

PROPOSAL FROM THE SUBCOMMITTEE ON SEDIMENTATION OF THE ADVISORY  
COMMITTEE ON WATER INFORMATION

**HOST, MAINTAIN, AND UPDATE THE  
REVISED RESERVOIR INFORMATION SYSTEM (RESIS-II)**

December 5, 2007

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At the October 19, 2007, SOS meeting, a verbal proposal was put forth for the U.S. Geological Survey's Office (USGS) of Surface Water to place the Revised Reservoir Information System (RESIS-II) on-line. Following is an evaluation of the options and requisite support requirements as perceived by the RESIS-II workgroup formed on Oct. 19 to address this issue.

There are at least three options for placing RESIS-II on-line, all of which are predicated on completion of planned RESIS-II upgrades by USGS researchers Eric Sundquist and Kate Ackerman in early CY2008, and subsequent hand-over to the USGS Office of Surface Water, with John R. Gray serving as the principal RESIS-II contact. The precise costs in terms of human resources and funds of the three options are known, at best, only in very general terms.

In the short-term, the handoff of the application from Eric Sundquist and Kate Ackerman and subsequent placement on-line will probably have some wrinkles to iron out.

**OPTION I: PROVIDE WEB ACCESS TO EXISTING RESIS-II INFORMATION**

This approach would provide any easy access to the original data as .pdf files (sub-option I-A, below), or that plus their digital incarnation (sub-option I-B, below). Either sub-option should minimize subsequent information requests as the user has essentially everything that can be offered at this time.

<p>I-A: <u>Post the RESIS-II .pdf images of each extant reservoir survey data sheet</u> (through 1992), or about 6,000 pdf files. This would be relatively easy, but would require an accurate list of the reservoir surveys and creating links between the list and the individual survey sheets.</p> <p>Additionally, links to the National Inventory of Dams (NID) database could be added, which would link to each RESIS II survey sheet in .pdf format. Not all RESIS-II survey sheets would be linked, since slightly more than half of the dams associated with reservoirs in RESIS-II are in the NID database.</p>	<p><b>Short-term issues/costs:</b> In its most simple form – a listing of sites alphabetically and/or by State – major problems are not anticipated. It does not appear that placing the information parts on-line and testing the application would require extensive effort, so costs should be minimal.</p> <p><b>Recommendation:</b> This seems to be a tractable and logical goal, but ideally not the ultimate goal of the database.</p>
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<p>I-B: <u>Provide web access to the RESIS-II files in an Access-ready format</u> (these would be the data only). These could be posted in logical pieces or in their entirety. If the file or files are too large, they could be zipped, provided as an ISO-disc image for download, or offered through a utility such as Amazon F3, a kind of FTP site. These data files could then be downloaded by any user.</p>	<p><b>Long-term issues/costs:</b> As a static application, with sufficient explanatory information and caveats accompanying the database, it should not be a significant long-term drain on resources.</p> <p><b>Opinion:</b> Appears to be quite tractable and much better than the present situation. Its existence might help stimulate interest in storing subsequent results of reservoir surveys, and to perhaps result in an increase in the number of new reservoir surveys.</p> <p><b>Recommendation:</b> This seems to be a tractable and logical goal, but ideally not the ultimate goal of the database.</p>
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If the data for either sub-option are to also be accessed via a United States Map graphical user interface, more work will be required. However, such GUI's already exist and developing such an interface is undoubtedly tractable (David W. Stewart, USGS, personal commun.). How much it might cost to develop is unknown to the authors.

## **OPTION II: OPTION I + UPDATING THROUGH SELECTED AGENCIES**

Under Option II, the RESIS-II .pdf images and the Access database would be posted on the internet. As with Option I, there would not be an on-line tool for inputting new reservoir survey data. New survey data would have to be uploaded to the database through a periodic maintenance process. Each Agency with reservoir management responsibility would be responsible for periodically providing additional reservoir survey data in the .pdf and Access database formats to the hosting agency on a periodic basis (annual or semiannual). Each Agency would also be responsible for providing the necessary quality assurance and control for the data they provide. This should mean that only a minimal effort would be necessary for the agency to receive the data from the on-line application, revise, and repost the data on the WEB site. This method would allow on-line searching and, presumably, analysis of the data.

**Short- and long-term issues/costs:** As with Option I, there are no apparent major problems. SOS agencies that obtain reservoir survey data (e.g., NRCS, USACE, and Reclamation) would have to agree to periodically provide any new data that come available, and to provide the backlog of data since the 1980's and 1990's.

**Recommendation:** Updating the database will need to be done sooner or later. The logical question is whether or not a cooperative agreement between the agencies can be forged to accomplish all ends.

## **OPTION III: OPTION II + DIRECT ON-LINE UPDATES**

This optimal version of an on-line RESIS-II would be a searchable database that is available to perform on-line analyses. It would also include allowance for each Agency to upload their quality-assured reservoir data to RESIS-II (with password protection).

**Short- and long-term issues/costs:** The most important short-term task under Option III would be to develop a WEB-based software to upload new reservoir survey data. However, an on-going task that would presumably peak in required effort shortly after the application becomes available and subsequently fall off to an “operational” level thereafter, is the quality-assurance and data-switch component. This approach requires a maximum of collaboration between the Agencies.

**Opinion:** In terms of time required to bring new data into the database, there are two schools of thought:

- a) Option III might be less of a resource drain than Option II, since an on-line system would require the new data to be in a specified format, and the data need only to be QA'd and not re-keyed into the database.
- b) It might be easier for each Agency to upload their quality-assured data into the Access database.

**Recommendation:** This approach is preferred given adequate resources.

## **OTHER FACTORS TO CONSIDER**

**New Survey Data:** Technological advances in bathymetric measurement techniques since 1992 will probably result in a more accurate calculation of reservoir full-pool volumes, based on a substantially larger dataset. How these data will be stored – with complete congruity with the existing data, with expanded information perhaps to include measurement uncertainties, or all of the data – is a major consideration when evaluating the tractability of options II and III. It might be advisable to have method codes associated with each reservoir survey as to how the data were obtained. Estimates of uncertainty, if available – and they are in some cases now – should also be incorporated into the database.

An on-line RESIS-II would need to be advertised. We – Jerry Bernard and John R. Gray, who planned on cooperating on a pre-RESIS-II paper (so-to-speak) a year ago – will develop a short paper describing an on-line RESIS-II that might be published in such outlets as AGU-Eos, the Forest Service's Stream Notes, and released through selected list servers. Note that any such information will either include as co-authors those that have upgraded the application to a web-suitable point, and/or, in consultation with them, acknowledge their contributions.

Some of the existing and new data reservoir data might prove to be problematic, in that some reservoirs may have had changes made to them between surveys, such as dam height, sediment volumes (maybe removed entirely or partially), etc., and some names may have changed, becoming a records-control problem.

Additionally, just more than one-half of the RESIS-II reservoirs have a match in the National Inventory of Dams (NID database (<http://crunch.tec.army.mil/nidpublic/webpages/nid.cfm>). If the application is going to go “full bore,” it would seem necessary to resolve this presumed major discrepancy.

## **OVERARCHING RECOMMENDATION AND CAVEATS**

In this day and age – with available technological acumen, increasingly inexpensive data storage, and the considerable work already completed by Eric Sundquist, Kate Ackerman, Bob Stallard, David Mixon, and others in the USGS – it would seem to be a shame and a disservice to the American taxpayer not to have a fully searchable version of RESIS-II available to everyone on a WEB site. The backlog of existing reservoir survey data not in the database needs to be included and data from new reservoir surveys needs to be routinely uploaded to the database.

Per its October 19, 2007, meeting, the SOS has the ultimate responsibility for the future of RESIS-II, and the approval of the Advisory Committee on Water Information (based on a 2005 RESIS-II presentation that was favorably received by the ACWI). Within that context, and given the approval of the USGS Office of Surface Water, the USGS proposes to host the RESIS-II website for up to 3 years with the following caveats:

1. The RESIS-II working group consider and resolve all known issues associated with placing the application on-line and perhaps updating it, and obtain the concurrence from the SOS on the proposed approach and resource requirements.
2. Other SOS organizations are willing and able to invest services-in-kind, or funds, to accomplish most tasks beyond the most minimalist version of Option I (only list access, no GUI) that are beyond the USGS resources for this endeavor.
3. If resource requirements placed on the USGS exceed those that the USGS is capable and willing to invest in the project, the on-line application should be either taken on by another organization, or, in a worst-case scenario, taken off-line.
4. SOS organizations that own, manage, or otherwise have interests in reservoir data accept responsibility for QA'ing new data.

If, after 3 years, the USGS wishes to ‘opt out’ as RESIS-II host, it will be incumbent on the SOS to find a new host, or to let the application go off-line.