

Environmental Monitoring Quality Assurance in Indian Country

Melinda Ronca-Battista



Northern Arizona University – Tribal Air
Monitoring Support Center

TAMS Center:

- US EPA
- Northern Arizona University
- Mission is to develop tribal capacity to assess, understand and prevent environmental impacts that adversely affect health, cultural, and natural resources

TAMS Center methods:

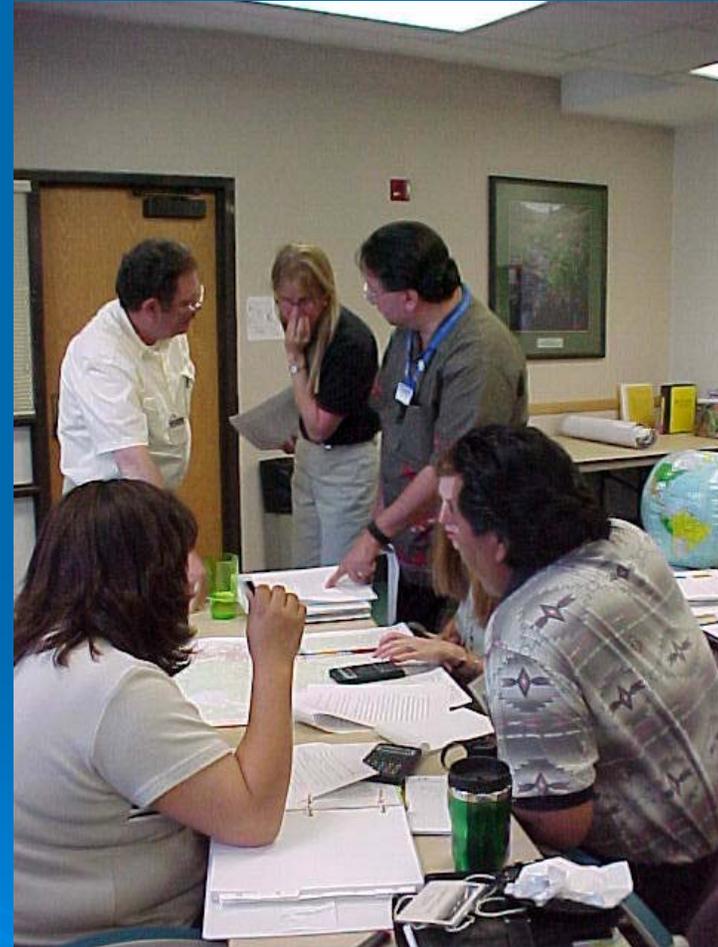
➤ Workshops

- QAPP-writing
- ALL workshops incorporate QA principles
- on-line courses

➤ Professional Assistance

- Via e-mail, telephone
- On-site, multiple tribes if possible

Workshops:





QA terms are NOT USED initially

- Emphasis on common sense and tools
- analogies used as parallels
- Examples of working systems and nonworking systems
- Your system of paying your bills = a “Quality System”
 - Checklists
 - SHORT SOPs that include “COMPLETE THE LOOP” philosophy, e.g., PLAN, ACT, CHECK, FIX
 - (1) plan a time to pay your bills and set up a system, (2) first see if check will bounce, (3) write check, (4) mail, (5) see if cleared, (6) see if credited, (7) devise reminder to mail it sooner next month
 - Control charts of \$ in the bank, with a lower limit, and alarms built into the system

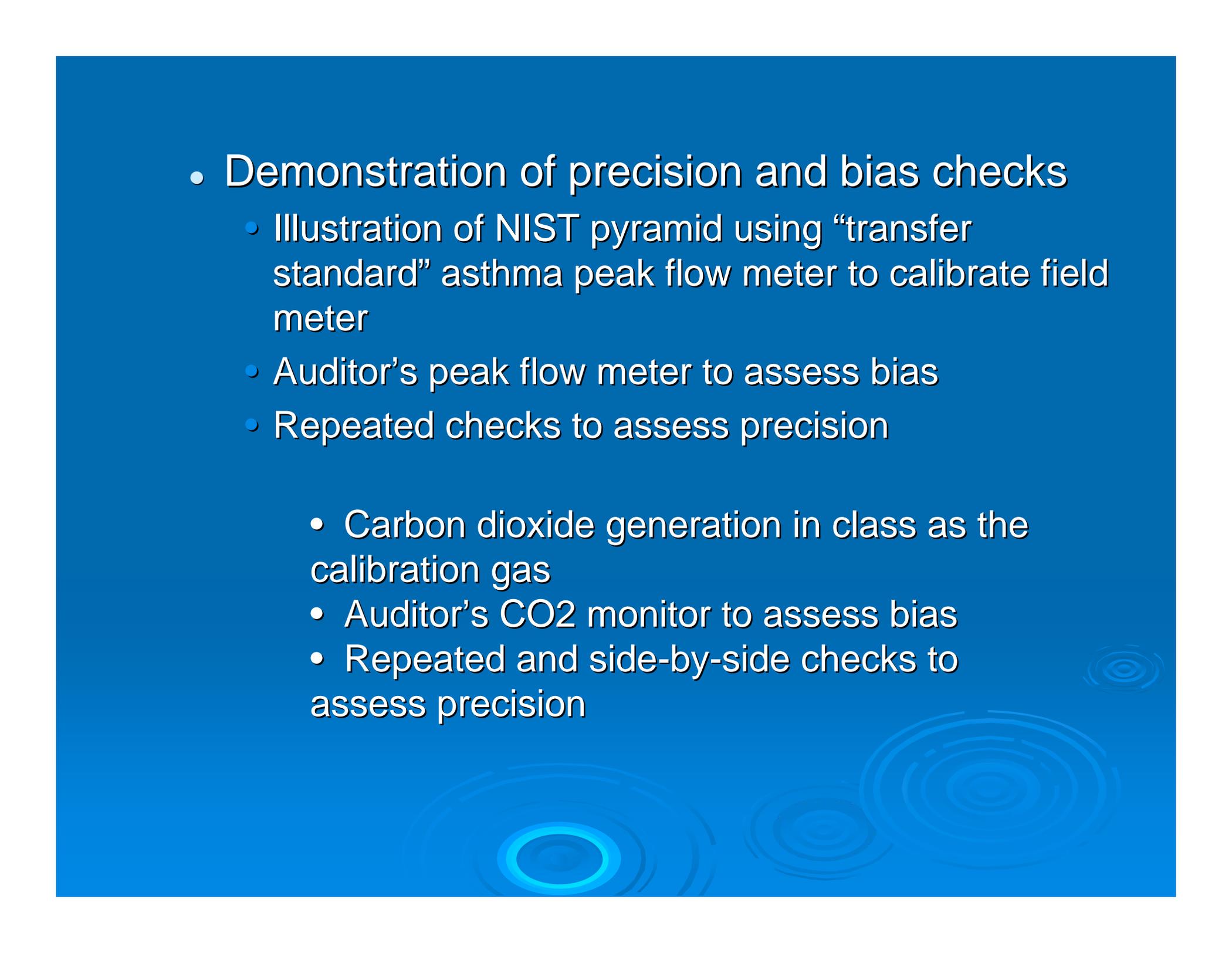
Simplest examples first, then more complicated

- Flow rate through monitor = peak flow on asthma peak flow meters

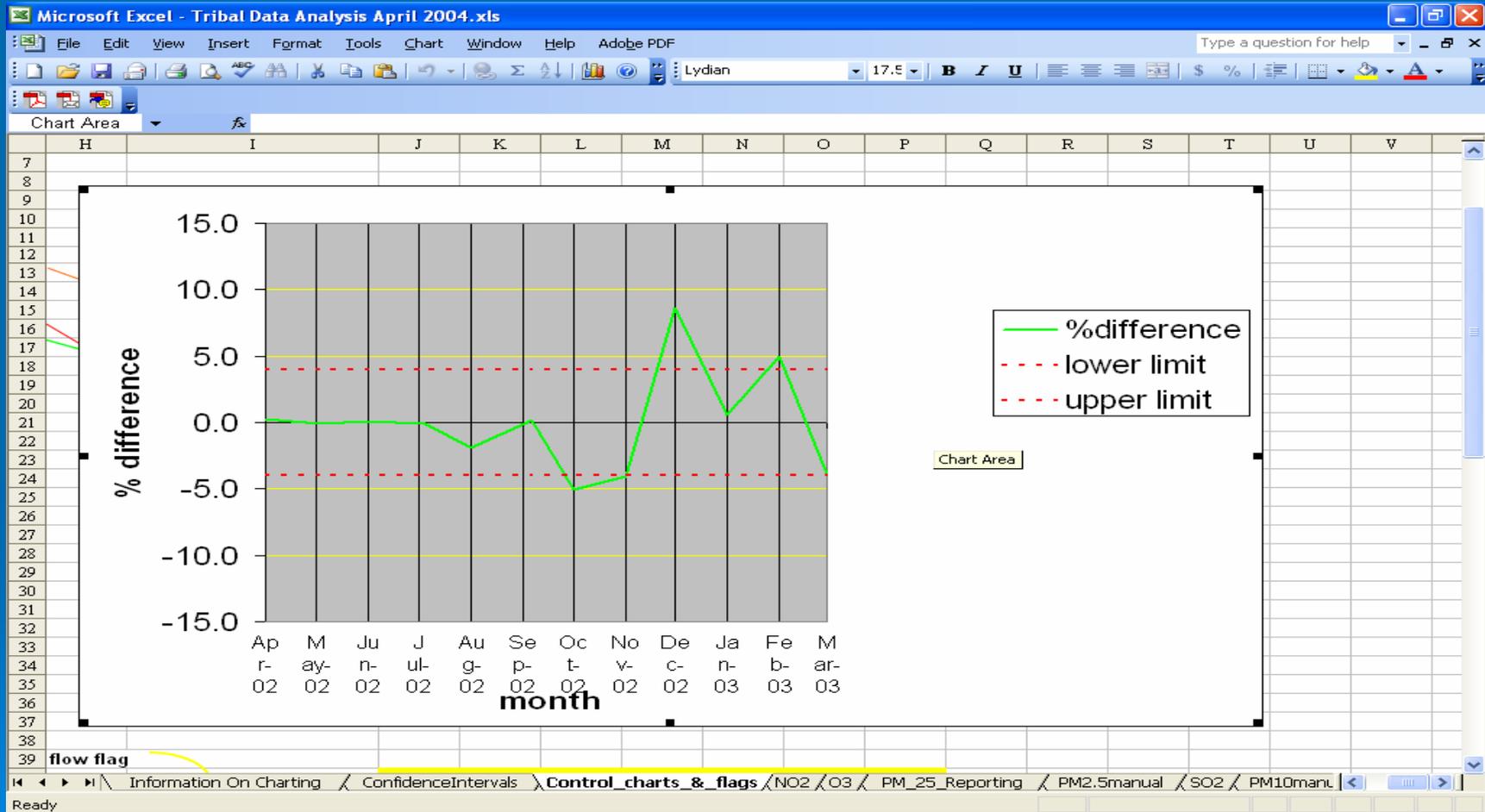


More elaborate: CO₂ monitors



- Demonstration of precision and bias checks
 - Illustration of NIST pyramid using “transfer standard” asthma peak flow meter to calibrate field meter
 - Auditor’s peak flow meter to assess bias
 - Repeated checks to assess precision
 - Carbon dioxide generation in class as the calibration gas
 - Auditor’s CO₂ monitor to assess bias
 - Repeated and side-by-side checks to assess precision
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Control charts used to illustrate the principle FIRST, then applied to flow rate through air monitor



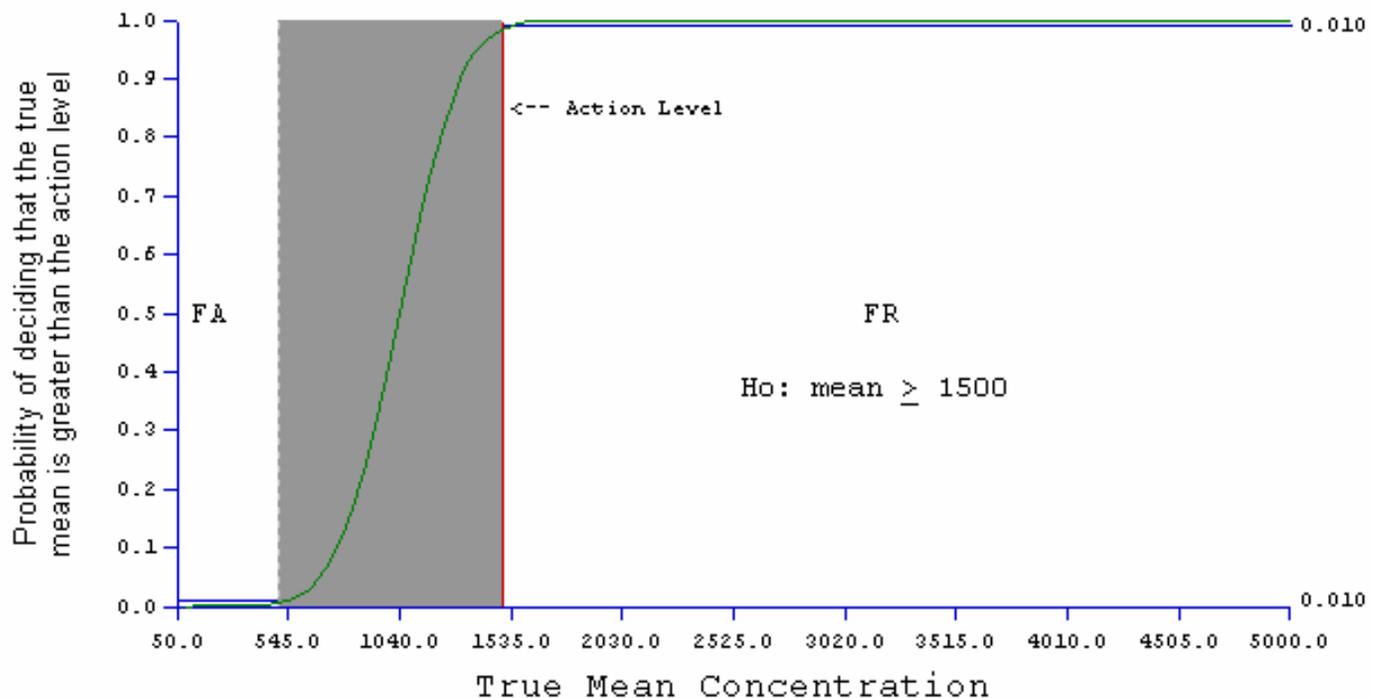
- Data Quality Objectives are developed WITHOUT terminology but with RIGOR
- CO₂ monitors are used in classroom to assess why people are fainting
- EPA's DEFT software is used to produce performance curves and evaluate alternative designs

CO₂ exercise:



- OSHA PEL =5000 ppm, so class usually chooses 1500 ppm as our AL
- nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate. Above 8% nausea and vomiting appear. Above 10%, suffocation and death can occur within minutes.

Estimated Performance Curve



Simple Random Sampling
 Action Level = 1500.000
 Cost = \$3150.00
 Sample Size = 3

Decision Error Limits		
concentration	prob(E)	type
500.000	0.010	FA
1500.000	0.010	FR





Professional Assistance:

- On-site or at TAMS Center
- Emphasis on sharing experience and tools
- Multiple tribes
- Can be for NAAQS monitoring or special projects



Lessons learned when starting a project from “scratch”:

- ***Pilot testing*** critical to reveal problems
 - Communication issues
 - documentation
- ***On-line*** documentation and ***examples***
- ***Allot time*** at the beginning of a project to plan, 16 hours for each person involved to READ THE QAPP, and at least 4 hours each week for QC



Lessons learned from “scratch” projects, cont.:

- Small staffs dictate multiple “hats”
- 1/10 time allotted to wearing the “QA hat”
- Ex: 4 hours every Monday morning the site operator reviews previous week’s data
- Swapped QA duties between departments—this requires documented training and procedures

Mid-stream lessons:

- ALWAYS start with the question “why are we making these measurements?”

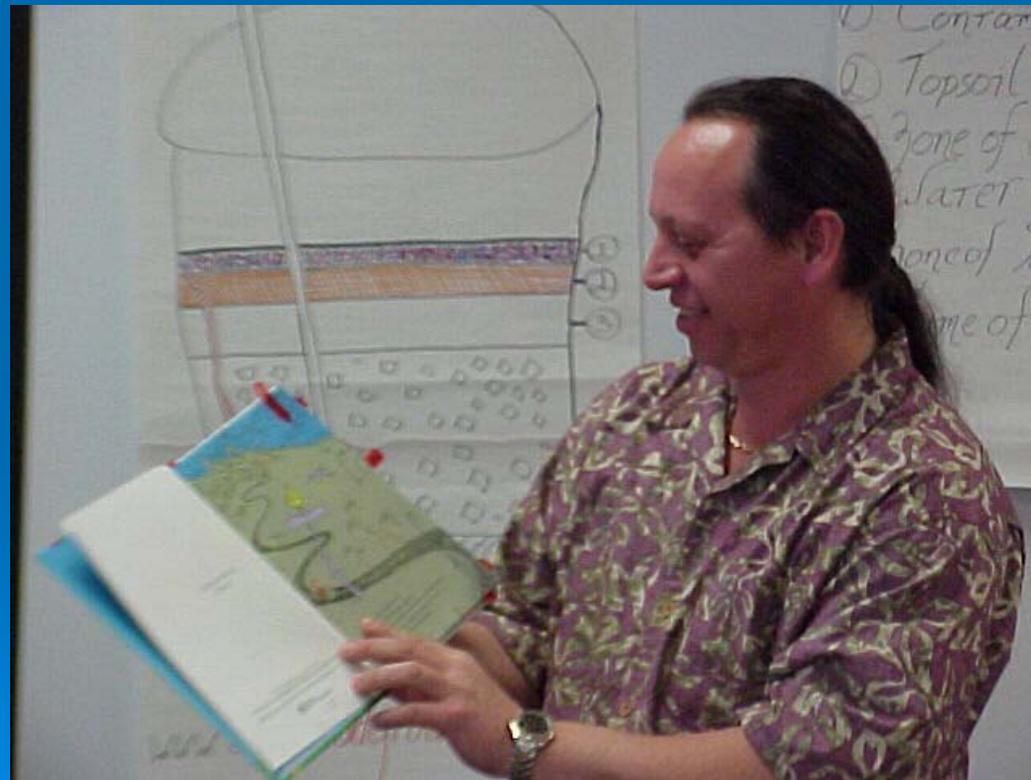




7 steps of DQO process are used to get project back on track



ANY documentation is better than none—emails, notes, scraps of paper can be scanned, saved, and used to reconstruct records



Share the wealth:

- On-line data management courses accessible to non-tribal users, summer '05
- Resource Information Center available now:
<http://www4.nau.edu/tams/services/ric/index.asp> (or follow from our website)
- <http://www4.nau.edu/itep/index.asp>

Melinda.ronca-battista@nau.edu

