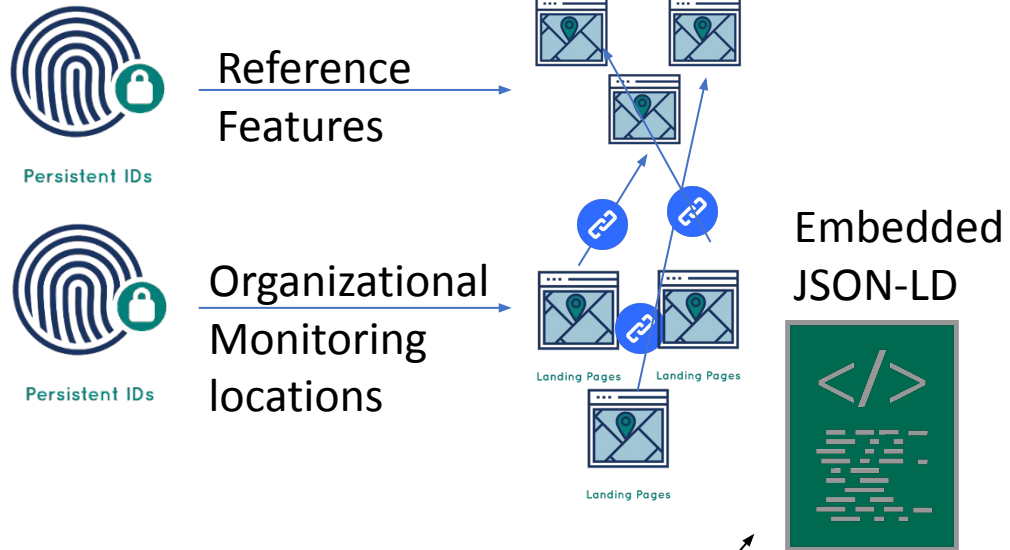


"I am a **model point of interest**"
"I'm from **USBR**"
"I am on **this spot** on NHDPlusHR,
"**USBR** has model data [here](#) formatted [like so](#)

<https://geoconnex.us>
(persistent identifier registry and resolver)



<https://geoconnex.us/sitemap.xml>



docs.geoconnex.us

JSON-LD guidance, templates, schemas, vocabularies.
Derived from SELFIE (HY_Features, schema.org, SOSA/SSN)

<https://geoconnex.us>
(persistent identifier registry and resolver)

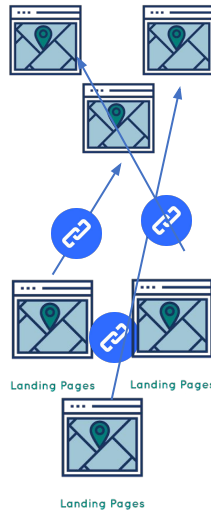
<https://geoconnex.us/sitemap.xml>



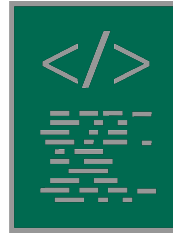
Reference
Features



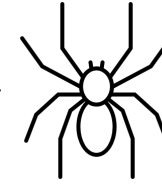
Organizational
Monitoring
locations



Embedded
JSON-LD



harvest.geoconnex.us



Knowledge graph
(graph database)

APIs



search.geoconnex.us
graph.geoconnex.us
reference.geoconnex.us

docs.geoconnex.us

JSON-LD guidance, templates, schemas, vocabularies.
Derived from SELFIE (HY_Features, schema.org, SOSA/SSN)

<https://geoconnex.us>
(persistent identifier registry and resolver)

<https://geoconnex.us/sitemap.xml>

harvest.geoconnex.us



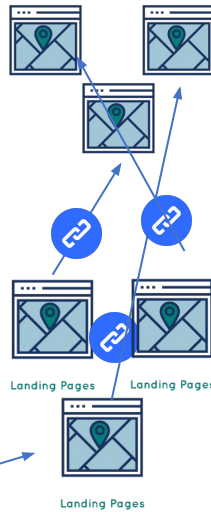
Reference
Features



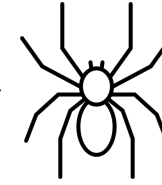
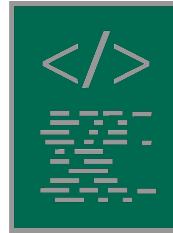
Organizational
Monitoring
locations



Datasets

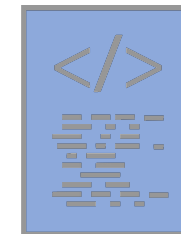


Embedded
JSON-LD



Knowledge graph

APIs



"I am a **reference location**"
"I am on **this spot** on NHDPlusV2,
and **this one** on NHDPlusHR"
"**USGS** has near-real-time data [here](#)"
"**USBR** has model data [here](#)"
"**NM OSE** has other data upstream [here](#)"

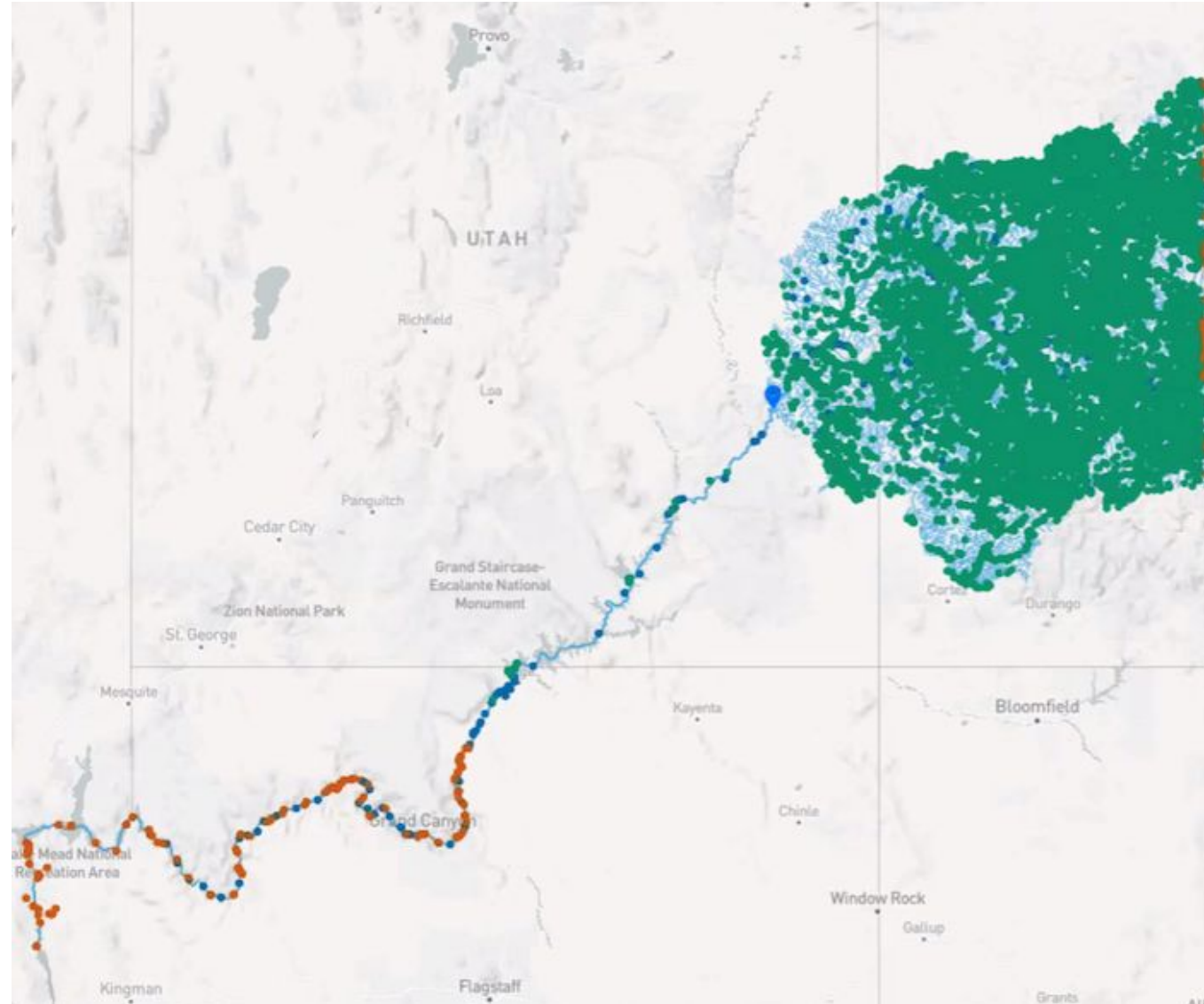
docs.geoconnex.us

JSON-LD guidance, templates, schemas, vocabularies.

Derived from SELFIE (HY_Features, schema.org, SOSA/SSN)

What is the NLDI?

- A RESTful application programming interface (API) in front of the NHD (NHDPlusV2 for now, HR support eventually)
- An open-source project with the codebase available at <https://github.com/internetofwater/nldi-services>
- Hosted by USGS
- <https://labs.waterdata.usgs.gov/about-nldi/index.html>
- Anyone can contribute!



NLDI – How to use

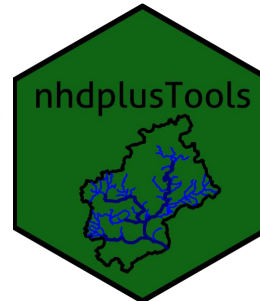
Swagger docs:

<https://labs.waterdata.usgs.gov/api/nldi/swagger-ui/index.html>

HTTP GET requests ->

Receive GeoJSON ->

Use in analysis, GIS software, custom web applications

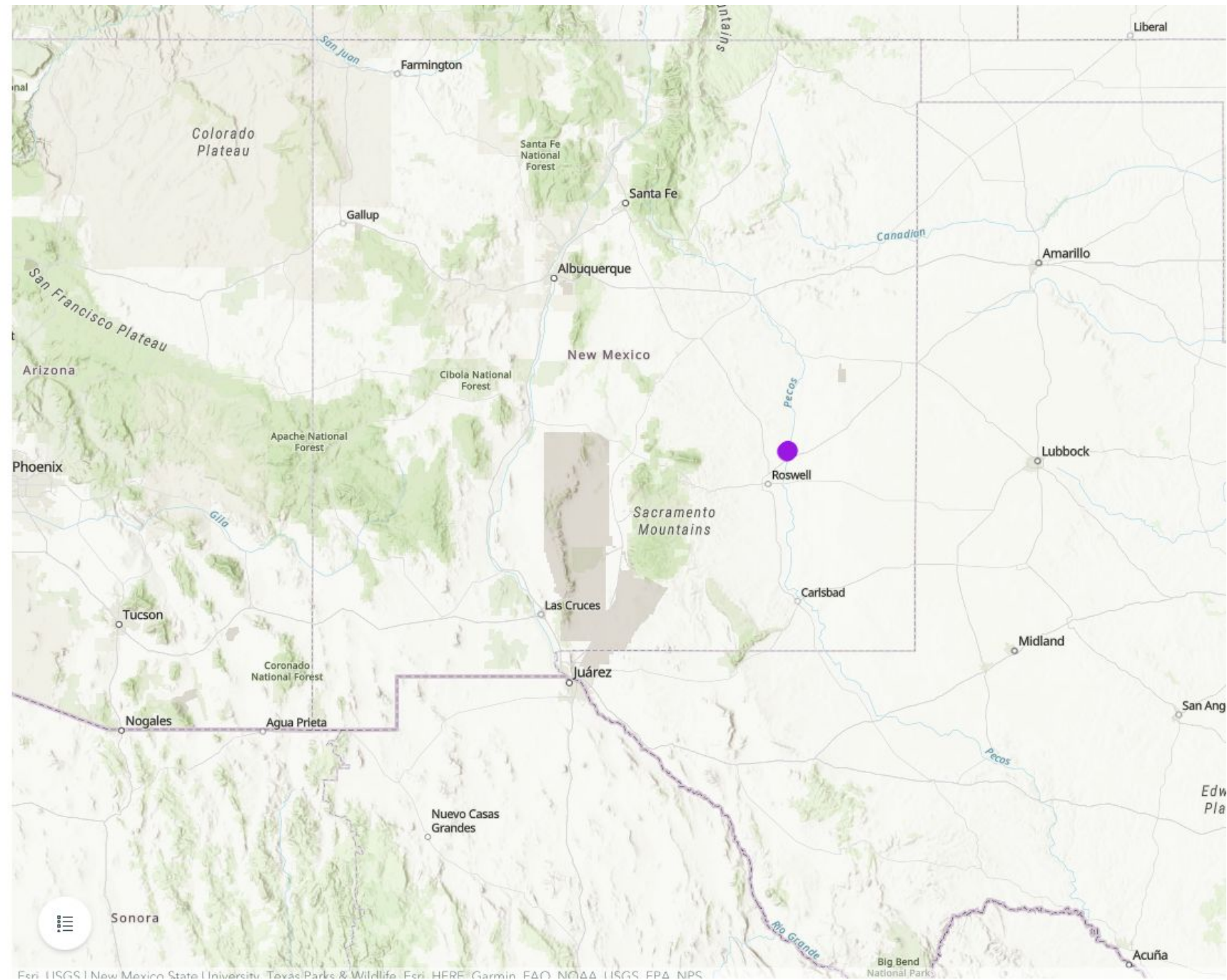


NLDI and Geoconnex – Emerging applications in New Mexico

Begin with a point of interest. For example:

lon: -104.337

lat: 33.675



[**https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/position?coords=POINT\(-104.34 33.68\)**](https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/position?coords=POINT(-104.34 33.68))

Use the NLDI COMID endpoint to find the catchment/flowline associated with the point of interest:

[https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/position?coords=POINT\(-104.34 33.68\)](https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/position?coords=POINT(-104.34 33.68))

Check "navigation" returned field:

<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation>

Gives links to "navigate" :

- upstream mainstem river (UM)
- upstream tributaries (UT)
- downstream mainstem (DM)
- downstream diversions (DD)

2 {"upstreamMain": "[A topographic map of a mountainous region, likely in the western United States, showing a river flowline. The flowline is represented by a series of purple dots connected by a light blue line, winding through the terrain. Several elevation markers are visible: 3562 ft, 3569 ft, 3567 ft, 3667 ft, and 3630 ft. The map is rendered in a light beige color with brown contour lines. At the bottom, a small text line lists data sources: Esri, NASA, NOAA, USGS, FEMA, Esri Community Maps Contributors, New Mexico State University, Texas Parks & Wildlife, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies.](https://labs.waterdata.usgs.gov/api/nldi/linked-
3 gov/api/nldi/linked-</p></div><div data-bbox=)

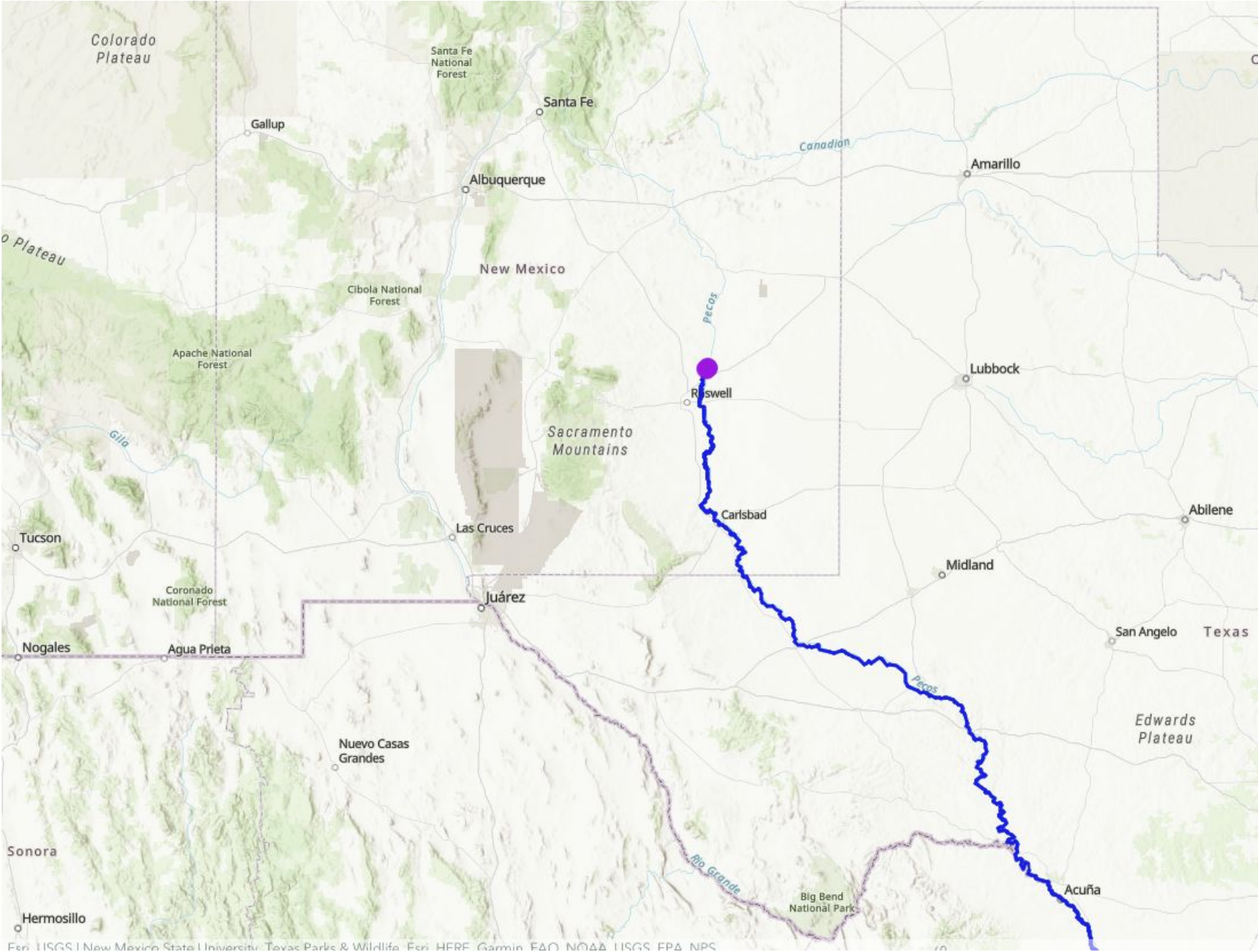
<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/DM/flowlines?distance=3000>

From there, can find the features of interest from a start feature (in this case, "comid/")

To find the downstream mainstem flowpath:

<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/DM/flowlines?distance=3000>

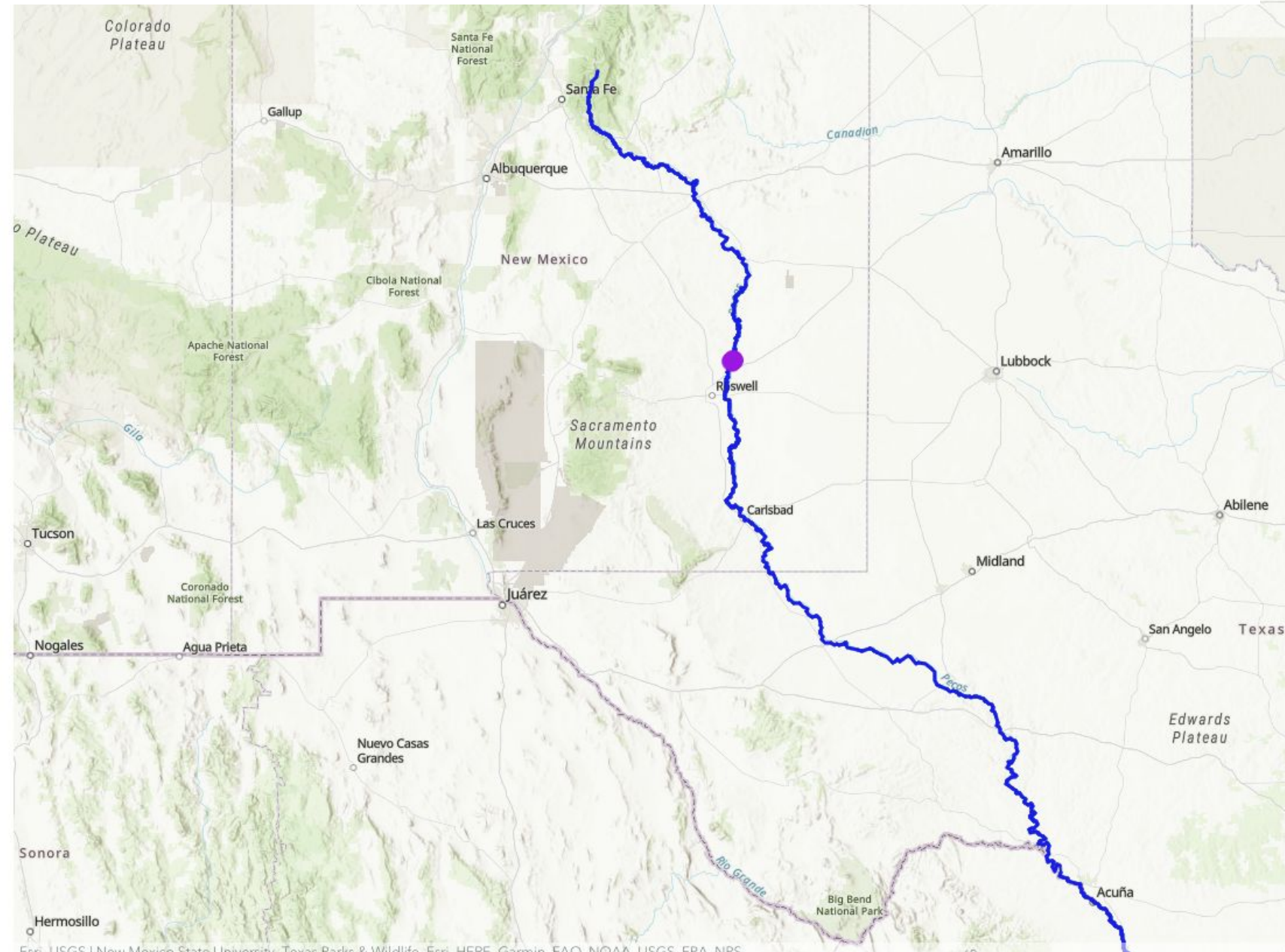
Note the "distance" query parameter, which is distance in kilometers to search.



<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/UM/flowlines?distance=500>

We similarly find the flowpath for 500km upstream :

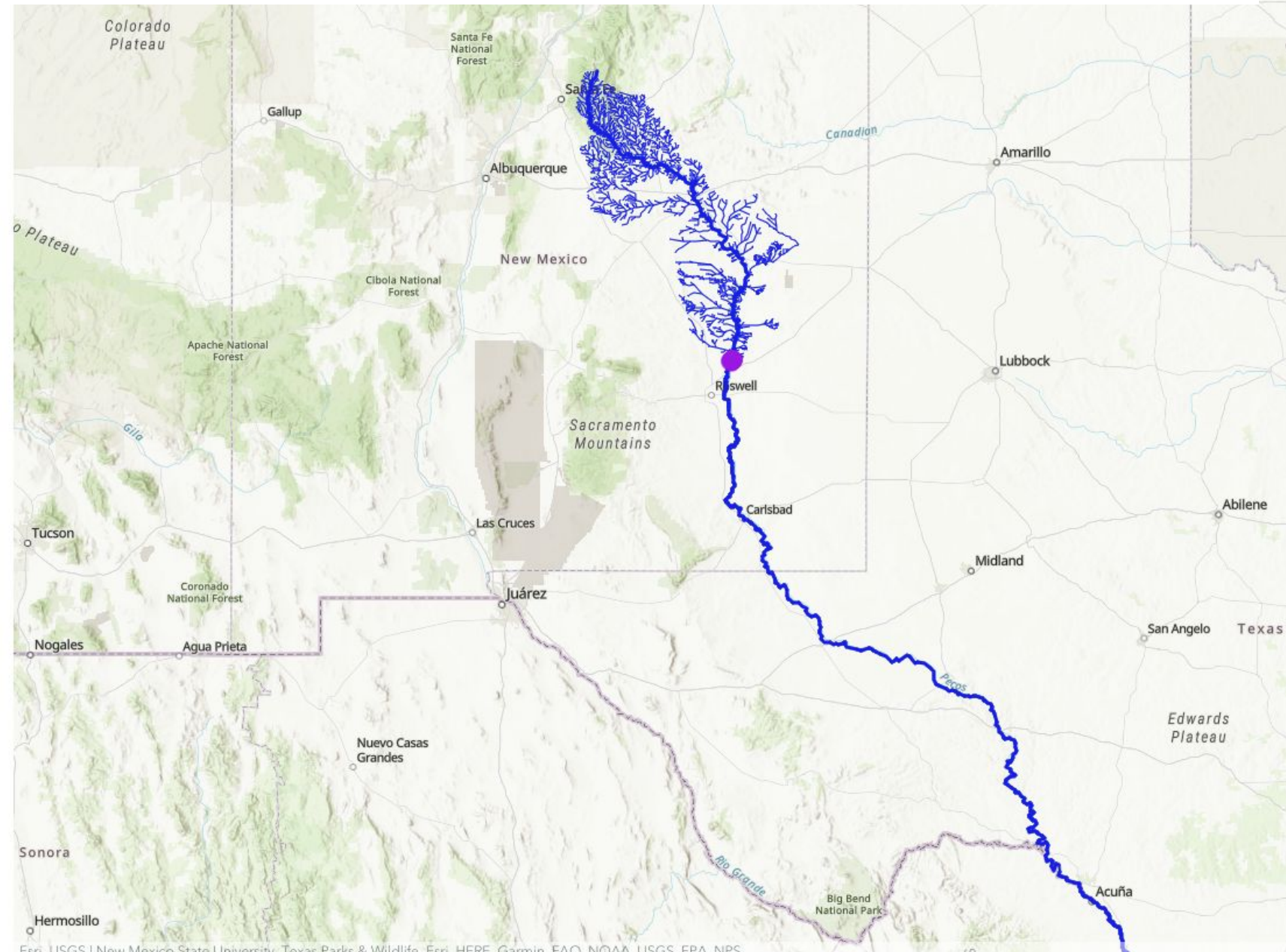
<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/UM/flowlines?distance=500>



<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/UT/flowlines?distance=500>

...and the upstream tributaries:

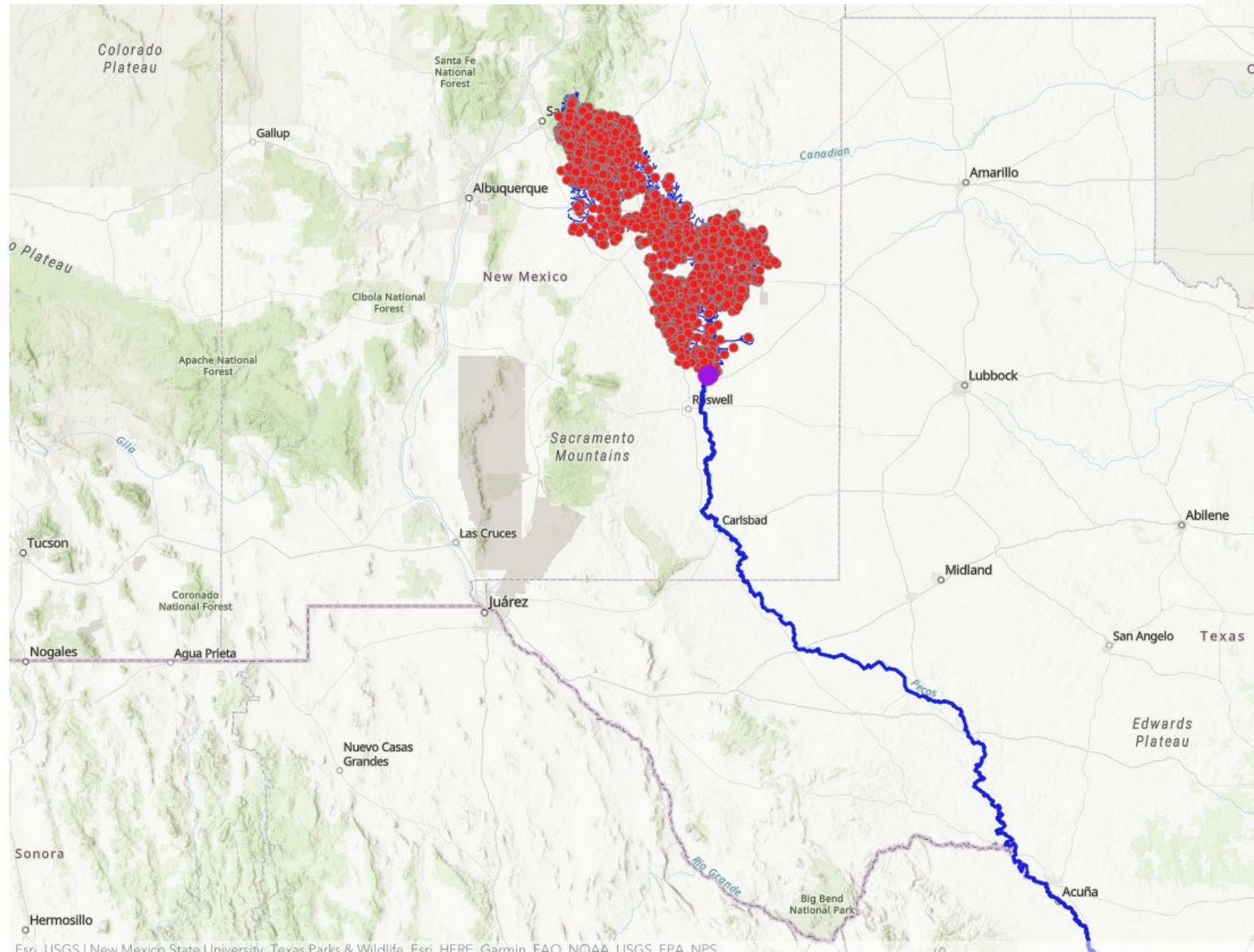
<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/UT/flowlines?distance=500>



<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/UT/wade?distance=500>

We can also query the NLDI for any location metadata that the community has registered. For example, any points of diversion in WaDE upstream

<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/UT/wade?distance=500>



<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/DM/nwissite?distance=3000>

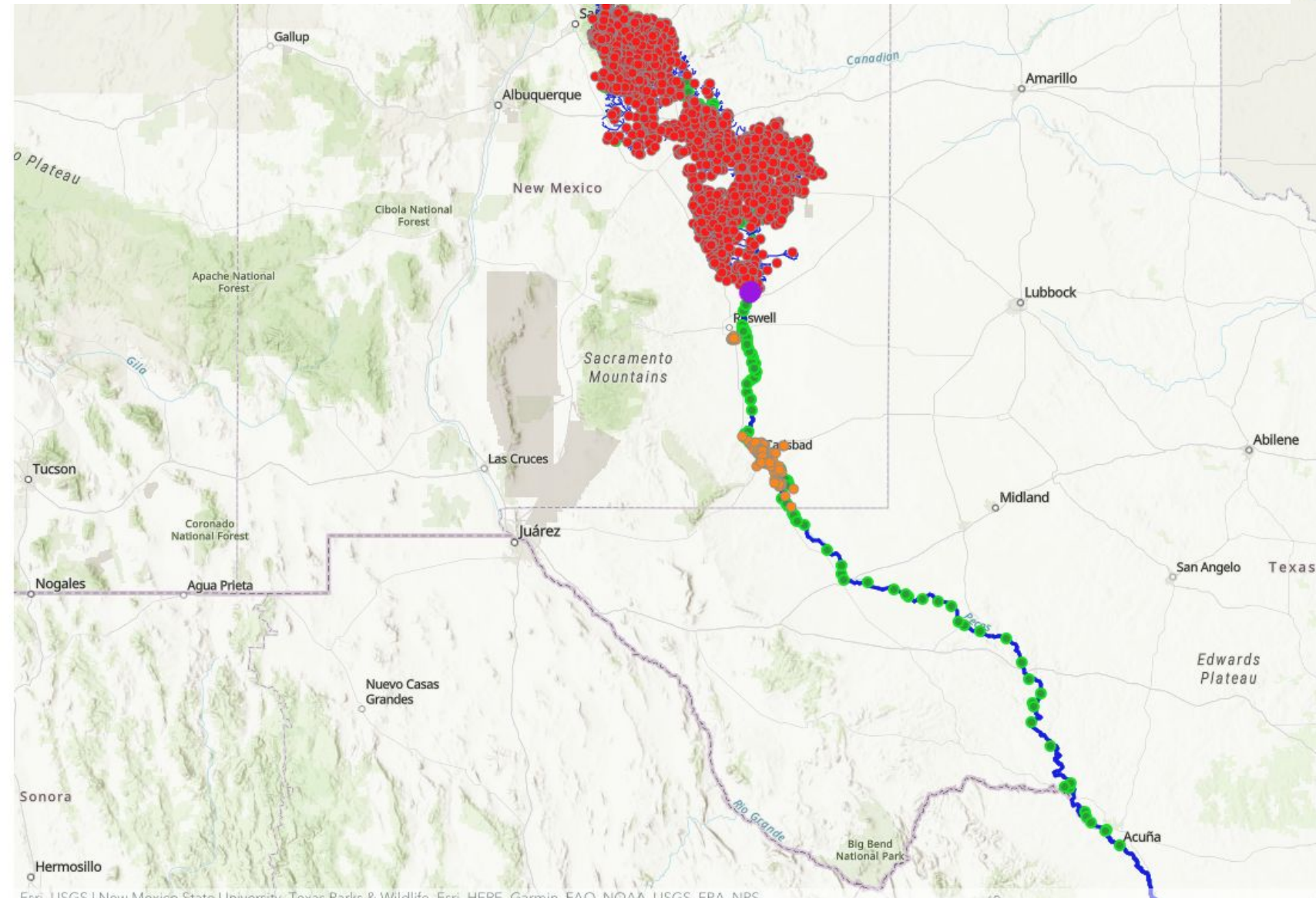
<https://labs.waterdata.usgs.gov/api/nldi/linked-data/comid/20805609/navigation/DM/nmwdi-st?distance=3000>

...as well as sites from any other contributing organization

(USGS)/navigation/DM/nwissite?distance=3000

(New Mexico Bureau of Geology)

/navigation/DM/nmwdi-st?distance=3000)

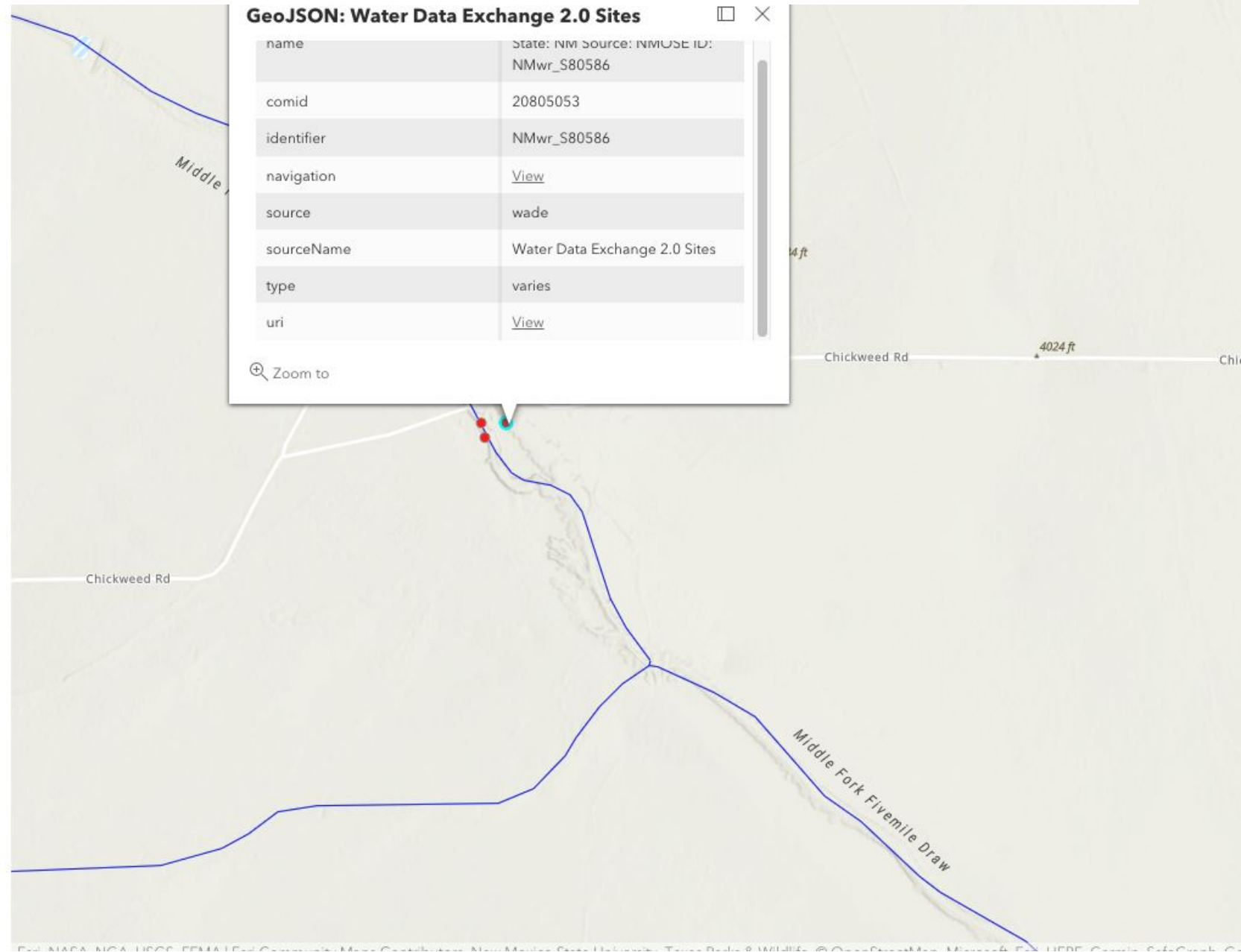


Each point in the NLDI has a URI which should point to a page where source information is available

Example: https://geoconnex.us/wade/sites/NMwr_S80586

If we inspect our sites, we see the "uri" field, which is a persistent identifier registered at geoconnex.us by the contributing organization.

https://geoconnex.us/wade/sites/NMwr_S80586



Which redirects to

https://westdaatqa.westernstateswater.org/details/site/NMwr_S80586

[Back to Map](#)

WaDE Site ID: NMwr_S80586

[Download Data](#)

Site Information

WaDE Site ID
NMwr_S80586

Site Native ID
WaDENM_S172741

Site Name
Unspecified

Longitude
-106.32888846537573

Latitude
32.036444822759535

County
OT

Site Type
Unspecified

POD or POU
POD

Water Source Information

[Water Right Information](#)

WaDE Water Source ID	Water Source Native ID	Water Source Name	Water Source Type
NMwr_WS1	WaDENM_WS1	Unspecified	Groundwater



Current work w/ NMWWDI

USGS uri (JSON-LD)

```
<script type="application/ld+json">
{
  "@context": [
    "https://opengeospatial.github.io/ELFIE/json-ld/elf-index.jsonld",
    "https://opengeospatial.github.io/ELFIE/json-ld/hyf.jsonld"
  ],
  "@id": "https://waterdata.usgs.gov/monitoring-location/08385503",
  "@type": "http://www.opengeospatial.org/standards/waterml2/hy_features/HY_HydroLocation",
  "name": "SAND GATE DIV FROM FT SUMNER CANAL AT FT SUMNER,NM",
  "sameAs": "https://waterdata.usgs.gov/nwis/inventory/?site_no=08385503",
  "HY_HydroLocationType": "hydrometricStation",
  "geo": {
    "@type": "schema:GeoCoordinates",
    "latitude": "34.4758333",
    "longitude": "-104.2583333"
  },
  "image": "https://waterdata.usgs.gov/nwisweb/graph?agency_cd=USGS&site_no=08385503&parm_cd=00060&period=100"
}
</script>
```

NMWWDI uri (JSON-LD)

```
{
  "@context": [
    {
      schema: "https://schema.org/",
      geoconnex: "@id",
      type: "@type",
      geosparql: "http://www.opengis.net/ont/geosparql#"
    },
    {
      sosa: "http://www.w3.org/ns/sosa/",
      ssn: "http://www.w3.org/ns/ssn/",
      Datastreams: "sosa:ObservationCollection",
      name: "schema:name",
      Locations: "schema:location",
      description: "schema:description"
    }
  ],
  type: "schema:Place",
  id: "6572",
  description: "Well drilled or set into subsurface for the purposes of pumping water or monitoring groundwater",
  name: "Water Well",
  @iot.selfLink: "https://st2.newmexicowaterdata.org/FROST-Server/v1.1/Things(6572)",
  Locations: [
    {
```

Current work w/ NMWDI

USGS uri (JSON-LD)

```
<script type="application/ld+json">
{
  "@context": [
    "https://opengeospatial.github.io/ELFIE/json-ld/elf-index.jsonld",
    "https://opengeospatial.github.io/ELFIE/json-ld/hyf.jsonld"
  ],
  "@id": "https://waterdata.usgs.gov/monitoring-location/08385503",
  "@type": "http://www.opengeospatial.org/standards/waterml2/hy_features/HY_HydroLocation",
  "name": "SAND GATE DIV FROM FT SUMNER CANAL AT FT SUMNER,NM",
  "sameAs": "https://waterdata.usgs.gov/nwis/inventory/?site_no=08385503",
  "HY_HydroLocationType": "hydrometricStation",
  "geo": {
    "@type": "schema:GeoCoordinates",
    "latitude": "34.4758333",
    "longitude": "-104.2583333"
  },
  "image": "https://waterdata.usgs.gov/nwisweb/graph?agency_cd=USGS&site_no=08385503&parm_cd=00060&period=100"
}
</script>
```

Link to SensorThings API endpoint
for measured streamflow

```
value: [
  {
    description: "Gage height / USGS-08385503-edd58ee130946949ed7d12e7bf01a96",
    @iot.id: "edd58ee130946949ed7d12e7bf01a96",
    name: "edd58ee130946949ed7d12e7bf01a96",
    observationType: "Instantaneous",
    observedArea: {
      type: "Point",
      coordinates: [
        -104.2583333,
        34.4758333
      ]
    },
    phenomenonTime: "2021-08-31T06:00:00.000Z/2022-08-09T03:30:00.000Z",
    properties: {
      Thresholds: [
        {
          Name: "Operational limit (minimum) 06/16 levels",
          Type: "ThresholdBelow",
          Periods: [
            {
              EndTime: "9999-12-31T23:59:59.9999999+00:00",
              StartTime: "2017-03-10T00:00:00.0000000-07:00",
              SuppressData: true,
              ReferenceValue: 0.73,
              ReferenceValueToTriggerDisplay: 0
            }
          ]
        }
      ],
      ReferenceCode: "Operational limit - low-Public"
    }
  }
],
```

NMWWDI uri (JSON-LD)

```
{
  "@context": [
    {
      schema: "https://schema.org/",
      geoconnext: "@id",
      type: "@type",
      geosparql: "http://www.opengis.net/ont/geosparql#"
    },
    {
      sosa: "http://www.w3.org/ns/sosa/",
      ssn: "http://www.w3.org/ns/ssn/",
      DataStreams: "sosa:ObservationCollection",
      name: "schema:name",
      Locations: "schema:location",
      description: "schema:description"
    }
  ],
  type: "schema:Place",
  id: "6572",
  description: "Well drilled or set into subsurface for the purposes of pumping water or monitoring groundwater",
  name: "Water Well",
  @iot.selfLink: "https://st2.newmexicowaterdata.org/FROST-Server/v1.1/Things(6572)",
  Locations: [
    {

```

Link to SensorThings API endpoint for measured
withdrawals/pumping/groundwater levels

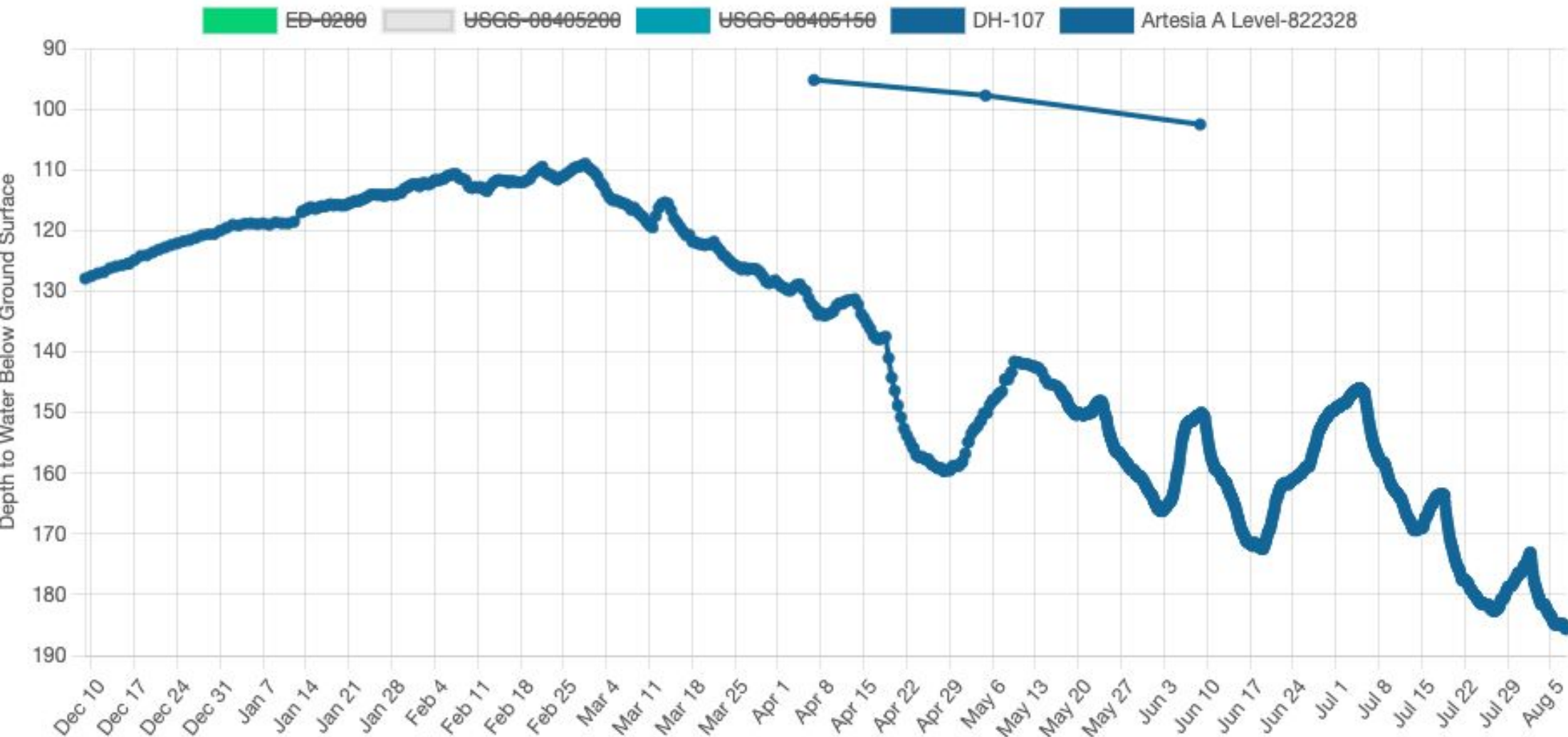
```
value: [
  {
    description: "Measurement of groundwater depth in a water well, as measured below ground surface",
    @iot.id: 23165,
    name: "Groundwater Levels",
    observationType: "http://www.opengis.net/def/observationType/OGC-OM/2.0/OM_Measurement",
    observedArea: {
      type: "Point",
      coordinates: [
        -104.302383508784,
        32.4837310997202
      ]
    },
    phenomenonTime: "1948-09-07T00:00:00.000Z/1948-09-07T00:00:00.000Z",
    properties: {
      topic: "Water Quantity"
    },
    resultTime: "1948-09-07T00:00:00.000Z/1948-09-07T00:00:00.000Z",

```

Current work w/ NMWDI

GOAL: Single piece of software can read/chart/download
observation data from any compliant provider without knowing
anything about them ahead of time

Chart



ired

face",
it",

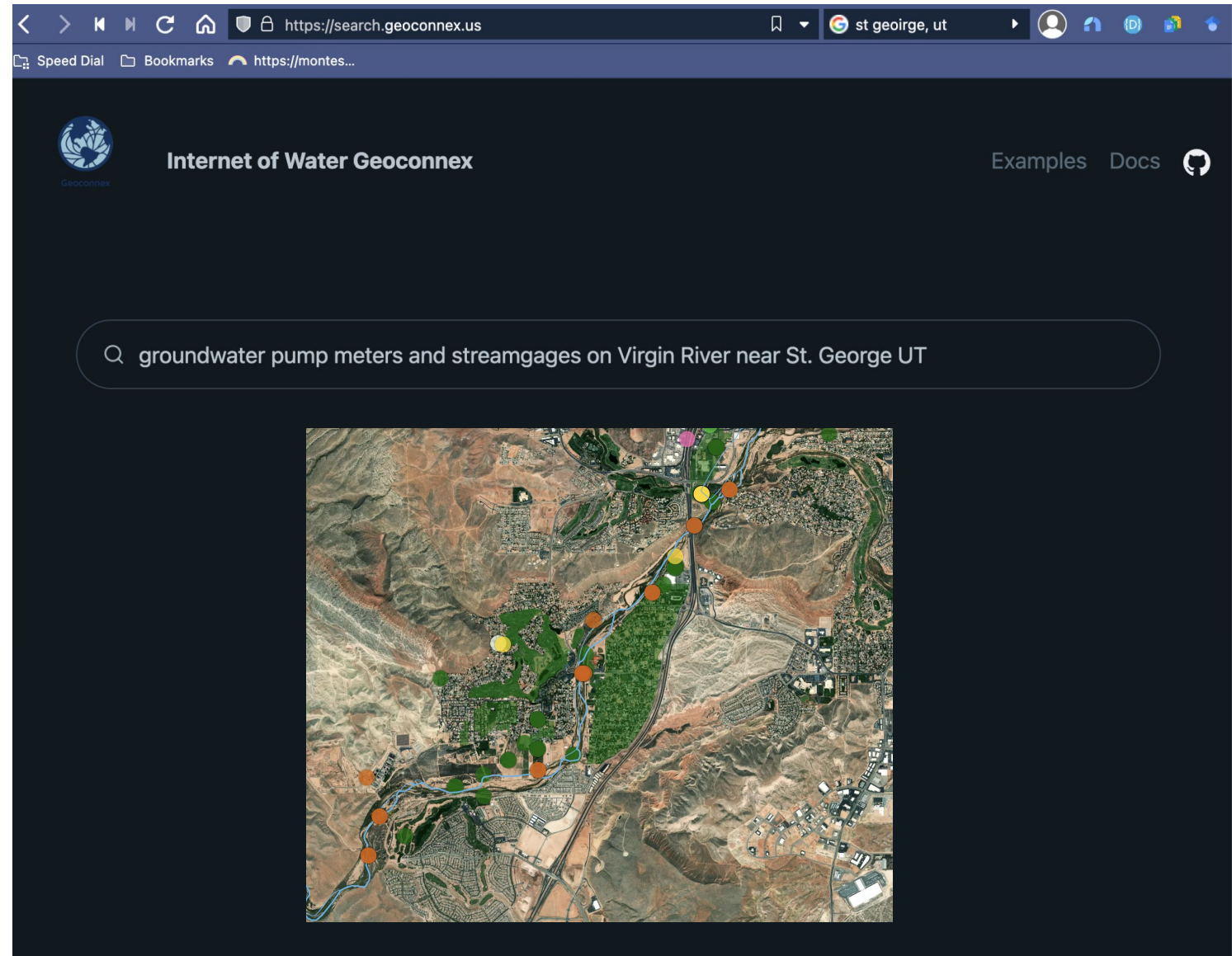
Future work

OGC/WMO Water Quality Interoperability Experiment

- Standardize water quality data exchange formats
 - Pilot use of SensorThings API for Water Quality sensors (time series)
- + samples

Future work

Semantic search on top of NLDI-based search



Future work

More participation in the system

- USBR RISE
- Oak Ridge National Lab + National Hydropower Association
(hydropower data)
- Texas Water Development Board
- Others??

Thank you

- Geoconnex Documentation at <https://docs.geoconnex.us>
- Reach out about Geoconnex at <https://github.com/internetofwater/geoconnex.us>
- NLDI Documentation at <https://labs.waterdata.usgs.gov/about-nldi/index.html>
- Reach out about NLDI at <https://github.com/internetofwater/nldi-services>

Kyle Onda (Lincoln Institute): konda@lincolninst.edu

David Blodgett (USGS): dblodgett@usgs.gov

RESERVE TUTORIAL SLIDES

How to contribute to geoconnex.us and the NLDI

1. Hydro-address your location data (see Mike Tinker's presentation)
geoconnex steps
2. Publish feature-level landing content with embedded JSON-LD and persistent identifiers
3. Mint persistent identifiers with <https://geoconnex.us>
NLDI Steps
4. Publish a geojson file with your hydro-addressed location data (can be same as step 2)
5. Register your geojson file with the NLDI repository

1. Hydro Address your data

1. Use HydroAdd to add NHD Reachcodes and Measures to your locations

Example: https://github.com/internetofwater/gwtc2022-workshop/blob/main/landing_pages/data/data.csv

	A	F	G	H	I	J	
1	SourceID	ReachCode	Measure	ReachSMDat	AddressDate	Catchment	H
2	TX05845	11120104003353	11.83387	40906	44621.0632	0	
3	TX04180	11120104001618	51.40588	40906	44621.0632	0	
4	TX03713	11120104001376	23.39122	40906	44621.0632	0	
5	TX03714	11120104001376	68.86861	40906	44621.0632	0	
6	TX06624	11120105000037	30.98668	42797.7118	44621.0632	0	

2. Publish feature-level landing content with embedded JSON-LD and persistent identifiers

1. Create a persistent identification scheme:

<https://geoconnex.us/my-org/topic/.../hierarchy/12345>



The diagram shows the URL <https://geoconnex.us/my-org/topic/.../hierarchy/12345> with three brackets underneath it. The first bracket, colored blue, spans the domain and path up to the first slash and is labeled 'stem'. The second bracket, colored black, spans the namespace 'my-org/' and is labeled 'namespace'. The third bracket, colored purple, spans the topic path 'topic/.../hierarchy/' and the ID '12345', and is labeled 'id'.

Examples:

<https://geoconnex.us/usgs/monitoring-location/08332622>

<https://geoconnex.us/epa/hmw/030300020607>

2. Publish feature-level landing content with embedded JSON-LD and persistent identifiers

2. Add the persistent identifiers to your data

Example: https://github.com/internetofwater/gwtc2022-workshop/blob/main/landing_pages/data/data.csv

A	B	G	H	I	J
SourceID	uri	Latitude	Longitude	ReachCode	Measure
TX05845	https://geoconnex.us/iow/demo/TX05845	34.64833	-101.8567	11120104003353	11.83387
TX04180	https://geoconnex.us/iow/demo/TX04180	34.565	-101.7283	11120104001618	51.40588
TX03713	https://geoconnex.us/iow/demo/TX03713	34.68	-101.9983	11120104001376	23.39122
TX03714	https://geoconnex.us/iow/demo/TX03714	34.68128	-102.0195	11120104001376	68.86861
TX06624	https://geoconnex.us/iow/demo/TX06624	34.61833	-100.2833	11120105000037	30.98668
TX03698	https://geoconnex.us/iow/demo/TX03698	35.00083	-100.8948	11120201000062	95.16322
TX02130	https://geoconnex.us/iow/demo/TX02130	35.21632	-100.8627	11120301001319	40.27132
TX03650	https://geoconnex.us/iow/demo/TX03650	35.30176	-101.2816	11120301000091	51.22846

2. Publish feature-level landing content with embedded JSON-LD and persistent identifiers

3. Publish your data so that each spatial feature has a website with:

- a. It's own URL
- b. A human-readable HTML version
- c. Machine-readable metadata formatted as JSON-LD

Why?

Search engines can index and organize individual features!

“I want all water quality sample points from all organizations within this random polygon across two counties, but not any others”

2. Publish feature-level landing content with embedded JSON-LD and persistent identifiers

3. Publish your data so that each spatial feature has a website with:

- a. It's own URL
- b. A human-readable HTML version
- c. metadata formatted as JSON-LD

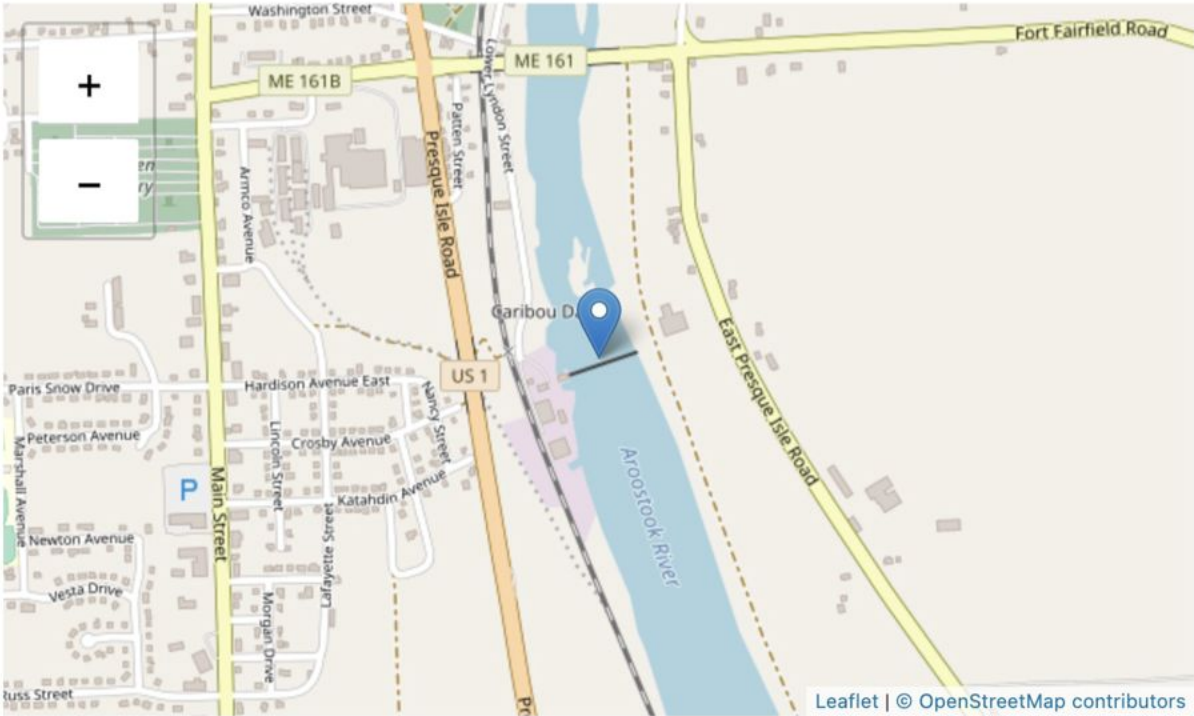
standardized vocabularies for interoperability with other data

links to common features (like NHD, states/counties/census tracts, etc.)

Example:

<https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/ME00227>

Item ME00227



Property	Value
uri	https://geoconnex.us/iow/demo/ME002...
id	ME00227
fid	2
SourceAgency	None
SourceDataset	None
SourceFeatureURL	None
FeatureType	None
ReachCode	01010004000009
Measure	28.082673915760665

```
1 <!doctype html>
2 <html lang="en">
3 <head>
4 <meta charset="utf-8">
5 <title>Item ME00227 - Demo landing pages for geoconnex.us -</title>
6 <meta name="viewport" content="width=device-width, initial-scale=1">
7 <meta name="language" content="en-US">
8 <meta name="description" content="Demo landing pages for geoconnex.us">
9 <meta name="keywords" content="geospatial,data,api">
10 <link rel="shortcut icon" href="https://geoconnex-demo-pages.internetofwater.dev/static/img/favicon.ico" type="image/x-icon">
11 <link rel="stylesheet" href="https://unpkg.com/mini.css@3.0.1/dist/mini-default.min.css">
12 <link rel="stylesheet" href="https://geoconnex-demo-pages.internetofwater.dev/static/css/default.css">
13 <!--[if lt IE 9]>
14 <script src="https://cdnjs.cloudflare.com/ajax/libs/html5shiv/3.7.3/html5shiv.js"></script>
15 <![endif]>
16
17 <link rel="alternate" type="application/json" title="This document as GeoJSON" href="https://geoconnex.us/iow/demo/ME00227?f=json"/>
18
19 <link rel="alternate" type="application/ld+json" title="This document as RDF (JSON-LD)" href="https://geoconnex.us/iow/demo/ME00227?f=jsonld"/>
20
21
22 <link rel="self" type="text/html" title="This document as HTML" href="https://geoconnex.us/iow/demo/ME00227?f=html"/>
23
24 <link rel="canonical" href="https://geoconnex.us/iow/demo/ME00227" />
25
26
27 <link rel="collection" type="application/json" title="geoconnex landing page demo (local file)" href="https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg">geoconnex landing...</a>
28
29
30
31
32 <link rel="stylesheet" href="https://unpkg.com/leaflet@1.3.1/dist/leaflet.css"/>
33 <script src="https://unpkg.com/leaflet@1.3.1/dist/leaflet.js"></script>
34 </head>
35 <body>
36 <header class="sticky row">
37 <div class="col-sm-12 col-md-10 col-md-offset-1">
38 <a href="https://geoconnex-demo-pages.internetofwater.dev" class="logo" role="button">
39 
40 <!--
41 Add additional menu items here
42 <a href="https://pygeoapi.io" role="button" class="button">About</a>
43 -->
44 <a href="mailto:konda@lincolnnat.edu" role="button" class="button" style="float:right">Contact</a>
45 </div>
46 </header>
47 <div class="sticky row crumbs">
48 <div class="col-sm-12 col-md-10 col-md-offset-1">
49
50 <a href="https://geoconnex-demo-pages.internetofwater.dev">Home</a>
51
52 / <a href="https://geoconnex-demo-pages.internetofwater.dev/collections">Collections</a>
53
54
55
56
57 / <a href="https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg">geoconnex landing...</a>
58
59 / <a href="https://geoconnex-demo-pages.internetofwater.dev/items">Items</a>
60 / <a href="https://geoconnex-demo-pages.internetofwater.dev/items/ME00227">Item ME00227</a>
61 <span style="float:right">
```

https://www.opengis.net/def/schema/hy_features/hyf/HY_HydrometricFeature /
https://www.opengis.net/def/schema/hy_features/hyf/HY_HydroLocation

https://www.opengis.net/def/schema/hy_features/hyf/HY_HydrometricFeature / https://www.opengis.net/def/schema/hy_features/hyf/HY_HydroLocation	0 ERRORS 0 WARNINGS
@type	https://www.opengis.net/def/schema/hy_features/hyf/HY_HydrometricFeature
@type	https://www.opengis.net/def/schema/hy_features/hyf/HY_HydroLocation
@id	https://geoconnex.us/iow/demo/ME00227
name	Aroostook River
description	Monitoring Location at Aroostook River
Type	hydrometricStation
https://www.opengis.net/def/schema/hy_features/hyf/referencedPosition	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/HY_IndirectPosition	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/linearElement	https://geoconnex.us/nhdplusv2/reachcode/1010004000009
https://www.opengis.net/def/schema/hy_features/hyf/distanceExpression	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/HY_DistanceFromReferent	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/interpolative	0.0
https://www.opengis.net/def/schema/hy_features/hyf/distanceDescription	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/HY_DistanceDescription	upstream
geo	
@type	GeoCoordinates
longitude	-68.00154815977119
latitude	46.848887462871332
gsp:hasGeometry	
@type	http://www.opengis.net/ont/sf#Point
gsp:asWKT	
@type	http://www.opengis.net/ont/geosparql#wktLiteral
@value	POINT Z (-68.00154815977119 46.84888746287133 0)


```
</script>

<script type="application/ld+json">
{
  "@context": [
    "https://opengeospatial.github.io/ELFIE/json-ld/elf-index.jsonld",
    "https://opengeospatial.github.io/ELFIE/json-ld/hyf.jsonld"
  ],
  "@id": "https://waterdata.usgs.gov/monitoring-location/04157005",
  "@type": "http://www.opengeospatial.org/standards/waterml2/hy_features/HY_HydroLocation",
  "name": "SAGINAW RIVER AT HOLLAND AVENUE AT SAGINAW, MI",
  "sameAs": "https://waterdata.usgs.gov/nwis/inventory/?site_no=04157005",
  "HY_HydroLocationType": "hydrometricStation",
  "geo": {
    "@type": "schema:GeoCoordinates",
    "latitude": "43.4219699",
    "longitude": "-83.951918"
  },
  "image": "https://waterdata.usgs.gov/nwisweb/graph?agency_cd=USGS&site_no=04157005&parm_cd=00060&period=100"
}

</script>
```

```
52 / <a href="../../../collections">Collections</a>
53
54
55
56
57 / <a href="https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg">geoconnex landing...</a>
58
59 / <a href="../../../items">Items</a>
60 / <a href="/ME00227">Item ME00227</a>
61 <span style="float:right">
```


https://www.opengis.net/def/schema/hy_features/hyf/HY_HydrometricFeature /
https://www.opengis.net/def/schema/hy_features/hyf/HY_HydroLocation

0

ERRORS

0

WARNINGS



@type	https://www.opengis.net/def/schema/hy_features/hyf/HY_HydrometricFeature
@type	https://www.opengis.net/def/schema/hy_features/hyf/HY_HydroLocation
@id	https://geoconnex.us/iow/demo/ME00227
name	Aroostook River
description	Monitoring Location at Aroostook River
Type	hydrometricStation
https://www.opengis.net/def/schema/hy_features/hyf/referencedPosition	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/HY_IndirectPosition	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/linearElement	https://geoconnex.us/nhdplusv2/reachcode/1010004000009
https://www.opengis.net/def/schema/hy_features/hyf/distanceExpression	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/HY_DistanceFromReferent	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/interpolative	0.0
https://www.opengis.net/def/schema/hy_features/hyf/distanceDescription	
@type	Unspecified Type
https://www.opengis.net/def/schema/hy_features/hyf/HY_DistanceDescription	upstream
geo	
@type	GeoCoordinates
longitude	-68.00154815977119
latitude	46.848887462871332
gsp:hasGeometry	
@type	http://www.opengis.net/ont/sf#Point
gsp:asWKT	
@type	http://www.opengis.net/ont/geosparql#wktLiteral
@value	POINT Z (-68.00154815977119 46.84888746287133 0)

What to put in JSON-LD?

- Templates: <https://docs.geoconnex.us/participating.html#templates>
 - `"@id" : "https://geoconnex.us/iow/demo/TX14456"`
 - `"@type" : https://www.opengis.net/def/schema/hy_features/hyf/HY_HydrometricFeature`
 - `"https://schema.org/name" : "Site 14556"`
 - `"https://schema.org/description" : "Sampling site on Rock Creek near New Hope Bridge"`
 - `"https://schema.org/geoWithin" : "https://geoconnex.us/ref/states/48"`
 - `"hyf:referencedPosition" : [{ "hyf:HY_IndirectPosition": { "hyf:distanceExpression": { "hyf:HY_DistanceFromReferent": { "hyf:interpolative": 35 } }, "hyf:distanceDescription": { "hyf:HY_DistanceDescription": "upstream" }, "hyf:linearElement": "https://geoconnex.us/nhdplushr/reachcode/121432425" } } }`

2. Publish feature-level landing content with embedded JSON-LD and persistent identifiers

- How?

- Templating systems: https://en.wikipedia.org/wiki/Web_template_system
- Turnkey solution:
 - Pygeoapi: <https://pygeoapi.io>
 - Internet of Water version: <https://github.com/internetofwater/pygeoapi>
 - Docker image: internetofwater/pygeoapi:stable
 - Can generate landing pages and JSON-LD from:
 - csv, geojson, shp, geopackage/SQLite
 - PostGIS
 - OGC WFS
 - ESRI FeatureServer/MapServer

<https://geoconnex-demo-pages.internetofwater.dev/collections>

3. Mint persistent identifiers with <https://geoconnex.us>

- Like a URL shortener, for your features!
- <https://geoconnex.us/your-org/123> -> 303 redirect ->

<https://yourorg.com/sites/123>

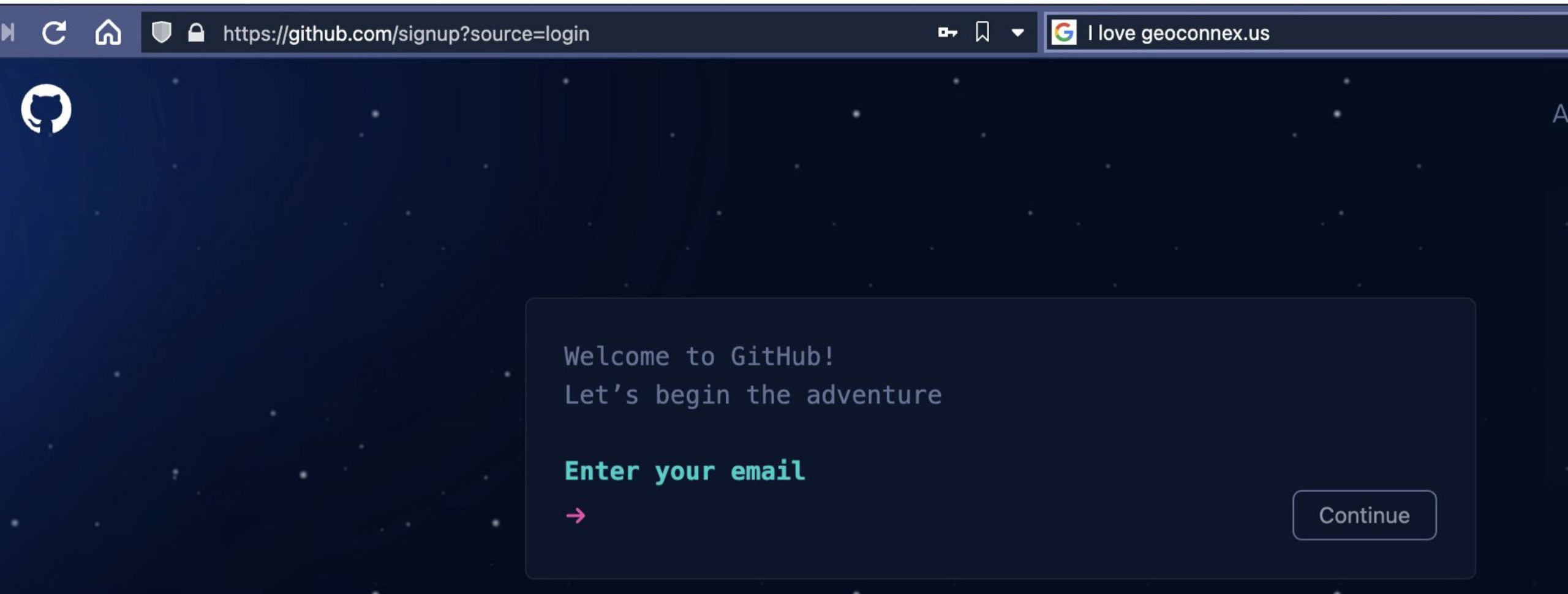
or

<https://yourorg-newwebsite.com/api?site=123>

or ...

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 0: Create a Github account



3. Mint persistent identifiers with <https://geoconnex.us>

- Step 1: Fork the repository:

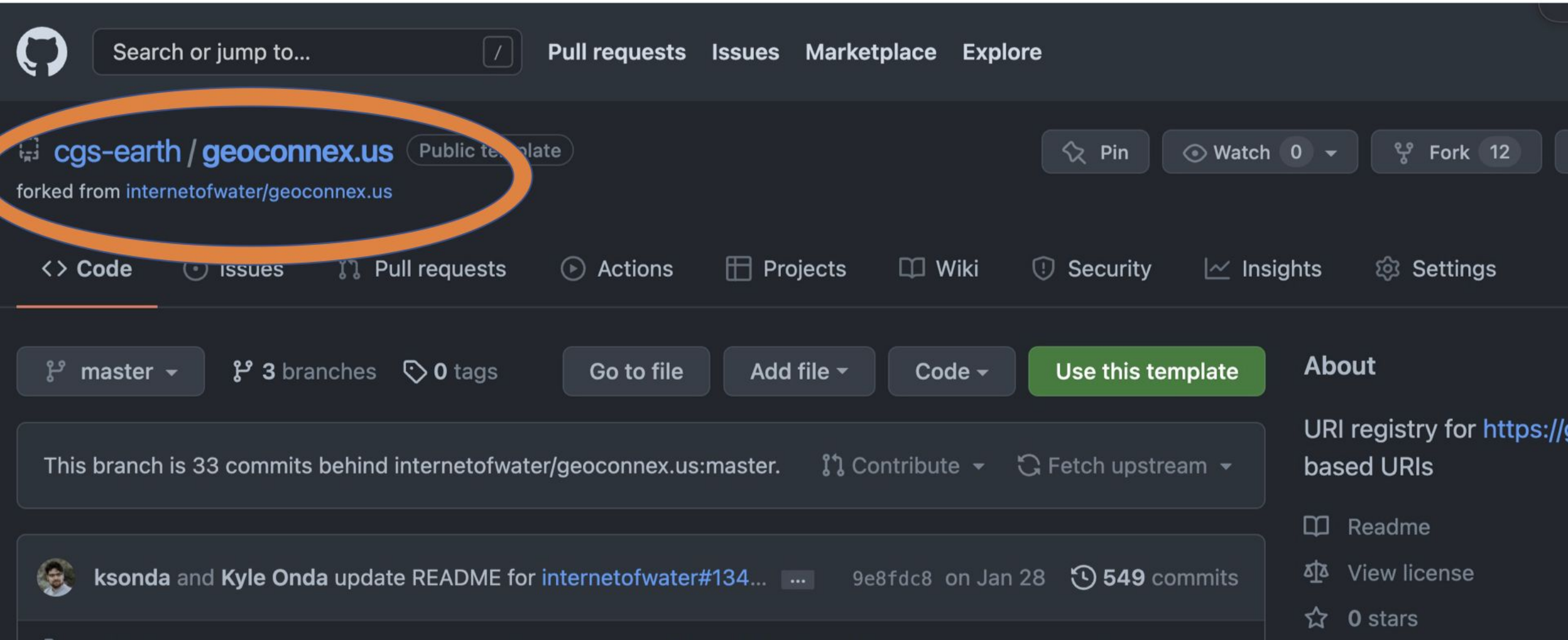
<https://github.com/internetofwater/geoconnex.us>

The screenshot shows the GitHub interface for the repository `internetofwater / geoconnex.us`. The repository is a public template. The `Fork` button, which shows 12 forks, is circled in orange. Below the repository name, there are tabs for `Code`, `Issues` (16), `Pull requests`, `Discussions`, `Actions`, `Projects`, `Wiki`, `Security`, and `Insights`. The `Code` tab is selected. Below the tabs, there are buttons for `master` (with a dropdown), `2 branches`, `0 tags`, `Go to file`, `Add file` (with a dropdown), `Code` (with a dropdown), and `Use this template` (a green button). The `About` section on the right shows the repository's purpose: "URI registry for <https://geoconnex.us> based URIs". It includes buttons for `name`, `namespaces`, and `permanent-identifiers`, and a `Readme` button. The commit history shows a recent update by `webb-ben` from `internetofwater/pids.geoconnex.us@1dc66...` with commit `1c5dce4` yesterday, and 582 total commits. The file list includes `.github` (updated 5 days ago), `PID-server` (updated yesterday), and `demo` (updated 5 months ago).

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 1: Fork the repository:

<https://github.com/internetofwater/geoconnex.us>



Search or jump to... / Pull requests Issues Marketplace Explore

cgs-earth / geoconnex.us Public template
forked from internetofwater/geoconnex.us

Pin Watch 0 Fork 12

<> Code Issues Pull requests Actions Projects Wiki Security Insights Settings

master 3 branches 0 tags Go to file Add file Code Use this template

This branch is 33 commits behind internetofwater/geoconnex.us:master. Contribute Fetch upstream

ksonda and Kyle Onda update README for internetofwater#134... 9e8fdc8 on Jan 28 549 commits

About
URI registry for <https://geoconnex.us> based URIs
Readme
View license
0 stars

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 2: Add your own namespace

 **cgs-earth / geoconnex.us** Public template

forked from [internetofwater/geoconnex.us](#)

<> Code

Issues

Pull requests

Actions

Projects

Wiki

Security

Insights

Settings

master

3 branches

0 tags

Go to file

Add file

Code

Use this template

This branch is up to date with [internetofwater/geoconnex.us:master](#).

Contribute

Fetch upstream



webb-ben Update from [internetofwater/pids.geoconnex.us@1dc664a](#)

1c5dce4 yesterday

582 commits



.github

Update yourls-ci.yml

5 days ago



PID-server

Update from [internetofwater/pids.geoconnex.us@1dc664a](#)

yesterday



demo

info -> reference ([internetofwater#129](#))

5 months ago



error

Update t401.csv

11 months ago



namespaces

principle -> principal ([internetofwater#154](#))

yesterday

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 2: Add your own namespace

 **cgs-earth / geoconnex.us** Public template

forked from [internetofwater/geoconnex.us](#)

<> Code

Issues

Pull requests

Actions

Projects

Wiki

Security

Insights

Settings

master

3 branches

0 tags

Go to file

Add file

Code

Use this template

This branch is up to date with [internetofwater/geoconnex.us:master](#).

Contribute

Fetch upstream



webb-ben Update from [internetofwater/pids.geoconnex.us@1dc664a](#)

1c5dce4 yesterday

582 commits



.github

Update yourls-ci.yml

5 days ago



PID-server

Update from [internetofwater/pids.geoconnex.us@1dc664a](#)

yesterday



demo

info -> reference ([internetofwater#129](#))

5 months ago



error

Update t401.csv

11 months ago



namespaces

principle -> principal ([internetofwater#154](#))

yesterday

master ▾

geoconnex.us / namespaces / iow / README.md

Go to



ksonda Update README.md

Latest commit 9d95540 2 minutes ago

1 contributor

17 lines (10 sloc) 453 Bytes



Raw

Blame

Internet of Water

Homepage:

- <https://internetofwater.org/>

These mappings are of two kinds:

1. temporary, experimental resources hosted by the Internet of Water organization for the purposes of testing geoconnex.us infrastructure.
2. (meta)data resources curated directly by the Internet of Water organization.

This collection will evolve over time, with experimental PIDs being retired as appropriate.

Contacts:

- konda@lincolninst.edu

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 3: Create a csv in the following format

The persistent ID for each feature

The URL for the landing page you want the ID to redirect to

	A	B	C	D
1	id	target	creator	description
2	https://geoconnex.us/iow/demo/TX05845	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX05845	konda@linco	demonstration
3	https://geoconnex.us/iow/demo/TX04180	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX04180	konda@linco	demonstration
4	https://geoconnex.us/iow/demo/TX03713	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX03713	konda@linco	demonstration
5	https://geoconnex.us/iow/demo/TX03714	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX03714	konda@linco	demonstration
6	https://geoconnex.us/iow/demo/TX06624	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX06624	konda@linco	demonstration
7	https://geoconnex.us/iow/demo/TX03698	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX03698	konda@linco	demonstration
8	https://geoconnex.us/iow/demo/TX02130	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX02130	konda@linco	demonstration
9	https://geoconnex.us/iow/demo/TX03650	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX03650	konda@linco	demonstration
10	https://geoconnex.us/iow/demo/TX00775	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX00775	konda@linco	demonstration
11	https://geoconnex.us/iow/demo/TX00579	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX00579	konda@linco	demonstration
12	https://geoconnex.us/iow/demo/OK00452	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/OK00452	konda@linco	demonstration

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 4: Add the csv to your namespace folder

 **cgs-earth / geoconnex.us** Public template

forked from [internetofwater/geoconnex.us](#)

<> Code Issues Pull requests Actions Projects Wiki Security Insights Settings

master **geoconnex.us / namespaces / iow / demo.csv** Go to file ...

 **ksonda** Add files via upload Latest commit e522891 25 seconds ago History

1 contributor

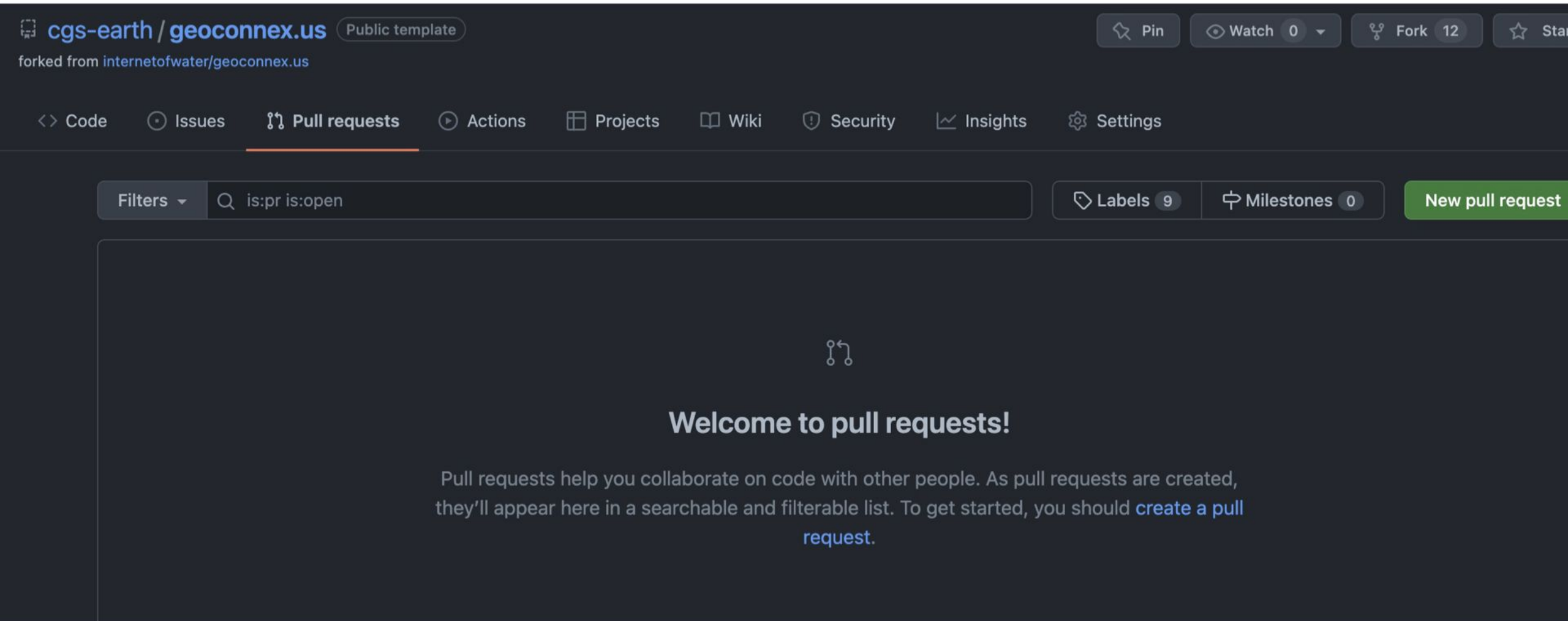
2027 lines (2027 sloc) | 370 KB Raw Blame Copy Edit Trash

Search this file...

	id	target	creator	description
1				
2	https://geoconnex.us/iow/demo/TX05845	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX05845	konda@lincolnst.edu	demonstration pids for tutorial purposes
3	https://geoconnex.us/iow/demo/TX04180	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX04180	konda@lincolnst.edu	demonstration pids for tutorial purposes
4	https://geoconnex.us/iow/demo/TX03713	https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items/TX03713	konda@lincolnst.edu	demonstration pids for tutorial purposes

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 5: Open a pull request to the main repository



The screenshot shows the GitHub interface for the repository **cgs-earth / geoconnex.us**, which is a public template forked from [internetofwater/geoconnex.us](#). The top navigation bar includes links for Code, Issues, Pull requests (which is the active tab), Actions, Projects, Wiki, Security, Insights, and Settings. On the right side of the header, there are buttons for Pin, Watch (0), Fork (12), and Star. Below the navigation bar, there is a search bar with the filter `is:pr is:open` and buttons for Labels (9) and Milestones (0). A green button labeled "New pull request" is located on the right. The main content area displays a welcome message with a pull request icon, stating: "Welcome to pull requests! Pull requests help you collaborate on code with other people. As pull requests are created, they'll appear here in a searchable and filterable list. To get started, you should [create a pull request](#)."

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 5: Open a pull request to the main repository

The screenshot shows the GitHub interface for a pull request. At the top, the repository is identified as 'internetofwater / geoconnex.us' with a 'Public template' label. Action buttons include 'Unpin', 'Watch' (7), 'Fork' (12), and 'Star'. The navigation bar shows 'Code', 'Issues' (16), 'Pull requests', 'Discussions', 'Actions', 'Projects', 'Wiki', 'Security', 'Insights', and 'Settings'. The main heading is 'Comparing changes', with a subtext: 'Choose two branches to see what's changed or to start a new pull request. If you need to, you can also [compare across forks](#).' Below this, the comparison is set between 'base repository: internetofwater/geoconnex.us' (base: master) and 'head repository: cgs-earth/geoconnex.us' (compare: master). A green checkmark indicates 'Able to merge. These branches can be automatically merged.' A large blue box contains the text 'Discuss and review the changes in this comparison with others. [Learn about pull requests](#)' and a green 'Create pull request' button. At the bottom, summary statistics show '4 commits', '2 files changed', and '1 contributor'. A commit history section is partially visible, showing 'Commits on Apr 12, 2022' and a commit titled 'Update README.md'.

internetofwater / **geoconnex.us** Public template

Unpin Watch 7 Fork 12 Star

<> Code Issues 16 Pull requests Discussions Actions Projects Wiki Security Insights Settings

Comparing changes

Choose two branches to see what's changed or to start a new pull request. If you need to, you can also [compare across forks](#).

base repository: internetofwater/geoconnex.us base: master ← head repository: cgs-earth/geoconnex.us compare: master

✓ **Able to merge.** These branches can be automatically merged.

Discuss and review the changes in this comparison with others. [Learn about pull requests](#) **Create pull request**

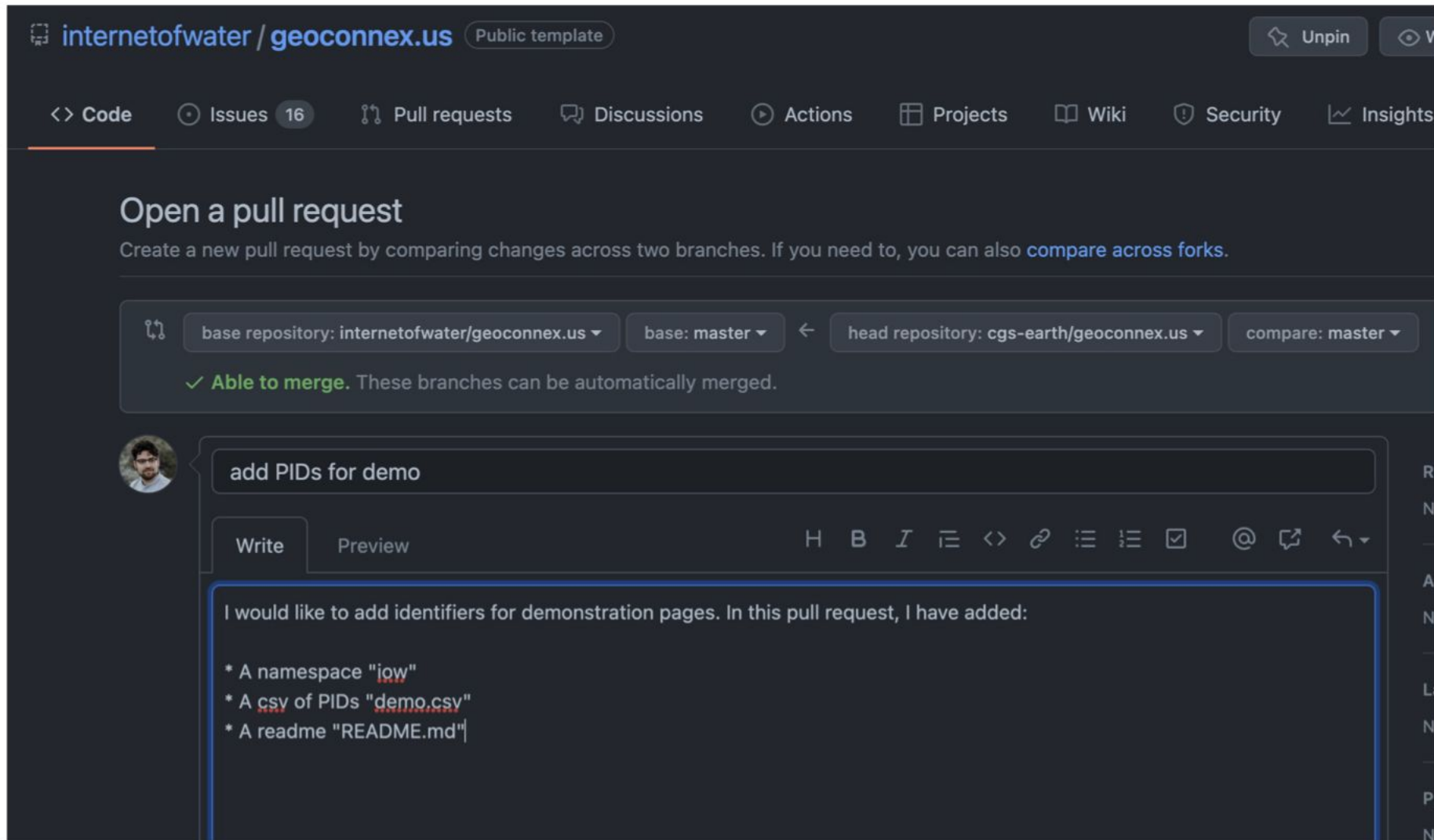
4 commits 2 files changed 1 contributor

Commits on Apr 12, 2022

Update README.md

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 5: Open a pull request to the main repository



The screenshot shows the GitHub interface for a pull request in the `internetofwater/geoconnex.us` repository. The page title is "Open a pull request". Below the title, it says "Create a new pull request by comparing changes across two branches. If you need to, you can also [compare across forks](#)." The interface shows the "base repository: internetofwater/geoconnex.us" with "base: master" and the "head repository: cgs-earth/geoconnex.us" with "compare: master". A green checkmark indicates "Able to merge. These branches can be automatically merged." The pull request title is "add PIDs for demo". The description text is: "I would like to add identifiers for demonstration pages. In this pull request, I have added:" followed by a bulleted list: "* A namespace `\"iow\"`", "* A csv of PIDs `\"demo.csv\"`", and "* A readme `\"README.md\"`".

internetofwater / **geoconnex.us** Public template Unpin

<> Code Issues 16 Pull requests Discussions Actions Projects Wiki Security Insights

Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also [compare across forks](#).

base repository: internetofwater/geoconnex.us base: master ← head repository: cgs-earth/geoconnex.us compare: master

✓ **Able to merge.** These branches can be automatically merged.

 add PIDs for demo

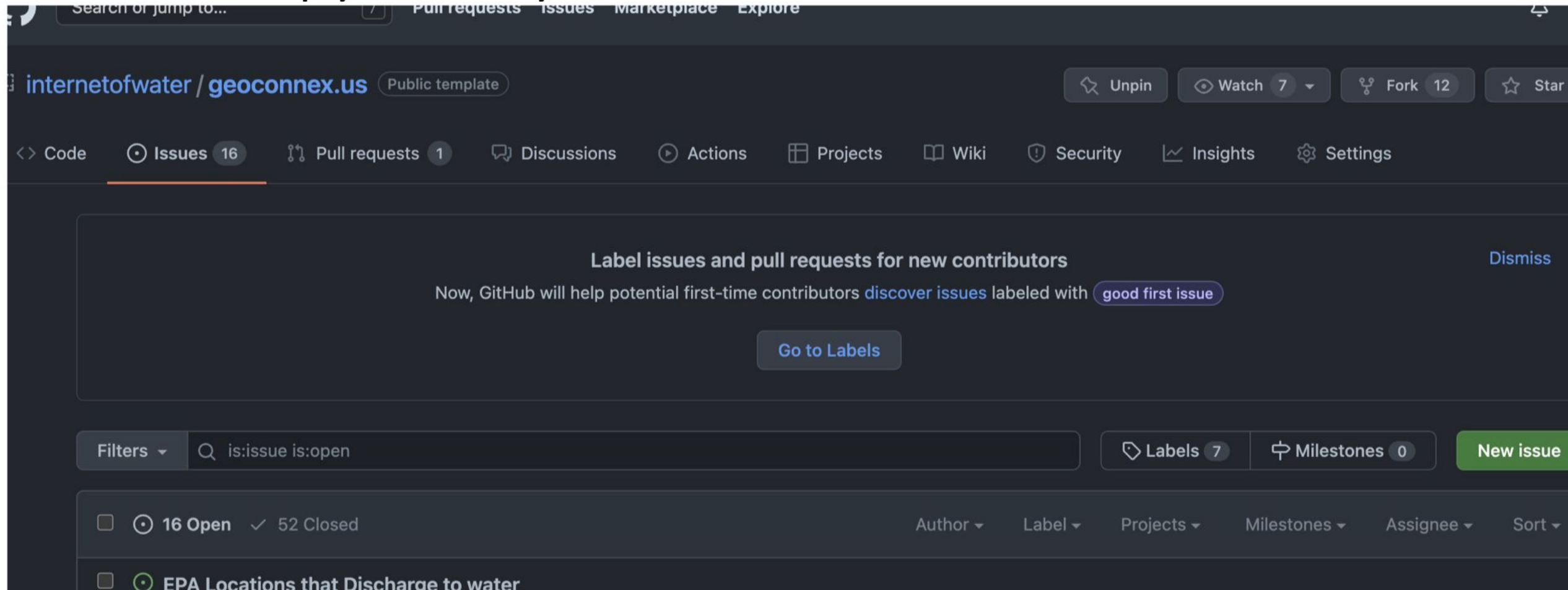
Write Preview H B I ≡ <> 🔗 ⋮ ⋮ ☑ @ ↩

I would like to add identifiers for demonstration pages. In this pull request, I have added:

- * A namespace `"iow"`
- * A csv of PIDs `"demo.csv"`
- * A readme `"README.md"`

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 6: Wait for your pull request to be approved
- Alternative to Steps 1-6: Open an Issue and ask the geoconnex.us team to help you directly!



3. M

- Ste
- Alt
- tea

internetofwater / **geoconnex.us** Public template Unpin Watch

<> Code **Issues 16** Pull requests 1 Discussions Actions Projects Wiki Security Insights

Issue: Request regex redirect

Describe this issue template's purpose here. If this doesn't look right, [choose a different type](#).



[regex redirect request]

Write

Preview

H B I        

Contact Information

Your name: Kyle Onda

Your email: konda@lincolninst.edu

Your organization: Lincoln Institute

Your organization website: https://lincolninst.edu

redirect request details

I would like to mint PIDs for my demo pages please help me.

Attach files by dragging & dropping, selecting or pasting them. 

 Styling with Markdown is supported

Submit new issue

 Remember, contributions to this repository should follow its [contributing guidelines](#).

3. Mint persistent identifiers with <https://geoconnex.us>

- Step 7: Try your PIDs!

<https://geoconnex.us/iow/demo/TX05845>

Now let's contribute data to the NLDI

4. Publish a geojson file with your hydro-addressed location data

- The NLDI requires a **geojson** (POINT geometry) file accessible from a URL (API or data repository) with at least columns that include the following concepts
 - **id**: a unique alphanumeric identifier for the feature within the file
 - **uri**: url pointing to a particular feature web resource where more information can be found (this can be a geoconnex PID)
 - **name**: name for the feature
 - **Reach** (optional): the NHD reachcode from the feature's hydrologic address (NHDPlusV2 for now, NHDHR coming)
 - **Measure** (optional): the measure along the reachcode from the hydrologic address

4. Publish a geojson file with your hydro-addressed location data

- Option 1: URL for GeoJSON output from a web service
 - NOTE: No pagination allowed (e.g., only <2,000 features for ESRI FeatureServer)
 - NOTE: Ensure output is in WGS84 CRS
 - NOTE: Endpoint must be publicly available (no authentication)
 - Examples:
 - ESRI Feature Service:
https://services5.arcgis.com/9b85MAhVnAUWydgW/ArcGIS/rest/services/data/FeatureServer/0/query?where=1%3D1&outFields=*&outSR=4326&f=pgeojson
 - Pygeoapi (same as internet of water landing page generator):
<https://geoconnex-demo-pages.internetofwater.dev/collections/demo-gpkg/items?f=json&limit=10000>

4. Publish a geojson file with your hydro-addressed location data

- Option 2 (>2,000 features or so): Create a separate geojson file with the fields, and place at a publicly available location with a http(s) URL (**NO AUTHENTICATION**). Examples:
 - CUAHSI Hydroshare
 - University dataverse
 - USGS ScienceBase
 - Personal website
 - Github (if < 100MB)
 - ESRI ArcGIS Online "Content" :
 - <https://lincolninstitute.maps.arcgis.com/home/item.html?id=89f9aa64d7ff47dd8bd2548385f3bc02>
 - <https://lincolninstitute.maps.arcgis.com/sharing/rest/content/items/89f9aa64d7ff47dd8bd2548385f3bc02/data>

5. Register your geojson file with the NLDI repository

- Step 1: Fork github repository:

<https://github.com/internetofwater/nldi-db>

The screenshot shows a GitHub repository page for **ksonda / nldi-db**, which is a public repository forked from **internetofwater/nldi-db**. The repository has 14 forks and 0 stars. The main branch is **master**, with 1 branch and 5 tags. The repository is 6 commits behind the upstream **internetofwater/nldi-db:master**. The repository contains the following files and folders:

File/Folder	Commit Message	Commit Time
database	chore(docker): fix build and run process	last month
liquibase	Update crawler_source.tsv	6 days ago
.gitattributes	Switch to apine - debian/jesse-backports broken	5 years ago
.gitignore	liquibase logs to std out	3 years ago
LICENSE	first commit	6 years ago
README.md	Update documentation	3 months ago

The repository also includes a **About** section with a link to waterdata.usgs.gov/blog/nldi-intro/, a **Readme**, a **View license** link, and a **Releases** section with 5 tags.

5. Register your geojson file with the NLDI repository

- Step 2: Update NLDI dataset registry:

master

nldi-db / liquibase / changeLogs / nldi / nldi_data / update_crawler_source / crawler_source.tsv

Go to file

...

 dblodgett-usgs

update links for usgs sources

Latest commit dcd1c1c on Mar 10

History

3 contributors



11 lines (11 sloc)

2.23 KB

Raw

Blame









Search this file...

	crawler_source_id	source_name	source_suffix	source_uri
2	2	HUC12 Pour Points	huc12pp	https://www.sciencebase.gov/catalogMaps/mapping/ows/57336b02e4b0dae0d5dd619a?service=WFS&version=1.0.0&re
3	1	Water Quality Portal	WQP	https://www.waterqualitydata.us/data/Station/search?mimeType=geojson&minactivities=1&counts=no
4	5	NWIS Surface Water Sites	nwissite	https://www.sciencebase.gov/catalog/file/get/60c7b895d34e86b9389b2a6c?name=usgs_nldi_gages.geojson
5	6	Water Data Exchange 2.0 Sites	wade	https://www.hydroshare.org/resource/5f665b7b82d74476930712f7e423a0d2/data/contents/wade.geojson
6	7	geoconnex.us reference gages	ref_gage	https://www.hydroshare.org/resource/4a22e88e689949afa1cf71ae009eaf1b/data/contents/nldi_gages.geojson
7	8	Streamgage catalog for CA SB19	ca_gages	https://sb19.linked-data.internetofwater.dev/collections/ca_gages/items?f=json&limit=10000
8	9	USGS Geospatial Fabric V1.1 Points of Interest	gfv11_pois	https://www.sciencebase.gov/catalogMaps/mapping/ows/609c8a63d34ea221ce3acfd3?service=WFS&version=1.0.0&re
9	10	Vigil Network Data	vigil	https://www.sciencebase.gov/catalog/file/get/60c7b895d34e86b9389b2a6c?name=vigil.geojson
10	11	NWIS Groundwater Sites	nwisgw	https://www.hydroshare.org/resource/5f665b7b82d74476930712f7e423a0d2/data/contents/nldi_gages.geojson

5. Register your geojson file with the NLDI repository

- Step 2: Update NLDI dataset registry, map geojson attributes to registry fields:

master nldi-db / liquibase / changeLogs / nldi / nldi_data / update_crawler_source / crawler_source.tsv Go to file ...

 **dblodgett-usgs** update links for usgs sources

Latest commit dcd1c1c on Mar 10 History

3 contributors   

11 lines (11 sloc) | 2.23 KB Raw Blame 📄 📋 ✎ 🗑

	feature_id	feature_name	feature_uri	feature_reach	feature_measure	ingest_type	feature_type
sName=EPSG:4326&typeName=sb:fpp&outputFormat=json	HUC_12	HUC_12	HUC_12	NULL	NULL	point	hydrolocation
	MonitoringLocationIdentifier	MonitoringLocationName	siteUrl	NULL	NULL	point	varies
	provider_id	name	subjectOf	nhdpv2_REACHCODE	nhdpv2_REACH_measure	reach	hydrolocation
	feature_id	feature_name	feature_uri	NULL	NULL	point	varies
	id	name	subjectOf	nhdpv2_REACHCODE	nhdpv2_REACH_measure	reach	hydrolocation
	site_id	sitename	uri	rchcd_medres	reach_measure	reach	hydrolocation
sName=EPSG:4326&typeName=sb::gfv11&outputFormat=json	prvdr_d	name	uri	n2_REACHC	n2_REACH_	reach	hydrolocation
	SBID	Site Name	SBURL	nhdpv2_REACHCODE	nhdpv2_REACH_measure	reach	hydrolocation
	provider_id	name	subjectOf	NULL	NULL	point	point

5. Register your geojson file with the NLDI repository

- Step 2: Update NLDI dataset registry, map geojson attributes to registry fields:

<https://github.com/ksonda/nldi-db/commit/0b36df17a67a71d3c490e2ab5408d0a4fcf5f65c#diff-7dce4ef6fadf7baa6c6a3309d25413215e43b79cd7795d63c972da88096adc5e>

5. Register your geojson file with the NLDI repository

- Step 3: Open Pull Request with your contribution

<https://github.com/ksonda/nldi-db/commit/0b36df17a67a71d3c490e2ab5408d0a4fcf5f65c#diff-7dce4ef6fadf7baa6c6a3309d25413215e43b79cd7795d63c972da88096adc5e>