# Subcommittee on Sedimentation
# November 4, 2014
# Meeting
# National Oceanic and Atmospheric Administration
# Silver Spring Metro Center, Silver Spring, MD
# Minutes

Subcommittee on Sedimentation (SOS) Chair Amanda Cox called the meeting to order at 9:01 a.m. EST. The minutes were prepared by Amanda Cox. Present were:

- Jenifer Bracewell, via GoToMeeting, USGS, RESSED FilemakerPro Database Programming Team Member, Reston, VA
- Matt Collins, Hydrologist, National Marine Fisheries Service, National Oceanic and Atmospheric Administration (NOAA), Gloucester, MA
- Deborah Cooper, via GoToMeeting, Research Hydraulic Engineer, Engineer Research and Development Center, U.S. Army Corps of Engineers (USACE), Vicksburg, MS
- Amanda Cox, Chair, Assistant Professor, Missouri Water Resources Research Institute (MWRRI), Saint Louis University, St. Louis, MO
- Marie Marshall Garsjo, via GoToMeeting, retired geologist, Natural Resources Conservation Service (NRCS), Fort Worth, TX; SEDHYD FISC Technical Program Chair
- John R. Gray, via GoToMeeting, Scientist Emeritus, Office of Surface Water (OSW), USGS, Reston, VA
- Victor Hom, Program Services Leader, National Weather Service Office of Climate Water Weather Services Hydrologic Services Division, NOAA, Silver Spring, MD
- Meg Jonas, Research Hydraulic Engineer, U.S. Army Corps of Engineers (USACE), Alexandria, VA
- Lee Koss, Senior Hydrologist, Bureau of Land Management Washington Office, Washington, DC
- Mark Landers, Federal Interagency Sedimentation Project Chief and OSW, USGS, Atlanta, GA
- Kevin Laurent, via GoToMeeting, USGS RESSED FilemakerPro Project Database Management System Expert, USGS, Patuxent, MD
- Paula Makar, via GoToMeeting , Civil Engineer (Hydraulics), Sedimentation and River Hydraulics Group, Reclamation, Lakewood, CO
- Tim Randle, Vice-Chair, Manager of the Sedimentation and River Hydraulics Group, Bureau of Reclamation (Reclamation), Lakewood, CO
- Matt Römkens, Director National Sedimentation Lab, and Researcher in erosion processes, Agricultural Research Center (ARS), Oxford MS
- Vincent Santucci, via GoToMeeting , Senior Geologist, Geologic Resources Division, National Park Service, Washington, DC

## Minutes from June 2014 SOS Meeting — Cox

The minutes from the June 25, 2014 meeting will be circulated by email for approval.

**SEDHYD 2015 Planning Overview** Makar

**General Conference**

- Wendy Norton (ACWI) believes the SEDHYD conference approval package will be signed by the USGS Director and sent to DOI for final approvals this week.
- Gerry Galloway – University of Maryland (accepted), John Entsminger - General Manager of Southern Nevada Water Authority, and Jennifer Gimbel - DOI Principal Deputy Assistant Secretary for Water and Science have been invited to be Plenary Session speakers.
- Committee voted unanimously for the Peppermill to provide all AV and computer equipment. The hotel has guaranteed a block of rooms at or below per diem.

**Technical program**

- Preliminary program and abstracts are available on the conference website - www.SEDHYD.org
- Will add paragraph about PDHs for session attendance to help with attendance as training
- Technical Papers (due on Nov 23), are starting to come in (as are requests for extensions). OpenConf notifies us of each submission, but Claudia Hoeft and Marie Garsjo must go into the system and download submissions and review them or have others review them. One author has retracted their paper. Three slots are still open.
- Proceedings will be digital only and published whether or not conference is held

**Registration**

- Contracted out to Event Brite.
- Would like ACWI – DOI conference approval to open registration, but plan to open it before the end of November.
- Agency approvals are going very slowly so we are looking into ways to pre-register and pay later.

**Exhibitors**

- 34 booths are available, Mark Landers is preparing a list of potential exhibitors. Please send him suggestions.
- Doug Glysson will send out RFPs for Exhibit Hall security.

**Student program**

- Single contest based on 17 papers
    - 1st prize $1000, 2nd prize $750, 3rd prize $500
    - Judging committee – need 9 more volunteers, would like at least one from each agency
- Two applicants so far for financial aid, will send out reminder with plan to notify those chosen by end of December
- Monday student luncheon - agency contacts will give a 5-10 min talk on careers at their agency

**Short courses** (PDHs are offered)

Sunday, April 19

| Track | Time | Course Title | Affiliation | Lead Instructor | Cost | Min - max attendees |
|---|---|---|---|---|---|---|
| 1 | 9AM/ 5PM | Flow and Sediment Transport Modeling in Streams with SRH-2D | USBR | Yong Lai | $55 | 8 - 30 |
| 2 | 8:30AM / 5:30PM | RVR Meander--a toolbox for meandering river planform evaluation and design | ARS/U ILL | Eddy Langendoen, Motta, Abad | $68 | 10 - 30 |
| 3 | 8:30AM / 5:00PM | Automated Geospatial Watershed Assessment (AGWA) Tool (w/ ArcGIS refresher) | ARS/ U AZ | Dave Goodrich, others | $55 | 5 - 25 |
| 4 | 9AM/ 5PM | Reservoir Sedimentation & Sustainability | SOS | NRST | $55 | 10 – 50 |
| 5 | 8AM/ 12PM | Overview of Collection of Fluvial-Sediment Data | USGS | John Gray | $25 | 10 – 50 |
| 6 | 1PM/ 5PM | Combined 1D and 2D Hydraulic Modeling with HEC-RAS | USACE HEC | Gary Brunner | $25 | 5 - ? |

Thursday, April 23

| Track | Time | Course Title | Affiliation | Lead Instructor | Cost | Min - max attendees |
|---|---|---|---|---|---|---|
| 7 | 10:30AM / 5:30PM | Water Erosion Prediction Project (WEPP) Model Application Workshop | ARS | Dennis Flanagan | $55 | 7 – 20 |
| 8 | 1PM/ 5PM | Basic Principles and Data Needs of Sediment Transport Modeling | USBR | Blair Greimann | $25 | 8 – 30 |
| 9 | 1PM/ 5PM | Sediment Transport in Stream Channel Design | Utah State U | Peter Wilcock | $35 | 10 - ? |
| 10 | 1PM/ 5PM | Best Practices for Continuous Suspended-Sediment Monitoring using Acoustic Surrogates | USGS | Mark Landers | $35 | 8 – 35 |
| 11 | 1PM/ 5PM | Sediment Transport Modeling using FLOWSED and POWERSED for Stream Assessment and Design | Wildland Hydro | Dave Rosgen George Athanasakes | $35 | 10 – 50 |

**Field trips** (PDHs are offered)

| | Field Trip | Time | Cost | Min/max attendees |
|---|---|---|---|---|
| A | **Management of Carson River and Truckee River**, including stops at Lake Tahoe, Carson City, Virginia City, Truckee, and key sites along the way. | Sun., April 19, 8am to 5pm | $90 (lunch not included) | 20/49 |
| B | **Mt. Rose Snow Courses and Importance of Snow Hydrology** to the Sun Valley Region. | Sun., April 19, 8am to noon | $40 | 20/49 |
| C | **Latest Bells and Whistles in Space, Weather, and Airborne Technologies** with technical overviews provided at the NWS Reno NV Forecast Office and Reno-Stead Airport | Sun., April 19, 1pm to 5pm | $30 | 20/49 |

| | Field Trip | Time | Cost | Min/max attendees |
|---|---|---|---|---|
| D | **New Cutting Edge Research at University of Nevada at Reno** and how they are leading the way in the aerial surveillance and underwater technologies. | Thu., April 23, 1pm to 5pm | $30 | 18/26 |
| E | **Truckee River Improvement Projects**, including water quality, sedimentation, and water supply concerns. | Thur., April 23, 1pm to 5pm | $30 | 18/26 |
| F | **Truckee River Diversion to Virginia Lake**, describing design elements of Cochran Ditch, Virginia Lake, and other shared uses. | Mon., April 20 6pm to 7pm | Free | |
| G | **Truckee River Urban Hydrology**, including the upstream and downstream areas of Truckee River along the downtown Riverwalk area. | Tue., April 21, 6pm to 8pm | Free (city bus not included) | |

**Reservoir Sustainability** Randle

Tim Randle listed the people who volunteered to be on the National Reservoir Sedimentation Team:

| | | | |
|---|---|---|---|
| Professor | Mustafa | Altinakar | Director & Research Professor, National Center for Computational Hydroscience and Engineering |
| Professor | Desirée | Tullos | Associate Professor, Water Resources Engineering |
| Professor | Rollin | Hotchkiss | Professor and Chair, Department of Civil and Environmental Engineering |
| Dr. | Greg | Morris | President, Gregory Morris Consultants |
| Dr. | George | Annandale | Program Leader, Golder Associates |
| Dr. | Kyle | Juracek | Research Hydrologist, Kansas Water Science Center, USGS |
| Mr. | Ron | Ferrari | Civil Engineer (Hydraulics), Sedimentation and River Hydraulics Group, Reclamation |
| Mr. | Kent | Collins | Civil Engineer (Hydraulics), Sedimentation and River Hydraulics Group, Reclamation |
| Mr. | Sean | Kimbrel | Civil Engineer (Hydraulics), Sedimentation and River Hydraulics Group, Reclamation |
| | Rene | Vermeeren | Chief, Hydrology and Hydraulics Branch, USACOE |
| | Werner | Loehlein | Chief, Water Management Branch, USACOE |
| | Paul | Boyd | Hydraulic Engineer, River and Reservoir Engineering Section, USACOE |
| | Darrell | Eidson | Hydraulic Engineer, Hydrology and Hydraulics Branch, USACOE |
| | Deborah | Cooper | Research Hydraulic Engineer, River Engineering Branch, USACOE |
| Professor | Matt | Kondolf | Dept Landscape Architecture & Environmental Planning, University of California at Berkeley |

The Subcommittee on Sedimentation Work Group on Reservoir Sedimentation and Sustainability members are listed below:

| | | | |
|---|---|---|---|
| Dr. | Tim | Randle | Reclamation Manager, Sedimentation and River Hydraulics Group, Reclamation |
| | Jon | Fripp | Stream Mechanics Engineer, National Design, Construction and Soil Mechanics Center, NRCS |
| | John | Gray | USGS (retired) |
| | Meg | Jonas | USACE |
| Professor | Peter | Nelson | CWRRI, Colorado State University |

The first meeting of the National Reservoir Sedimentation Team will be November 12-13 in Lakewood, Colorado. The workshop agenda is attached, but the highlights are listed below:

- Objectives and Mission for the National Reservoir Sedimentation Team
- Updates on the permitting process for reservoir sediment management
- Develop short course on reservoir sedimentation and sustainability for the Federal Interagency Sedimentation Conference
- Development of resources for the SOS website
- Develop interagency requirements for web-based storage and retrieval of reservoir survey datasets
- Brainstorm ideas to encourage the storage of sediment survey data in the national reservoir database RESSED
- Discuss plans for a paper on reservoir sedimentation and sustainability

Tim Randle listed the effects of reservoir sedimentation:

- Loss of water storage capacity. Reduced reliability will have the largest impact in regions exposed to multiple-year droughts, which may be exacerbated by the effects of climate change.
- Burial of dam outlets, water intakes, boat marinas, and boat ramps.
- Reduction in surface area for recreation.
- Increased dam safety risks from sediment loads against the dam, abrasion of outlets and spillways, and loss of functioning outlets.
- Degradation of the downstream channel bed and stream-bank erosion.
- Alteration of downstream channel and riparian habitat.
- Aggradation of upstream channels, which can lead to reduced conveyance capacity, increased flooding stage, and increased ground water table (which can cause water logging and soil salinization).

The degree of effect and the effects of most concern to resource managers will be site specific. If the operation of dam outlets or spillways becomes impaired due to reservoir sedimentation, then this would become a dam safety issue, even if it is also an Operations and Maintenance problem.

Meg Jonas mentioned the idea about developing reservoir sedimentation metrics or score cards from a resource management perspective.

The RESSED database will be an excellent source of information to developed GIS-based sediment yield maps. The computation of sediment yield from reservoir surveys is prone to error when different surveys methods are used to compute the reservoir storage volume (e.g. plane-table surveys, range-line surveys, contour mapping). As more reservoir surveys are conducted with the same method, sediment yield can be computed with greater accuracy.

Matt Collins mentioned that the diversity of RESSED database uses (e.g., sediment yield, reservoir sediment management nationally, regionally, and locally) reflects on the great value of the data.

Matt Romkens suggested the need for a joint paper on reservoir sedimentation and sustainability. This is an agenda item for the National Reservoir Sedimentation Team.

Amanda Cox suggested the need for a database on reservoir sediment management practices. Meg Jonas suggested the need to solicit data on these management practices.

Meg Jonas suggested that we link issues of reservoir sedimentation and aging infrastructure.

**<u>REServoir SEDimentation</u>** Laurent/ Gray

John R. Gray (retired but remains as alternate USGS representative to the SOS) was joined by RESSED programming duo Kevin Laurent and Jenifer Bracewell via WebEx to report on the progress of RESSED. John's opening PowerPoint slides (attached as part of these meeting minutes) was followed by Kevin's slide show. Jenifer gave a summary of the Corps data-acquisition and –merge endeavors.

John made the following motion:

"Subcommittee recommends Version 2 of RESSED be released with known problems and the appropriate caveats at the absolute earliest time without any adjustments."

Tim Randle seconded the motion and it was passed unanimously by the committee. The SOS made clear two objectives:

- RESSED V-II should be posted on the RESSED website with appropriate description at the earliest possible time without additional attempts to correct or further qualify data-specific issues; and
- A list of about 627 problems identified by Kevin should be posted and duly qualified at the same time in a 'notice' with the RESSED release. This should be present on the data download page alerting the potential user of the preliminary nature of the data.

Matt Collins suggested reconvening a SOS RESSED workgroup.

The following are observations and points made during the presentations:

- John's PowerPoint slides were shown to either refresh members' memories, or educate new members and those attending their first SOS meeting, including a representative from the USGS Center for Integrated Data Analysis (http://cida.usgs.gov/).
- John has been retired for 10 months and is in the process of stepping back from a leadership role on RESSED. He reiterated his fealty to the project but that leadership should be provided by someone continuously and intimately connected to the SOS and the project. He does not feel he can guarantee the degree of oversight that the project needs, particularly in this transitional time from data-centric concerns back to programming issues for eventual web-release of RESSED.
- As discussed some years ago, the SOS needs to develop a protocol to check and approve new reservoir survey data entries (John).
- Kevin stated that the team had added 100 to 125 new reservoirs from the Corps data in the last 2 years.
- Members of the SOS emphasized the importance of being able to compute watershed sediment yield from the data base (where multiple reservoir surveys had been performed). Kevin stated that this was not possible. The SOS noted that sediment yield is an entry in Form 34; and RESSED was created to include at least all attributes of the Form 34 data.
- No comments were received regarding the RESSED's teams proposal to open RESSED up to web-based public update capability on a once-per-year basis (starting in FY16).
- Some 575 instances of duplicated reservoir survey dates/times were identified by Kevin in FY14. Another 52 problems were associated with duplications in other reservoir records. Many of these problems are associated with the historical RESIS-II database inherited by the RESSED team. The existence of RESSED inconsistencies and errors has been evident to a number of researchers; the only present revelation was to quantify and identify the 627 known problems, which are unlikely to represent all such data-related problems in the database.
- John attempted to dispel some inadvertent confusion on the status of the project. Contrary to other statements made, there is no short-term (1st quarter FY15) plan to continue to work toward RESSED database version II (V-II) – a decision articulated to the programming team during meetings in September and October 2014. The intent of the USGS is to put the RESSED project on hold – neither data- nor program-centric endeavors to be undertaken -- and no funds charged against the project (other than reasonable expenditures to accomplish V-II release).

**<u>Federal Interagency Sedimentation Project</u>** Landers

The Technical Committee (TC) that governs the FISP met on October 7-8th$^{th}$ 2014 in Baltimore, MD. During this Fall meeting the TC carefully reviews and ranks proposals submitted to FISP for applied sediment research. Winning proposals are selected based on their merits and based on the budget of the FISP for external research. The TC also heard presentations and evaluated results from 2014 FISP-sponsored projects and evaluated internal FISP research progress. The TC took a field trip to Patapsco River dam removal sites and to the USGS Rock Creek acoustic sediment demonstration site.

Projects selected for 2015 funding are noted in the following table:

| Proposal Title | Submitting Organization | Proposal Year |
|---|---|---|
| Computational Fluid Dynamics Analysis of Suspended Sediment Sampler Efficiency II | USGS KY WSC/OSW | 2015 |
| Hydraulic Efficiency of Pressure Difference Bed Load Samplers With Varying Type and Mesh Characteristic | CO State Univ | 2015 |
| Accuracy evaluation and verification of FISP sediment samplers through CFD modeling | Penn State Univ | 2015 |
| Analysis of lower limits of densimetric measurements of stream water as suspended-sediment surrogate in the Rio Grande, New Mexico | USGS, NM WSC | 2015 |

The following motion was by Mark Landers (second by Matt Collins), "The SOS will support the upcoming workshop as a named sponsor: Advancing Hydroacoustic Technologies for Sedimentology Research and Monitoring. " It is a joint USGS CUAHSI Workshop on sediment hydroacoustic techniques for rivers and streams, Sheperdstown, WV, March 2015. The motion was passed unanimously. (Note: subsequent to the meeting, this workshop was postponed. A new date will be set; probably in late 2015.)

**Subcommittee on Hydrology Update** Hom

Victor Hom the current chair of the Subcommittee on Hydrology (SOH) of the Advisory Committee on Water Information (ACWI) gave a summary of their ongoing efforts. The purpose of the SOH is to improve the availability and reliability of surface water quantity information needed for hazard mitigation, water supply, and demand management. They have 19 voting members and the following workgroups:

- Hydrologic Modeling Workgroup (FIHMC)
- Extreme Storm Events Workgroup
- Hydrologic Frequency Analysis Workgroup (bulletin 17B, working on 17C), planned to complete 2015
- Satellite Telemetry Interagency Workgroup

**Prospectus 2007 – 2012 update** Jonas

No new activities to report since previous SOS meeting.

**National Stream Morphology Data Exchange Proposals** Collins

Matt and Amanda recapped the status of the two active proposals to pilot the NSMDE concept. Matt reminded the group of what he reported at the April 3, 2014 meeting regarding the status of the proposal led by Marian Muste and resubmitted to the USGS-NIWR (see April 3, 2014 meeting minutes). Currently, there is no funding mechanism to develop the NSMDE.

Amanda Cox summarized the status of the proposal she resubmitted to the NASA ROSES Terrestrial Hydrology program (A.16) on July 15, 2013. The proposal was not funded; however, reviewers suggested discussing the proposal idea directly with NASA's Surface Water and Ocean Topography Mission. The proposal will remain intact and the committee will move forward when and if there is another funding opportunity.

Brief discussion followed. Tim Randle wondered if we could put forth common data elements now without the pilot studies. Victor Hom was supportive of exploring this. Mark Landers wondered if we could identify our "clients", so-to-speak, by identifying the sectors that stand to benefit and in that way get the idea off the ground. Meg Jonas noted that the EPA Office of Water might be supportive and she could assist with organizing a conference call with them, the two proposal leads (Marian and Amanda), and other interested team members.

**Technical Presentation: Patapsco River Dam Removal Projects** Collins

As a primer for the SOS field trip the next day, Matt Collins gave a presentation summarizing the physical and biological monitoring at the Patapsco River dam removals. Matt described the sites, the monitoring parameters being investigated, and results to date for the Simkins Dam removal--highlighting similarities in the physical response with a dam removal site in southern New Hampshire that shares many attributes. Matt also described pre-removal sediment transport model predictions using the Dam Removal Express Assessment Model-1 (DREAM-1) and compared those predictions with observations.

**New Business** Cox

No new business was discussed.

**Set Date of Spring 2015 Meeting** Cox

The spring 2015 SOS meeting will be held in conjunction with the SEDHYD 2015 conference with the date and time to be determined.

The meeting was adjourned at 4:30 EST

# Advisory Committee on Water Information, Subcommittee on Sedimentation
# Task Committee on Reservoir Sedimentation and Sustainability
# National Reservoir Sedimentation Team

## Meeting and Workshop Agenda
## November 12-13, 2014
## Hampton Inn, 137 Union Boulevard
## Lakewood, CO 80228

**Wednesday, November 12**

8:30 AM Introductions

8:45 AM Objectives and Mission for the National Reservoir Sedimentation Team (Tim Randle):

- Provide training on reservoir sedimentation and sustainability
- Provide publically available web-based resources
- Develop interagency protocols for web-based storage and retrieval of reservoir survey datasets
- Encourage storage of sediment survey data in the national reservoir database RESSED
- Formulate a white paper on reservoir sedimentation and sustainability

9:15 AM Rollin Hotchkiss will give updates on the following topics:

- Millsite reservoir sediment management project in Ferron, Utah: 404 permit process.
- Sandhills sediment management project in Nebraska: EPA regulations.
- Perspective as the chair of the Environmental Advisory Board for the Army Corps.

9:45 AM Other Updates

**10:00 AM Break**

10:15 AM Develop short course on reservoir sedimentation and sustainability for the Federal Interagency Sedimentation Conference (April 19, 2015, Reno, NV)

- Target audience
- Training objectives
- Presentation by Dr. Greg Morris, President, Gregory Morris Consultants
- Training agenda
    - Importance of reservoir sedimentation (e.g. population increases, declining groundwater levels, and climate change)
    - Reservoir sediment monitoring

**11:45 AM Lunch break**

1:15 PM Continue development of training sessions

- Training agenda (continued)
    - Sustainable sediment management practices (e.g. reductions in watershed sediment yield, reservoir sediment bypass, pass through, and flushing, and mechanical and hydraulic sediment removal)
    - Economics of reservoir sediment management
    - Dam Decommissioning
- Assignments
- Other workshop venues?

**3:00 PM** **Break**

3:15 PM Continue development of training sessions

4:00 PM Paonia Reservoir Sedimentation Problems, Colorado

4:40 PM Update on Elwha River Restoration Project: Sediment Management

5:00 PM Adjourn

## Thursday, November 13

8:30 AM Development of web-based resources

- Answers to frequently asked questions
- Protocols for answering new questions
- Photo Gallery
- Bibliography and publications

**10:00 AM** **Break**

10:15 AM Continued development of web-based resources

**11:45 AM** **Lunch break**

1:15 PM Continued development of web-based resources

**3:00 PM** **Break**

3:15 PM Develop interagency requirements for web-based storage and retrieval of reservoir survey datasets.

3:45 PM Brainstorm ideas to encourage the storage of sediment survey data in the national reservoir database RESSED.

4:00 PM Discuss plans for a paper on reservoir sedimentation and sustainability.

4:45 PM Workshop wrap-up

5:00 PM Adjourn

# RESSED

## THE NATIONAL RESERVOIR SEDIMENTATION DATABASE

OF THE

**FEDERAL INTERAGENCY SUBCOMMITTEE ON SEDIMENTATION**
**Advisory Committee on Water Information**

**SOS**

**November 4, 2014**

**by**

**John R. Gray, jrgray@usgs.gov (kind-of-retired)**

**Kevin Laurent, klaurent@usgs.gov**

**Jenifer Bracewell, jbracewell@usgs.gov**

**With the support of the RESSED Development Team, past and present:**

**Meg Jonas, Dan Pridal, Paul Boyd, Jenn Gitt, Deborah Cooper, Jim Leech, Jerry Webb, John Remus, COE; Tim Randle and Jan Oliver, USBR**

USGS

**http://water.usgs.gov/osw/ressed/index.html**

# Kev, Jen and I hope to cover:

I. Brief…Societal Relevance of Fluvial Sediment

II. Overview of RESSED (SOS Reservoir Sedimentation Database)

III. Need and goals of a RESSED-21 Program

IV. Progress and Challenges by Kev and Jen

V. Open Season on John and any other RESSEDer

USGS

# Overarching Theme

- Societal damages from too much, too little, and/or contaminated sediment cost $Billions annually
- The reservoir sedimentation problem is inexorable, and difficult and expensive to address
- Thoughtful and technically supportable sediment management – based on credible science – can lead to cost-effective management decisions
- Any such management decisions are predicated on reliable and accessible data – enter RESSED…

USGS

# Societal Relevance of Sediment – Cost $Billions

- **$25-$65 billion**: Annual physical, chemical, and biological damages sediment damages in N. America (SCIENCE, 1995, by Pimental et al., adjusted for inflation); most damages in U.S.

- **$2.5 billion**: Annual sediment damages/remediation, reservoir-storage facilities (ARS & USGS).

- **$0.8-$1.1 billion**: Created Louisiana's coastal wetlands annual costs (per COE estimates).

- **$1.1 billion**: Dredging costs in support of about 490 million tonnes of commerce on the Mississippi and Ohio Rivers in 2007 (per COE estimates).

- **$1.5-$2.5 billion**: Cost for 3-5 overflow diversions to build wetlands in Louisiana; up to 20 could be constructed (per COE estimate).

- **$0.7 billion**: Missouri River Recovery Program, Environmental Management Program, low-flow water-supply infrastructure upgrades (per combined COE estimates).

- **$Unknown, but Undoubtedly Substantial**: Gulf Hypoxia, sediment management from dam removal, sediment-quality impairments, many others.

USGS

# Some Uses of Reservoir Sedimentation Data

- Determine if a threat to public water supply is imminent or foreseeable,
- Fine-tune water releases to minimize capacity-loss effects on flooding, water use.
- Design reservoir sediment-storage allocations in minimize future threats
- Manage sediment deposits,
- Rehabilitating aging or damaged structures,
- Designing sediment-sluicing and other sediment-management structures,
- Estimating mass of captured sediment and associated solid-phase constituents, such as carbon, plus selected sediment-bound contaminants, and
- Assessing resource conditions related to land cover, land use, and rates of erosion and sediment production.

USGS

# Reservoir Sedimentation is a Special Concern in Western States

- **Sedimentation problems (high loads, wildfire, debris flows, erosion);**
- **Water scarcity issues;**
- **Fewer sediment gages;**
- **Shorter periods of gage record;**
- **In summary, less information and higher stakes than in the eastern U.S.**

# What Is RESSED?

- ACWI Subcommittee on Sedimentation Project
- 1950's-era Soil Conservation Service database
- Changes in capacities from bathymetric data
- 2,194* reservoirs, 8,974* surveys, lower US, 1:PR
- Based on Soil Conservation Service Form 34
- Inc. USBR (81), COE (444), TVA (37) reservoirs*
- Presumed USA's largest/oldest such database

* Data from September 4, 2012; Kevin will provided updated statistics

# Abbreviated History

- 1950's origins "pre-computer"
- 1985: SCS digital DB construction unsuccessful
- 1993: NRCS finds unmarked magnetic tape…
- 1998-2008: USGS carbon budget analyses
- 2008: USGS/SOS places on-line as "giveaway"
- 2010-2012: CoE and BoR provide 1-year $$
- 2011: ACWI resolution encourages support
- 2012: Closure BoR needs
- 2013: ACWI 2011 resolution leads to $75K annual maintenance funds (WaterSMART)
- 2014+: See following.

WICP Water Information Coordination Program
ACWI Advisory Committee on Water Information

# III. Status and Plans of RESSED

**Subcommittee on Sedimentation**

**The Reservoir Sedimentation Database (RESSED)**

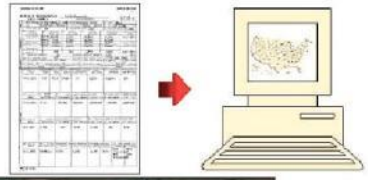

- WELCOME
- PURPOSE AND SCOPE
- BACKGROUND
- DATA SOURCES AND DATA QUALITY
- DATABASE DOWNLOAD AND DOCUMENTATION
- INTERACTIVE MAP
- LIST OF RESERVOIRS
- ENHANCEMENT AND EXPANSION
- UPDATING RESSED - INTERIM GUIDELINES
- ACKNOWLEDGEMENTS
- SELECTED REFERENCES
- ACRONYMS
- CONTACT


**WELCOME TO THE RESERVOIR SEDIMENTATION (RESSED) DATABASE**

The Advisory Committee on Water Information, Subcommittee on Sedimentation's Reservoir Sedimentation (RESSED) database enables access to sedimentation-survey data for selected United States reservoirs. These data or their visual representation are available via:

- A Relational Database containing all Subcommittee on Sedimentation's compiled reservoir-survey information to facilitate analyses related to reservoir-sediment deposition.
- Interactive Maps for viewing reservoir-survey locations and ancillary information, and
- List of Reservoirs and Individual Data Sheets used to populate the relational database for all but two of the surveyed reservoirs.

RESSED, developed in March 2009 from its predecessor RESIS-II, is a work-in-progress, dynamic database. The Subcommittee on Sedimentation seeks additional or revised quality-assured sediment-survey information to improve and expand RESSED.



Placed On-Line
in 2008
Access Database
"Giveaway"

Technical support for this Web site is provided by the U.S. Geological Survey.

Accessibility FOIA Privacy Policies and Notices

U.S. Department of the Interior | U.S. Geological Survey
URL: http://ida.water.usgs.gov/ressed/index.cfm
Page Contact Information: RESSED Web Support Team
Last Modified: 07/14/2009

USGS

# III. Status and Plans of RESSED

The Reservoir Sedimentation Database (RESSED) - Windows Internet Explorer

http://ida.water.usgs.gov/ressed/interactive_map/index.cfm

File Edit View Favorites Tools Help

The Reservoir Sedimentation Database (RESSED)

WICP Water Information Coordination Program

ACWI Advisory Committee on Water Information

**Subcommittee on Sedimentation**

**The Reservoir Sedimentation Database (RESSED)**

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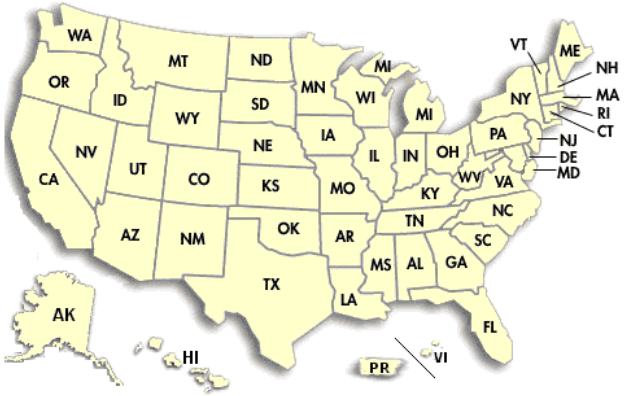
## INTERACTIVE MAP

Select a State




**Select a State or View the Reservoir Master List by Data Sheet Number.**

AK - AL - AR - AZ - CA - CO - CT - DE - FL - GA - HI - IA - ID - IL - IN - KS - KY - LA - MA - MD - ME - MI - MN - MO - MS - MT - NC - ND - NE - NH - NJ - NM - NV - NY - OH - OK - OR - PA - PR - RI - SC - SD - TN - TX - UT - VA - VI - VT - WA - WI - WV - WY -

Accessibility FOIA Privacy Policies and Notices

U.S. Department of the Interior | U.S. Geological Survey
URL: http://ida.water.usgs.gov/ressed/interactive_map/index.cfm
Page Contact Information: RESSED Web Support Team
Last Modified: 04/07/2009

Done

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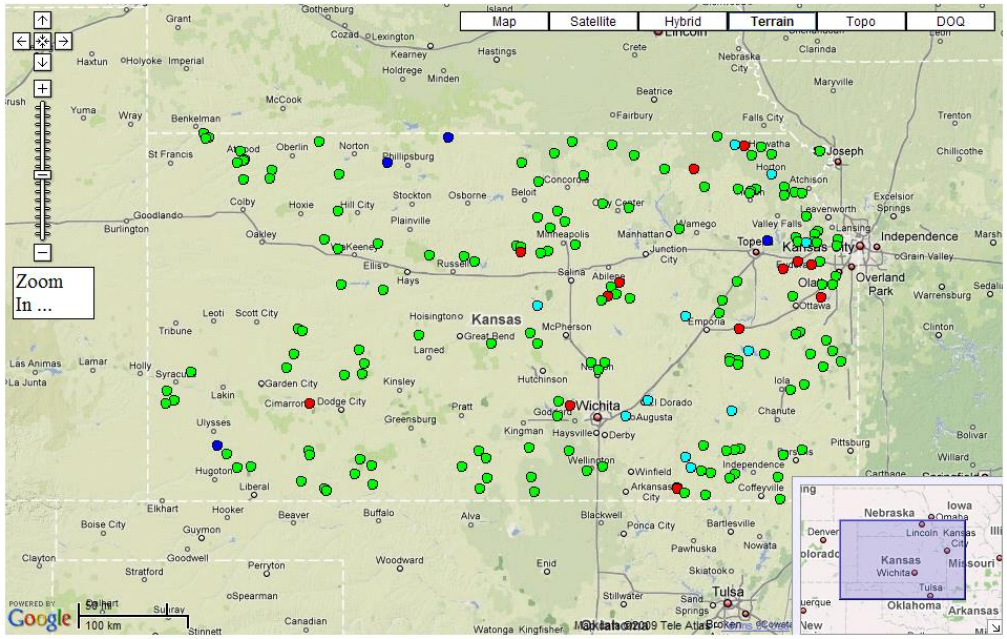
# III. Status and Plans of RESSED

The Reservoir Sedimentation Database (RESSED) - Windows Internet Explorer

http://ida.water.usgs.gov/ressed/interactive_map/selectstate.cfm/011D084517540242B2/index.htm

- DOWNLOAD AND DOCUMENTATION
- INTERACTIVE MAP
- LIST OF RESERVOIRS
- ENHANCEMENT AND EXPANSION
- UPDATING RESSED - INTERIM GUIDELINES
- ACKNOWLEDGEMENTS
- SELECTED REFERENCES
- ACRONYMS
- CONTACT




● Verified on 1:24,000 topo map ● NHD lat/lon of dam outlet, & Verified on 1:24,000 topo maps lat/lon ● NID

● Original datasheet lat/lon ● Located at nearest post office

| Reservoir Name | County | Water Course | Data Sheet | Reservoir Map | NID ID |
|---|---|---|---|---|---|
| ADAIR | CHAUTAUQUA | NORTH CANEY RIVER | 45-25 | Map | |
| ADAMS | HARPER | TRIB. OF BLUFF CREEK | 46-26 | Map | |
| ALBERT SAUVAGE STOCKWATER DAM | RAWLINS | SAPPA CREEK | 33-15 | Map | KS01762 |
| AMERINE | HAMILTON | TRIB. OF LITTLE BEAR CREEK | 47-14 | Map | KS03546 |
| BARBER | RICE | TRIB. OF ARKANSAS RIVER | 46-45 | Map | |
| BARRETT | HARPER | WILD CREEK | 46-31 | Map | |

Done Internet 100%

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# III. Status and Plans of RESSED

**RESSED**

**Subcommittee on Sedimentation**

SCS Form 34

Lake Meade

Page 1 of 3

RESERVOIR SEDIMENT DATA SUMMARY

LAKE MEAD (HOOVER DAM)
NAME OF RESERVOIR

62-1a
DATA SHEET NO.

**DAM**

| | | |
|---|---|---|
| 1. OWNER Interior - Bureau of Reclamation | 2. STREAM Colorado | 3. STATE Nevada - Arizona |
| 4. SEC. 29 TWP. T22S RANGE R65E | 5. NEAREST P.O. Boulder City 6NE | 6. COUNTY Clark-Mohave |
| 7. LAT 36° 01' " LONG 114° 44' " | 8. TOP OF DAM ELEVATION 1232 1/ | 9. SPILLWAY CREST ELEV. 1221.4 2/ |

**RESERVOIR**

| 10. STORAGE ALLOCATION | 11. ELEVATION TOP OF POOL | 12. ORIGINAL SURFACE AREA, ACRES | 13. ORIGINAL CAPACITY, ACRE-FEET | 14. GROSS STORAGE, ACRE-FEET | 15. DATE STORAGE BEGAN |
|---|---|---|---|---|---|
| a. FLOOD CONTROL | 1229 | 162,600 | 1,587,000 | 32,471,000 | |
| b. MULTIPLE USE 3/ | 1219.61 | 156,600 | 27,661,000 | 30,884,000 | Feb. 1, 1935 |
| c. POWER | | | | | |
| d. WATER SUPPLY | | | | | 16. DATE NORMAL OPER. BEGAN |
| e. IRRIGATION | | | | | |
| f. CONSERVATION | | | | | |
| g. INACTIVE | 895 | 33,400 | 3,223,000 | 3,223,000 | Mar. 1, 1936 |

17. LENGTH OF RESERVOIR 152 4/ MILES; AV. WIDTH OF RESERVOIR 1.65 MILES

**WATERSHED**

| | | | |
|---|---|---|---|
| 18. TOTAL DRAINAGE AREA 167,800 SQ. MI. | | 22. MEAN ANNUAL PRECIPITATION 10 6/ INCHES | |
| 19. NET SEDIMENT CONTRIBUTING AREA 167,600 5/ SQ. MI. | | 23. MEAN ANNUAL RUNOFF 1.30 INCHES | |
| 20. LENGTH MILES | AV. WIDTH MILES | 24. MEAN ANNUAL RUNOFF 11,610,000 7/ AC.-FT. | |
| 21. MAX. ELEV. 14,400 | MIN. ELEV. 640 | 25. ANNUAL TEMP.: MEAN RANGE | |

**SURVEY DATA**

| 26. DATE OF SURVEY | 27. PERIOD YEARS | 28. ACCL. YEARS | 29. TYPE OF SURVEY | 30. NO. OF RANGES OR CONTOUR INT. | 31. SURFACE AREA, ACRES | 32. CAPACITY, ACRE-FEET 8/ | 33. C/I. RATIO, AC.-FT. PER AC.-FT. |
|---|---|---|---|---|---|---|---|
| 2-1-35 | – | – | (D) | 10 ft. | 163,000 | 32,471,000 | 2.80 |
| 9-30-48 | 13.7 | 13.7 | (D) | 10 ft. | 163,000 | 31,047,000 | 2.67 |
| 10-14-64 | 16.0 | 29.7 | (D) | 10 ft. | 163,000 | 29,755,000 | 2.56 |

| 26. DATE OF SURVEY | 34. PERIOD ANNUAL PRECIPITATION | 35. PERIOD WATER INFLOW, ACRE-FEET | | | 36. WATER INFL. TO DATE, AC.-FT. | |
|---|---|---|---|---|---|---|
| | | a. MEAN ANNUAL | b. MAX. ANNUAL | c. PERIOD TOTAL | a. MEAN ANNUAL | b. TOTAL TO DATE |
| 9-30-48 | | 12,526,000 | 17,260,000 | 175,362,000 | 12,526,000 | 175,362,000 |
| 10-14-64 | | 10,083,000 | 18,160,000 | 161,335,000 | 11,610,000 | 336,697,000 |

| 26. DATE OF SURVEY | 37. 8/ PERIOD CAPACITY LOSS, ACRE-FEET | | | 38. TOTAL SED. DEPOSITS TO DATE, ACRE-FEET | | |
|---|---|---|---|---|---|---|
| | a. PERIOD TOTAL | b. AV. ANNUAL | c. PER SQ. MI.-YEAR | a. TOTAL TO DATE | b. AV. ANNUAL | c. PER SQ. MI.-YEAR |
| 9-30-48 | 1,424,000 | 104,000 | 0.621 | 1,424,000 | 104,000 | 0.621 |
| 10-14-64 | 1,292,000 | 80,750 | 0.482 | 2,716,000 | 91,450 | 0.546 |

| 26. DATE OF SURVEY | 39. AV. DRY WGT., LBS. PER CU. FT. | 40. SED. DEP., TONS PER SQ. MI.-YR. | | 41. STORAGE LOSS, PCT. | | 42. SED. INFLOW, PPM | |
|---|---|---|---|---|---|---|---|
| | | a. PERIOD | b. TOTAL TO DATE | a. AV. ANN. | b. TOT. TO DATE | a. PERIOD | b. TOT. TO DATE |
| 9-30-48 | 65 9/ | 879 | 879 | 0.320 | 4.39 | 8,460 | 8,460 |
| 10-14-64 | 60 | 572 | 714 | 0.282 | 8.36 | 7,700 | 7,760 |

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# SELECTED RESSED DATABASE CHARACTERISTICS (from 2012)

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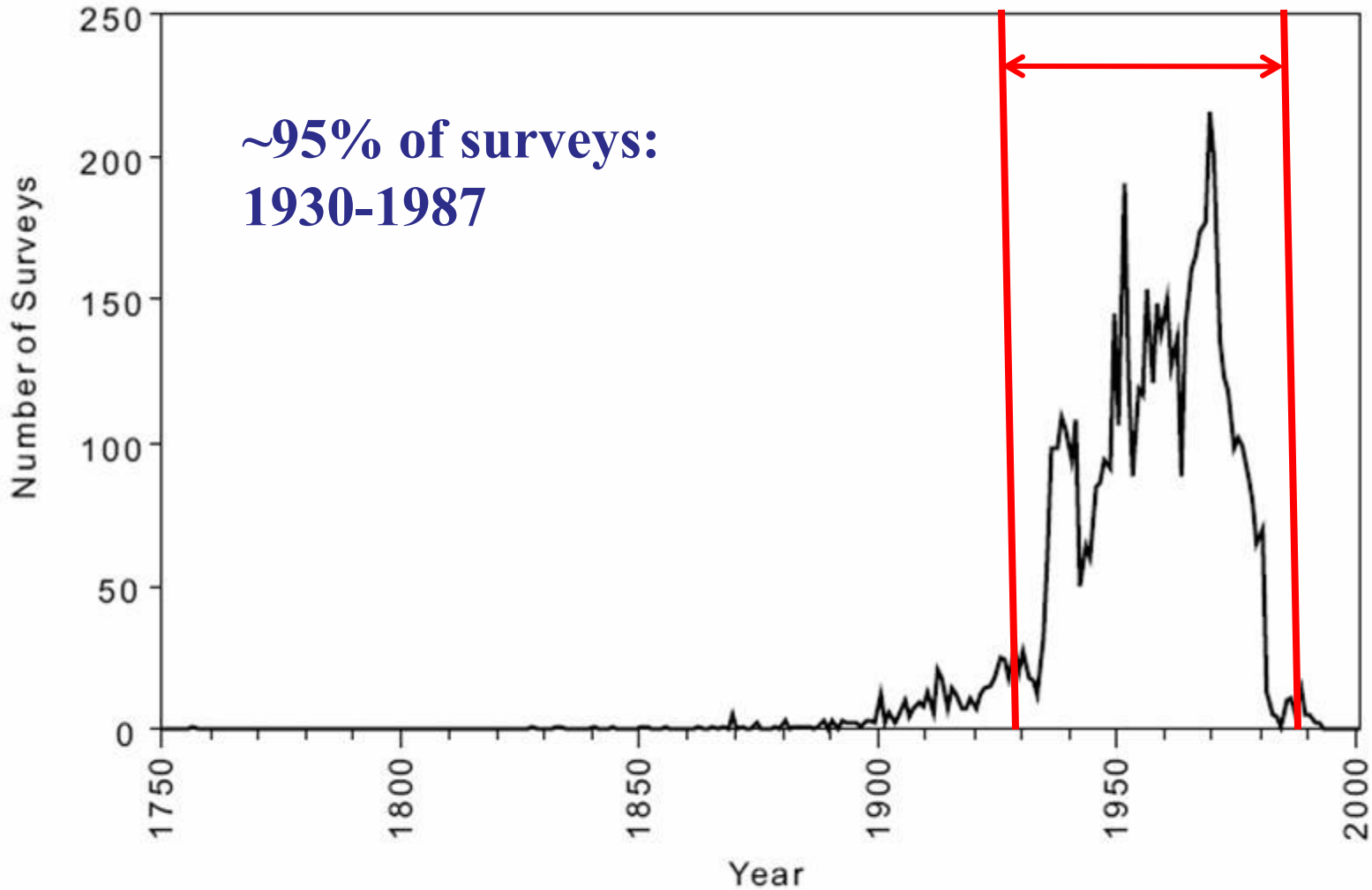
# RESSED Reservoir Surveys by Year

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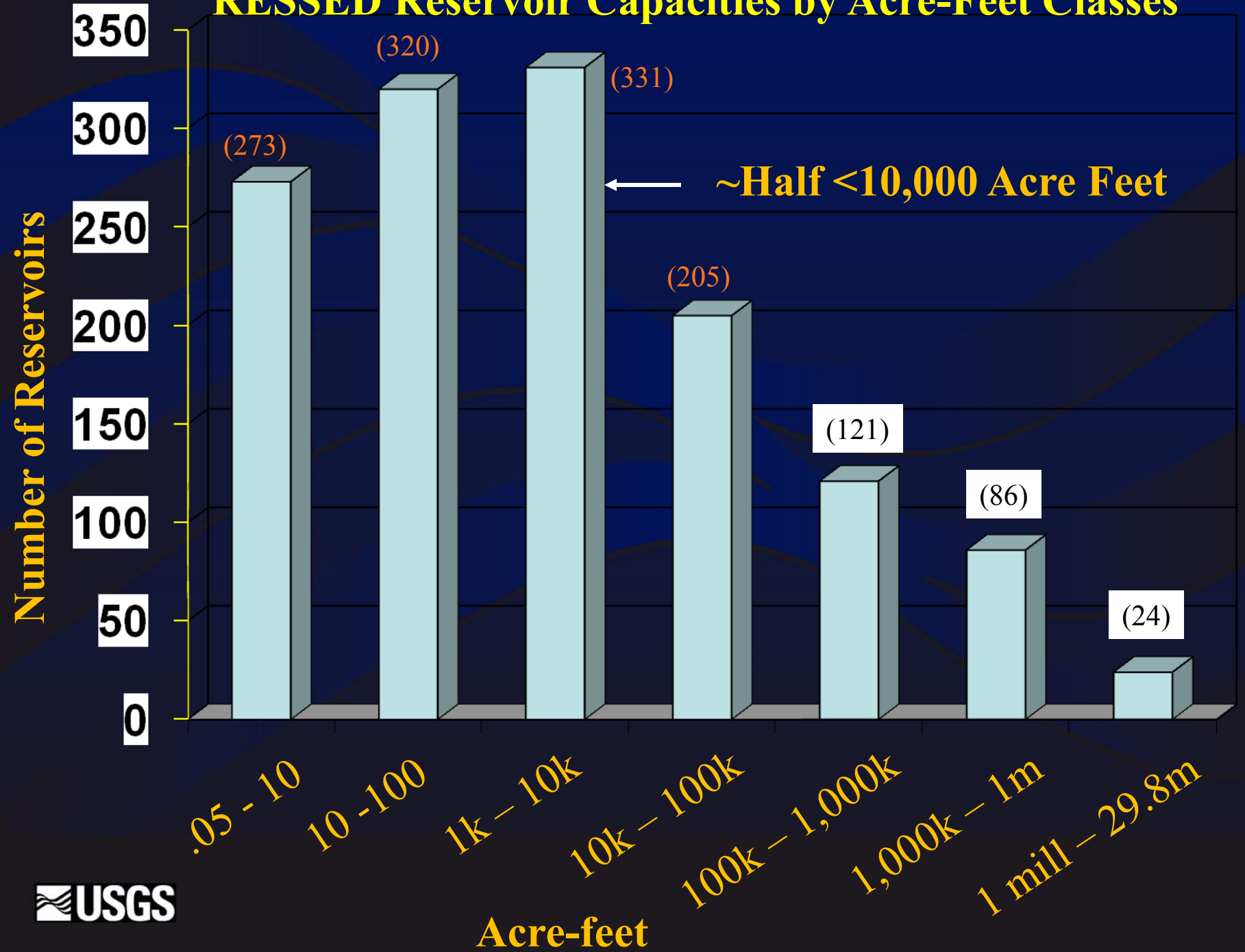
# RESSED Reservoir Capacities by Acre-Feet Classes

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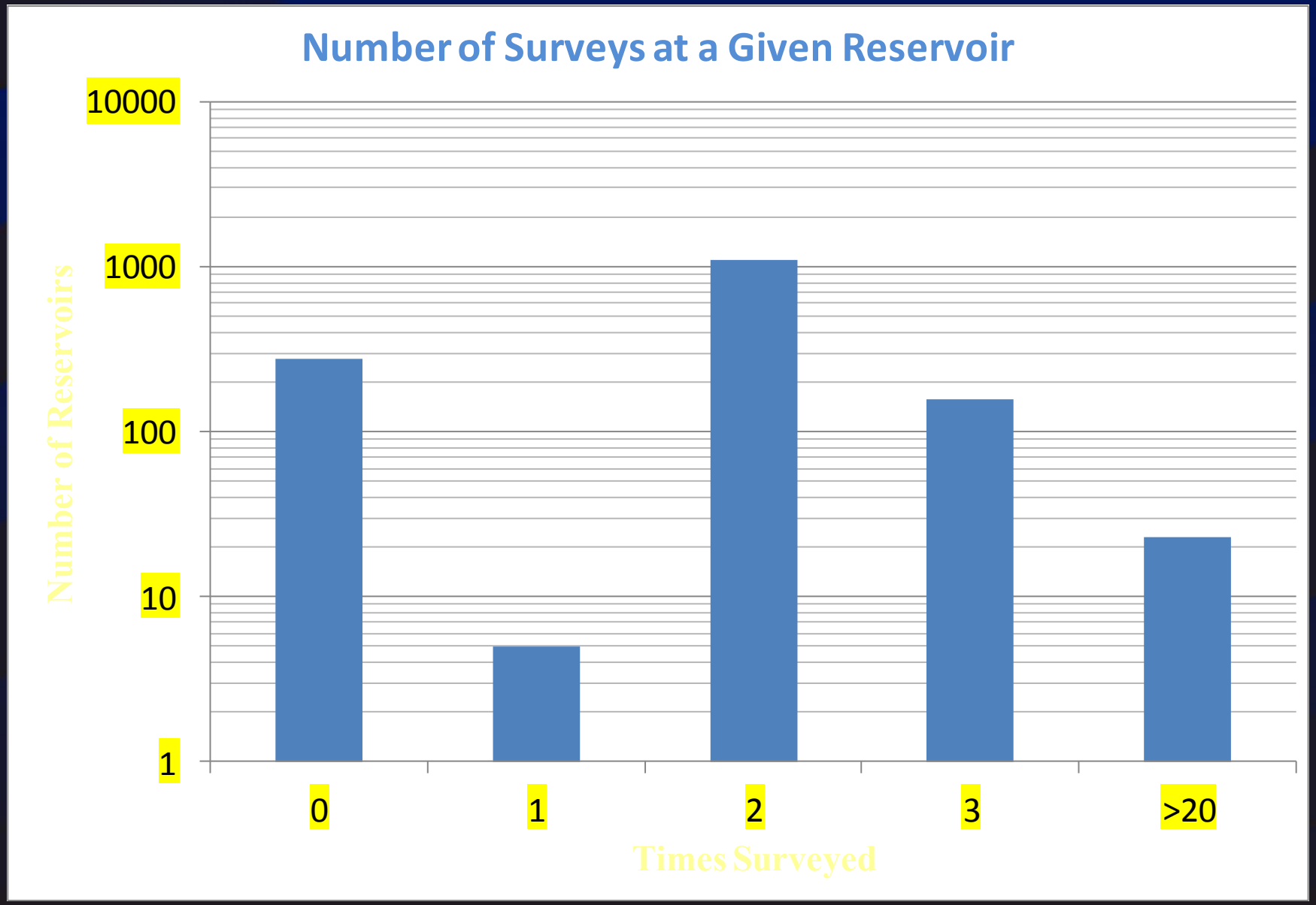
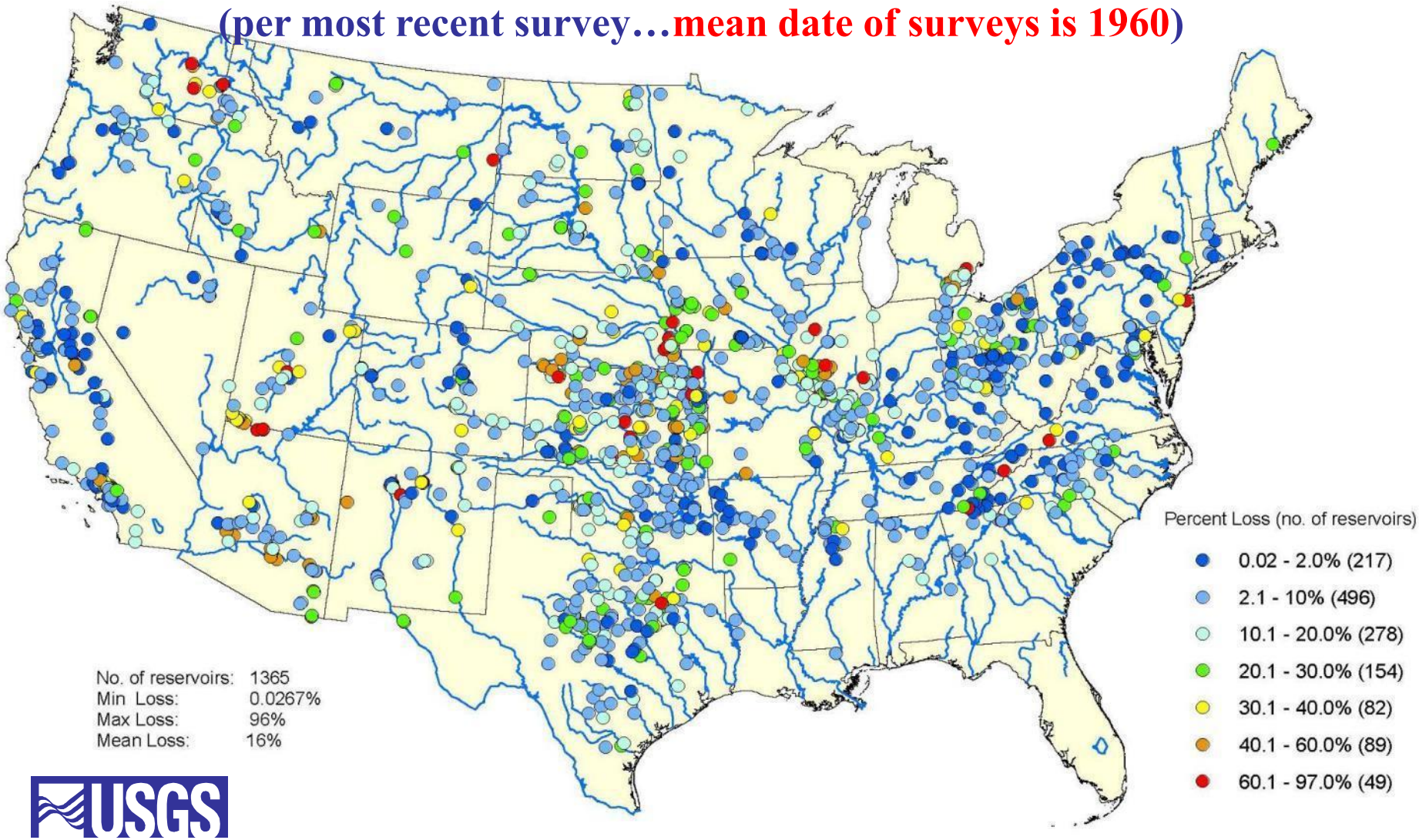



Data from David W. Stewart, USGS, June 19, 2012

Total Reservoir Capacity Loss in Percent

# RESSED Total % Capacity Loss

**(per most recent survey…mean date of surveys is 1960)**

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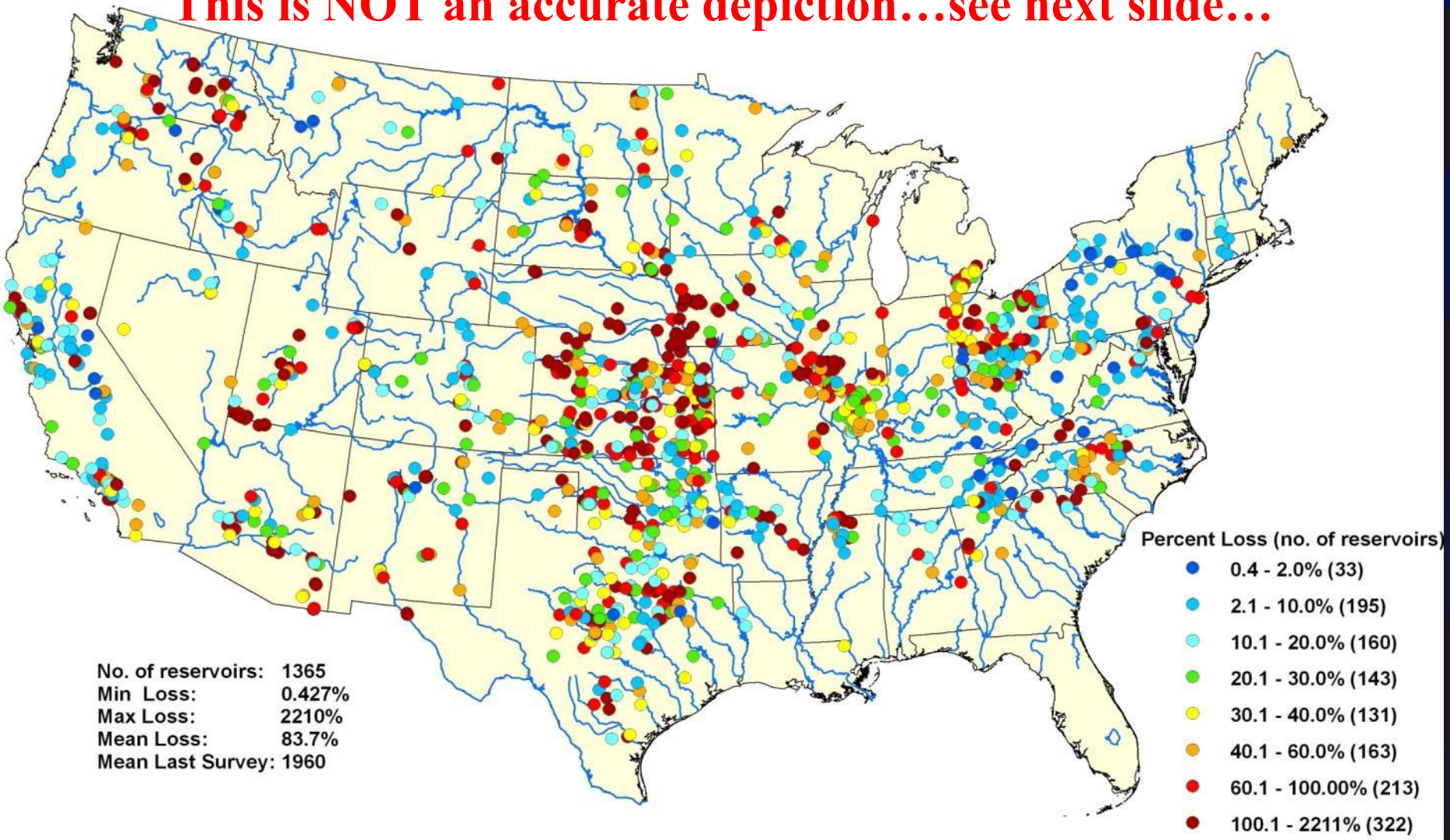
**~32% have lost 10-30% capacity as of last survey (432/1,365 reservoirs)**

# Extrapolated to 2010 Total % Capacity Loss

**This is NOT an accurate depiction…see next slide…**




**~39% have lost > 60% capacity (535/1,365 reservoirs)**

# % Extrapolated Capacity Loss for All RESSED Reservoirs in 2010

- USGS does not believe that the previous slide represents an accurate depiction of reservoir capacity loss determined from the RESSED database.

- A 2011 review of several dozen reservoirs using Google Earth – an inferior tool for this purpose – indicates that some reservoirs predicted to have lost 100% of capacity are not chock full of sediment…but that some are, with the latter tending to be smaller reservoirs.

John R. Gray and David W. Stewart, USGS

USGS

# RESSED Reservoirs --

- Let's do a little math:
  - Some ~2,100 reservoirs listed in RESSED
  - ~80,000 dams in the National Inventory of Dams
  - ~6 million – 9 million impoundments in the U.S. (USGS National Hydrography Dataset; Renwick, Miami of Ohio)
- Hence, the number of reservoirs in RESSED are:
  - ~2% of number of dams in the NID (but not all cross-listed)
  - ~0.03% of U.S. impoundments

**Considered by numbers of reservoirs, those in RESSED are much less than the "tip of the iceberg" or akin to the "drop in the bucket"**

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# A National RESSED-21 could provide:

- Unrestricted/free access and use
- Update capability by any user (free data to planners, researchers)
- A flexible, robust schema amenable for the 21st Century
- Linkages to key databases (National Inventory of Dams, National Hydrography Database, StreamStats, National Water Information System, others
- Quality-control data – a first for reservoir database
- Capability for local, regional, and national-scale spatial/temporal analyses by anyone (universities, States, in addition to SOS organizations will love RESSED-21)

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# RESSED-21 Project Full Program Support Need Estimates (2012 dollars)*

| | |
|---|---|
| Year I: | $376 K |
| Year II: | $388 K |
| Year III: | $399 K |
| Year IV: | $305 K |
| Year V: | $192 K |

*** Moderately fewer annual funds may be accommodated by moderately longer project. From Subcommittee on Sedimentation meeting 4/5/2012 minutes; contact jrgray@usgs.gov**

See: http://acwi.gov/sos/minutes/4-5-2012_SOS_final_minutes_9-5-2012.pdf

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# RESSED Plans after FY14 – Funding Dependent

- $75K maintenance funds from USGS WaterSMART program in FY2013 ++ (max amount, not guaranteed in any given year).
- Options range from Wild Enthusiam to Stark Reality:
  - Full 5-year RESSED-21 project (build it/they will come…)
  - Mid-level RESSED (maintenance/public data release)
  - Maintenance/support of present application
- Tough times to be building support for a project.
- *Tougher times if insufficient water at the tap…*

# KEV AND JEN WILL DISCUSS

- Status of Merge of COE Data, and Posting of RESSED V.2 on RESSED Website
- Problems with Conflicting Bathymetric Survey Data, Same Reservoir/Day, and Dup Records (627 known instances)
- Web-Based RESSED and Suggestion for COE Beta Testing
- Sequel Ingres to Replace Filemaker Pro as Database Management System Proposed
- Need for Technical Support in Reservoir Science
- Need for Competent Project Manager
- Need for SOS Review and Approval Protocol
- Support Required for Public Release

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