Special Session on Low Flow Studies

at the National Surface Water Conference and Hydroacoustics Workshop
St. Louis, Missouri

Friday, April 6, 2007
8:30 am – 3:00 pm

Objectives

- Review recent applications of low flow data and statistics, to evaluate whether our current methods adequately support these purposes.
- Introduce new techniques for low flow analysis and communication of results.
- Discuss recurring issues in low flow studies, to identify possible solutions and needs for further research or guidance.
- Develop a list of priorities for future work on low flows.

Participants

- Hydrologists seeking a better understanding of the issues involved in low flow studies.
- Hydrologists wishing to share their ideas on low flow studies.
- Other scientists, engineers, and managers who utilize the results of low flow studies.

Format

- The agenda is organized around several topics relevant to low flow studies. Brief presentations will be given by invited speakers to introduce topics, but active discussion among the participants is expected to be a key component of the special session.

Preliminary Agenda

0. Introduction and welcome

I. Low flow studies – the purposes behind the statistics

- What is water availability and how should it be defined? A water budget based approach (Peter Weiskel, MA)
- Ecological flow requirements – what information do ecologists need? (Jim Henriksen, BRD)
- An application of flow metrics to assess ecological impairments (Daren Carlisle, NAWQA)

II. Tools for communicating results

- A GIS-based tool for testing water availability under different use scenarios (Marla Stuckey, PA - invited)
- Drought characterization: An alternative to the 7Q10 for real-time drought characterization (Harry Lins, Dave Wolock)
- Communicating the uncertainty in low flow studies

III. New techniques

- Partial record stations – new techniques for regional regressions (Ken Eng, NRP)
- AFINCH (Analysis of Flows in Networks of Channels): Taking full advantage of a changing gage network – (Dave Holtschlag, MI)
- Construction of a complete hydrograph at ungaged sites – (Stacey Archfield, MA)

IV. Recurring issues (if not already covered in earlier discussion)

- Dealing with trends and other troubling time series issues (Schopp, Aucott)
    - Urbanization and other land use change, flow regulation, sewer discharges; zero flows (Schopp)
    - A specific example of an apparent change in precipitation - low flow relationship over time. How do we deal with this and how do we communicate this result? (Aucott - invited)
    - What can be done in tidally-affected areas?
- Regionalization
    - Site selection: how do we identify “unaltered” or “natural” flows?
    - Should partial records be used?
    - What length of record is needed? Is there a need for base/concurrent period? Should records be extended?
    - Variable selection
    - OLS vs. WLS vs. GLS
    - Selection of sub-regions for regression – when is it necessary and what should be the basis for defining regions?
    - When is the use of region of influence appropriate?
    - Is there any place for alternative techniques such as artificial neural networks?
- Frequency analysis
    - Is there a need for development of regional skews? (similar to those used in flood frequency studies)
    - Is it possible to provide both “natural” and “current conditions” estimates of low flow frequency?
- Partial records
    - Do we (should we) update partial record station statistics whenever index sites are updated?
    - Should correlations between sites be based on just flows that are considered “natural” or over the entire period of record, which may include land use change and other alterations?

V. Wrap-up

- Priorities for low flow research, data collection, and other programs