Minutes: 3D Geomatics Committee Hydrogeomorphology Workgroup

Date: **8/13/2019**

Time: 10:00 a.m. – 11:00 a.m.

Location: Skype online meeting

I. Attendance | Hydrogeomorphology Workgroup

Accountable: ~~Ann Banitt~~ ~~(ACOE)~~; **Andrea Bergman** (MNIT@DNR); **Jen Crea** (MNIT@MPCA); **Matt Drewitz** (MNIT@BWSR); ~~Tyler Grupa~~ ~~(MNSU WRC)~~; **Tom Hollenhorst** (EPA); ~~Brandon Krumwiede~~ ~~(NOAA Affiliate)~~; **Rick Moore** (MNIT@DNR); **Christiane Roy** (USDA-NRCS); **Kiah Sagami** (HEI); ~~Jamie Schulz~~ ~~(MNIT@DNR)~~; **Sean Vaughn** (MNIT@DNR)

Informed: ~~Lyn Bergquist~~ ~~(MNIT@DNR)~~; ~~Joe Brennan~~ ~~(USDA NRCS)~~; ~~Whitney DeLong~~ ~~(UMN)~~; ~~Chuck Fritz~~ ~~(IWI)~~; **Ben Gosack** (DNR-EWR); **Kevin Hanson** (ACOE); ~~Keri Hedin~~ ~~(Fond du Lac)~~; ~~Brian Huberty~~ ~~(USFWS)~~; **Alan Laumeyer** (Goodhue Co); ~~Rick Lorenzen~~ ~~(MNIT@DNR)~~; ~~Grit May~~ ~~(IWI)~~; ~~Joel Nelson~~ ~~(UMN)~~; ~~Doug Norris~~ ~~(DNR-EWR)~~; ~~Jill Pohjonen~~ ~~(DNR-EWR)~~; **Emily Resseger** (Met Council); ~~Ben Richason~~ ~~(SCSU)~~; ~~Casey Scott~~ ~~(MPCA)~~; ~~Aaron Spence~~ ~~(BWSR)~~; ~~Angus Vaughan~~ ~~(MPCA)~~; ~~Barbara Weisman~~ ~~(DNR-EWR)~~; ~~Andy Williquett~~ ~~(MNIT@DNR)~~

Guests: **Clint Little** (DNR)

II. Steering Team and Subgroup Reports (25 min)

- Breachline Subgroup updates – Rick
  - Showed map of currently submitted data for authoritative breachline map
    - Mostly data from our group members
    - Members are reaching out to entities outside of our group who have created data in order to fill in map so we know what is out there. Mostly watershed organizations that funded their own (not CWL funded).
  - Subgroup meeting in 2 weeks, going to continue looking at this and have discussion on "completeness"
    - How do we determine if a watershed is complete? Determine if flow lines from breachlines fall within channel
    - Process or toolbox we could run or just a visual?
    - How will we determine completeness and how will we QAQC that in the future?
- SharePoint – Andrea
  - 3D Geomatics SharePoint site, each workgroup has their own section
  - Intent is a place where we can collaborate among the groups, across agencies and businesses
    - Things we don't want on or aren't ready for our public site

- - - Other documents uploaded to page: minutes, agendas, recordings, presentation materials, supplemental information, etc.
  - o 3D Geo contact list
    - - Master list drives workgroup member lists
    - - Color coordinated with committee ferris wheel
    - - Sean: use contact list for tracking who is a stakeholder for lidar acquisition and who is a steward as a funding source. Contact list is taking on a higher role in tracking funding for lidar acquisition.
  - o Access – we still need to set up access and permissions for everyone
  - o Sean: SharePoint site serves as a foundation for all things related to the committee and work groups. This is something we just did not have before (former Hydro group, Elevation group, Lidar Research & Education), we all kept things on our own computers. The only items of record were things that made the web site. SharePoint will serve as archive of all things important, especially as people and committees change. The SharePoint site can identify what is important for moving forward.
- LiDAR Acquisition Update – Sean
  - o Hosted two full days of meetings at DNR Central Office with vendors on lidar acquisition
    - - Identified vendors on master contract list, included a couple others not on the list
    - - Sent email letter explaining objective and purpose
    - - Sent vendors questions and open-ended statements on experience, specifications, topo-bathy, cost estimates
    - - One-hour meetings, we knew it was too short but we also couldn't take two weeks to do the interviews
    - - Most vendors had sales, outreach, marketing staff in person with subject matter and technical experts available via WebEx
    - - Many vendors complimented us on our efforts, recognized the value of a statewide collect, value of informed customer
  - o Important that state plan for lidar acquisition to have same parameters, same specifications, overlapping between acquisition footprints
    - - Want to keep individual counties, LGUs from acquiring their own lidar data
  - o Comes down to cost and specifications
    - - What is the real cost of lidar? Cost of lidar and lidar acquisition is difficult to nail down
    - - USGS lidar specifications from the American Society for Photogrammetry & Remote Sensing (ASPRS)
    - - Costs go down with larger footprint of lidar acquisition
    - - Three different levels of lidar acquisition (QL3, QL2, QL1) and another one creeping in called QL2+
  - o Where does the lidar we have now fit in to that scheme?
    - - Currently it is QL3 or less
    - - QL2 is the USGS minimum standard for lidar acquisition, especially if they have any involvement with funding
    - - QL2+ not part of lidar specification, but is a happy medium between QL2 and QL1
    - - QL1 really stepping in to the realm of high density
    - - QL2 is >2 points/sq meter; QL1 is >8 pts/sq m

- QL0 is highest density known, exists as a placeholder for super high density lidar as technology advances
- What does this mean if someone says, "We're going to get lidar data with greater than 8 points per square meter."
  - Most of the time, with QL1 upwards of 20 and in some cases 30 pts/sq m
  - Standard for QL3 ranges from 0.7 to 1.7 pts/sq m, so less than 2 and much of our data is less than 1 pt/sq m
  - We could see an increase from our current data that is less than 1 pt/sq m to upwards of 20-30 pts/sq m
  - **Increased and improved digital elevation model that is hydromodified**
  - **Important takeaway**: it was made clear by many vendors that QL1 is not what most of their clients are buying in to, but **there is a trend of for people migrating toward specs for QL1. One thing we heard several times was ability to identify culverts, QL1 maps inlet and outlet of culverts.**
- **Longevity and shelf life?** Suppose we get a lidar collect off the ground in spring 2020. If we invest in QL2, we know it will take 5-6 years to complete. **What is the shelf life of QL2? Will we regret not doing QL1 in 6 years when we wrap this up?**
  - Costly, if you go to QL1, upwards of almost doubling cost
    - For 3,000-5,000 sq mile footprint:
      - QL2 range: $205 - $220 per square mile
      - QL1 range: $315 - $335 per square mile
  - Task ahead of us, is ensuring we make the right decision, buy the right quality level, ensure the longest life span and usability, meet the greatest number of business needs
  - We probably won't get new lidar data every 3-5 years, we already are working hard for buy in today
  - What we buy today, has to serve us for about 10 years (our existing data is 10 years old)
  - Other cost is storage and access, voluminous data
- First lidar acquisition was an easier sell, business needs now are far greater
  - **Benefits of pulling information from point cloud**
  - If you collect higher density point cloud, the point cloud is there, it's not going away
  - Subject matter experts can go in and pull out what they need, buildings, building aspect, pitch, utility mapping, etc.
  - When someone says, "We don't use it, don't have interest that high density." It is not any one individual or business need uses. It is the point cloud as fundamental foundation source of information and you can pull it out of that point cloud
  - **Focus on business needs that are out there, what are requirements of them, and can we afford to buy the best quality level, best density, to serve a wider magnitude of business needs.**

III. Current Projects of Interest: Ben Gosack; Watershed Health Assessment Framework (25 min)

The Watershed Health Assessment Framework (WHAF) is a structured, science-based approach to help resource professionals and citizens work together and grow our common understanding of Minnesota's complex natural resource systems.

The WHAF brings together current data and scientific analysis to generate information about Minnesota's watersheds. These products are delivered in a transparent and repeatable framework to foster robust conversations and innovative approaches for improving the health of Minnesota's watersheds and communities.

- Clean Water Funded program in DNR Ecological and Water Resources – River Ecology Unit
- WHAF has been around for about ten years. It started as map books and evolved to a web application and web presence.
- WHAF is a web tool for resource managers and others interested in the ecological health of Minnesota's watersheds
- Uses a five-component framework (hydrology, geomorphology, water quality, biology, connectivity) to organize and deliver information about watershed conditions
- Application is delivered through a web browser, we try to make complex issues easier to visualize
- Interactive map delivers 27 unique health scores that are organized into these five components
- Collect GIS data from a variety of sources and interpret that data to present raw data as information
- **Organize into different lenses that allow us to incorporate multiple perspectives across silos of expertise and build community networks, bring information out to those that need it in the field**
- Application demo:
  - View map and perform visualization and assessment at different watershed scales
  - Compare and contrast conditions across a region
  - Set location, explore scales, zoom, mask to get a better perspective
  - Health scores organized under five components
    - Toggle health scores on/off
    - Scores at different scales (catchment vs major)
    - Links to information about health scores and how they are calculated in the 'About' tab
    - Scores range from 0-100, to interpret and present score consistently and in a repeatable format, provides a gradient across statewide scale
  - Manage and distribute about 150 geospatial data layers in the app
    - Search and sort by data category
    - Add data layers, switch base map, query attributes
  - Charts and reports
    - Based on active data layers and selected scale
    - Static pdf reports summarizing information at the major watershed level
    - Report cards summarizing health scores, static image
    - Health scores
    - Climate summaries for watersheds
      - NOAA observed data back to 1890s
      - See how temperature and precipitation has changed over time

- - Compare monthly breakdowns
    - Next is to incorporate projected data coming out of the U of MN
  - **Data Resource Catalog is immensely helpful, knowing what the authoritative source for information is. Not everyone has access to the insider knowledge; need to have that knowledge formalized in an official way.**
    - Struggled with watershed names, these groups help to connect those dots
    - Sean: This group has the ability to make those changes. It functions under the GAC, under MnGE, across agencies. We may never align, but we are on a better path to make those changes.
- Question from Thomas Hollenhorst: Will or does the WHAF address watersheds that cross state boundaries?
  - For catchment dataset are the areas that have hydrologic flow into MN surface waters or waters that border MN. Input data sources that cross boundaries, just for hydrologic connectivity.
- WHAF homepage – www.mndnr.gov/whaf
- WHAF email – whaf.dnr@state.mn.us
- ben.gosack@state.mn.us

Next meeting: Jeff Green, Groundwater Hydrologist DNR EWR, Karst Hydrologic Landscape Unit

IV. Meeting Schedule

October meeting – week after GIS/LIS keep with loose agenda?

Future Meetings

Date: 9/10/2019

Time: 10:00 a.m. – 11:00 a.m.

Location: Skype online meeting

Agenda items: submit proposed agenda items to Jamie Schulz