#### Task Description

The Current State report prepared under Task 2 will include a comprehensive review of field data collection protocols for up to five (5) data sets, representing a breadth of content areas, data collection methodologies, and content. This section will rely on data collected via the survey instrument as well as the follow-up consultations with the data collectors/stewards. It will focus primarily on the collection and post-processing of the coordinate information associated with each of the data sets, although attribute data that represents locational information may also be addressed.

#### Dams

JIM WEBBER \_ AM MEETING

* Primary database is Access; shapefile is created once/year for NHDES and posting on GRANIT.
  + Lat/long is tracked and used to geocode what does this mean if they have lat/long and what do they use for geocoding?
* Attributes
  + Material
  + Inspections
  + Owners
  + Emergency applications
* Inspection Intervals
  + High hazard every 2 years
  + Significant hazard every 4 years
  + Low hazard every 6 years
* Database did not exist until 1984-85. Information is missing from the 30’s, e.g. first dam built in the state was in the 1930’s.
* Ownership is changing; (10% a year) that are active.
* 75% are privately owned.
* Number of inspections per year is 180.
* Any structure over 6’ tall requires a permit.
* Most permits are reconstruction (less than 15 per year).
* Permit number is not a separate data element - Dam Number and year of issue is permit number.
* Inspections are logged. Attributes are updated.
* Only adding ~10 new records each year - new dams
* Do not feel there is much value in field devices as they use both hands in the field.

#### Well Water Inventory

GREG BARKER PM MEETING

* 1983 or so database began; presently ~130,000 records.
* Used for geologic mapping, and admin for water well.
* Tax map, address and lat/long are verified. Sometimes the lat/long values are way off.
  + This is all manual
    - Lat/long
    - Address
    - Map/lot
* Paper forms are scanned.
  + Tabular data entry into Oracle.
  + Then locate point in ArcMap.
* 2,000-4,000 annually.
* 50-60% enter tabular data into a web form that feeds Oracle – this still results in the creation of a layer manually.
* Paper forms and web forms feed both feed Oracle.
* Limited value to populating well points only (for wells before 1983).
* Could do field location in Survey123 – would likely need to link back to the office to do data update for the rest of the form.
* Do they have inspections?

SECOND MEETING

Brief refresh on what they do for data collection – new records as well as inspections.

* How do they QA/QC the data?
  + If so, do they check to see that every high hazard dam has actually been inspected at required interval (every 2 years)? Do they issue “compliance” reports after the inspection? If not “in compliance”, what happens?
  + Where do they find the most inaccuracies, e.g. do they have data quality problems, e.g. struggle to keep the owner updated? Does material they have in the database always match what they have in the field?
  + Where to they spend the most time, e.g. what aspect of QA/QC?
  + Are there specific steps that you know would benefit from automation?
* Do they do any QA/QC on the non-spatial data?
* Do they have annual reports they generate for the Commissioner’s office, the legislature, etc. and how confident are they in what they report?

Jim Weber, Dam Bureau:

Primary focus – public safety per RSA 482.

Primary database – Access. Started with “cards” back in the 20’s and 30’s, so part of the challenge is that they have records dating back to the 20’s. The dam itself may have been destroyed, but the data remains. In total – 8,000 records. Older records may have nothing more than name of the town. So large portion of database – highly suspect. Smaller portion of database – 3,000 records – still active. Large number of these are considered non-hazardous and never inspected. Smaller number (approximately 800) actively inspected so have good data – generally hazardous dams. The 2200 that are not inspected – permit is required if they reconstruct or modify the dams.

Periodically, convert Access to shapefile. Still have a lot of non-GIS users so need to preserve Access format for now, but in the future will convert to another format.

Also use database to create Garmin file for inspections and for emergency response. (Have people who have never been to locations so GPS coordinate is helpful.) Because of that, tend to represent locations toward where access is available (e.g. towards parking lot). Average dam – 60 to 80 ‘ and longer. So positional accuracy isn’t same as point. (Dave – consider recording two locations – one for dam and one for access. Or consider representing dam as a polygon. )

Numbering system based on town. (Use same town numbering system as DOT.) So if a river is a town boundary, and dam crosses the town boundary, decision was made as to which town the dam is recorded in. In this case, need to make sure point is in town that is recorded.

Use GIS to evaluate downstream hazards in case of dam failure.

Dam breaching programs – now mostly in ArcGIS, but transitioning towards stand alone programs.

Transitioning from 1D breach analysis to 2D breach analysis.

Law passed recently – if no change in dam since 1981, can’t change hazard classification of dam. They can go out and look at it/inspect it if someone calls, and can make recommendations, but can’t change the classification and can’t change the dam owner to make any changes. RSA 482:12 – changes jurisdictional reference to a dam. Significance of 1981 – that’s when they formally defined hazard classifications and discharge capacities.

Permit required if new construction or if doing something that is considered reconstruction. If permit required, then dam can be reclassified. Lower threshold applies if doing a repair.

When they do inspections – they verify the information they have in the database (including physical information, heights, etc.), as well as downstream impacts (new roads, new houses, culvert sizes, etc.) Particularly high hazard inspections. Don’t do it on every inspection. Also verify the locational values.

Generally, don’t have formal QA/QC program. Inspections are done by licensed engineers/DES staff who know importance of locational accuracy. And try to keep same inspectors going to same dams on repeat cycles – at least for the high hazard 2-year cycles.

No specific form used for inspections. Configurations are too varied. Instead, use field notebooks to record notes. And take photos. The photos are filed into electronic filing system, along with model runs, etc.

Use of drones? Told “they can’t use them unless they’re the Department of Safety”. But can hire consultants who use drones.

State owns ~280 dams. These are inspected on same scheduled as private dams. For some of larger dams, hiring outside consultants to do inspections due to lack of staff/equipment and sometimes lack of expertise. Consultant reports are entered into database.

Basically no new dams constructed (state or private) with exception of detention ponds that qualify as dams. Issues – need wetlands permit, and have to show public benefit. Average age of dams in NH – 100 years. “Newer” dams are 50-60 years old.

How do they get notified of ownership changes? By rule, new owner is required to notify them of a transfer – often because new owner doesn’t know it’s a requirement. They find out when they send notifications of inspections.

Can have situations where owner of dam is NOT owner of the land. Quite frequently the case. Sometime have situations where the owner of the dam doesn’t have rights to access the dam.

For hydro dams regulated by FERC, have agreement and can’t share the data. But do retain same basic attributes as on all other dams.

Majority of 280 state-owned dams – high hazard classification. Mostly, dams acquired because on large water bodies (Winnipesaukee, etc.) and in more developed areas.

State-owned dams – owned by DES, F&G, DNCR, DOT, etc. DES manages/operates those they own and those owned by F&G. DOT manages their own.

Also, do 2-4 dam removals/year – mostly privately owned. Typically result of inspection requiring significant maintenance and being too costly for landowner.

Biggest QA challenge: For routine inspections, don’t have a significant challenge as they have a standard method/protocol. Staff turnover can be a problem, but doesn’t happen too often and Jim just trains new employees.

Don’t get a lot of calls from the public with questions. Note that dams database only went “public” 6-7 years ago. (There was more sensitivity directly after 9/11.) Version of data that is released to public – many of the fields are redacted. Do get people coming in to review files – mostly consultants, prospective property buyers, attorneys, etc.

Bigger question – what to do when they move away from Access (after “Nancy’s” retirement of key person who is responsible for it). Would like to attach other documents, photos – a lot of which are not scanned. Does see benefit in scanning the older documents. Even new documents aren’t necessarily all scanned (e.g. letters complaining from a constituent about a lake level). Inspection reports they issue now are all electronic and field in electronic filing structure, it’s the historic “stuff” that isn’t and it’s all different sizes/formats. But all reports they issue are issued as pdf’s, and all referenced to the dam ID.

Another capability they would like to have – ability to add fields “on the fly” in response to an event, e.g. Mother’s Day floods. Also on reporting side, e.g. be able to pull all pdf’s associated with a dam. Or ability to access database remotely.

Do have files on beaver dams, particularly those that create hazards. They are responsibility of property owner, who can remove them (but need permit if they bring in equipment). They can also shoot the beaver, etc.

Database – just text. Does include links to photos, files. No links to other DES databases/programs.

Per Kristen – key issue is intersection of paper and electronic files. Some cases – consultant scans all documents associated with a project and records them in xls file. They will provide the scans to Dam Bureau, but they don’t really have a system to accept/store/manage them.

Integration of technologies

Our own observations:

Don’t track lineage of data, eg if update dam characteristics

Lot of procedural information isn’t formally documented

They could implement field forms

GREG BARKER:

Origins – 1983/1984 where drillers were required to report drilled hole data to DES. Presently collect a lot of attributes. Things were getting georeferenced off tax map/lot when available, or street addressing when available. Issue – when property gets developed and subdivided, this approach is problematic. Since 2010 or so, drillers required to provide coordinates in WGS84. Quality is “not great”. Could be typing entry, notation entry, or just bogus coordinates.

Issue – drillers don’t have good way of communicating amongst themselves where there are problems. Even if could show them where the point lands, it might not help as sometimes it’s the in-office clerk entering the data and they don’t know where the points are.

Presently online data entry form without mapping component. That goes to a temporary Oracle table, then Drinking/Groundwater Bureau person reviews data to make sure required elements are there and pushes the record to permanent database. Primarily just looking to make sure record is complete, but not really validating location. 3 sets of coordinate fields in the archival table. Depending on when data were entered, it would get entered into one set of fields then get transferred over to a lat/long DM and decimal seconds. Around 2008/2009, data entry was into state plane X,Y fields. Since 2011/2012, Greg has been digitizing locations ad hoc – moving point to top of house using orthos.

Primary key – town ID with a sequential counter.

Pull data from archival database to a feature class. Append records, but those records aren’t saved to the archival Oracle “core” database.

Greg’s group – stewards. But Drinking/Groundwater Protection Bureau is approving new records and also reviewing coordinates but not in any systematic way.

Besides web form, also have paper forms that are manually entered. In a busy year, could be 5-6000 added. More typically, 3000 added/year.

What QA/QC is done? Abby Fobiano look at the data coming in via tables, plotting coordinate pairs directly in Google or in ArcMap. Required fields – address, parcel number, lat/long.

Not presently using E911 address data since it hasn’t been provided to them in some time. Would be nice to use this to geocode against, particularly now that they have building locations (front doors).

Biggest challenge – getting data in. Whole data set needs to be gone through again. Quick and easy way to do that – address matching. 77,000 records. But how many of those records don’t exist anymore? Could do multi-tier matching score.

Not presently a mobile application. If so, driller could enter the data himself/herself and avoid the clerk. But form itself is lengthy and probably doesn’t lend itself to this.

Best alternative – rely on map/lot when there’s a subdivision. If use the E-911 data, would only get location of parent parcel. If had geocoder using e911 and map/lot number, with TIGER as a tertiary source, would help. Per Greg – will always require visual review of the data. Water Well Board – horizontal tolerance is 10’. For Greg’s use for geologic mapping, ideal if point is located on the house. So could use building footprint data if available. But can use the data if in correct parcel.

Drinking water – has records from driller installing a well for a municipality. They provide the data to Greg, but collect other information (e.g. water quality, etc.) One approach – one well inventory with additional custom fields for the separate bureaus. At present, can crosswalk them based on various ID fields for historic data so structure is there, but it hasn’t been maintained. Probably only 2 dozen or so that would have to be re-visited to catch up with new municipal/public water supply wells.

2/3 web data entry vs. 1/3 paper data entry.

No field inspections other than major municipal water supply. No inspection for private residential well. Not permits required unless town level. Instead, get a well completion report within 60 days of drilling. And that wouldn’t be Greg’s group anyway since they’re non-regulatory. It would be Drinking Water/Groundwater Bureau. No way to know if someone is not reporting.

Good geocoder would be extremely helpful. In legacy dataset – some wells just don’t plot in the state.

Ham also looking at Data Reviewer for ArcMap – tool to look at results of geocoding and use automated data cleanup tools.

Other challenges – lack of staff. They have a reasonable workflow, but don’t have the staff to do it.