RESSED

THE NATIONAL RESERVOIR SEDIMENTATION DATABASE

OF THE

FEDERAL INTERAGENCY SUBCOMMITTEE ON SEDIMENTATION
Advisory Committee on Water Information

Matt Romkens, Chair, SOS

In collaboration with John R. Gray, jrgray@usgs.gov

U.S. Geological Survey, Reston, VA

Meg M. Jonas, Margaret.M.Jonas@usace.army.mil

U.S. Army Corps of Engineers, Alexandria, VA

and the RESSED Development Team

Jerry McFaul, Jen Bracewell, Kevin Laurent, Dave Stewart, Meg and John

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http://ida.water.usgs.gov/ressed/

Overview of Presentation

- Overview of ACWI-SOS RESSED project
- Description of RESSED Database and Website
- RESSED issues/problems
- RESSED FUTURE
  - Description
  - Support Needs
  - ACWI RESOLUTION

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What Is RESSED?

- REServoir SEDimentation database
- 1,824 reservoirs, 6,618 surveys, lower US, 1:PR
- Changes in capacities are computed from repeat bathymetric surveys (+/- acre feet/year)
- Presumed to be largest such database for US

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Origin of RESSED

- Major Period of U.S. Dam Construction 1930-1970.
- Increasing reliance on reservoirs + sheer number of reservoirs led to realization of the national significance and potential deleterious consequences of capacity losses.
- This in turn led to an SCS ‘call’ for reservoir capacity data (initiated in 1953) for tabulation and reporting.
- Loss of institutional memory on reservoir sedimentation in 1994 SCS morph to NRCS. Present effort is attempting to restart and expand this program.

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SELECTED RESSED DATABASE CHARACTERISTICS

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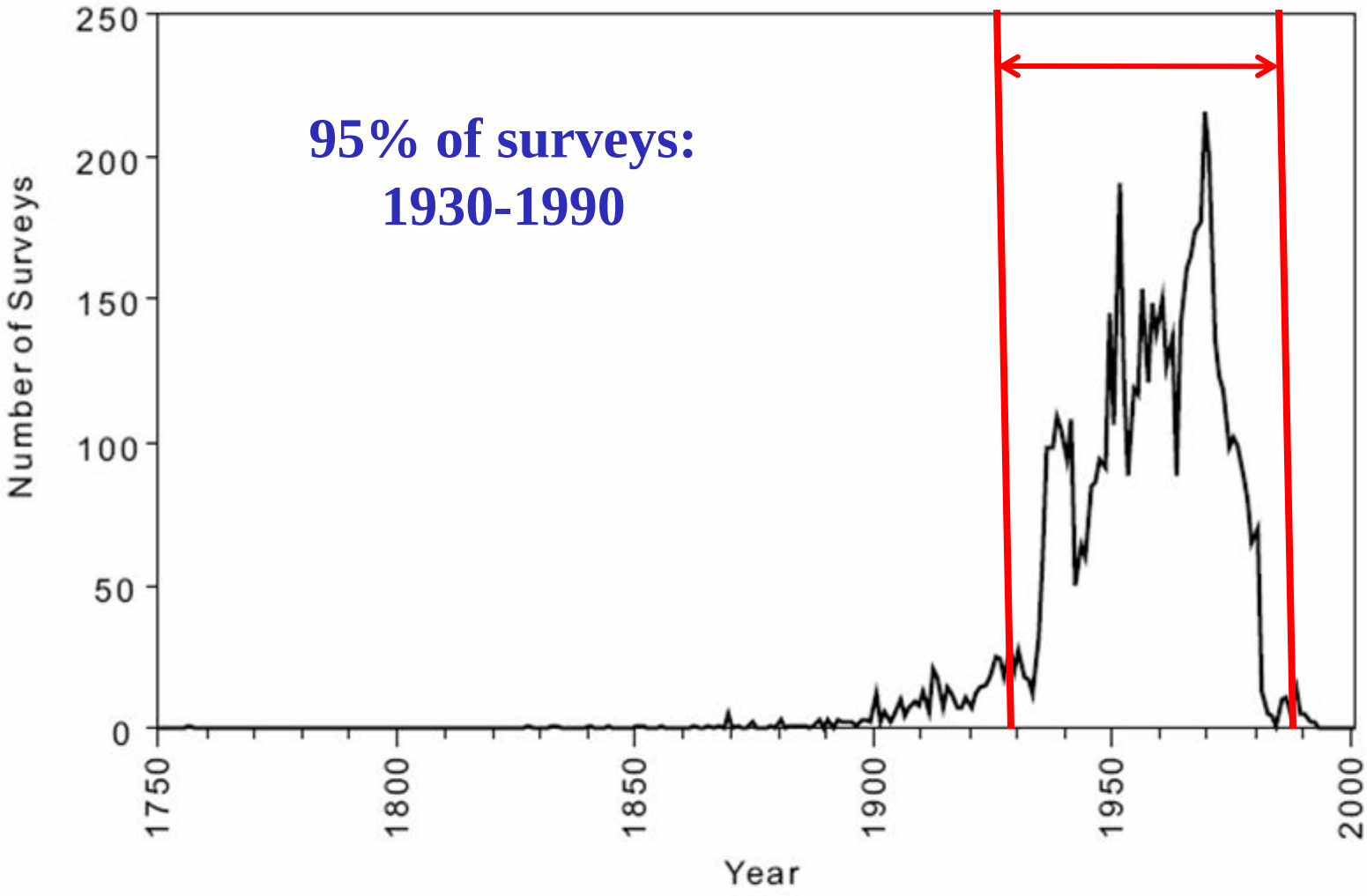
RESSED Reservoir Surveys by Year



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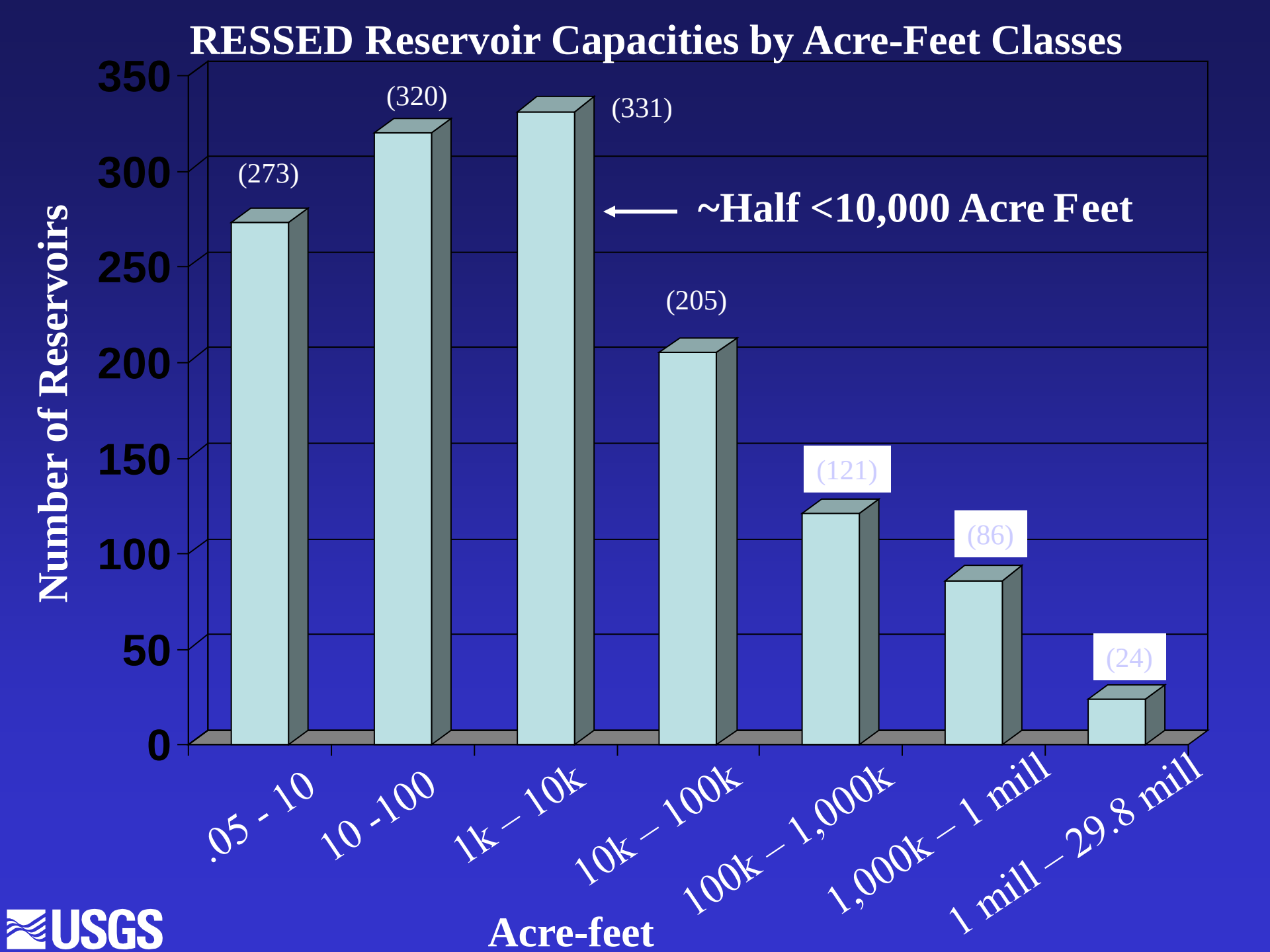
RESSED Reservoir Capacities by Acre-Feet Classes
Number of Reservoirs
350
300
250
200
150
100
50
0
(273)
(320)
(331)
(205)
(121)
(86)
(24)
~Half <10,000 Acre Feet
.05 - 10
10 -100
1k – 10k
10k – 100k
100k – 1,000k
1,000k – 1 mill
1 mill – 29.8 mill
Acre-feet
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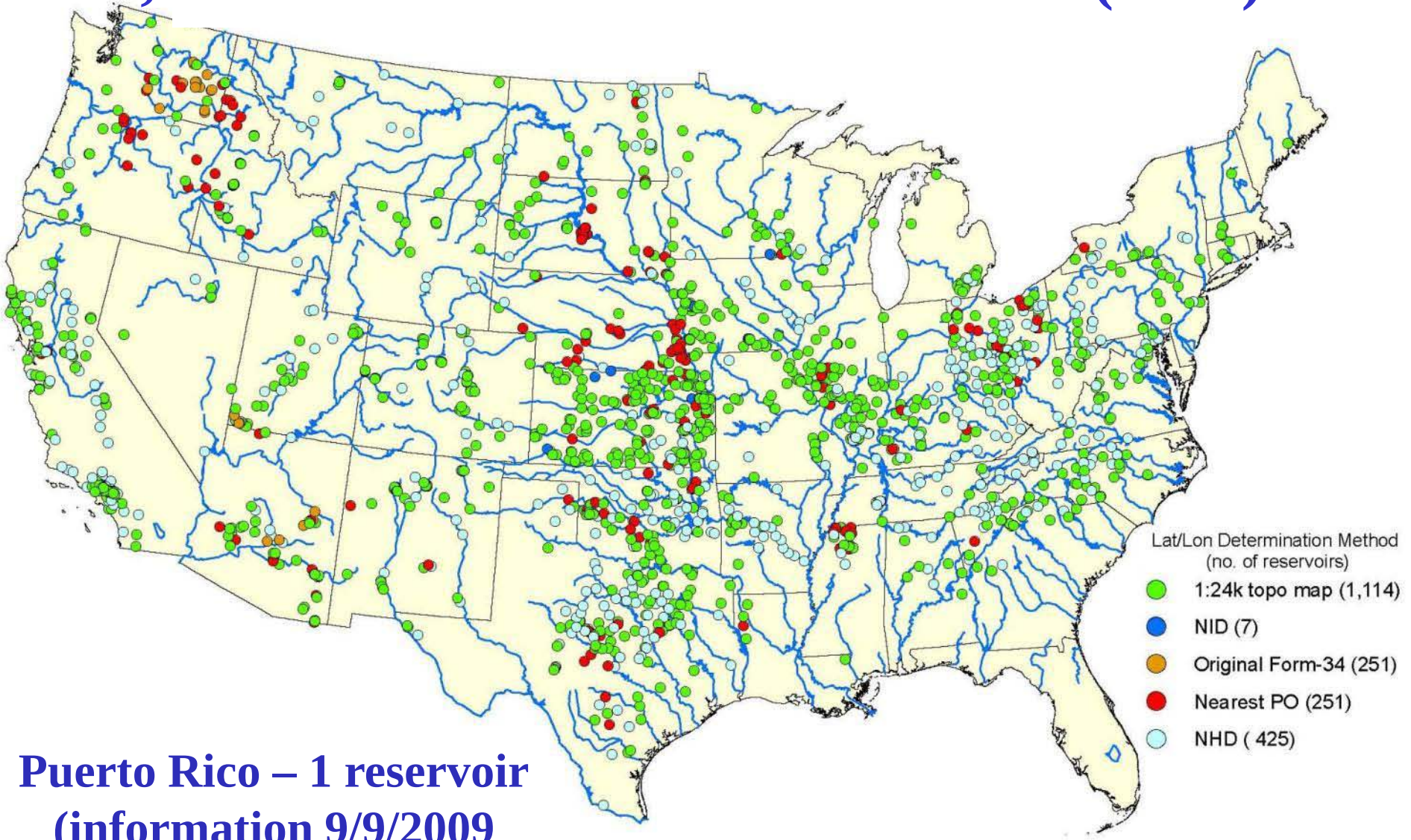
1,824 RESSED Reservoir Locations (2009)



Puerto Rico – 1 reservoir
(information 9/9/2009
D.W. Stewart)

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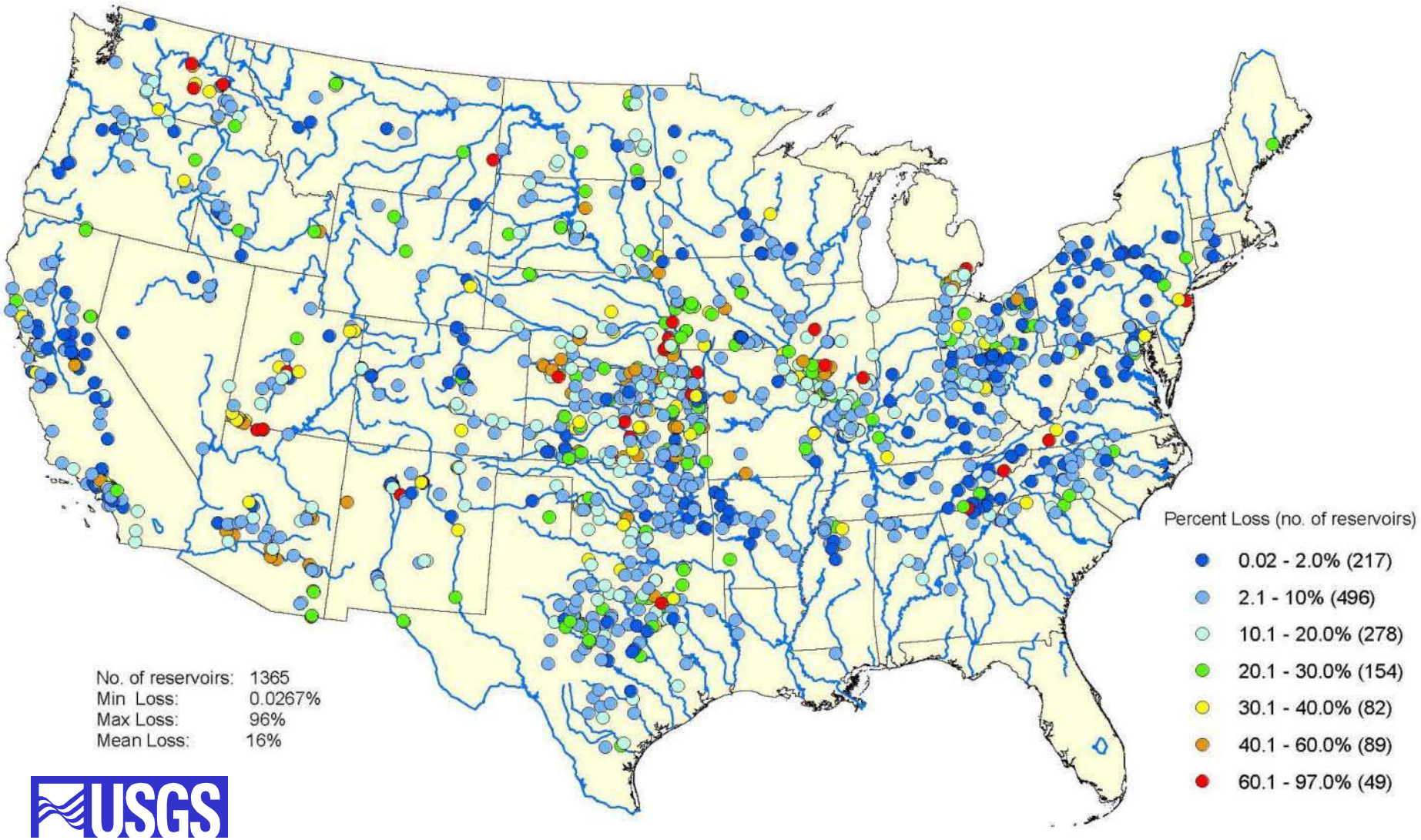
RESSED Total % Capacity Loss

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



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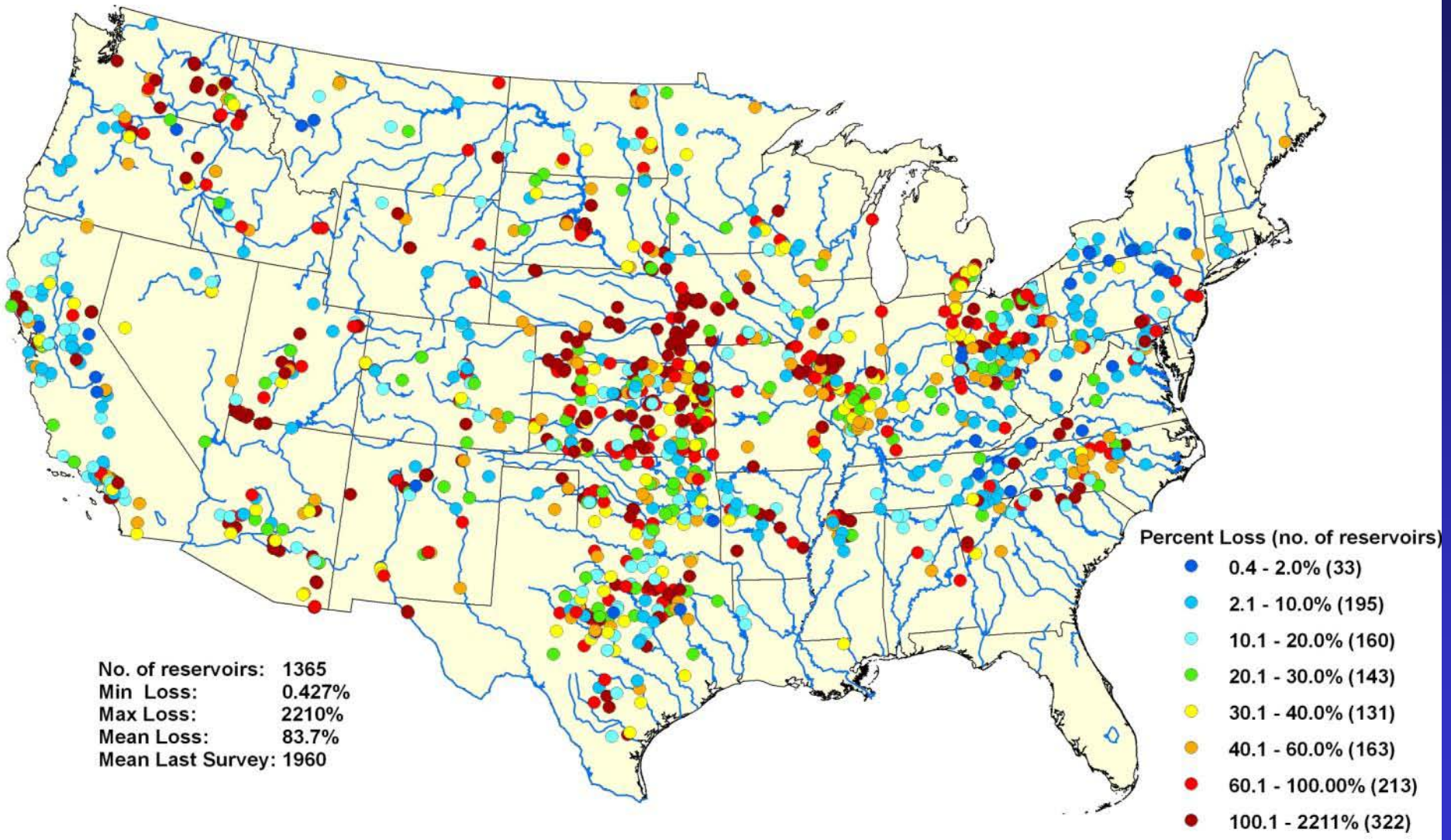
~32% have lost 10-30% capacity (432/1,365 reservoirs)

Extrapolated to 2010 Total % Capacity Loss



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

% Extrapolated Capacity Loss for All RESSED Reservoirs in 2010

- USGS (John Gray and Dave Stewart) are skeptical that the 2010 capacity-loss extrapolation depicted reality.

- Subsequently, we used Google Earth in an attempt to determine if any were actually filled. A ‘thumbnail’ review of 52 reservoirs over a range in drainage areas showed that 11 were completely filled; the remainder appeared to retain some storage capacity.

National Significance

- Sediment inexorably deposits in reservoirs, diminishing storage capacity over time
- Aging reservoir population – approx 33,000 dams constructed between 1955-1975) - “aging infrastructure”
- Reservoirs as nonrenewable resources (in most cases)
- Storage needs are increasing (uses added/increased)
- Sediment impacts occur long before 25% volume depletion
- Climate change anticipated to accelerate sediment deposition
- Whiskey’s for drinkin’, Water’s for Fightin’

Selected Uses of Reservoir Sedimentation Data

- For the particular reservoir, enables prediction of storage loss and impacts to purposes
- Will assist in prioritizing reservoir survey and sediment management needs within agency
- National data provides valuable sediment yield info, supplementing fluvial sediment gage data. Useful for:
  - Prediction of reservoir depletion rates (Jennings Randolph Reservoir example)
  - Watershed sediment management studies (such as Chesapeake Bay, Illinois River Basin, etc.
  - TMDLs

Reservoir Sedimentation is a Special Concern in Western States

- Sedimentation problems are most acute (high sed. loads, wildfire, debris flows, erosion)
- Water scarcity issues
- Fewer sediment gages
- Shorter period of record
- In summary, less information and higher stakes than in the eastern U.S.

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"20TH CENTURY" RESSED

(what we have on-line)

- Report, website, and "give-away" Access DB
- Many deficiencies, typo errors
- Loss of institutional memory and morphing through various database structures over course of 2 decades resulted in hard-to-use and error-ridden product. This is NOT the future…

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"21st CENTURY" RESSED

(what is needed)

- Correct the vexing number of deficiencies extant in the original database

  •As Kevin Laurent stated, "there are things we know we need to fix, and things we don't know that we need to fix."

- Enable capture and permanent storage of all raw 'modern' survey data
- Include a quality-control evaluation component for new data
- Include on-line search and analytical capability
- Link to other key databases: National Inventory of Dams, National Hydrography Dataset, StreamStats…the possibilities are almost limitless
- Develop recommended data-acquisition and –storage protocols
- Place on-line for public use and advertise
- Quality assure all new data
- Synthesize on this 'unique' and expanding database

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Kansas Water Resources Institute

"Sedimentation rate is the fundamental problem in all reservoirs; all other reservoir problems are linked, by various degrees, to this issue. Therefore, determining a reservoir's sedimentation rate is necessary for developing both short- and long-term management strategies and will help determine the flow regimes under which most sediment is delivered and deposited. This, in turn, can guide design and placement of appropriate BMPs."

"Multiple constituencies in Kansas need or desire information on water depth, sediment type, sediment accumulation, and related conditions affecting reservoirs. However, data and information are of little use unless readily and easily accessible to a wide variety of users."

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ACWI RESSED RESOLUTION

- ✓ RESSED is a logical starting point for a permanent USA reservoir sedimentation database
- ✓ Historical data are GOLDEN
- ✓ About $250K/year over 4 years needed to proceed (or, allocation of about $1M over any reasonable time period)
- ✓ Only “new” funds sought; if taken from appropriated funds, likely that other good water projects will unduly suffer.
- ✓ Can the Nation afford NOT to track reservoir capacity losses?

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?The Beginning?
http://ida.water.usgs.gov/ressed/