

Ground Water Status and Trends Meeting San Antonio, Texas April 20-22, 2005

These rough meeting notes are respectfully submitted by Terri Arnold – Please see **Guidance** from this Meeting on the PA internal web page (<http://water.usgs.gov/nawqa-only/aq/>) for complete and accurate details.

April 20, 2005 (Wednesday) 1:00pm – 5:30pm

Overview by Wayne Lapham:

FY05 budget for GW Status & Trends activities is ~\$9.5M

Listed principal aquifer groups and group leaders

- Want to reach consensus on issues and have written guidance.
- Will post presentations and notes from the meeting.
- Written guidance finalized within 2 weeks after end of meeting.

NLT Overview by Bill Wilber:

What is the role of the regional teams? Principal Aquifer Team leaders are to be called ‘Lead Scientists’ to emphasize that their primary role is scientific and not management. Workplan and budget development, staffing and personnel are to be done in conjunction with Study-Unit Chiefs, ARHNs and Wayne Lapham.

Communications and Liaisons are important – we’ll want to take advantage of scientific meetings with potentially interested parties. We won’t have a large and specific ‘liaison meeting’ like study units did. We need to take advantage of other ground-water networks where appropriate and leverage NAWQA funds to forward our NAWQA Program goals.

For this meeting, at the end of each session, we want to reach consensus to the extent possible on what approach to take for the specific issue discussed and document that decision in the Guidance from the meeting.

For the Water Quality Monitoring Council meeting in San Jose, it might be beneficial to get people / cooperators who are interested in your principal aquifer to come to the meeting. We might be able to organize a session around those topics of interest. (Gary Rowe is helping to organize the meeting)

Data Warehouse – Ken Skach

Discussed the Data Warehouse interface.

Conditions restrict how the data are retrieved (filters).

Primary schedule numbers – each PCODE is in at most 1 ‘Primary schedule number’.
All methods for the PCODE will be retrieved unless the retrieval is additionally filtered.

QC data will be retrieved unless they are deliberately filtered out.

Netcode and sucode can cause sample data to be retrieved more than once.

Can have a table or a crosstable for output. If you use a crosstable be sure to drill down to the finest level (like 'result date time') so that the multiple values don't get summed into one. If you use 'Result for crosstab' then the value retrieved will be the average value. **Always group by the most detailed sample key. Need to include medium code also or results from different mediums may be aggregated together.**

DWH can do calculations during retrieval, for example: redox potential class is calculated by DWH (based on every sample but only derived for samples with all 5 parameters (DO, NO₂+NO₃, Mn, Fe, SO₄).

You can create (through Nate Booth) permanent citable DWH queries that you can reference in published reports. But remember that the data is continually updated and the stored query may retrieve different data than you used. **Alternative is to make a 'frozen' static data set and put it on your own web site.**

GIS derived ancillary data

Available by sampling point and also by 500-m buffer around the sites or study boundaries.

When is cycle 2 GIS derived data going to be available? May already be available?

- We need to make the need for the data update known. It needs to be requested from Kerie Hitt?

NOTE: Export to 'csv' to fill in blank lines when STAID is duplicated. Ken Skach uses RDB files.

Beware of "Sample-ID" – this is only a DWH generated field. It changes whenever data is refreshed. Don't use this as a key for joining data.

Multiple samples per well:

POSV – Study Units should only have had 1 primary sample per cycle. Sometimes this rule wasn't followed. 'POSV patch' in DWH will give 1 day's worth of environmental data per site per cycle. This patch can give multiple values.

If no primary or multiple primaries are coded then DWH selects the day in the cycle with the most parameters. If multiple days have most parameters then the most recent day in the cycle is selected.

'GW POSV Last Value of Day' returns 1 value per parameter per day – use ONLY with POSV patch. Different samples on a given day may be combined.

NOTE:

The Item 'primary POSV patch' returns y/n.

The Condition 'primary POSV patch flag' – filters the data.

Cycle 1 vs. Cycle 2 dates

- 'nawqa cycle code' in samples folder is hard coded to be the correct date. 4 SUs began later than the others so may be after Oct 1, 2001.

Corrections and updates back to DWH

- Study units must fix the data in NWIS because data are refreshed from NWIS to DWH.
- Target dates are set for refresh.
- QWdata, GWSI, Sitefile is refreshed once per month (total replacement of data).
- ADAPS daily values refreshed 1/year.
- GIS Ancillary data updated much less frequently (as needed).

ACTION ITEM: Coordinate NWIS update requests to Study Units. Updates should be coordinated through Lori Apodaca and the data synthesis group so we don't keep asking for the same data over and over again.

- Ken Skach -- Maybe check for missing data – can the data value be determined or is it unavailable? Consider including flags that can define whether the missing data has not been looked for versus looked for and not available.

Summary of this Data Warehouse Session

Consensus: We want to freeze a static data sets used for reports for future reference. Also consider publishing datasets on a CD to include in the report.

Recommendations about how to freeze a static data set

- 1) TANC style
- 2) Saved query
- 3) Static dataset outside of warehouse

Consensus: Coordinate updates for Principal Aquifer data through Lori Apodaca and the Data Synthesis group to get updates from study units. Need to ask for updates at predictable timeframes to relieve the burden - generally 6 weeks between request and update. Get ARHNs involved early on if not resolved.

Recommendation: Request that Ken Skach help to coordinate data checks on aquifer codes. GW user group is using the National Aquifer Code (From PA map) – this will be stored in GWSI in C93 (lithology). There is also primary aquifer code (C794 – many to one relation between this and National Aquifer Code).

ACTION ITEM: Ken Skach to recommend to Sandy Williamson to get Oracle add-on for subqueries for aquifer teams.

ACTION ITEM: To get cycle 2 GIS data updated, need to let Kerie Hitt know what networks are missing and what information is needed.

Updating PA Datasets in DWH

ACTION ITEM: Terri, Ken, Curtis, Chip Hunt and Wayne to work on a proposal to modify PA netcodes to be a report code, not a PA code for review and consensus by the PA Lead Scientists.. These codes refer to reports not to aquifers. Consider calling this a 'report code' or 'report netcode', not a 'netcode'. - Set time period to get the rest of the site lists for the PA netcodes.

Proposed PA factsheet (example handed out)

- Might be used to help develop program by handing it out to interested parties. This fact sheet should point out the rich dataset we have.
- **ACTION ITEM:** Have a group consisting of Terri, Marian Berndt (Study-Unit Chief & PA Lead Scientist), Pixie Hamilton, an ARHN, and Wayne Lapham to help flesh out the fact sheet by end of FY05.

Comparing PA data to National Data (example handed out)

- High Plains is writing their final report and they'd like to put their data into a larger context.
- High Plains would compare about 10 constituents.
- Two options: Compare High Plains data only to aquifers of their type or against all 20 aquifers.
- Not all PAs have identified their site lists yet. Would be important to use the same datasets the PAs are going to show results for in later reports.
- Should data be compared to individual principal aquifers or to grouped principal aquifers?
- **ACTION ITEM:** High Plains should just select the data they are going to use and freeze the data set used for the analysis.
- Different PAs may have different constituents of interest.
- Creating comparison graphs may be valuable for all PAs but funding for this effort is currently not planned in the GW S&T budget – who would do the work. Sharon Qi is able to help make these graphs for the High Plains. Maybe with help from Ken Skach or Terri Arnold. Could be done for the 10 or so constituents that are identified for the High Plains.
- High Plains is only using cycle 1 data
- Other PAs are not ready to compare against other PAs. Need to focus on their own PA before comparing to others.
- **ACTION ITEM:** Sharon Qi, Ken Skach, and Pete McMahon could retrieve data using site lists we have compiled already
- **Consensus/ACTION ITEM:** High Plains will do their own comparison graphs, archive their static dataset, and other PAs will do what is needed when they are ready. Explain differences as needed. Ken Skach can help other teams as needed when they are ready.

Summary of this Data Warehouse Session

- Include all PA contacts as a source for people to go back to for questions/program development.
- Complete plan for a PA Fact Sheet by end of FY05.
- Rework report netcodes to identify principal aquifer teams/reports not aquifers.
- Ken Skach will work with High Plains to get data set for comparisons.

Water Use effort – Molly Maupin

(1) Compilation of Principal Aquifer withdrawals in 2000 is complete for irrigation, industrial, public supply for fresh ground water. Report ready to go to press. Next planning effort is for the 2010 compilation.

ACTION ITEM: Molly to estimate cost for estimating 2005 withdrawals for the ~16 Pas for the 2005 compilation that will occur in FY06. Can we implement this for the 2005 compilation, rather than wait until 2010. What kind of effort would be required? This factor may affect if NAWQA/PA teams are interested in funding the effort.

(2) Stream-valley aquifer withdrawals (2000) disaggregate stream-valley aquifer data from alluvial aquifer data. If identified as glacial, it was not used as stream-valley. GW atlas used to define the geology. Will report on this in FY2006.

(3) Domestic withdrawals by aquifer.

- Info not widely available. Withdrawals by county do not exist for all states. Where data are available they could be used.
- Molly Maupin thinks that this info could be estimated.
- 1990 census info on the geolytics cd has info about the sources of water (public or domestic). Could estimate current use based on the 1990 data and the population increase/decrease.
- Domestic wells are < 1% of total freshwater withdrawals.
- MA and TN have errors in reporting domestic population.

Recommend:

Going to GWSI retrieval and assigning domestic withdrawals based on GWSI database. Each state would need to be handled differently because the data availability is not uniform. Use C714 code to help identify the PA from which water is withdrawn.

Some states have domestic withdrawals by aquifer but not many

Public supply data from EPA and SWUDS

www.dsd.ce.usgs.gov/nawqa/vocns/wuse -- Have information from the water-use committee and the National Resource Council.

(4) SDWIS to SWUDS – site specific database

Linking individual wells to aggregate use and storing withdrawals for each link.

Future plans are to link return flows and WWTPs to this database.

Thursday April 21, 2005

Censoring and Data Analysis Issues – Mike Rupert

MRL – minimum reporting level – commonly based on subjective criteria. It is the smallest measured concentration of the substance that can be reliably measured

MDL – method detection limit (EPA) is the minimum concentration that can be measured and reported at 99% confidence. Problem is that MDLs have multiple sources of variation.

LT-MDL – long-term MDL – Requires collecting more replicates (at least 24). Collection of more replicates provides better information on variance.

LRL – Laboratory reporting level – less chance of false positives

LS – lowest calibration standard

See Helsel, 2005 page 9: 3 methods for dealing with censored data

- 1) substitution methods (worst method).
- 2) maximum likelihood estimation – good for large datasets (more than 25-50 observations).
- 3) nonparametric methods – rank data for analysis. May need to alter values so less-than values rank properly.

- in 1992 lab used MRL.

- in 2002 lab used LRL.

– See examples for handling censored data on the slides.

Examples from VOC team and circular -- Mike Moran

Circular uses cycle 1 data for VOCs. They have an approach document – posted on the internal web site.

VOC reporting levels are highly variable between different VOCs and between different networks depending on when the lab analysis was done. Could compare: (1) detection frequencies or (2) median concentrations.

Decision was to select median LTMDL among all VOCs. Have 87 VOCs but only looked at the 55 of most interest. Concern is about the rate of false negatives rather than the rate of false positives. At 2 times the LTMDL, this decision should result in less than 1% false negatives.

For the VOC Circular, the VOC team is using 2 assessment levels (0.2 and 0.02) so that all data can be considered. The lower assessment level is used only for the most recent data ('04 and '07 SU data). Detection frequencies are comparable between the two. Detection frequencies at 0.02 levels are considered 'estimates'.

The VOC Circular approach is to compare findings at both assessment levels. If the story doesn't change, report out a one assessment level. If the story changes, report the findings at both assessment levels.

NOTE: First decide what question you want to answer and then determine the censoring method you want to use. If you compare constituent detections, then you need common censoring methods.

Pesticide Team Approach - Paul Stackelberg

Discussed biasing Interpretations as shown in Dennis Helsel's new book (2005).

Jeff Martin from Indiana worked a lot on the best estimate of the method detection level for every pesticide of interest from Cycle 1.

Censored data processed in 3 ways:

- 1) set to final LTMDL.
- 2) set value to < lowest E value for percentiles.
- 3) set ND for detection frequencies.

NOTE: How you handle censored data depends on the questions you want to answer. What is the goal? Are you comparing individual constituents? Are you lumping? If you are comparing constituent detection frequencies you need to use common censoring methods to make fair comparisons. If you are lumping then there is no need to censor.

Pesticide NS team is using 3 censoring levels in their Circular for comparisons. Uncensored (all detects, 0.01 ug/L, and 0.1 ug/L)

Question: Are the values of 'best estimate' for long term method detection level that Jeff Martin came up with available? Yes, the spreadsheet is available from Jeff Martin.

ACTION ITEM: Jeff to post the spreadsheet on the pesticide team's internal web page.

ACTION ITEM: Set up a matrix of the commonly asked questions and then suggested methods for handling censored values? Come up with 'rules' to follow.

If showing co-occurrence is the goal, you don't necessarily have to have all same censoring levels. If comparing VOCs to pesticides then would need to have same methods to be able to 'compare apples to apples'.

Summary of censoring plans by PA teams – Chip Hunt

ACTION ITEM: Lori Apodaca et al to have a conference call to discuss and document how to censor trace elements. Get peers to get our best ideas down on paper and make sure we haven't overlooked anything important.

ACTION ITEM: For each applicable nitrate publication, document assumptions related to the determination of natural, background nitrate concentrations.

DISCUSSION/Recommendation:

How much discrepancy in PA approaches to censoring is there? So far approaches seem relatively consistent.

Document that Mike Rupert handed out for trends is a good guidance document for everyone but it may not be detailed enough. We need to develop censoring approaches to address specific questions. For example, what is the median of all detected values? What is the median of ALL samples? Suggest that we put together a library of questions that we may want to answer. Let each of the groups state what method they'll use.

ACTION ITEM: PA Lead Scientists - Brainstorm a list of questions we likely will answer in many of the reports. Identify which method we will follow or come up with a new method to address those questions.

QA/QC info for reports – Lori Apodaca

How to include qa/qc info in reports. What should be included?

QC for national synthesis. available for 91, 94, 97, 2001 starts.

2 QC reports are available – see VOC internal web page. (contact Dave Bender for questions).

QC results should be referenced as 'written communication' from VOC National Synthesis.

QC -VOC samples were not censored because there was no systematic contamination.

2 published pesticide QC reports Martin, 2002 and Martin and others, 1999 – on internal pesticide web page. Contact Jeff Martin with any questions.

1997 national summary of pesticide detections in GW is available.

TE QC reports available – Koterba, 2000. Apodaca and others in review.

How should QC data be included in reports? Each report should state how many and what type of field and lab QC data collected. Results from QC samples should be summarized. The appropriate references may be cited instead of included in each report.

Boxplots in SPlus – Terri Arnold – see handout

Terri described how to write simple scripts in SPlus to easily generate a series of boxplots (or any type of graph).

Ancillary Data Sources – Curtis Price

NLCD accuracy varies a lot because tiled across country.

percentage grids at 1km to show percent landuse

NLCD 2001 – updated database. Not directly comparable to NLCD so %urban won't compare – they aren't equivalent. – has 3 derivatives (%impervious, %tree canopy, ??)

Population density grids – grids of population density by block group. Landscan 2000, CEISEN are 2 sources

Soils – SSURGO (county scale), STATSGO (state scale map units)

Places to get spatial ancillary data:

- NAWQA GIS page
- Water NSDI node
- geodata.gov
- landcover.usgs.gov

New data (contact Gail Thelin, Kerie Hitt, Curtis Price)

- Geolytics Census DVD “trends analysis package” – being purchased by NAWQA
- NLCD 2000

Contact Gail Thelin if you want a copy of this Geolytics data.

Site characterization:

Identity – at a point

Buffer – for percent in buffer area

There are already built-in weight tables for block groups for all NAWQA sites. – this keeps you from having to do the overlay again. (Kerie has good metadata posted on the web site).

GIS illustrations pitfalls:

ask questions! see gio.usgs.gov/egis/illus or ask GS Help GIS

Weighted Pesticides info is on GIS web page.

Applications of ancillary data:

John Mullaney gave an example of applying national datasets to Glacial work.

Betsy Frick presented data on trends in pesticide use in the Floridan – only 1992 and 1997 data have been found. Need annual data for trends.

Pete McMahon – High Plains Study – discuss work of Jason Gurdak and Sharon Qi
wedge-shaped buffer around well used for modeling

Mike Rupert/Chip Hunt – GW recharge data from RASA flow models. WEVO aquifers. Need recharge info to model climatic and ag differences in these systems. Recharge estimates from RASA are available.

Joe Ayotte – water use data to estimate population with high arsenic in NECB. USGS water use had info about population on public vs private water. Census water use data contained info on if people used drilled or dug well. In New England, dug wells are usually in the unconsolidated aquifer/drilled are in the bedrock aquifers.

Summary of this Data Warehouse Session

Need to determine the timetable for NLCD 2000 availability.

Need to coordinate pesticide use data updates.

Need to compile National Datasets from Alaska and Hawaii along with the rest of the U.S.

Extrapolation session – Bruce Lindsey

The goal is to use the data we have to make conclusions about ground-water quality.

The definition of extrapolation: predict QW conditions in areas without samples. Degrees of extrapolation based on robustness of methods. Is the area you are extrapolating to similar to the area you are extrapolating from?

You have to make some assumptions. Need validation data sets. Susceptibility vs vulnerability map – include source then it's a vulnerability map.

Terri Arnold presented extrapolation techniques using cluster and regression tree analysis.

Bruce Lindsey presented his work using multiple linear regression.

You have to assume a linear relationship to extrapolate.

If you predict a value that implies certainty in the value.

Not many examples using linear regression for gw data. May be good for exploratory data analysis.

Tom Nolan – PCA analysis on nutrients and major ions – determined factors that explain a large part of the variance the nitrate national data set and yielded insight into the mineral source of phosphorus. JEQ v 28 – on nutrients synthesis website.

Mike Rupert – probability mapping of nitrate and atrazine using logistic regression. report is online, or ask Mike for a copy. Also a fact sheet about improvements to DRASTIC model.

Logistic regression combines ordinal and continuous variables. This method was originally developed for epidemiology studies. All possible combinations of variables can be tried and the best model is selected.

The optimum buffer radius for urban wells was 500m but for ag land it was 2,000m. May have to do with well depth/depth to water and/or point sources.

If you have too much variability and things aren't falling out, try using a variable like hydrogeomorphic regions to identify sites with similar hydrogeo characteristics.

Verification is a very important thing to do.

ACTION ITEM: Email the handout to everyone. Also post presentations on the web.

Friday April 22, 2005

Health Based Screening Levels – Patty Toccalino

Patty Toccalino handed out a table with some health based bench marks.

There is a report from USGS that is about the development of the HBSLs in cooperation with USEPA and New Jersey. Findings from this report are applicable to local scale studies only (maybe up to state wide).

HBSLs are not indicative of violation of drinking water standards. These are NOT regulatory values. Using screening levels is not equivalent of a risk assessment. The HBSLs are not necessarily indicative of adverse health effects.

USEPA MCL/state MCL – maximum contaminant levels for regulatory purposes

Guidelines – not regulatory:

Lifetime health advisories (LHA) – concentration not expected to have long-term noncarcinogenic health effects

risk specific dose – guideline to judge cancer risk. USEPA IRIS program has risk assessments. state guidelines

HBSLs – 3 types of compounds evaluated: carcinogenic (use RSD if available), noncarcinogenic (use LHA if available), possible carcinogen

Use of HBSLs enable us to give early warning of possible/potential human-health concerns.

Some pesticides don't have toxicity values so HBSLs cannot be calculated for those yet.

On a local scale, only compare unregulated compounds to HBSLs. Compare regulated compounds to USEPA and State MCLs.

USEPA and State MCLs may be higher than HBSLs. These regulatory measures take into account economic factors. Treatments to get water down to an HBSL may be cost prohibitive for water treatment utilities.

Communicating water-quality findings – work with drinking-water agencies and cooperators BEFORE making any statements about water-quality findings. Consider how the reporting of findings will be interpreted (or mis-interpreted) from multiple perspectives (such as by reporters).

Future work will include a national analysis of VOCs and Pesticides in GW from an HBSL perspective.

NOTE:

- For carcinogens, there is a range of HBSLs based on the range of cancer risk. The lower range of the HBSL is lower than the MCL and the upper range of the HBSL is higher.
- For noncarcinogens, the HBSL = MCL in most cases.

MCLs are appropriate for looking at finished drinking water only (that serves at least 25 people(?))

Examples on using HBSLs for QW data – Examples were presented by Greg Delzer

Reports and Publications session – Suzanne Paschke

Circulars should not present new data. They are for the general public.

Could publish data as Digital Data Series Format and then published reports could reference the DDS.

Recommend: Plan what type of report outlet will be used for each PA report.

Recommend: updating report proposals/outlines

Recommend: post spreadsheet on the web that has report title, lead, theme. There are some resources already on web → email links to everyone.

Recommend: Add PA aquifers to NAWQA reports planning database. (Rosemary keeps information?)

Recommend: regular updates to PA web page for information sharing

Recommend: get core group to decide how to present PA info in reports...similar report format, similar covers, etc. What is the big picture vision. What is the marketing plan. Should have a common look and feel but not to hem anyone into a mold. Strike a balance that is everyone is comfortable with.

May be able to highlight local (SU) findings within a regional report. Could show regional differences across an aquifer by using more local findings to help explain variations.

Report review: Who in NAWQA is going to review these reports? Will go through normal publications procedures still.

One issue to be addressed: similar findings in various aquifers but different interpretations. Need to keep National Synthesis teams in the loop so we don't have conflicting results.

Recommend: Whatever the report topic, keep National teams in the loop and have them provide feedback on our reports. They can provide a technical scan but maybe not a whole peer review. Work through ARHN if needed. Include key outside agencies on the review process.

Regional public affairs people can help you write and distribute press releases. Keep the press release to 3 key points. Have them review the release. Give them enough lead time. Press releases may need to be repeated at key times to get the publicity for what we're doing.

Report Distribution – Kelly Warner

Liaison list categories (should have at least one from each group):

National organizations
nonprofit organizations
regional organizations
state organizations
local organizations
nonprofit trade/professional organizations

Ideas: For domestic water supply, some of our stakeholders may be local homeowner associations, state health boards, and county water authorities. American Groundwater Trust? County commissioners.

Recommend: work with Pixie Hamilton to develop list. Sort National list for ground water interest. Each PA coordinate with study units to refine liaison lists and coordinate with Pixie. Work with ARHNs to develop lists in states with no NAWQA. Tie in ground water specialists and other groups in USGS that want to build USGS GW program.

The liaison list would be used for report distribution and for future program development.

Recommendation: Each report should make sure you have some money in budget to present your results somewhere.

How soon to get stakeholders involved depends on how much the report is going to impact them.

Web pages and web distribution of reports - Terri Arnold

All new USGS reports must be available on the web. They should use a persistent registered URL and be housed in Reston. Local web pages at the District level could link to the persistent URL.

Terri Arnold discussed the need for a public web site that introduces the public to Regional Synthesis and Principal Aquifer work in particular. The regional synthesis web pages would parallel the National Synthesis pages and have both PAs and MRBs as components. The MRB team could build their pages when they are ready. Terri is already working on internal pages for each of the principal aquifers. The internal web pages as well as Pixie Hamilton's PA fact sheet and the internal NAWQA PA web pages could provide some material for a public web site.

Wrap-up – Wayne Lapham**Consensus, Recommendations and Action Items:**

Session leaders to work with session team to update guidance, then place updates on the web.

Data Warehouse

- Coordinate updates for principal aquifer data through Lori Apodaca.
- Ken Skach will add data checks on aquifer codes. → Ken Skach work with Kelly Warner and other on the logic of a particular check.
- Terri Arnold and Wayne Lapham – work on PA report netcodes – include Ken Skach, Curtis Price and Chip Hunt.
- Prioritize oracle add on for subqueries for aquifer teams → Ken Skach
- PA Fact comparison Fact Sheet – group to work out the details – Terri Arnold, Wayne Lapham, Marian Berndt (SU chief and PA team lead), and Pixie Hamilton

Consensus: High Plains will make their own comparison graphs.

Water Use

- Determine cost of determining water use for all uses or population served for dom and pub supply → Molly Maupin, Wayne Lapham and Bill Wilber

Data Analysis and Censoring

- Jeff Martin to put spreadsheet of Pest LTMDLs on web page.
- Matrix of commonly asked questions and suggestions for handling censored values → data analysis session team (Mike Moran/Paul Stackelberg lead).
- Develop guidance to handle TE censored values → Lori Apodaca (TE NS) and TE report teams.
- Address use of mixtures in regional analysis – relevant info (rethink usefulness of just listing mixtures). Highlight relevant mixtures only – is there a story? Work with others like CDC to determine what information is relevant to present? → Patty Tocalino, Lisa, Knowel, Bill Wilber

Consensus:

- Make clear in reports how an assumed background nitrate value was determined (e.g. for the nitrate probability maps) → nuts NS, nutrient report teams.
- QC: refer to National QC reports in PA reports to document quality of samples.

Ancillary Data

- Need more frequent updates to national pesticide/chemical use data (all national data really) → Bill Wilber, Gail Thelin
- If there is a water-table map available, consider using 90-degree-angle rather than circular buffers for investigating effects of land-use on ground-water quality.

Extrapolation

- Consider variety of approaches from simple to complex for extrapolation of findings. Extrapolation is an evolving process as your understanding of the system improves
- Add PCA part → Mike Rupert, Wayne Lapham, Tom Nolan
- Bruce Lindsey → add multiple linear regression info
- Post handout on the web → Wayne Lapham, Terri Arnold

HBSLs

- For now, all follow the NJ guidance on use of HBSLs for reporting out on drinking-water quality.

Reports

- add planned reports to NAWQA planned reports list
- collectively make long term vision about reporting out on a regional scale over long term → Chip Hunt, Wayne Lapham, others?
- identify/develop review plan for each report
- lead authors identify what report series to use

Need for progress reviews on GWS&T reports

Is there a need to see if reports are on track? – all or select reports? When? Progress might affect FY06 budget. Review Process? – would need to be done by the time the workplans are done.

By mid-June 2005, hold conference calls with NLT, Wayne, PA Lead Scientists to discuss status of ongoing reports. Identify reports for which additional review is warranted. Complete calls by mid-June, 2005 so that any decisions made about reports can be implemented as part of the FY06 work plans.