



October 2007 Board of Directors Meeting

Minutes and Briefing Package

Today's Meeting Minutes, October 24, 2007	Error! Bookmark not defined.
Previous Meeting Minutes, June 2007	7
Location of CUAHSI Biennial Meeting	17
Quarterly Report for Waters Network Conceptual Design Subcontract.....	18
Governance Alternatives.....	23
A Proposal for a Water Science and Engineering Consortium.....	28

Meeting Minutes
CUAHSI Board of Directors
Telephone Conference: October 24, 2007

→ Symbols in the text are placed to draw attention to votes, action items and other priority agenda items.

**Notes for the meeting are recorded by the CUAHSI secretary (Kevin Dressler) as representation of the discussion topics and point and are not the opinion of the secretary

Call to Order: 5:05 pm (Claire Welty)

Roll Call: (Kevin Dressler)

X – denotes director was present

Term expires 12/31/2007

Wendy Graham, U Florida (WATERS Design Liaison): **X**

Jeff Dozier, UC Santa Barbara:

Claire Welty, UMBC: **X**

Laura Toran, Temple (Observatories Liaison): **X**

David Tarboton, Utah State (Education & Outreach Liaison): **X (Not official, has resigned in August; Here to present on WATERS document progress)**

Term expires 12/31/2008

Jay Famiglietti, UC Irvine: **X**

Praveen Kumar, U Illinois: **X**

Venkat Lakshmi, U South Carolina (Science Plan Liaison):

Greg Pasternack, UC Davis (HMF Liaison): **X**

Fred Scatena, U Penn: **X**

Term expires 12/31/2009

Efi Foufoula, U Minnesota: **X**

Larry Murdoch, Clemson (Synthesis Liaison): **X**

John Selker, Oregon State: **X**

Fred Ogden, U Wyoming: **X**

Juan Valdes, U Arizona (HIS Liaison): **X**

Officers: Rick Hooper (President), Kevin Dressler (Secretary)

Others Present: Jonathan Duncan (Project Manager), David Kirschtel (Program Manager)

Approval of Today's Agenda

→ Motion to Approve revised agenda: Graham

Second: Scatena

Discussion: Add Larry Murdoch's report on the two NSF-funded Synthesis teams and the report on the HMF competition from Richard Hooper

Approved: Yes

Approval of Minutes from June Meeting (see attachment)

→ Motion Approve: Selker
Second: Murdoch
Discussion: No
Approved: Yes

Location of August, 2008 Biennial Meeting (see attachment)

- Foufoula has suggested having the meeting at NCAR in Boulder to have it more scientific and cheaper
 - Primary disadvantage is distance from NSF in terms of their attendance
 - More agency people would also be able to attend in WDC
- No contracts have been signed yet
 - Have competing bids for a meeting planner
- What is the goal of this meeting?
 - To have a community science meeting
 - People with community projects (e.g. WATERS Testbeds, CZO, etc) can showcase efforts
 - Small number of longer talks and posters
- Tremendous advantage at NCAR due to its facilities, proximity to one of the CZOs, proximity to NEON, others – Scatena, Selker
- Challenge we are faced with is getting the message of what we are doing across NSF (beyond the hydrology program) – Famiglietti
 - Want to maximize NSF participation
 - Could just invite Art Goldstein and the new AD of Geoscience
 - Attract with the science focus and the CZO focus of the Boulder location
 - Another point may be an “observatory position paper” and provide to NSF as a result of the workshop

→ Motion to Approve Biennial Meeting location for NCAR in Boulder: Selker
Second: Graham
Discussion: The NOAA CPPA program has a meeting in August – need to coordinate
Approval: Yes

WATERS Status Report (see attachment)

View the attachment for the complete report but below is a summary for brevity

- David Tarboton, Roger Bales, Martha Conklin and Ilya Zaslavsky are being paid by CUAHSI to engage this effort
- Series of meeting so far
 - Friendly review in May (Schnoor was main author until this time)
 - Presented a powerpoint to the NRC committee (George Hornberger, chair)
 - In August a draft conceptual design was submitted to NSF (again, this was mainly the authorship of Jery Schnoor with limited time to edit from the CUAHSI contingent)
 - Draft was criticized b/c there was a gap between the science and the infrastructure proposed to address the science
 - Doug James provided comments which led to a the current approach of a series of case studies with explanations of instruments and approaches to address them
 - Before the CUAHSI regional meetings a draft executive summary was circulated to NSF and was not received well
 - This reinforced the need to provide good science requirement case studies
 - Need to articulate a compelling integrative them
- WATERS project office has received an extension
 - Organization chart is attached

WATERS Governance Alternatives (see attached alternatives)

- If there is another year of planning, NSF has mentioned going forward with only one entity or organization to represent the community
- Does CUAHSI retain its current structure or does it reconstitute to a larger interdisciplinary corporation?
 - Mixed response from the Board
 - General feeling is that it is counterproductive in fitting science to an MREFC opportunity rather than focus on the science that the community feels needs done and then letting the opportunities emerge
 - Premature to take any sort of vote on course of action
 - ○ Suggestion to expose the issues to the broad membership by first having a panel that discusses the alternatives in a debate format (Efi Foufoula and John Selker to facilitate the debate. After that there is a straw pole of the membership Ahead of the debate three 1-page documents (Hooper to open the argument; 1 document from each of Selker and Foufoula to provide point and counterpoint of the debate) should be distributed to the membership. Further decision to be addressed in January Board meeting

Engagement of Burke Associates for representation

- Foufoula reports that this group can both keep CUAHSI informed of congressional activities/movement and advocate for CUAHSI
 - Hooper to explore what this means in November – will report back in January
 - Engagement may require funds from non-NSF sources
 - To do this we will need to better establish why we would this and the benefit (whether it costs money or not)
 - One way to do this is to try it for one year to test the viability
- Board reminds us to make sure that CUAHSI's mission is clear in that we are not talking about large water projects but research

Synthesis Effort (Larry Murdoch)

- Both teams have gotten started
- Main thing they have done is a pair of meetings
 - Illinois had about 35 people attend from many institutions
 - At the end there were about ½ dozen clear directions that were formed
 - David Kirschtel (CUAHSI) developed an online survey that will report back an assessment of project successes
 - UNH group met in October – 12 members
 - This was more of a planning meeting for the leads on the project
 - Hired a postdoc Mark Green
- CUAHSI fellowships have been advertised, 9 applicants and 4 positions
- Two groups collaborating on a special session at Fall AGU with 35 papers
 - Will also be some team meetings ahead of AGU

HMF Competition (Richard Hooper)

- Advertised for Director of HMF Geophysics
 - Some responses from USGS and some university responses
 - Rosemary Knight reviewed the proposals. Some were for affiliate nodes and only a few were for the actual directorship role
 - Rosemary writing up review for the ExCom and then to be ratified so that a proposal can be written to NSF for December 1st

Adjourned: 6:41 pm

Motion to Adjourn: Selker

Second: Foufoula

Discussion: No

Approved: Yes

Appendix



Meeting Minutes, June 2007

*CUAHSI Board of Directors
AGU Building, Washington DC
June 18-19, 2007*

Monday June 18, 2007

→ Symbols in the text are placed to draw attention to votes, action items and other priority agenda items.

**Notes for the meeting are recorded by the CUAHSI secretary (Kevin Dressler) as representation of the discussion topics and point and are not the opinion of the secretary

Call to Order (Claire Welty) – 8:10 am

Role Call of Current Board of Directors (BoD): “X” – **Indicates Present**

Term expires 12/31/2007

Wendy Graham, U Florida: X

Jeff Dozier, UC Santa Barbara: X

Claire Welty, UMBC: X

Laura Toran, Temple: X

David Tarboton, Utah State: Recently Resigned

Term expires 12/31/2008

Jay Famiglietti, UC Irvine: X

Praveen Kumar, U Illinois:

Venkat Lakshmi, U South Carolina: X

Greg Pasternack, UC Davis: X

Fred Scatena, Penn: X

Term expires 12/31/2009

Efi Foufoula, U Minnesota: X

Larry Murdoch, Clemson: X

John Selker, Oregon State: X

Fred Ogden, U Wyoming: X

Juan Valdes, U Arizona:

Officers

Rick Hooper, CUAHSI

Kevin Dressler, Pennsylvania State U

Others

Jon Duncan, CUAHSI

Meeting Procedures
Succinctness
Relevance to Thread of Discussion
Big Picture
Jon as Facilitator

→ Approval of Agenda (Claire)

Motion to Approve: Venkat Lakshmi
Second: Jeff Dozier
Discussion: The BoD should be approving or developing strategies? The BoD should be approving but right now the progress is to a point such that the BoD is developing them, at least in part. Additional discussion on specific agenda items and then what their extended details are. HIS/HMF activities are not on the break-out groups. Revisit details of break-out groups around 1 pm.
Approval: Yes

I. Strategic Planning: History, Goals, and Vision

Setting the Stage: Lessons Learned (Rick)

Zimmerman's Vision (IRIS Model)
Expectations of the Community
Current Reality

Goals (Business Principles)

- Active (rather than reactive), independent mode of action from NSF
- Establish credibility with NSF as community spokesman
- Re-establish relevance and importance of CUAHSI to the community
- Broaden funding base beyond NSF

Actions

- Define boundaries between CUAHSI and NSF
- Crisper decisions
- Community engagement
- Specificity of reports (limits to consensus)

Open Discussion on CUAHSI Role and Proposal Content

- CUAHSI can articulate activities but it needs to show some products
- Hydrologic Prediction is a good concept to lead from in terms of a community goal
 - Decide how to pitch it so that all types of prediction are included

- Standard predictability (distributed hydrologic models – rainfall runoff prediction and routing)
 - Chaos based nonlinear approach to modeling complex systems
 - Simple rules over large populations
 - Mechanistic measurements where we have no models – experimental and field basis for predictions (understand first and then try an equation, for example)
- CUAHSI's role: CUAHSI as a facilitator for identifying and formulating community need versus CUAHSI as a doer (submitting proposal)
 - When CUAHSI is a facilitator it has no real oversight of proposals or post-award input
- Series of workshops related to a particular thrust (e.g. Modeling Platform) will enable cohesion and deliverables
 - Using NCAR as an example, a modeling platform (e.g. MM5, WARF) was used to advance prediction and scientific understanding in the atmospheric community
 - Their science agenda was integrated with their product
 - However, they had infrastructure to continue and support this effort, CUAHSI really does not have these vast resources at this time

Discussion of Business Principles and Actions (5-yr Horizon)

- None

Presentation of Current Proposal Ideas (Hooper)

- The HIS support personnel in the proposal would provide user support of the HIS tools and data curation activities
 - Discussion on whether the time is right for CUAHSI to provide support for transferring HIS tools to community teams
 - The feeling is that this is a good idea but the personnel role must be discussed and refined
 - Big shift in using some of our core dollars to “do” something as a service to the community
 - Task of HIS support person to make sure that the CUAHSI data comply with the EAR data policy

Prioritization/Addition of Activities

- What about the synthesis center/activities?
 - In the proposal right now there is a language for a need for evaluation of both projects and for a another workshop that fuels solicitation for a synthesis center
- Core HMF activities

II. Renewal Proposal

General Discussion on the Major Thrusts to Include in the Renewal Proposal

- What products, if any, would CUAHSI produce
- Charting of a CUAHSI Core Element Life Cycle (e.g. A progression of workshop, then white paper, then solicitation or not, then Pilot, then Development, then implementation) for each thrust is desired
 - Have an ongoing effort with this life cycle that continually evaluates where we are with each CUAHSI core activity

Core Element Life Cycle	Observatories	Instrumentation	HIS	Model Platform	Synthesis	E&O	Special Opportunities
Workshop							
White Paper							
Solicitation or not							
Pilot							
Development							
Implementation							
Assessment/ Redirect							

Plenary Discussion on Thrust Area Specifics

Take the three thrust areas (i.e. Modeling Platform, Campaign Workshops, WATERS/CZO) and apply them to the life cycle format

Modeling Platform

What cannot we do right now? What do we need?

The community is ready now to go through the process of a new starting point, will interface with CSDMS, will start providing the platform within which HIS products can be applied. This will guide observatories

Must recognize other community hydrologic efforts (NCAR’s CLM, NASA’s GLS which also supports CLM)

Technology discussion may need to go first (e.g. model representations in CSDMS versus OpenMI)

- Need something that serves as a benchmarking for alternative model representations

What motivated people in the past after workshops (e.g. HIS and HMF) was that there was follow-on pilot opportunity that was funded by CUAHSI core funds

A series of two workshops would flush out several different approaches that are hydro-centric and multi-scale (look at aspects of technology and the general objective is to have multiple representation of processes and be a scientific tool for the community to evaluate their models and data)

- Going to acknowledge an initial scoping workshop
- Budget a pilot activity

The proposal should lay out the vision and goals of the Hydrologic Modeling Platform and workshop series

- ■ Jay Famiglietti to collate information from Venkat Lakshmi, Fred Ogden, and Fred Scatena
- Should go so far as implementing on the current testbeds
- 1 week from now

Campaign Workshops

Focus on regional scale, bigger than what a PI group can do, around a specific topic designed around data collection and integration of existing field sites to answer larger questions

- Short term science product
- How do we manage the activity (compensation, who how)
- Structure would be to have 4 topics each having two workshops
 - Sentiment to stay away from workshops and just go to the campaigns
 - Would not cost too much b/c people will have their own equipment
 - Write a solicitation for proposals for travel funds and a workshop to write-up the results
- ○ Form a sub-committee to gather information and solicit individuals for campaign ideas and proposals (not workshops)
 - Claire Welty to ask Larry Band
 - Greg Pasternack to look at Geomorphology
 - Laura Toran to look at Karst
 - Fred Ogden to look at Soil Moisture
 - Report back to Rick in a week

WATERS/CZO's

WATERS project office ends at same time the existing CUAHSI grant ends

- Need to make some statements on how CUAHSI is dealing with the extension of WATERS and why it is important to keep up the effort
 - Provide a bridge of commitment and how much we can afford to put forth to this effort over the next 2-3 yrs
 - Need to point out some small activity like workshops or some small salary to prepare for the CDR in December, 2008
 - To address this, do we assemble CUAHSI staff time to retrieve information from the CZO's and the testbeds? How much?

Critical Zone Observatories

- Seed funds for CZO's
- Graduate student funds for CZO's
- Provide and show how CZO's can be integrated as part of the greater CUAHSI "network" through HIS and maybe even synthesis activities
- CZO call did specify open data, so CUAHSI could participate through HIS

Adjourned – 5:05 pm

Tuesday June 19, 2007

IV. Additional Business

Call to Order: 8:05 am

Approval of Minutes from April meeting

Motion to Approve: Selker

Second: Graham

Discussion: No

Approval: Yes

CUAHSI Annual Meeting (Fred Scatena)

Report

- Debate about the value of an “annual” meeting
- \$70K allocated
- Should it be stand alone?
 - One option is multi-day stand alone
 - Invite keynote speakers from agencies or academia
 - Peter Eagleson (maybe be the Plenary speaker at 2008 Annual Meeting)
 - Another option is to coordinate with an existing meeting

Date/Location

- August 2008 in WDC
 - Want to highlight student participation with posters
- AGU for off years

Feeling that we could do biannual meetings with odd years having a special session and a reception at AGU or GSA

- The annual meetings serve to create two-way input

Suggested Sessions at the Annual Meeting

- Linking the Hydrosphere and Biosphere (Steve Running, Rafael Bras, Ignacio Rodriguez-Iturbe, Bob Costanza, Rob Jackson, McKnight)
- Upscaling hydrologic, biogeochemical and geomorphic processes (Siva, Kirchner, Syvitski, Dunne, Dietrich)
- Predicting the effects of climate change and human development on water resources (Vorosmarty, Peter Gleick)

Suggested Agency Keynotes at the Annual Meeting

- Hirsch (USGS)
- Bartuska (USFS)
- Garamendi (Lt. Gov, California)
- Rick Anthes (UCAR)
- AD Geosciences

- Lucia Tsaoussi (NASA)
- Lou Uccellini (NOAA)

Regional Meetings at the Testbeds

- To benefit a larger group than the university representatives
- One idea is to do an open house at the Test Bed sites and/or coincident with NEON sites if feasible

Fall/Winter Calendar

- Fall BoD Oct. 24, 3 pm
- Membership Meeting w/ Elections, December 3, 3pm
- Winter BoD, January 8-9, Washington, DC
- Nominations Committee (August 15 Select Committee; Potter, Vogel and Shuttleworth were on it last year) – Efi Foufoula indicates that she would like to be on the nominations committee
- June 2008 BOD Meeting (trying for Silver Falls, Oregon for 3rd week of June – try to avoid Father’s Day)

Synthesis status (Murdoch)

- Project has started last week
- Internal and joint meetings so far (refinement of their plans – down to 4 topics)
- Really two separate projects but they are exploring their overlap
- Should be reporting progress at the 2008 annual meeting

NEON Discussion

- Deferred, Dave Schimel had family emergency

V. Renewal Proposal Redux

Path forward on proposal

Schedule

- June 25-26 – requested pieces from board member
- Complete internal draft by Monday July 2nd for Board markup
 - Have a list of people for this informal review for Doug so that there is no conflict
- Board to Return draft comments in one week (July 9th)
- Hooper to reformulate by July 16th to put out for wider friendly review
- Review back, July 31
- August 7th pass to Doug James
- Brief Art Goldstein in early August after Doug has seen the draft
- August 31st submission to NSF

→ Two near-term Actions for Hooper:

1. Show Doug the above schedule and see where he would like to plug in
Be open and post the draft on the CUAHSI website

2. Send an email to the general membership (of proposal highlights) to show the connection with the science plan and general rationale

Possible Draft Reviewers: Ken Potter, Wilf Brutsaert, Rafael Bras, David Goodrich, George Hornberger, Dara Entekabi, Murugesu Sivapalan, Peter Troch, Ana Baros. Jerry Schnoor, Jenny Jay, CAREER Awardees

Suggested Formal Reviewers: Defer to Doug James

“Government Advisory Council” (look at CUAHSI activities)

- Bob Hirsch (USGS)
- Mark Hamilton (EPA)
- Ann Bartuska (USFS)
- Gary Carter (NOAA-NWS)
- “No Name Yet” (USDA ARS)
- CSREES – Mary
- River Basin Commissions/State Agencies on rotation
- Steve Parker (NAS)

“Research Applications”

- Constantin Georgakakis

“Senior Observers/Advisors”

- Invite them periodically to BOD meetings in retreat settings
- Marco Borga
- Jim Reichman
- Eric Barron
- Fred Molz
- Vijay Gupta
- Ed Sudicky
- John Cherry
- Wayne Swank
- Tom Dunne
- Frank Schwartz
- Richard Sparks

Liaison with on-going efforts (invite project chiefs; e.g. LTER, NEON)

- LTER—Fred Scatena
- NEON – Jay Famiglietti
- NCAR – Efi Foufoula

Reminder: Next Meetings

BoD October 24, 2 pm ET

Membership, December 3rd, 3 pm ET

BoD, January 8-9, 2008

Adjourned – 1:45 pm

Location of CUAHSI Biennial Meeting

At the June board meeting, it was decided to hold the Biennial meeting in a Washington DC hotel during August, 2008. One motivation for the location was to have it near NSF to permit easy access by NSF program officers and senior management. We have begun to inquire into possible locations, but have not signed any contracts yet for meeting space.

Efi has proposed that we hold the meeting at NCAR in Boulder instead of Washington, primarily because it is a more scientific climate and could permit more grassroots contacts between CUAHSI and NCAR scientists. Boulder has some additional advantages including being the location of one of the CZO's, cheaper than Washington, somewhat easier to arrange meeting space in a university/lab setting, and more pleasant in August than DC. She believes that the accessibility of the location to NSF staff is not a primary consideration.

We can move the meeting to Boulder, but have to move quickly to get space. We need a firm decision as to where the meeting will be held.

Quarterly Report for Waters Network Conceptual Design Subcontract

David Tarboton
Utah State University
October 20, 2007

This project involves planning for the WATER and Environmental Research Systems (WATERS) network. My subcontract with CUAHSI is to serve as Co-Lead with Jerald Schnoor (U. of Iowa) in the development of a detailed conceptual design document for the WATERS network. This contract runs from July 1, 2007 to June 30, 2008. This is the first quarterly report for the period July 1, 2007 to present.

Statement of work. (according to the subcontract)

Assist in the selection of and leading 4 exemplar local teams through an observatory design process during the fall of 2007 and winter of 2008. From the information gathered in this process, a site-independent conceptual design for a WATERS Network Observatory will be developed. Serve on the Executive Committee of the WATERS Network Project Office. A draft conceptual design report is due in March 2008 and a final report due by July 2008. Contribute to the WATERS Network Science Requirements document, which links science hypotheses defined in the Integrated Science and Education Plan with infrastructure requirements.

Progress summary

There have been fairly significant changes in the direction of the planning effort as we have responded to input from the NSF and other reviewers on the WATERS Network planning. The following chronologies some of the events and their outcomes and directions.

May 9-10, 2007 (before my contract officially started). Participated in WATERS Network "friendly" review meeting in Arlington. A team of external reviewers (Paul Brooks, SAHRA, Jenny Jay, UCLA, Dan Noguera, University of Wisconsin, Robert Ward, Colorado State U.) together with NSF program officers Brezonik, Hamilton and James reviewed the then current conceptual design draft and offered comments on its improvement. This meeting also included a presentation by Jerry Schnoor and I of the conceptual design at an NSF seminar. Following this meeting Doug James suggested that the conceptual design central focus should be "integrated cycling" reflecting a quest to understand the integrated movement of water, sediment and nutrients through natural and managed systems.

June 18-19, 2007. First meeting of NRC Committee on Review of the Water and Environmental Research Systems (WATERS) Network. George Hornberger is chair. Jerry Schnoor and I presented the WATERS Network conceptual design. I also presented CUAHSI HIS. There were presentations by other NSF programs and agencies related to or interested in

WATERS Network (NEON, USGS, NOAA, USACE, NASA, USDA, EPA). The next meeting of this committee is likely to be early 2008.

July 19, 2007. WATERS Network Project Office planning grant extension was awarded to University of Illinois by NSF Environmental Engineering program. Barbara Minsker is PI, with Hooper, Tarboton, Schnoor and Haas as co-PI's although the CUAHSI component of this (Hooper, Tarboton, Bales, Zaslavsky, ...) does not receive funds through University of Illinois, rather our funding is through subcontracts under CUAHSI NSF EAR awards. Figure 1 reflects the management and work breakdown in this proposal.

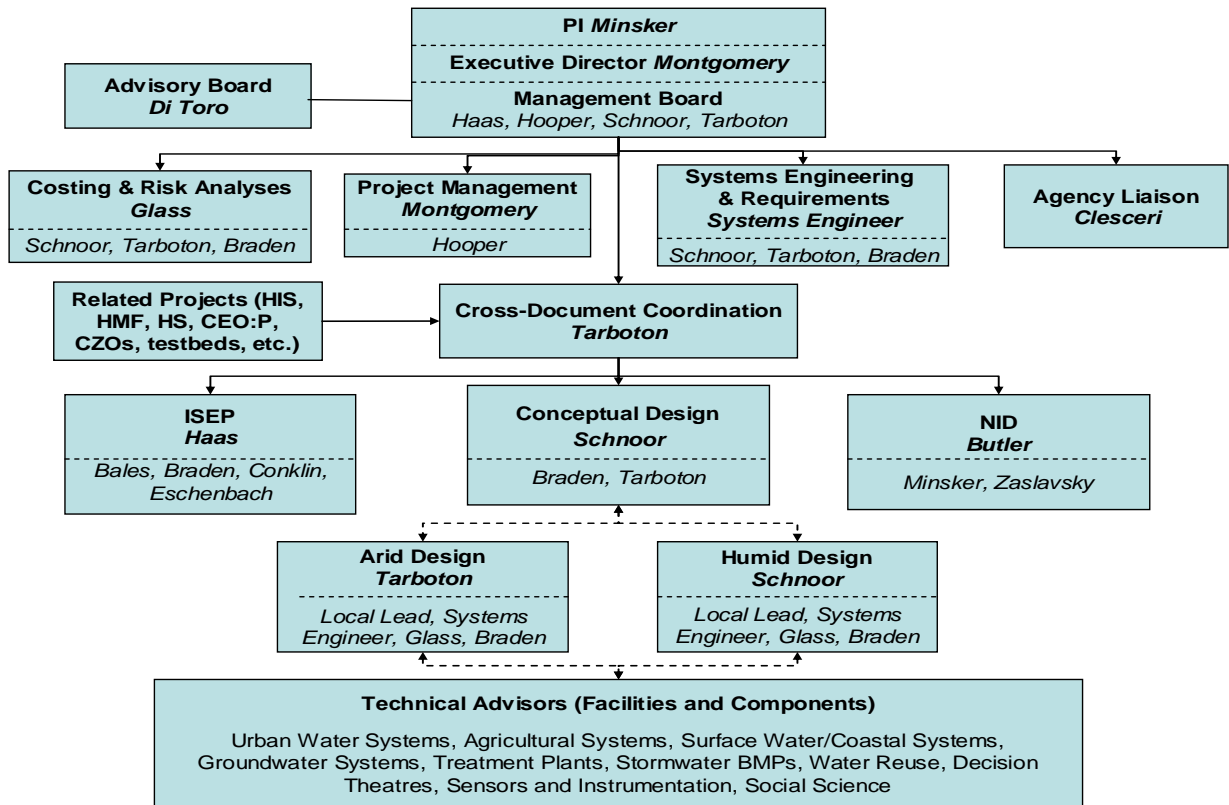


Figure 1. WATERS Network Project Management Structure

August 13, 2007. Draft Conceptual Design (Version 4.0) submitted to NSF. Much of the content of this draft came from previous WATERS Network project office writing, but Roger Bales and I worked to include content from the CUAHSI Science plan. The presentation of this draft was organized to include the lengthy list of questions near the beginning to focus on them. This draft was reviewed by Doug James (NSF Hydrology) and Bruce Hamilton (NSF Environmental Engineering) who indicated that the generalities with respect to the objectives, do not relate precisely to the description of observations to be made in observatory design. We were directed to correct this situation before sending drafts out for review. This review also provided suggestions for formulating in detail what would need to be measured to address each specific question.

The suggestion was to start with a small number of example case studies. This approach is motivating the current efforts to develop science requirement vision papers that will form the core of the conceptual design.

October 1, 2007. Draft executive summary with two attachments (Attachment A – research questions grouped by topic, and attachment B – 4 examples of draft requirements derived from questions) sent to NSF in advance of CUAHSI regional meetings. This document was reviewed by Doug James, Bruce Hamilton and Art Goldstein. Its context and significance were misunderstood (the NSF took it to be more than we had intended it) and this resulted in a teleconference at which Art Goldstein expressed extreme disappointment and concern over the lack of earth science content, starting from the grand challenge which he perceived to be too focused on engineering. This reaction has reinforced the need to clearly articulate the unifying science theme for WATERS Network and develop good science requirement case study papers.

October 5, 2007. I presented an update on the WATERS Network at the CUAHSI regional meeting in Austin. This meeting included a breakout discussion on WATERS. Feedback from this meeting included:

- The importance of scaling as a problem endemic to much of hydrologic science.
- The importance of selecting sensors that focus on process physics rather than just process quantification that may not quantify physics (a somewhat subtle, but useful distinction)
- The importance of emergent process and order as scale increases
- The importance of working with federal and state agencies that have related efforts

October 16-19, 2007. I attended the Project Science workshop given by Gary Sanders. In addition to presentations on the management of large science projects, this workshop also is a gathering of several MREFC projects and NSF program officers involved. Barbara Minsker presented the WATERS Network project as a case study and used the presentation to frame the unifying theme for WATERS around the scaling problem. She used the Gulf Hypoxia as a motivating example/problem that integrates across spatial, temporal and institutional scales. This workshop reinforced for me: (1) The importance of having a simple compelling integrating theme to justify WATERS Network; (2) The importance of having a community that has set the priority for the question(s) that WATERS Network will address. These priorities should have the stamp of approval of an authority such as the NRC; (3) The importance of a "roadmap of the science" as Gary Sanders puts it: a series of implementation steps for advancing the community science agenda; and (4) The importance of, once the direction and priority is set, fixing it and implementing strict change control and scope management procedures to maintain stability of the project.

October 22-23, 2007. Present conceptual design at WATERS Network test bed meeting in Baltimore.

October 26, 2007. Present conceptual design at CUAHSI regional meeting in Boise.

Assessment and next steps

Progress has not been as smooth as hoped and the initial plans for detailed exemplar designs have been changed. In my assessment the priorities for the WATERS Network team are:

1. Articulate a compelling integrating theme.
2. Develop a document that integrates the material already collected in a more effective way.
3. Develop compelling case studies that relate precisely the measurements being proposed to the questions being addressed
4. Engage with the NRC committee reviewing WATERS Network, the CUAHSI and environmental engineering community and other environmental observing efforts, such as NEON and CZOs to establish community water research priorities and make WATERS responsive to them.

My specific work as we move forward will be to:

- complete two of the science requirement case study vision statements for inclusion in the conceptual design for discussion at a WATERS Network retreat on Nov 13/14. The complete list of these, and the designated leads is:
 - o Sediments - Jerry Schnoor
 - o Water Treatment - Chuck Haas
 - o Water and vegetative science - Dave Tarboton.
 - o Hydrologic Carrying Capacity - Rick Hooper/John Braden.
 - o A social science question (TBD) - John Braden.
 - o Wastewater and stormwater treatment - Barbara Minsker
 - o Multiscale forecasting and adaptive sampling - Dave Tarboton
 - o Critical Zone question (TBD) - Roger Bales
- Write the executive summary and provide integration across the science requirements case studies for the conceptual design document. The outline and assignments of responsibility for the conceptual design document follow. This is due for completion by Jan 4 for consideration by the NRC committee in March.

Outline for WATERS Network Draft Conceptual Science, Education, and Design Strategy

Dave will provide overall integration across the sections.

- I. Executive Summary [Dave]
- II. Vision and Objectives [Roger]
 - A. Introduction and vision
 - B. Major science questions (*NSF large facility plan asks that the major science questions be relatively prioritized*)
 - C. Roadmap of remaining chapters
- III. Science and Education Plan [Roger]
 - A. Detailed Science Questions with example boxes [Roger]
 - B. Specific educational objectives/broader impacts [Martha]
- IV. Science requirements [Dave]
 - A. Introduction
 - B. Requirements vision papers
- VI. Design strategy to meet science requirements [Jerry]
 - A. Network design requirements (proposed fractional factorial design, settings, etc)
 - B. Observatory design strategy
 - a. Data to be collected each observatory
 - b. Tools needed for data collection (sensors, network nodes, etc)
 - c. Individual Observatory Site Examples
 - C. Proposed Experimental Facilities
 - D. Centralized Facilities
 - a. Sensor and Measurement Facility
 - b. Cyberinfrastructure, Modeling, and Synthesis Facility
 - c. Education/Outreach Facilities?
 - E. Networking and informatics requirements
- VII. Preliminary costing analysis [Jeff Glass]
- VIII. Glossary of Terms
- IX. References

Other (items related to WATERS Network, but not my work directly)

The WATERS Network organizational committee has developed a recommendation for the organizational entity that will run the WATERS Network. The committee has unanimously recommended that a broad university consortium be formed to represent all of water science and engineering, which would run the WATERS Network as well as engaging in other community activities, and this recommendation has been approved by our leadership. The committee prepared a draft vision for the consortium. Rick Hooper prepared a white paper on governance alternatives from which the committee suggested Path 1, which is to reorganize CUAHSI into the organizational entity that will run the WATERS Network.

Roger Bales has the responsibility for the science plan part of the WATERS Network conceptual design and has extensively edited the original document assembled by Chuck Haas. His edits have included addressing reviews and incorporating material from Sue

Brantley and Chris Paola to increase the responsiveness of the science plan to the critical zone and geomorphology sectors of the EAR community. This has been at the request of NSF.

Governance Alternatives

Discussion Paper

Richard P. Hooper, October 1, 2007

There are fundamentally two alternatives that I believe are viable: modify CUAHSI to enfranchise the larger WATERS community or form a joint venture to operate the WATERS MRE. For completeness, a third alternative, to form a new entity, is added, but the negative aspects of this alternative are large. These paths forward are described below.

Path 1. Modify CUAHSI

Objective

The entity we are creating has a broader mission than design, construction, and operation of an MREFC project. It should continually develop additional infrastructure projects and support the “community” (to be defined) through various facilities and services that are independent from infrastructure projects, supporting both research and education. It should seek funding not only from the NSF but other funding sources as well.

Challenge

There is no precedent for an NSF-funded university consortium that cuts across multiple NSF Directorates. Yet, the facilities we contemplate should be useful to not only hydrologists, environmental engineers and social scientists, but also geochemists, geomorphologists, ecologists, etc. The list of relevant NSF programs is long. If we form a single corporate entity to represent a “community” (not necessarily some division of NSF), we need an intellectual basis that defines this community. Understanding water, including its role in geosciences, environmental engineering, and social sciences, could be such a basis. (David Maidment has expressed this as “water as a physical environment, water as a living environment, and water as a human resource.”) Such an approach is consistent with the premise that I stated above. Its strength is that it stakes out intellectual turf and defines who we are and why we have come together. Constructed in this way, however, we have no “home” at NSF. On one hand, that may be risky: who is our champion? On the other hand, if the premise is intellectually strong, it should transcend the people who rotate in and out of senior management positions at NSF. In any event, if we go this way, I think we need leaders from all the communities that are represented by this entity—hydrology, environmental engineering, social scientists, certainly, but also aquatic ecologists, limnologists and estuarine scientists—to make a pitch to the most senior levels of NSF that this is what is needed.

Background Comments

Currently, CUAHSI is a 501(c)(3) corporation that can receive NSF funds. It has 122 members and affiliate members representing most of the major research institutions in the United States. This number includes a few undergraduate universities and a few non-US institutions in Canada, Australia, Japan, England, Italy and Slovenia.

The intent in the modification process is to retain the administrative services of CUAHSI which have been audited by the NSF. We are having a field review of our accounting system in November by NSF that should complete the authorization process and move us to a fully trusted entity for handling NSF funds. The point to keep in mind is that the incorporation process is relatively simple and inexpensive; being certified to handle NSF funds with appropriate business systems is not.

Current CUAHSI Governance Structure

Representation: Each member and affiliate member university names a representative and, optionally, an alternate representative. Representatives from member universities are eligible to serve on the Board of Directors. No stipulation is made as to how the representative is appointed nor the term they serve nor the department that they are in.

Board of Directors. A 15-member Board governs the corporation. One third of the Board (5 Directors) are elected each year to serve a 3-year term. Board meets quarterly, with January and June meetings in person and April and October meetings by telecom. Board appoints standing committees, compensation committee, audit committee, and nominations committee. The Board elects a “Chair Elect” each year who serves one year in that position, becomes Chair the following year, and Past Chair in the third year. The Executive Committee of the Board is composed of the Chair Elect, Chair, Past Chair and two at-large members from the Board. The Executive Committee meets weekly by conference call. The Chair is compensated for one-month of summer salary. Chair Elect and Past Chair are compensated at one-half month summer salary.

Officers. The Board elects a President, Secretary and Treasurer to 3-year terms. The President also serves as Executive Director and is a full-time employee of the corporation. Secretary and Treasurer perform traditional duties and are not compensated.

Dues. No dues are charged. A one-time membership fee of \$2000 is required to join for full members and \$500 for affiliate members. By laws require membership approval of any subsequent levies of dues.¹ There is an annual cap (\$2000) and total cap (\$10,000) that can be levied per member.

By-Law Amendments. Amendments to by laws must be undertaken by full membership.

Standing Committees. Note that the real “work” of the corporation (e.g., project oversight, science plan development) is done by standing committees and special committees. The Board appoints those committees, and, generally, accepts their recommendations on necessary actions. The following options discuss how to appoint the Board, but note that nothing in current CUAHSI By-Laws precludes the establishment of multiple science and/or education committees to represent various disciplines, and that the membership of the committees is not restricted in any way.

¹ The rationale for a one-time fee was to encourage membership in a nascent organization that was not yet offering any services. The need for an on-going source of unrestricted revenue is recognized.

Alternative 1. Status Quo

Action: All universities are requested to re-appoint members drawn from all relevant departments of the university.

Pro's: No changes required to CUAHSI By-laws.

Con's: No structure to assure representation across disciplines. No guaranteed rotation or turnover of representatives.

Alternative 2. Add Fixed Number of Multiple Representatives

Action: Modify by-laws to specify n representatives of each discipline per member university, as defined by department (geosciences, engineering, resource economics or equivalent, etc.) or other objective criteria. Representatives elect 15-member board.

Action 2a: In addition, partition the Board into $15/n$ positions to be elected by representatives from each of those disciplines. Representatives from a discipline elect only the positions in their discipline.

Action 2b: Representatives serve for a fixed-term and must be re-appointed by university and are, potentially, unable to succeed themselves.

Pro's: Structure ensures disciplinary representation.

Con's:

1. By-Laws must be amended.
2. Reinforces disciplinary boundaries, which seems inconsistent with encouraging interdisciplinary research
3. Defining objective criteria to define representative's discipline is difficult; neither degree nor department is a perfect indicator (most CUAHSI reps are in engineering departments).
4. Smaller universities may not cover all n disciplines or faculty in all n disciplines not interested in WATERS projects.
5. Rigid number will require further by-law modifications if we want to change number of disciplines represented in future.

Alternate 3. Variable number of representatives

Action. University members can have up to n representatives covering n disciplines or n themes² by paying n membership fees (and n times the annual dues).

Action 3a. Partition Board seats as above.

² Sue Brantley has suggested simple questions to represent themes such as "How does rain become a river?" for hydrology and "How does rock become soil?" for low-temperature geochemistry. This may strike some as simplistic, but I see an advantage to defining a scientific or engineering goal, which will involve interdisciplinary research, rather than a discipline such as hydrology or environmental engineering.

Action 3b. Representatives serve a fixed-term, with or without right to succeed themselves, as above.

Pro's:

1. More flexible definition of topics; not necessarily rigid disciplinary definitions.
2. Scalable for smaller universities.
3. Avoids categorizing people into disciplines, but rather reflects research interests, if themes are chosen rather than disciplines

Con's:

1. Requires modification of by-laws
2. Larger or more wealthy universities have more power

Path 2. Joint Venture

Objective

A joint venture between CUAHSI, AEESP and a social science organization would be formed to operate the WATERS MRE project. The scope of the joint venture cannot be open-ended, but must be specified.

Background

A joint venture is simply a contract among parties that lays out how a project will be undertaken. In our case, it would be easy to specify that CUAHSI is to administer the funds and that some board, whose composition is specified in the contract, manages the project. Thus, the CUAHSI Board of Directors is contractually obligated to follow the dictates of the project board. There is no new corporate entity formed in a joint venture (as many of us seemed to believe).

Because a contract must be specific, it seems that the scope would most likely be limited to the topic at hand, namely, the design, construction, and operation of an MREFC project. Any other activity would have to be the subject of a subsequent joint venture. There is great flexibility in how a joint venture is formed. One option is described here.

Joint Venture Structure

Each party to the joint venture nominates n members to a project management board by some rule (e.g., each party gets an equal number of seats). Each party is free to determine eligibility criteria for people to serve on the board. The number of board members should not exceed 15 to be an effective management organization. The board can form subcommittees of the board (e.g., Executive Committee) and can appoint non-board members to specialty committees as needed for the project. The board can be given hiring and firing power over personnel for joint venture. CUAHSI can be designated as

the fiduciary agent for the joint venture with provisions that the joint venture be treated as a separate 'company.'³ The decision-making power rests with this Board.

Pro's:

1. Each community retains its identity.
2. No modification of CUAHSI by-laws required. CUAHSI Board can define joint venture because they have the power to enter into contracts.
3. Joint venture can be executed fairly quickly.
4. CUAHSI retains its niche within EAR.

Con's:

1. Project management board may not be viewed as authoritative by community given their indirect role in its selection.
2. Retention of individual community identity may undercut interdisciplinary thrust of WN.
3. EE is represented by a non-NSF supported entity. Is AEESP willing to undertake this role in the long term?
4. Does social science have an organization that can be party to joint venture?

Path 3. Form a new organization

Action. Waters Project Office incorporates a new entity with its own by-laws.

Pro's:

1. Able to customize organization to meet WATERS Network needs with no history

Con's:

1. Unlikely to complete start up in time for continuity of Project Office
2. Need to re-establish acceptable business systems with NSF
3. Organization will be redundant with CUAHSI; if successful, CUAHSI is not necessary.
4. Need to recruit members to a new organization

³ Because the joint venture will be funded by a grant separate from the CUAHSI core grant, a separate accounting by grant is required anyway by NSF.

A Proposal for a Water Science and Engineering Consortium

Mission

The mission of this consortium, hereafter called the Water Science and Engineering Consortium for the sake of discussion, is to (1) facilitate disciplinary research and catalyze interdisciplinary research on water, including its scientific, technological, and social aspects, by bringing together natural scientists, engineers, and social scientists through integrated projects, (2) develop the infrastructure necessary to conduct innovative research and to translate that research into knowledge for the use of the nation, and (3) to support education of the next generation of water scientists and engineers who are prepared to address our nation's complex water challenges.

Vision

Enable understanding and responsible management of water resources, including trade-offs among human, natural and economic development, by providing the necessary infrastructure (data sets, advanced instrumentation and cyberinfrastructure) and a platform for synthesis and interdisciplinary initiatives.

Guiding Principles

1. **Objectivity.** Water Science and Engineering Consortium does not advocate for any policy outcome but seeks to develop the scientific and technical knowledge to understand the implications of any policy choice.
2. **Information Exchange.** Water Science and Engineering Consortium supports the free exchange of ideas and data and encourages multiple points of view that can be objectively evaluated.
3. **Interdisciplinarity.** The science and technology needed to meet the water challenges of the future require interdisciplinary cooperation among natural science, engineering, and social science disciplines as a compliment to disciplinary research.

Values

Organizational values would be adopted later, but the following represent examples of values that could be considered:

1. **Diversity.** Water Science and Engineering Consortium is committed to the development of a diverse community of natural scientists, engineers and social scientists that reflects the broad experiences of the citizens of the United States.
2. **Sustainability.** Water Science and Engineering Consortium seeks to enable research and education that will inform resource decisions and encourage resource use in a way that recognizes the needs of future generations.

