

GLTG Phase 4 - Data to Knowledge

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1 Introduction

The National Great Rivers Research and Education Center (NGRREC) is a partnership of Lewis and Clark Community College and the University of Illinois at Urbana-Champaign.

Phase 1 was the initial collaborative effort that presents historical and real time data with real time reporting and visualization of nitrate data within a cyber-infrastructure framework. Focusing on nitrates as a proof of concept, Phase 1 prioritized extant reliable knowledge; facilitated collaborations and data sharing; and enabled automated data extraction interfaces with highly visual decision support tools. It also incorporated Great Rivers Ecological Observatory Network (GREON) data into the GeoDashboard (an NCSA developed geospatial dashboard for geo-temporal data streams).

Phase 2 identified data gaps and the need for additional data collection activities (use cases), and upgraded the user interface based on input from scientists and managers. This involved a more rigorous assessment of water quantity and quality issues at the watershed scale; incorporated nutrients beyond nitrates; prioritized data gathering and reliable knowledge about the data needed to optimize large scale conservation programs; facilitated collaborations and data sharing; revised the user interface; and built on/enhanced Phase I automated data extraction interfaces with highly visual decision support tools.

Phase 3 brought further enhancements of the data platform to archive, explore, search, visualize and download data obtained from various data sources and formats and upgraded data ingesting and user interface visualizations. We added historical nitrate and other nutrient data over a greater expanse of the Mississippi River Watershed, and added/enhanced real time nitrate data from the GREON buoys and USGS monitors as they become available.

To date, the Great Lakes to the Gulf Virtual Observatory has emphasized the identification and integration of water quality data pertaining to the Mississippi River. While the data related aspects of GLTG merit continued work, we are now setting the stage to create value streams for GLTG along the continuum:

- data,
- data to knowledge, and
- knowledge to decision support capabilities.

These capabilities are essential to improve policies and practices that affect the river.

In phase 4, NCSA will focus on transforming data to knowledge in GLTG by developing decision support capabilities that state and federal agencies can ultimately use to grow public support and build capacity to advance nutrient loss reduction (NLRs) strategies.

2 Tasks of Phase 4

2.1 Task A: Acquire new data

2.1.1 Task A-1: Acquire additional water quality data

NCSA will harvest and ingest the data (at least 6 new sources) from various sources identified by LC-NGRREC. It will require NCSA to develop additional parsers for these various sources and configure the GLTG with proper metadata and information.

GLGVO-360 - Getting issue details...

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGVO-521	Foxriver and IEPA data	<input checked="" type="checkbox"/>	Mar 21, 2019	Apr 04, 2019		Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Fixed

GLGVO-372	Install aquarius server and sql server	<input checked="" type="checkbox"/>	Aug 28, 2017	May 09, 2018	Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Done
GLGVO-343	parser vm spawning many jobs update usgs and greon parsers	<input checked="" type="checkbox"/>	Jul 11, 2017	Aug 24, 2017	Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Fixed
GLGVO-198	add data from metropolitan counsel	<input checked="" type="checkbox"/>	Oct 01, 2015	May 30, 2018	Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Fixed

4 issues

2.1.2 Task A-2: Acquire additional contextual data

NCSA will integrate at least 3 additional contextual data (geospatial layers) to the platform. This requires NCSA to manipulate the identified geospatial data, upload it to Geoserver and integrate it to GLTG.

[GLGVO-361 - Getting issue details...](#)

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGV O-508	Assemble Point Source Maps	<input checked="" type="checkbox"/>	Jan 28, 2019	Nov 05, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Done
GLGV O-515	Prepare Cropscape Frequency Data	<input checked="" type="checkbox"/>	Feb 21, 2019	Aug 07, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Done
GLGV O-420	Create Hypoxia layers	<input checked="" type="checkbox"/>	Mar 29, 2018	Oct 18, 2018		Jong Lee	Jong Lee		<input type="button" value="DONE"/>	Fixed
GLGV O-546	Create Upstream Land Cover Datasets for Mclsaac	<input checked="" type="checkbox"/>	Jun 19, 2019	Feb 11, 2020		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Done
GLGV O-469	Develop Nutrient BMP Map	<input checked="" type="checkbox"/>	Sep 07, 2018	Jan 02, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Done
GLGV O-529	Generate Catchments for Dashboard Mockups	<input checked="" type="checkbox"/>	Apr 18, 2019	May 16, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Fixed
GLGV O-256	Investigate incorporating Gulf Hypoxia layer to emulate on GLTG	<input checked="" type="checkbox"/>	Sep 01, 2016	Mar 29, 2018		Ted Kratschmer	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGV O-511	Cropscape Layer	<input checked="" type="checkbox"/>	Feb 01, 2019	Aug 22, 2019		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGV O-464	Add Layers for Hypoxia and NOAA Precipitation	<input checked="" type="checkbox"/>	Aug 22, 2018	Sep 12, 2018		Michelle Pitcel	Michelle Pitcel		<input type="button" value="DONE"/>	Fixed
GLGV O-454	Prepare Hypoxia Layer Data	<input checked="" type="checkbox"/>	Jun 26, 2018	Oct 19, 2018		Aaron Hoyle-Katz	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGV O-458	Prepare NOAA Precip Layers	<input checked="" type="checkbox"/>	Jul 05, 2018	Jan 02, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Done
GLGV O-404	Prepare geospatial data (corresponding to HUC 8s) for the 2002 USGS SPARROW model	<input checked="" type="checkbox"/>	Jan 11, 2018	Apr 20, 2018		Jong Lee	Shannon Bradley		<input type="button" value="DONE"/>	Fixed

12 issues

2.2 Task B: Deploy GLTG for State of Illinois

NCSA will deploy another instance of GLTG for State of Illinois. The site development will be done In cooperation with NGRREC and IEPA. It will be used for the Illinois Nutrient Reduction Strategy Plan.

[GLGVO-362 - Getting issue details...](#)

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGV O-392	About Page Text for the State of Illinois GLTG Instance of Geodashboard		Nov 20, 2017	Dec 12, 2017		Michelle Pitcel	Michelle Pitcel		DONE	Done
GLGV O-449	add Illinois EPA to the Partners List on About Page		Jun 06, 2018	Sep 12, 2018		Unassigned	Shannon Bradley		DONE	Won't Fix
GLGV O-379	Outline what is needed to deploy an instance for the state of Illinois over the GLTG database		Oct 17, 2017	Apr 20, 2018		Marcus Slavenas	Shannon Bradley		DONE	Fixed
GLGV O-381	Illinois Nutrient Water EPA - End of November - DEMO Prep		Oct 19, 2017	Dec 12, 2017	Nov 08, 2017	Jong Lee	Shannon Bradley		DONE	Done
GLGV O-441	Wording Changes on Welcome and About Pages		Jun 06, 2018	Jun 07, 2018		Michelle Pitcel	Shannon Bradley		DONE	Fixed
GLGV O-384	Setup UI for the State of Illinois GLTG Instance of Geodashboard		Nov 10, 2017	Nov 20, 2017		Michelle Pitcel	Michelle Pitcel		DONE	Fixed
GLGV O-417	Phosphorous data for Supergages needs parsed and shown-USGS Specific		Mar 15, 2018	May 31, 2018		Marcus Slavenas	Shannon Bradley		DONE	Fixed
GLGV O-413	Update ILNLRs Repositories		Feb 20, 2018	Feb 22, 2018		Michelle Pitcel	Michelle Pitcel		DONE	Fixed
GLGV O-401	Subdomain for ilnrls		Dec 13, 2017	Mar 30, 2018		Marcus Slavenas	Marcus Slavenas		DONE	Fixed
GLGV O-394	Adjust Maps on Compare and Download Pages		Nov 29, 2017	Nov 29, 2017		Michelle Pitcel	Michelle Pitcel		DONE	Fixed
GLGV O-393	Remove River Reaches Layer		Nov 28, 2017	Nov 28, 2017		Michelle Pitcel	Michelle Pitcel		DONE	Fixed
GLGV O-390	usgs - separated supergauges into different source		Nov 20, 2017	Dec 13, 2017		Marcus Slavenas	Marcus Slavenas		DONE	Fixed

12 issues

2.3 Task C: Upgrade GLTG to GeoDashboard v3

GeoDashboard v3 is an ongoing development effort with two other projects: IML-CZO and Great Lakes Monitoring.

2.3.1 Task C-1: Gather user requirements

NCSA and NGRREC will gather, identify, and prioritize additional user requirements along with lessons learned from the current GLTG site.

GLGVO-363 - Getting issue details...

STATUS

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGVO -521	Foxriver and IEPA data		Mar 21, 2019	Apr 04, 2019		Marcus Slavenas	Marcus Slavenas		DONE	Fixed
GLGVO -372	Install aquarius server and sql server		Aug 28, 2017	May 09, 2018		Marcus Slavenas	Marcus Slavenas		DONE	Done
GLGVO -343	parser vm spawning many jobs update usgs and greon parsers		Jul 11, 2017	Aug 24, 2017		Marcus Slavenas	Marcus Slavenas		DONE	Fixed

GLGVO-198	add data from metropolitan counsel	<input checked="" type="checkbox"/>	Oct 01, 2015	May 30, 2018		Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Fixed
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4 issues

2.3.2 Task C-2: Implement/test/deploy GeoDashboard v3

NCSA will implement/test/deploy GeoDashbarod v3 for GLTG based on the user requirements. During the development process, the testing will be done via NCSA and NGRREC.

[GLGVO-364 - Getting issue details...](#)

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGVO-477	Update Dev Servers to api v3 and geodashboard v3	<input type="checkbox"/>	Sep 27, 2018	Oct 10, 2018	Oct 01, 2019	Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Done
GLGVO-496	Fix all 4 instances of gltg and inlrs	<input checked="" type="checkbox"/>	Dec 06, 2018	Apr 01, 2019		Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Fixed
GLGVO-525	Cluster Zoom issue	<input type="checkbox"/>	Apr 17, 2019	May 01, 2019		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGVO-430	Gltg servers: switch from clowder api to geostream-service	<input checked="" type="checkbox"/>	Apr 12, 2018	Sep 27, 2018		Marcus Slavenas	Shannon Bradley		<input type="button" value="DONE"/>	Done
GLGVO-442	Update Label for USGS Supergauges	<input checked="" type="checkbox"/>	Jun 06, 2018	Mar 13, 2019		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGVO-460	Explore by Source - map zoom error	<input type="checkbox"/>	Aug 09, 2018	Feb 14, 2019		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Won't Fix
GLGVO-438	Deploy version 3 branches with usgs phosphorus parameter	<input type="checkbox"/>	May 31, 2018	Oct 10, 2018		Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Done
GLGVO-486	Update v3 UI to show continuous (online / offline) sensor status	<input checked="" type="checkbox"/>	Oct 18, 2018	Jul 15, 2019		Shannon Bradley	Shannon Bradley		<input type="button" value="DONE"/>	Done
GLGVO-513	ILNLRS - none of the layers are being shown on the map	<input type="checkbox"/>	Feb 05, 2019	Apr 17, 2019		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGVO-524	Explore page sensor popup is hidden if you pan the map	<input type="checkbox"/>	Apr 17, 2019	May 01, 2019		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGVO-523	Explore page sensor popup does not have pretty name	<input type="checkbox"/>	Apr 17, 2019	May 03, 2019		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGVO-447	Investigate issue with Compare Page - Three Parameters at once	<input type="checkbox"/>	Jun 06, 2018	Jul 15, 2019		Unassigned	Shannon Bradley		<input type="button" value="DONE"/>	Won't Fix
GLGVO-526	Zoom reset problem	<input type="checkbox"/>	Apr 17, 2019	May 01, 2019		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGVO-537	Merge Master to GLTG	<input checked="" type="checkbox"/>	May 06, 2019	May 15, 2019		Michelle Pitcel	Michelle Pitcel		<input type="button" value="DONE"/>	Fixed
GLGVO-374	v3: merge master into gltg branch	<input checked="" type="checkbox"/>	Sep 12, 2017	Sep 21, 2017		Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Fixed
GLGVO-462	V3 Merge Master to ILNLRS Branch	<input checked="" type="checkbox"/>	Aug 09, 2018	Oct 10, 2018		Marcus Slavenas	Michelle Pitcel		<input type="button" value="DONE"/>	Duplicate
GLGVO-461	V3 Merge Master to GLTG Branch	<input checked="" type="checkbox"/>	Aug 09, 2018	Oct 04, 2018		Michelle Pitcel	Michelle Pitcel		<input type="button" value="DONE"/>	Fixed
GLGVO-485	Add binning to cron parsing	<input checked="" type="checkbox"/>	Oct 10, 2018	Jun 13, 2019		Marcus Slavenas	Marcus Slavenas		<input type="button" value="DONE"/>	Done

GLGVO-481	V3 ILNLRs About Page Content	<input checked="" type="checkbox"/>	Sep 28, 2018	Oct 18, 2018		Michelle Pitcel	Michelle Pitcel		<input type="button" value="DONE"/>	Fixed
GLGVO-480	V3 GLTG About Page Content	<input checked="" type="checkbox"/>	Sep 28, 2018	Oct 18, 2018		Michelle Pitcel	Michelle Pitcel		<input type="button" value="DONE"/>	Fixed

Showing 20 out of 21 issues

2.3.3 Task C-3: Upgrade current GLTG to GeoDashboard v3

NCSA will replace the current search page with v3 first. Then, NCSA will gradually upgrade other components of GLTG to GeoDashboard v3

[GLGVO-365 - Getting issue details...](#)

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGVO-395	Remove Search Page from Version 2 Geodashboard		Dec 01, 2017	Jan 12, 2018		Michelle Pitcel	Michelle Pitcel		<input type="button" value="DONE"/>	Fixed
GLGVO-342	Use V3 Search Page Instead of V2 Search Page		Jul 06, 2017	Aug 24, 2017		Michelle Pitcel	Michelle Pitcel		<input type="button" value="DONE"/>	Fixed

2 issues

2.4 Task D: Develop Computational Models (tools) Repository

NCSA will develop a repository (or exploratory analysis) page for computation models (tools) for water quality interpretation (i.e. SPARROW, SWAT, etc.). The site will allow users to test the models with the water quality data from GLTG.

[GLGVO-369 - Getting issue details...](#)

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGV O-410	Refactor Exploratory Analysis code	<input checked="" type="checkbox"/>	Feb 01, 2018	Mar 08, 2018		Michelle Pitcel	Michelle Pitcel		<input type="button" value="DONE"/>	Fixed
GLGV O-500	Batch Processing of Catchment Generation	<input checked="" type="checkbox"/>	Dec 20, 2018	Jan 10, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Fixed
GLGV O-553	Create Graphs for Storyboarding	<input checked="" type="checkbox"/>	Jul 25, 2019	Nov 05, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Done
GLGV O-540	Create Reveal.js Storyboard Draft	<input checked="" type="checkbox"/>	May 23, 2019	Aug 23, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Done
GLGV O-288	Investigate: Graphing multiple parameters for a single site on a single graph	<input checked="" type="checkbox"/>	Jan 12, 2017	Oct 03, 2017		Michelle Pitcel	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGV O-544	Generate Maps for Lisa's Storyboarding	<input checked="" type="checkbox"/>	Jun 14, 2019	Nov 05, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Done
GLGV O-509	Layer coloring for Sparrow Model		Jan 30, 2019	May 10, 2019		Aaron Hoyle-Katz	Shannon Bradley		<input type="button" value="DONE"/>	Fixed
GLGV O-408	Implement Exploratory Analysis		Feb 01, 2018	Jul 15, 2019		Unassigned	Shannon Bradley		<input type="button" value="DONE"/>	Done
GLGV O-391	Predefined area needs to support "multipolygon" of Geojson		Nov 20, 2017	May 17, 2018		Michelle Pitcel	Jong Lee		<input type="button" value="DONE"/>	Done
GLGV O-538	Generate Interstate Station Catchments	<input checked="" type="checkbox"/>	May 10, 2019	May 16, 2019		Aaron Hoyle-Katz	Aaron Hoyle-Katz		<input type="button" value="DONE"/>	Fixed

GLGV O-85	Explore: Highlight the HUC4 Boundaries on the map when you hover over a HUC4 number	✓	Nov 20, 2014	Mar 15, 2018	Michelle Pitcel	Brock Angelo	○	DONE	Done
GLGV O-416	Separate Actions Exploratory Analysis from Trends	✓	Mar 08, 2018	May 31, 2018	Michelle Pitcel	Michelle Pitcel	●	DONE	Fixed
GLGV O-412	Test and Try to Improve Exploratory Analysis Speed Using Local Data	✓	Feb 12, 2018	Mar 08, 2018	Michelle Pitcel	Michelle Pitcel	●	DONE	Fixed
GLGV O-378	Graphing multiple parameters for a single site on a single graph	+	Oct 03, 2017	Mar 15, 2018	Michelle Pitcel	Michelle Pitcel	●	DONE	Duplicate
GLGV O-377	Compare Page - Add Switch to Turn the Graph Points On and Off	+	Oct 03, 2017	Oct 19, 2017	Michelle Pitcel	Michelle Pitcel	●	DONE	Fixed
GLGV O-376	V3 Explore Page - "Explore Layers" presented as a Drawer	+	Oct 03, 2017	Jan 08, 2018	Michelle Pitcel	Michelle Pitcel	●	DONE	Fixed

16 issues

2.4.1 Task D-1: Gather/Survey models/tools

LC- NGRREC and NCSA will gather/survey the models/tools which could be possible for GLTG to host. Example data and executions will be collected for GLTG to test.

[GLGVO-366](#) - Getting issue details... STATUS

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGVO-535	Pre-programmed Search Functions	✓	Apr 26, 2019	Jun 10, 2019		Michelle Pitcel	Shannon Bradley	●	DONE	Fixed
GLGVO-399	Port the Model to Python Code - Step 3	✓	Dec 07, 2017	Mar 22, 2018		Michelle Pitcel	Michelle Pitcel	●	DONE	Fixed
GLGVO-403	Implement the Model in Our Platform - Step 5	✓	Jan 05, 2018	Nov 26, 2018		Michelle Pitcel	Michelle Pitcel		DONE	Won't Do
GLGVO-397	Learning Models - Step 1	✓	Dec 07, 2017	Mar 05, 2018		Michelle Pitcel	Michelle Pitcel	●	DONE	Done
GLGVO-398	Run Model Locally - Step 2	✓	Dec 07, 2017	Mar 05, 2018		Michelle Pitcel	Michelle Pitcel	●	DONE	Done
GLGVO-463	Preparations for next aquarius meeting	✓	Aug 15, 2018	Sep 12, 2018		Marcus Slavenas	Marcus Slavenas	🚩	DONE	Fixed
GLGVO-465	Implement the Model - Step 5a	✓	Aug 29, 2018	Sep 20, 2018		Michelle Pitcel	Michelle Pitcel		DONE	Won't Do
GLGVO-415	Utilize Data Wolf for Model Implementation - Step 4	✓	Mar 05, 2018	Apr 12, 2018		Michelle Pitcel	Michelle Pitcel	●	DONE	Done

8 issues

2.4.2 Task D-2: Develop/test the platform for models

NCSA will develop/test the platform for models/tools by using NCSA DataWolf, a scientific workflow engine.

[GLGVO-400](#) - Getting issue details... STATUS

Key	Summary	T	Created	Updated	Due	Assignee	Reporter	P	Status	Resolution
GLGVO-433	Get or Locate Clowder Data for the Model - Step 6	<input checked="" type="checkbox"/>	May 09, 2018	Sep 20, 2018		Michelle Pitcel	Michelle Pitcel		DONE	Won't Do
GLGVO-475	Model Phosphorus Code - Rscript for Automation	<input checked="" type="checkbox"/>	Sep 18, 2018	Jan 25, 2019		Michelle Pitcel	Michelle Pitcel		DONE	Fixed
GLGVO-467	Start Investigating Model Phosphorus Code	<input checked="" type="checkbox"/>	Sep 04, 2018	Sep 18, 2018		Michelle Pitcel	Michelle Pitcel		DONE	Done
GLGVO-478	Updates to Nitrate Model	<input checked="" type="checkbox"/>	Sep 28, 2018	Jan 25, 2019		Michelle Pitcel	Michelle Pitcel		DONE	Fixed
GLGVO-427	Update Python Model Code to Use Clowder Data	<input checked="" type="checkbox"/>	Apr 12, 2018	Jul 11, 2018		Michelle Pitcel	Michelle Pitcel		DONE	Fixed
GLGVO-457	Full State Statistics	<input checked="" type="checkbox"/>	Jul 05, 2018	Sep 20, 2018		Michelle Pitcel	Michelle Pitcel		DONE	Fixed

6 issues