

Hydro Atlas Final Grant Report 2019

The Hydro Atlas Project has been completed as of December 2018 for what was in the Lakes Protection Grant contract. Below is the general timeline for each aspect of the Hydro Atlas Project, all the tasks of the project were made to fit in the time line of the scope of work completed in the Lakes protection grant.

Project timeline BAYFIELD GW ATLAS	FY17		FY18		FY19				FY19		Project workflow (description of tasks)
	2017		2018		2019				2019		
	1Q1	1Q2	1Q3	1Q4	2Q1	2Q2	2Q3	2Q4	3Q1	3Q2	
Depth to bedrock map											Depth to bedrock map
- Draft map; identify locations for passive seismic/field surveys			X	X							Grace & GIS create first draft d2 bedrock map; identify datagaps if any
- Data collection as necessary, map refinement				X	X						Grace collects passive seismic data, GIS/Grace iterate map
- Complete map including GIS files and metadata					X						PI/Grace finalize map and GIS preps files and metadata.
Soil-Water-Balance (SWB) recharge modeling											Soil-Water-Balance (SWB) recharge modeling
- Compile climate, soil, land use & DEM data sets				X							GIS compiles and formats inputs to SWB to extend to county boundaries
- Run model				X							GIS runs SWB for avg, high, low precip years
- Review results					X						PI reviews results, GIS revises if necessary
- Complete/format results including map, GIS files, and				X							GIS documents, preps files and metadata-- handing off to Grace as much as possible
Groundwater contaminant susceptibility mapping											Groundwater contaminant susceptibility mapping
- Determine model for susceptibility, dtw, dtb, rech. maps						X					PI/PA develop contaminant susceptibility model
- Perform susceptibility analysis/evaluation metadata						X					GIS and P/PA iterate model
							X	X			PI/PA finalize maps. Kathy/ Steve M. to aid with GIS files and metadata as needed.
Reporting and public outreach											Reporting and public outreach
- WGNHS reports on progress to County				X	X	X	X	X			PI & Grace meet with County committee, review progress
- WGNHS provides drafts to County for final review and interim use								X			PI & Grace meet with County Committee to present final drafts for their review
- Peer review by WGNHS								X			Final drafts ready for peer review early October 2018
- Production (editing, layout, carto)											Include time for printing paper copies and mounted maps (details in p[roposal])
- Prepare GIS data files (data, shapefiles, GDBs, metadata)									X		Grace/PI/GIS revise as needed and iterate with WGNHS pub process
- Submit final report with all GIS data									X	X	Editor leads effort to finalize maps; Pete and Linda will provide a completion date that Madeline will relate to the County
	1Q1	1Q2	1Q3	1Q4	2Q1	2Q2	2Q3	2Q4	3Q1	3Q2	
	FY17	FY17	FY18	FY18	FY18	FY18	FY19	FY19	FY19	FY19	

As part of the education and public outreach for the Hydro Atlas grant we had several meetings with a wide variety of people and organizations. Our working group included the people below.

Sara Warman – Health Department Director
 Anne-Marie Coy – Heath Department
 Jason Fischbach – UW-Extension Ag Educator
 Robert Schierman – Zoning Administrator
 Madeline Gotkowitz – Hydrogeologist, Wisconsin Geological and Natural History Survey
 Scott Galetka – Land Records Administrator
 Ben Dufford – County Conservationist
 Grace Gram – Wisconsin Geological and Natural History Survey
 Chad Abel – Red Cliff Band of Chippewa
 Suzi Smith – Bad River Band of Chippewa GIS Specialist
 Pamela – Land Records Department
 Fred Strand – Bayfield County Board
 Carmen Novak – Land Records Department
 Tom Fitz – Northland College Geologist
 Mike Friis – WI Department of Administration
 Ken Bradbury - Wisconsin Geological and Natural History Survey and State Geologist
 Ian Meeker – UW-Extension
 Jeff Silbert – County Board
 Kristine Kavajecz – Administrators Office
 Mary Pardee - Area Extension Director

Meeting Dates

Feb 15, 2018, 3pm Hydro Atlas Meetings

June 28, 2018, 9am

Sept 14, 2018. 2pm

October 15, 2018, 2pm

July 31st 2018 at 6:00 pm County Board

December 5, 2018 Tribal County Relations

May 17, 2018 at 10:00am Tribal County Relations

Deliverables:

1. See Attachment or this site for All the maps in the Report
<https://wgnhs.uwex.edu/pubs/wofr201702/>
2. All of the digital data is posted at this site: <https://maps.bayfieldcounty.org/HydroAtlas/>
3. Data Can be down loaded here: User: ftpdownload@BayfieldCountyGIS.com
Password: !{f^p9EXh3y
4. We also published the data so anyone can consume the data in any GIS products here:
<https://maps.bayfieldcounty.org/arcgis/rest/services/HydroAtlasDataOneMap/MapServer>
 - a. **Preliminary Ground Water Susceptibility**
 - i. <https://maps.bayfieldcounty.org/arcgis/rest/services/HydroAtlasDataOneMap/MapServer/9>
 - b. **Preliminary Estimated annual recharge (in/yr)**
 - i. <https://maps.bayfieldcounty.org/arcgis/rest/services/HydroAtlasDataOneMap/MapServer/10>
 - c. **Preliminary Depth to Watertable**
 - i. <https://maps.bayfieldcounty.org/arcgis/rest/services/HydroAtlasDataOneMap/MapServer/11>
 - d. **Preliminary Depth to Bedrock**
 - i. <https://maps.bayfieldcounty.org/arcgis/rest/services/HydroAtlasDataOneMap/MapServer/12>

Conclusions from the Hydro Atlas report:

Groundwater flow and well construction in Bayfield County are influenced by the distribution of glacial deposits. Precipitation and snowmelt infiltrate in the sandy Copper Falls Formation in central and southern Bayfield County. Shallow sand-and-gravel wells are common in these areas. Groundwater flows away from the upland recharge area, and ultimately discharges to streams, wells, and lakes. Upward gradients are common where groundwater discharges to tributaries of Lake Superior. Here, the fine-grained glacial deposits of the Miller Creek Formation result in the drilling of sandstone wells and deeper sand-and-gravel wells. Most wells in Bayfield County are completed in sand-and-gravel deposits. In general, wells completed at shallow depths, and with thinner overlying deposits of fine-grained materials, have less protection from surface contamination than deeper sand-and-gravel wells. Susceptible wells with little natural protection are most commonly located in southwest Bayfield County in the sandy Copper Falls Formation, as well as near the Lake Superior shore where glacial deposits are

thin. Wells completed in sandstone are generally drilled deeper than sand-and-gravel wells and have a thicker layer of natural protection. However, sandstone wells drilled in the shallow bedrock near Lake Superior are vulnerable to contamination due to the fractured nature of the sandstone. The water-table map indicates the direction of groundwater flow. The map is useful to determine facilities or fields located hydraulically up-gradient of any well or stream, or conversely, to identify wells or streams down-gradient of specific facilities or agricultural fields.