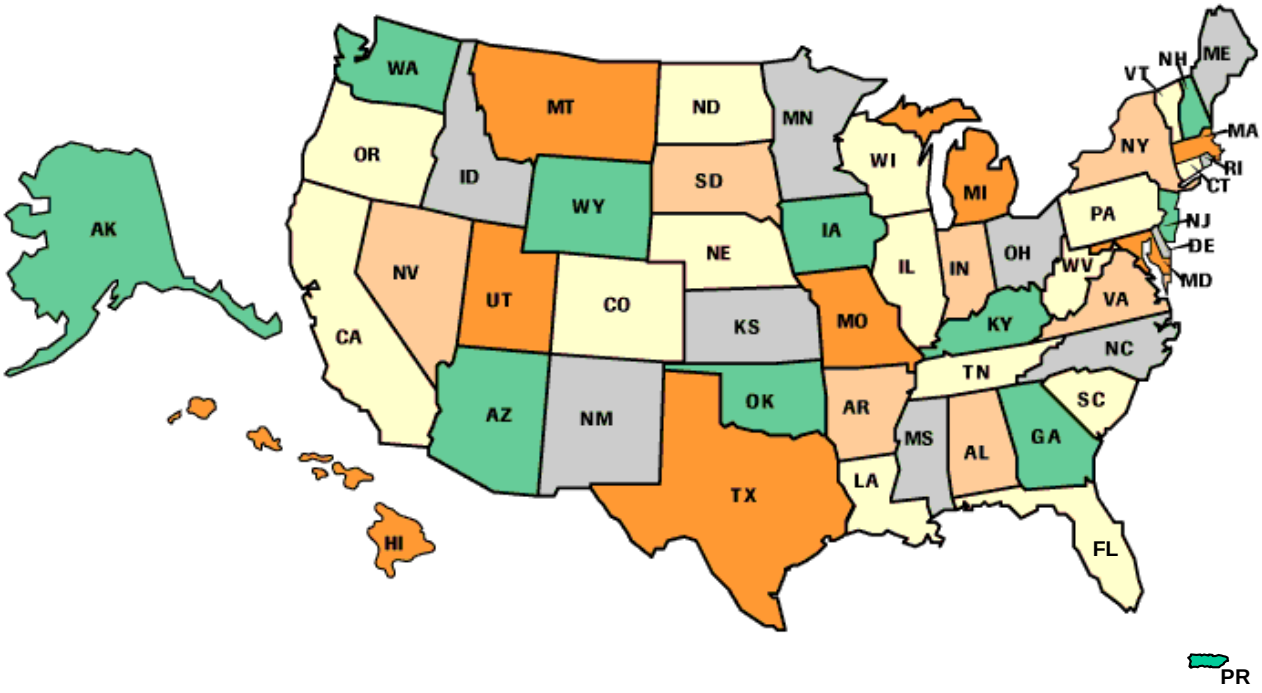
2008

State Laboratory Program

Workload Survey

Summary Graphs and Data



Thanks must be extended to all of the laboratory personnel who gathered and submitted the data. Without you, this survey would not be possible.

Thanks to the NCSLI Legal Metrology Committee, (Georgia Harris, NIST; Val Miller, NIST; Elizabeth Gentry, NIST; Van Hyder, North Carolina; Steven Harrington, Minnesota; Richard Gonzales, Oklahoma; and Ken Fraley, Oklahoma) for their perceptive review in the development of this report.

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Abbreviations

National Conference of Standards Laboratories International.....NCSLI
National Institute of Standards and Technology..... NIST
NIST Weights and Measures Division ..... WMD
NIST State Laboratory Program ..... SLP
NIST National Voluntary Laboratory Accreditation Program .....NVLAP

2008
NCSLI Legal Metrology Committee
State Laboratory Program
Workload Survey

Objectives and History of the Survey

The Workload Survey Committee, after examining the data from past surveys determined that there has been inconsistency in the titles as they relate to the year from which data was extracted. To allow proper comparison of the survey data to other available measurement data the comparisons in the charts and tables of the 2008 Survey report reflect the year from which data was extracted rather than the year in the survey title.

Survey Title	Year represented by the survey data
1996 State Laboratory Program Workload Survey	1996
1999 State Laboratory Program Workload Survey	1998
2000 State Laboratory Program Workload Survey	1999
2001 State Laboratory Program Workload Survey	2000
2003 State Laboratory Program Workload Survey	2002
2005 State Laboratory Program Workload Survey	2004
2005 & 2006 State Laboratory Program Workload Survey	2005 & 2006
2008 State Laboratory Program Workload Survey	2008

In 1996, the National Conference on Weights and Measures (NCWM) Metrology Subcommittee surveyed the State Laboratory participants to quantify the workload of the State Laboratory Program (SLP) and document its impact on the United States economy. From the survey analysis, it was clear that the workload statistics were dynamic and only provided a snapshot of the workload at the time. Therefore, the Metrology Subcommittee circulated a revised survey April 16, 1999 to update program statistics and to investigate trends in the National workload. The subcommittee has since recommended that the survey be conducted on a regular basis and that the core survey be kept standardized in order for state labs to develop databases that could automatically generate the information for the survey.

Survey data will be used not only to quantify the impact of the State Laboratory Program on the United States economy, but also to plan and maximize its effectiveness. Training and inter-laboratory comparisons will be designed to meet real needs of the workload. Ultimately, the survey information will increase the efficiency of the entire State Laboratory Program and maximize the benefits to the National Economy. The results of previous surveys have been used extensively at NIST to gain support and attention for the State Laboratories and have been helpful in putting together budget proposals. The information from the survey is also useful in identifying the diversities of the workload on a national level.

Presentation and Analysis of Data

Laboratories submitted their data using an Excel spreadsheet designed and distributed for this survey. Macros were developed to parse the data from each individual survey into a master data spreadsheet. Excel spreadsheets were used to present the information in graphical form for the different types of standards. The first graph at the top of each page is a map graph in which shading is used to indicate the number of standards each state tested. Also included is a pie graph that provides a further breakdown of the data. The pie graph is automatically placed as an overlay on the map graph and associated with the appropriate State. The bar graph uses the same data as the map graph and provides a further breakdown of the data. The bar graph displays the total number of standards tested above each bar and an average is calculated and plotted.

> *Note: Extreme caution should be used when comparing one state's data with data from another state. It was determined in the 1996 survey that laboratory workload is based somewhat on industrial and population densities that vary by geographical location. Laboratories generally attempt to meet the needs of their customers equally. For this and additional reasons listed elsewhere in this report, variance between individual laboratories concerning the number of devices tested, staffing, and laboratory facility are normal and cannot legitimately be used to rate the quality of any laboratory program.*

Also presented are some comparisons between the calculated laboratory averages from previous surveys. No attempt was made to compare increases or decreases in the workload of individual laboratories due to the fact that laboratories may use different calibration intervals for different standards and their annual workload will fluctuate accordingly. For example, a state may have their volumetric glassware on a two-year calibration interval with the majority of these standards calibrated in one twelve month period with very few that are tested in the following twelve-month period. This does not indicate that the workload is decreasing in that state; it is just a reflection of the calibration interval assigned to those standards.

Participants

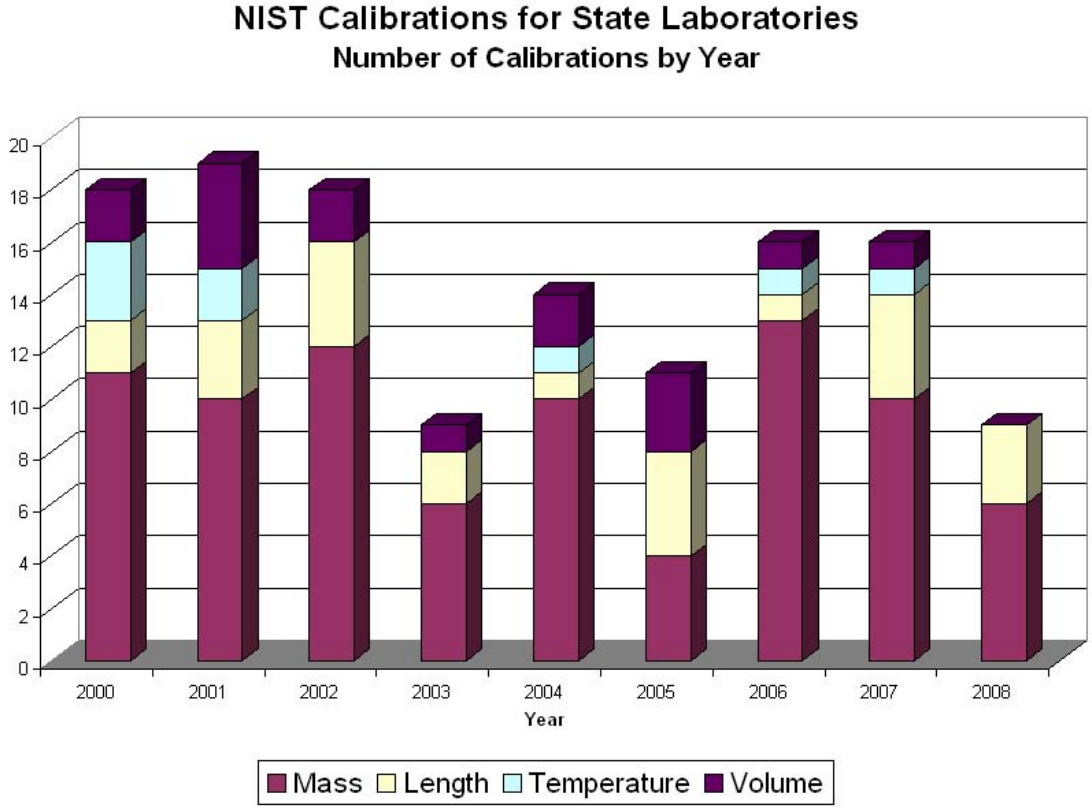
The State Laboratory Program (SLP) is comprised of 55 metrology laboratories. There are 50 state laboratories and 5 other government laboratories (Puerto Rico, Washington DC, Los Angeles County, USDA-GIPSA (identified as 'DA' in the survey), and U.S.-Virgin Islands). Of these 55 laboratories, 4 are not operational. The Washington DC, Delaware, U.S.-Virgin Islands, and Rhode Island metrology laboratories were not operational during the 2008 reporting period of the survey. The Nebraska Weights & Measures did not participate in this survey. Fifty laboratories of the fifty-one active laboratories responded to the survey.

The following is a list of the SLP laboratories and their participation status in previous surveys.

	1996 Survey Participant	1998 Survey Participant	1999 Survey Participant	2000 Survey Participant	2002 Survey Participant	2004 Survey Participant	2005 Survey Participant	2006 Survey Participant	2008 Survey Participant
AK	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
AL	Yes				Yes	Yes	Yes	Yes	Yes
AR	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
AZ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CO	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
CT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DE	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)
FL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HI	Yes	Yes	Yes	(inactive)	Yes	Yes	Yes	Yes	Yes
IA	Yes	Yes	Yes		(inactive)	Yes	Yes	Yes	Yes
ID	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IL	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
KS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
KY	Yes	Yes	Yes	Yes	Yes	(inactive)	(inactive)	Yes	Yes
LA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MA	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes
MD	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ME	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MN	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MS	Yes	Yes		(inactive)	Yes	Yes	Yes	Yes	Yes
MT	Yes	Yes	Yes	Yes	Yes	Yes			Yes
NC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ND	Yes	Yes	Yes	Yes	Yes	(inactive)	Yes	Yes	Yes
NE	Yes	Yes		Yes	Yes	Yes	Yes	Yes	No
NH	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NJ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NV	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
NY	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OH	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OK	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RI	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)
SC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SD	Yes	Yes			(inactive)	Yes	Yes	Yes	Yes
TN	Yes	Yes	Yes	Yes	Yes	(inactive)	Yes	Yes	Yes
TX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UT	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VT	Yes	Yes	Yes	Yes	Yes	Yes	Partial	Partial	Yes
WA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WV	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
WY	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes
USDA-GIPSA	Yes					Yes	Yes	Yes	Yes
Wash. DC	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(closed)
Virgin Islands	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)	(inactive)
Puerto Rico	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LA County	Yes	Yes	Yes	Yes	Yes	(inactive)	(inactive)	(inactive)	Yes
TOTAL	51	46	45	45	48	47	46	49	50

Impact and Leveraging of NIST Calibrations
(Information provided by NIST/WMD)

Calibration data for State laboratories was obtained from the NIST Measurement Services Division from 2000 to 2008. One of the measures of impact of NIST calibrations is to quantify the number and impact of downstream calibrations. How many additional calibrations are made by other laboratories using these calibrations? The answer to this question is a measure of the national impact of NIST calibration services and training. This leveraging of NIST calibrations to industry by the State weights and measures laboratories contributes greatly to the economy of the United States.



State weights and measures laboratories account for a small portion of NIST's annual calibrations. The average leveraging impact is approximately 28,000:1. Given data obtained in the early SLP surveys, almost half of the customer workload in the state laboratories is for industry and other government agencies (i.e., not weights and measures enforcement efforts). Many of these customers are the same customers who in other countries must obtain calibrations from the national laboratory.

Economic statistics indicate that weights and measures enforcement, supported by these leveraged State weights and measures laboratory calibrations, affects more than half of the $13.2 trillion U.S. GDP (2006). Since nearly half of the State weights and measures laboratory workload does not affect weights and measures enforcement, the economic impact of these calibrations influences virtually all of the U.S. GDP. Accurate measurements ensure product quality for practically every product manufactured, are required for other regulatory functions (EPA, FDA, DOD, DOE, DOT), and are requisite for international trade.

One question that might be asked in looking at this kind of leveraging data is "are enough calibrations being obtained from NIST by the States?" One responsibility of the NIST Weights and Measures Division is to coordinate the State weights and measures laboratories. Each state laboratory that is Recognized by WMD and/or Accredited by NVLAP is required to have calibrations from acceptable sources, which are most often from NIST. WMD Recognition or NVLAP Accreditation ensure that enough calibrations are obtained from NIST by the State weights and measures laboratories and that the State metrologists are trained adequately. Furthermore, metrologists must prove their proficiency and have specified calibration intervals for laboratory standards to ensure the ongoing ability to provide calibration results that are traceable to SI units or international and national standards. The number one corrective action following failed PTs/ILCs is that of obtaining updated calibrations for laboratory reference standards. It is estimated better than 96 % of the laboratory standards are calibrated in a timely manner according to these established calibration intervals.

We can also look at comparisons by industry sector. For example, the CENAM in Mexico must calibrate all volumetric standards used by the petroleum industry. In the 2006 report, 8,800 volumetric standards were calibrated by the States to support petroleum meter calibration. Very small fractions of that number are calibrated annually by NIST. The same kind of leveraging comparison can be made for other measurement areas. It would require a very significant expansion of NIST facilities, equipment, and staffing just to handle the number of standards calibrated by the State weights and measures laboratories. Also, the economic impact of cost and downtime to ship standards from all over the United States to NIST for calibration would be crippling to U.S. industry. The recognition of this evolving reality was the primary driving force behind the legislation enabling the "new State standards program" in the 1950's. The State weights and measures laboratories established by that legislation have matured to the efficiently leveraged program documented in this and previous surveys. From this analysis, it is clear that the State weights and measures laboratories are an essential element of the U.S. National Measurement System.

National Institute of Standards and Technology
Weights & Measures Division
(Information provided by NIST/WMD)

NIST Weights and Measures Division has a strategic plan as a part of its effort to comply with the Baldrige quality framework. Objective 5 of the plan focuses on the State Weights and Measures Laboratories. The laboratory program has the most mature set of measures in the division, and will continue to develop better measures through a defined laboratory score and rating system to evaluate the level of competence of each laboratory. The following information is an excerpt from the WMD strategic plan.

Objective 5: Ensuring Nationally Consistent Measurement Results and the Acceptance of State Lab Measurements

One of NIST's primary responsibilities is to ensure that uniform standards are available to support the nation's measurement infrastructure. State laboratories provide the foundation for over 360,000 calibrations as a critical part of the U.S. measurement infrastructure. Approximately half of these calibrations support commercial weights and measures with the remaining supporting measurements needed by industry and other government agencies. NIST will be successful if measurement results from State laboratories are accurate, traceable, defensible in support of enforcement actions, and widely accepted (both nationally and internationally.)

Objective Measures:
1. Number of W&M labs accredited by NVLAP (third-party independent assessment of compliance to ISO/IEC 17025 criteria).
2. Increasing percentage of acceptable/passing proficiency test results and increasing percentage of effective follow up action (improvement, preventive, and corrective).

Strategy: To operate a comprehensive system of lab program assessment, metrology training, proficiency testing, and technical development to increase and measure the knowledge, performance, and services of state metrology laboratories and demonstrate their impact.

Strategy/Outcome Measures:
1. Number of laboratories where measurement results are accepted (vs. not accepted) through Recognition and Accreditation programs;
2. Number of active labs considered to have acceptable or above average operations with knowledgeable metrologists, adequate quality systems, and acceptable proficiency results based on data shown in the Laboratory Scoring Model.

Action Plan for 2008-2009:
1. Review annual submission data for all State's that submit materials and issue feedback letters and certificates; post laboratory status (used by accreditation bodies to determine acceptance levels). Encourage laboratories to apply for NVLAP accreditation to enable

greater acceptance of calibration results. Update scoring for the year. (November to January each year).
2. Conduct Basic, Intermediate, Advanced Mass Metrology Seminars and Specialty Training according to posted/circulated schedule and continue evaluating laboratory auditing program (LAP) problems for proficiency once training is completed.
3. Conduct proficiency tests and interlaboratory studies in mass, length, volume, temperature, magnetism, and environmental measuring equipment through national and regional comparisons as planned and scheduled in each group according to NIST PT Quality System and ensure laboratory follow up.
4. Refine laboratory scoring method for rating and ranking laboratories on national basis.
5. Publish special reports on proficiency testing and national workload survey. (2009).

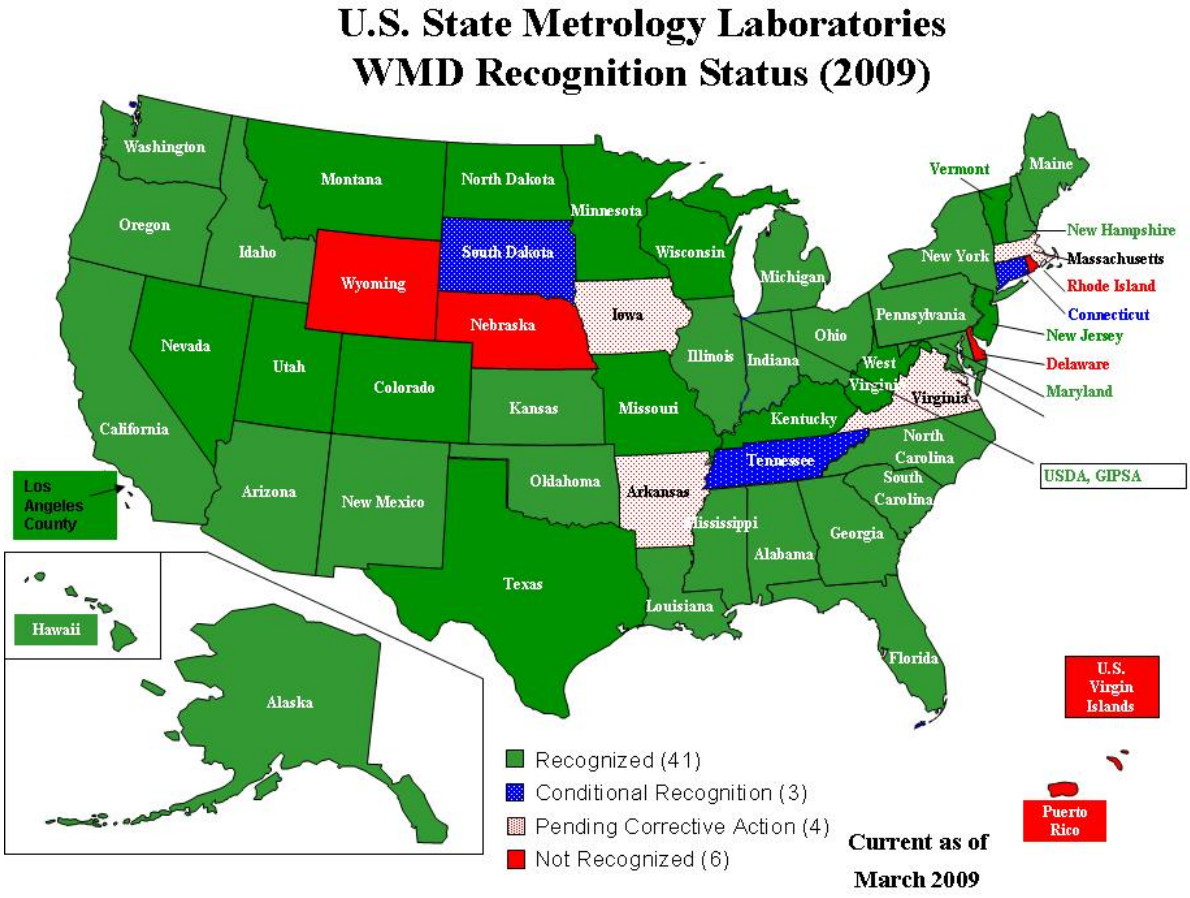
Action Plan Measures:

5.1 Number of active W&M labs recognized as satisfying WMD criteria.
5.2 Number of active W&M labs accredited by NVLAP.
5.3 Number and Percent of success rates of proficiency test results by measurement area.
5.4 Number of measurement problems corrected as revealed by LAP problems and proficiency test results and percent completed actions.
5.5 Number of metrologists trained by WMD.
5.6 Average laboratory score refined and updated with intermediate scores.
5.7 Succession planning: number of metrologists trained to assist with training courses, number of metrologists trained to assist with PT/ILC coordination and analysis.

Based on the WMD efforts and measures, and to promote more effective synergy and awareness of program objectives, additional information is included in this SLP Workload Survey. The WMD measures include the following graphs:

1. Map of laboratories recognized by WMD.
2. Map of laboratories accredited by NVLAP.
3. Proficiency Testing (PT/ILC) Measures.
4. Laboratory Metrology Training.
5. Laboratory Scoring Model.

NIST Weights and Measures Division
Certificates of Measurement Traceability
(as of March 2009)



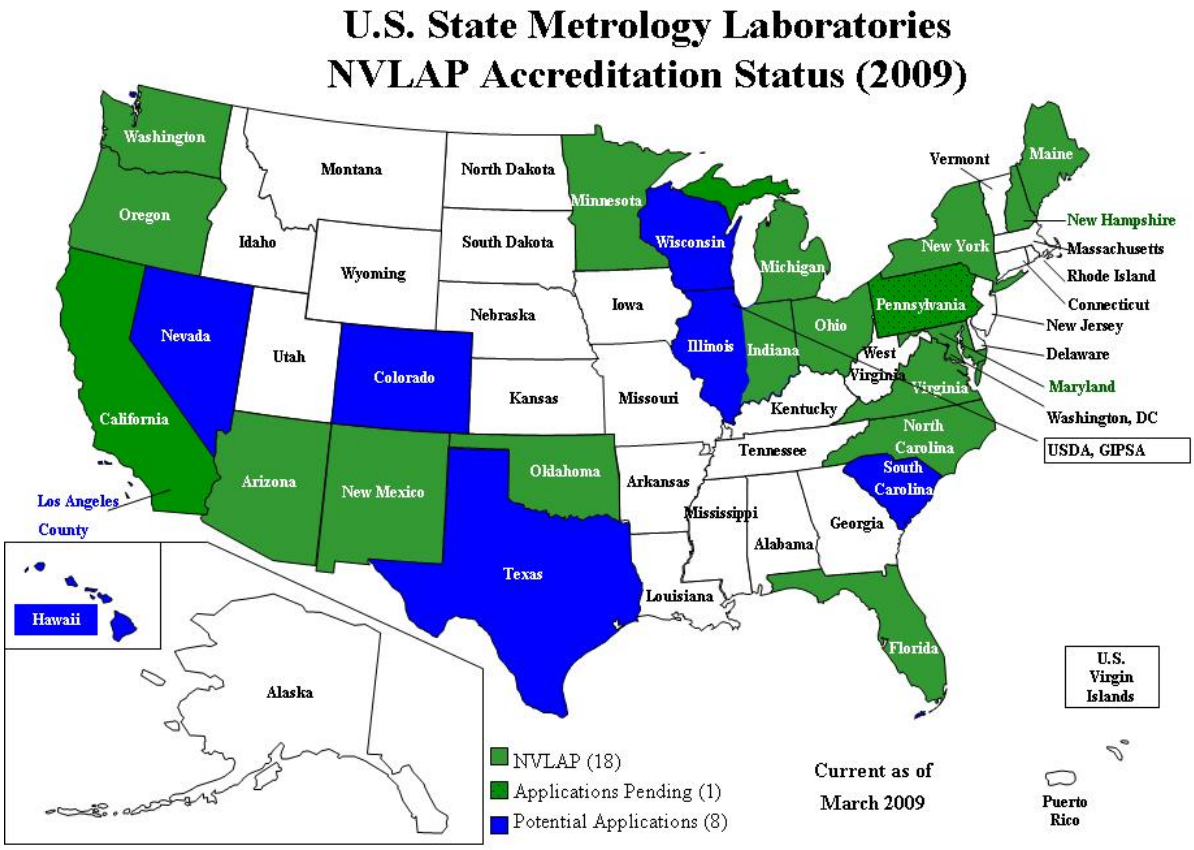
Comments:

Conditional Recognition (primarily based on facility limitations):
Connecticut
South Dakota
Tennessee

Pending Corrective Actions:
Arkansas
Iowa
Massachusetts
Virginia

Not Recognized:
Delaware [CLOSED]
Nebraska
Puerto Rico
Rhode Island [CLOSED]
U.S. Virgin Islands
Wyoming

NIST NVLAP
Accreditation Status
(as of March 2009)

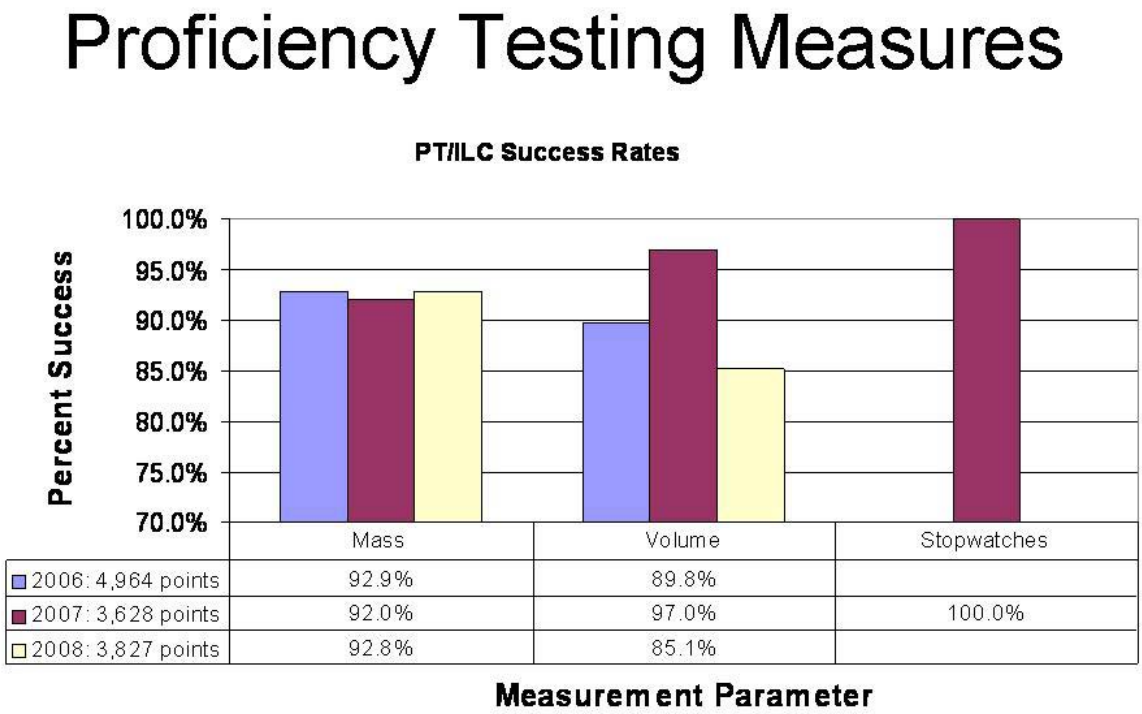


Comments:
17 laboratories are currently accredited by NVLAP:
Arizona, California, Florida, Indiana, Maine, Maryland, Michigan, Minnesota, New Hampshire, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Virginia, and Washington

Pennsylvania underwent an audit in March 2009; accreditation is pending.

There are eight laboratories that have indicated plans to apply or have been encouraged to apply for NVLAP accreditation:
Colorado, Hawaii, Illinois, Los Angeles County, Nevada, South Carolina, Texas, Wisconsin

Proficiency Testing Measures



Proficiency testing and interlaboratory comparisons (PTs/ILCs) have been conducted in the Regional Measurement Assurance Program (RMAP) regions since the early 1980's. NIST has captured the number and types of PTs/ILCs since that time. However, measures for evaluating proficiency testing results have been modified since 2006. NIST began capturing pass/fail statistics for all PT/ILC results and compiling them by measurement parameter. This allows NIST to evaluate the effectiveness of training efforts and use of uniform calibration procedures among laboratories and to see improvements (or declines) over time. It also provides information on where to dedicate effort and resources in additional training and follow-up efforts.

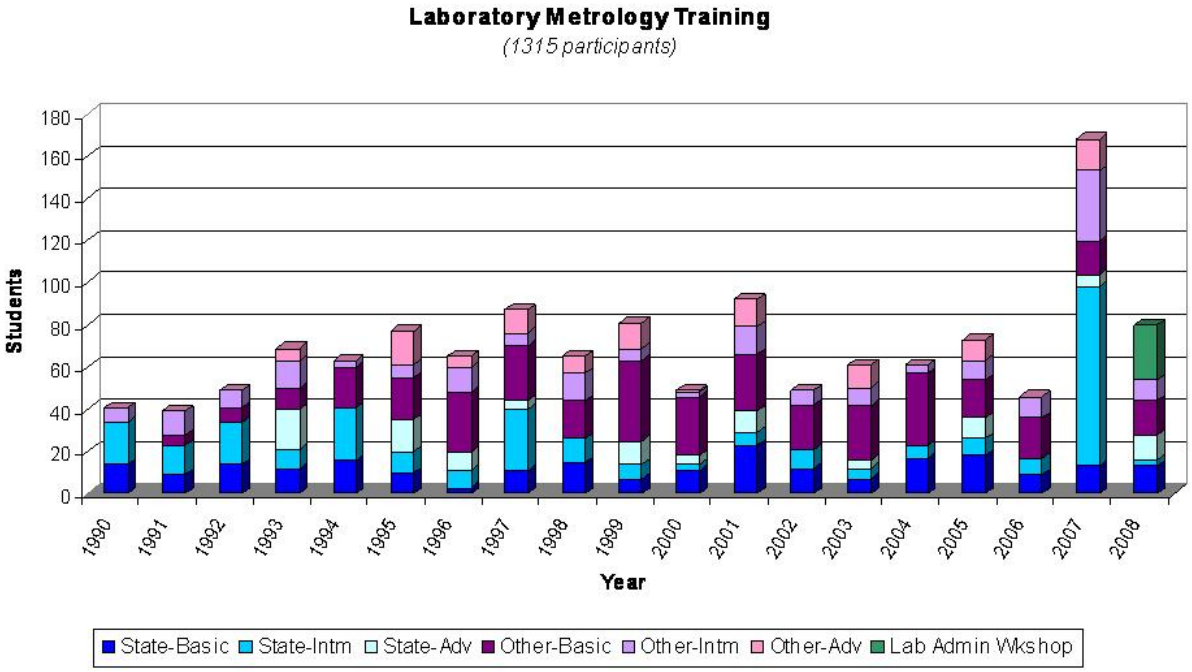
Further assessments can be observed based on the data. For example, in Mass, special proficiency tests were begun in 2007 and continued in 2008 at the 20 kg and 500 lb precision levels. These tests have not regularly been conducted and the data shows a decline in performance, reflecting that a number of follow-up corrective actions were required. In the area of volume, special training efforts were conducted on gravimetric volume calibrations in 2005 and 2006 at the 5 gal level, reflecting overall improvements in the proficiency testing results. However, glass flasks were included for gravimetric calibrations in 2008, demonstrating the need for additional follow up for all gravimetric calibrations.

A four-year assessment of follow-up and corrective actions was conducted by NIST in 2007 with a summary report circulated to all laboratories. The top 5 lab actions that were identified from periodic reviews included the need for:

- Obtaining or calibrating standards
- Obtaining updated equipment or service for existing equipment
- Revising uncertainty analyses
- Training on problem areas and review of procedures
- Implementing better measurement assurance methods

Overall, based on the four-year assessment, laboratories completed a total of 245 follow-up actions from 85 PTs/ILCs. The success goals are 100 % passing rates and 100 % completed follow-up when needed.

Metrology Training



NOTES: 2007 data included Special Regional Intermediate Seminars; 2008 data included new Lab Admin Workshop.

The training graph shows the number of metrologists and categories of training at NIST since 1990. The training numbers are somewhat cyclical, primarily because the Advanced Mass course has been taught every other year since 1993. Nearly half of all students are from State weights and measures laboratories. The rest are from aerospace, pharmaceutical, defense, energy, biomedical industries and foreign governments. The mix of students is very similar to the non weights and measures calibration customers of the State laboratories.

In addition to training at NIST in the Training and Demonstration laboratory, NIST also

provides training at Regional Measurement Assurance Program (RMAP) meetings in six regional groups where attendance is required for ongoing laboratory recognition and participation in the proficiency testing is required. The percentage of State laboratory staff in functional laboratories who are trained through the hands-on laboratory courses at NIST and in the RMAP training sessions is routinely maintained at over 98 %. The success goal is 100 %.

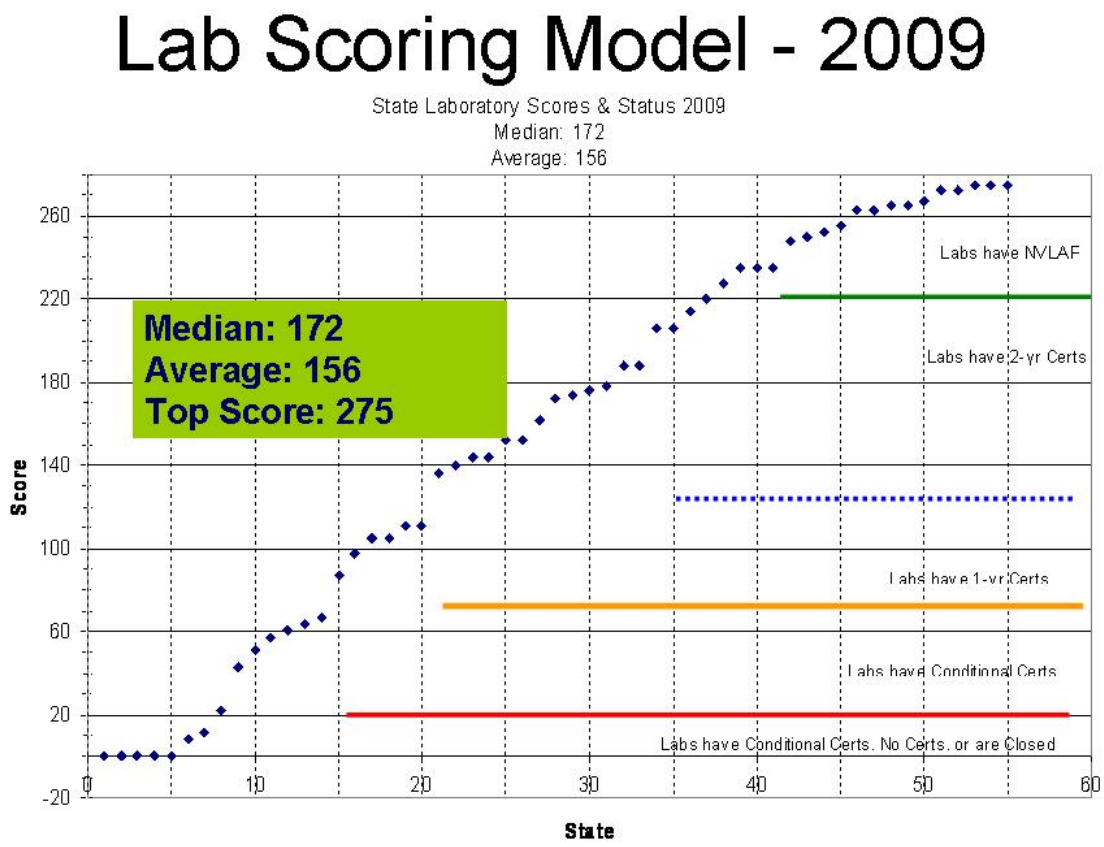
A new course was added in 2008: Laboratory Administration Workshop. The course was designed to assist laboratories in complying with the requirements of ISO/IEC 17025 (through Handbook 143, State Laboratory Program Handbook). The course is a one-week workshop with group interactions and working sessions on laboratory quality/management and technical documentation and covers auditing and submission requirements for Recognition.

An effort is underway to evaluate the NIST Laboratory Metrology Program training seminars. This SLP Training Redesign Working Group is examining the training program from the 'ground up' using current instructional models. The goal is to provide our training in a format that will produce the most competent laboratory metrologists possible. Input from past seminar attendees for improvement, as well as working group input, will be considered as plans are made to implement changes to the training offerings.

Laboratory Scoring Model

A draft laboratory scoring model was developed in 2006 and is based on assigning numbers to each laboratory in a number of categories that correspond to NIST Handbook 143. The outline for the scoring model is contained on the following pages.

Points are awarded in the following categories:
- Quality Management System
- Administrative Procedures
- Facility
- Equipment
- Standards
- Staff
- Management Support
- Proficiency Tests (PTs)
- Extra Credit – Timely Submissions
- Multipliers (NVLAP accreditation, 2.5; WMD, 2 year recognition, 2; WMD, 1 year recognition, 1.5; WMD, 1 year conditional recognition, 1; No recognition, 0.5; Lab Closed, 0)



The model is intended to provide a quality index to the overall laboratory program. The scoring model was updated in 2008 based on laboratory feedback and the past two years of use. The scoring model is used internally at NIST to identify where resources and efforts will be allocated. The current "top score" possible (success goal) is 275.

Scoring Model Results

Year	Median	Mean
2006	97.5	130
2007	140	140
2008	172	156

The WMD goal is to see the laboratory scores increase. Note: At this time, specific coding is not provided for identifying laboratories.

Summary of All Standards for 2008
{Total Number of Standards or Devices Tested}

Description

The graphs on the following page are a summary of the total number of standards or devices tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices being tested. The pie graph provides a breakdown into the categories of mass, volume, length, temperature, time/frequency, wheel load weighers, lottery balls, and other. The bar graph at the bottom of the page shows the same breakdown in categories along with the total number of devices tested by each laboratory. There is also a smaller line graph indicating the totals from previous surveys.

Findings

The 50 reporting laboratories tested a total of 367,336 standards.

Comparison of previous surveys

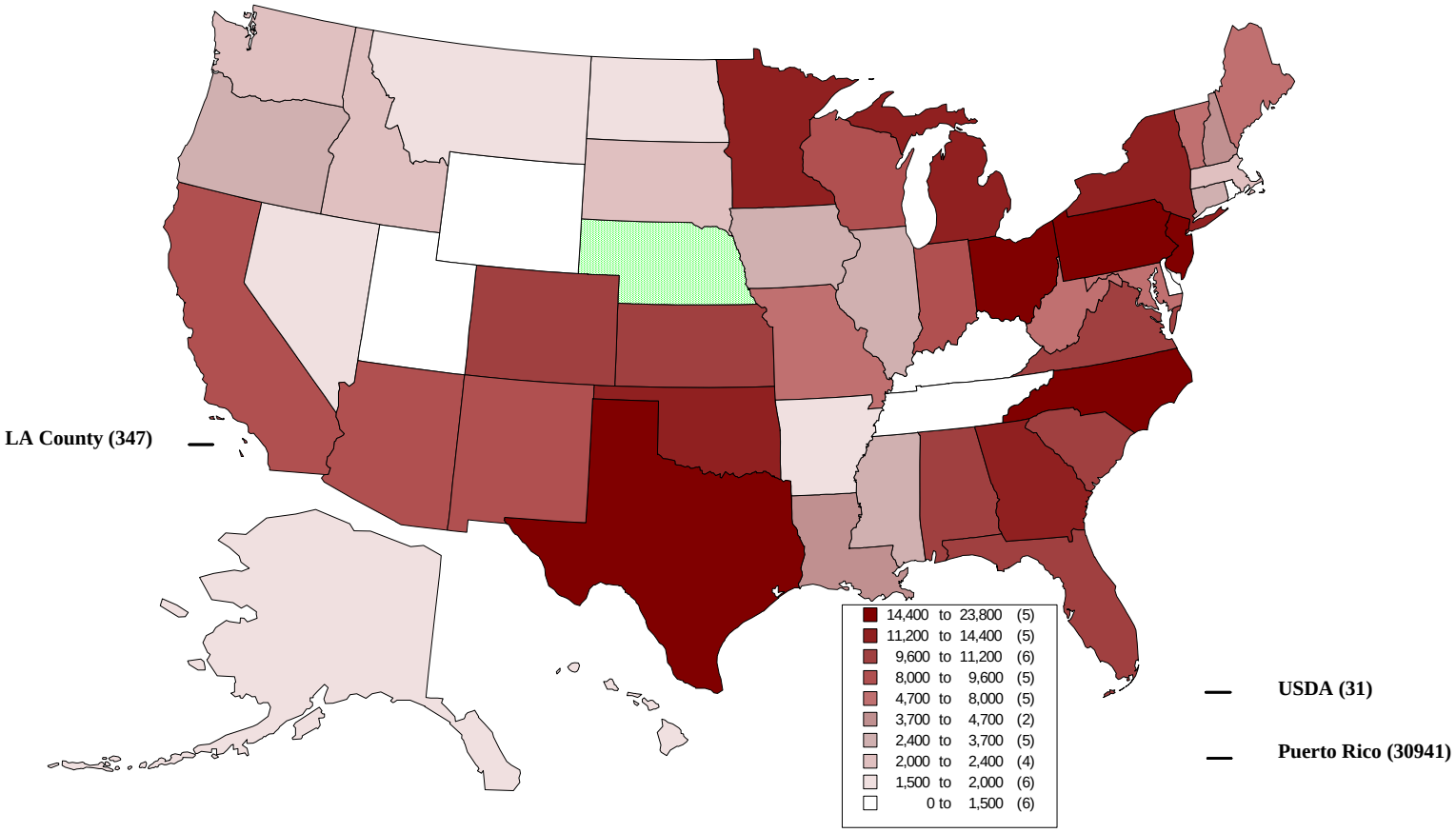
	# Reporting Labs	Total Devices	Lab Average
1996	51	322,472	6,323
1998	46	320,931	6,977
1999	45	352,274	7,828
2000	45	361,600	8,036
2002	48	375,411	7,821
2004	47	355,986	7,574
2005	46	361,054	7,849
2006	49	365,004	7,449
2008	50	367,336	7,347

	Using the lab averages:	Using the survey totals:
1996 to 1998	-- An increase of 10 %	-- A decrease of less than 1 %
1998 to 1999	-- An increase of 12 %*	-- An increase of 10 %*
1999 to 2000	-- An increase of 3 %	-- An increase of 3 %
2000 to 2002	-- A decrease of 3 %	-- An increase of 4 %
2002 to 2004	-- A decrease of 3 %	-- A decrease of 5 %
2004 to 2005	-- An increase of 4 %	-- An increase of 1 %
2005 to 2006	-- A decrease of 5 %	-- An increase of 1 %
2006 to 2008	-- A decrease of 1 %	-- An increase of 1 %

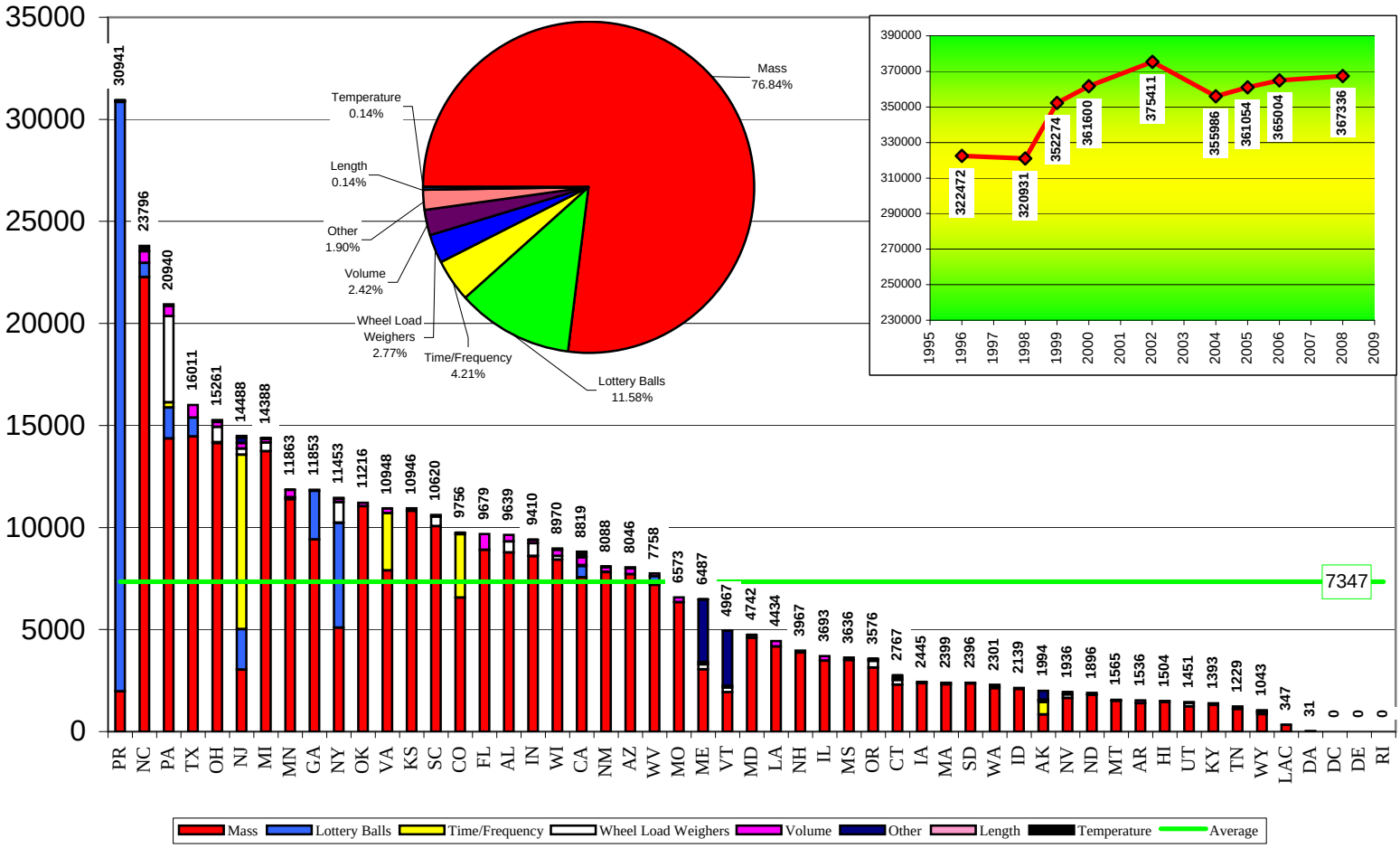
Notes and Comments

*Part of the increase from 1999 to 2000 may be attributed to a new category that was called "Other". These are calibrations done by the laboratory, which did not fall into any of the pre-defined categories of the survey.
Mass standards accounted for 77 % of the total number of devices tested in 2008.

Summary of All Standards by Device Type (2008)



367336 Total Devices (2008)



Summary of All Standards for 2008
(by customer type)
{Lab, W&M, and External}

Description

The graphs on the following page represent the total number of all mass standards tested by the 50 reporting laboratories. The pie graph provides a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory.

Lab – work done for the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

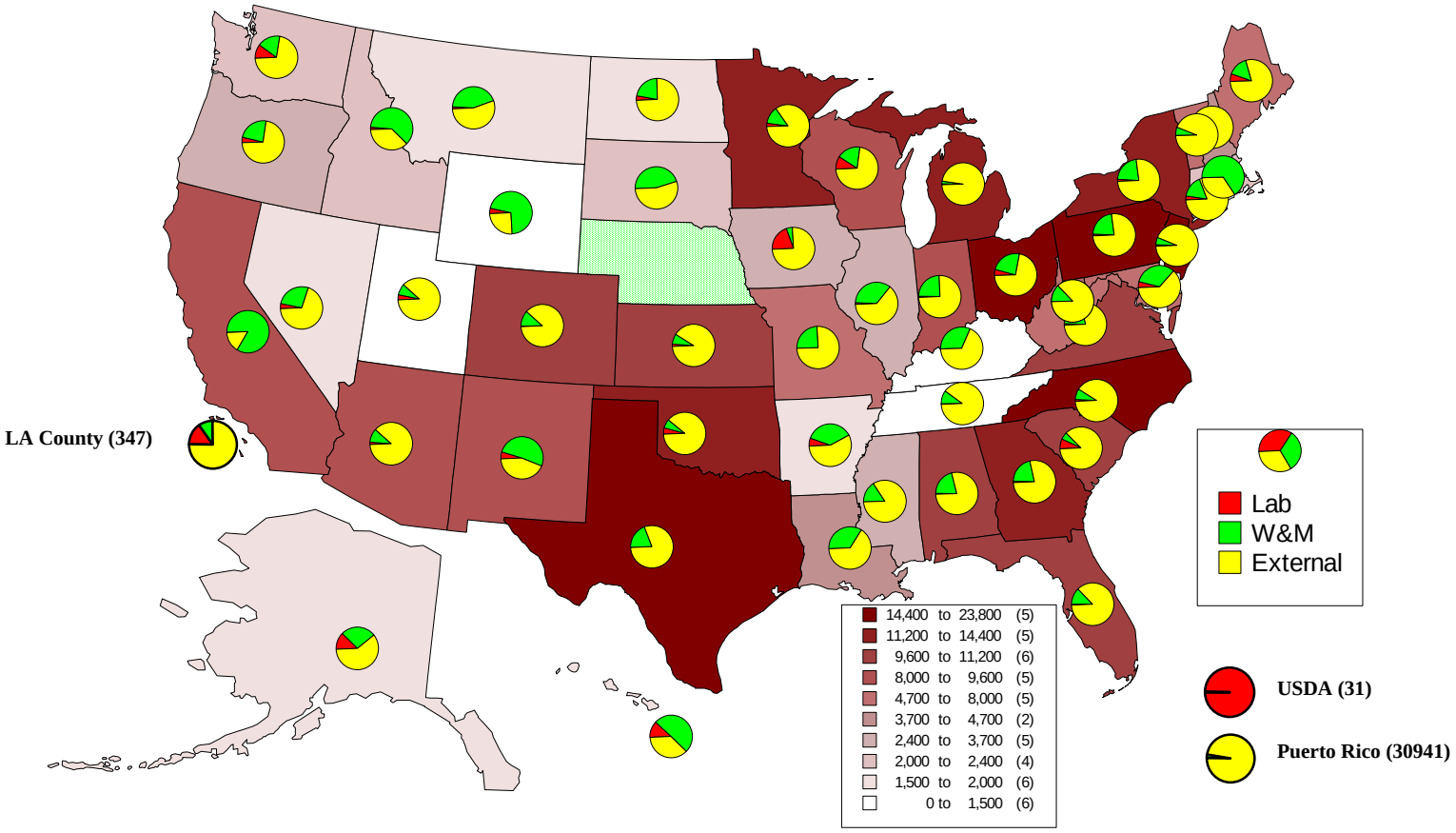
The 50 reporting laboratories tested a total of 367,336 standards.

Notes and Comments

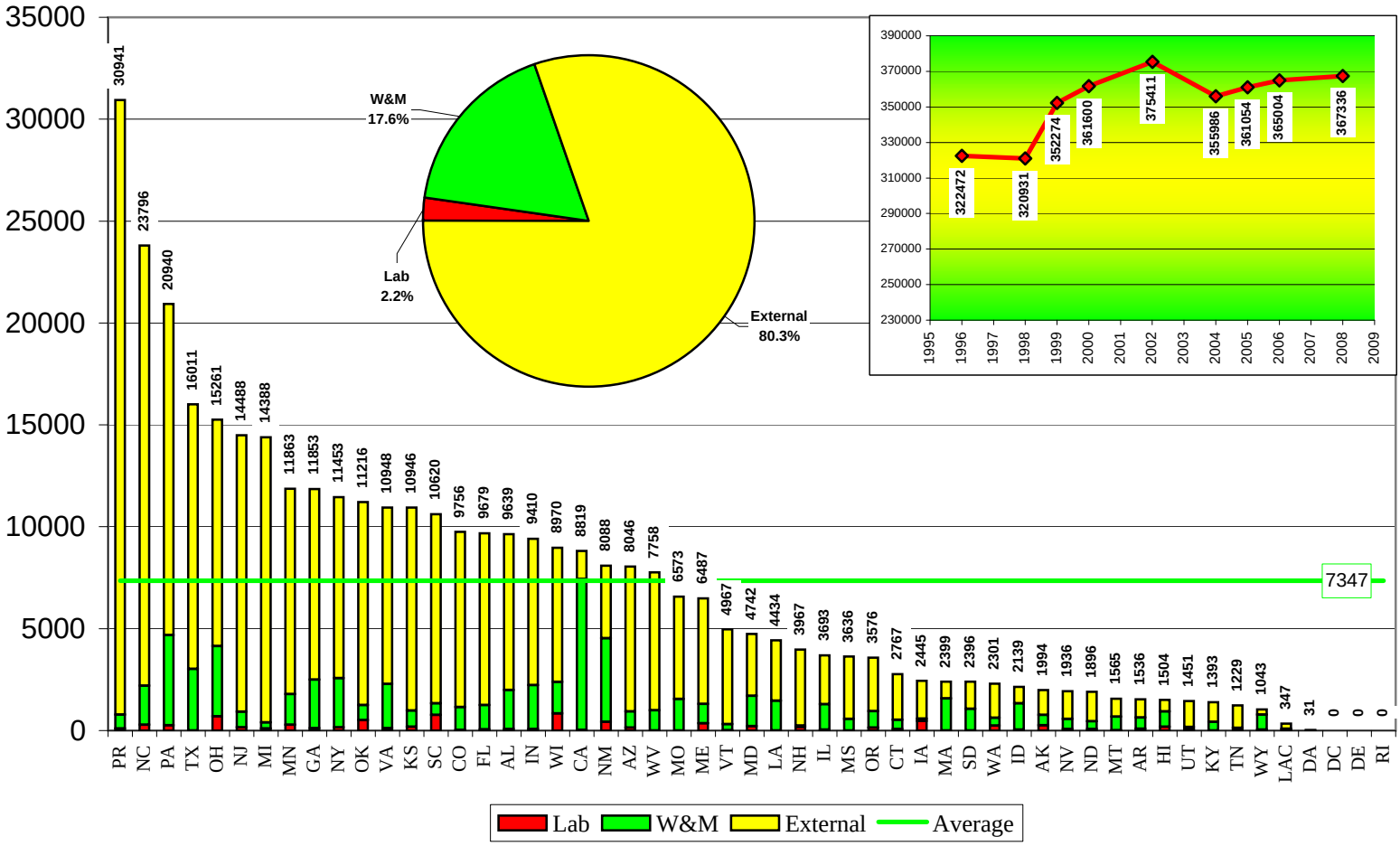
2.2 % of all standards were calibrated for internal use of the laboratory.
17.6 % of all standards were calibrated for "Weights & Measures Enforcement Program'.
80.3 % of all standards were calibrated for 'External' customers.

This 2 % / 18 % / 80 % pattern is very representative of the breakdown of customers. However, it can be noted that the smaller the entire workload of the lab, the greater percentage "Lab" becomes. This reflects the 'basic maintenance' workload necessary to keep a metrology laboratory operational.

Summary of All Standards by Customer Type (2008)



367336 Total Devices (2008)



Mass Total for 2008
(by customer type) & (by accuracy type)

Description

The pie graphs on the following page are for the total number of mass standards tested by the 50 reporting laboratories. The top pie graph provides a breakdown into the customer categories of Lab, W&M, and External.

Lab – work done for the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

The bottom pie graph provides a breakdown in the accuracy echelons of Mass I, Mass II, and Mass III.

Mass I – Precision mass standards that are calibrated using Advanced Weighing Designs and Mass Code Data Reduction regardless of accuracy classification.
Mass II – Precision mass standards that are usually calibrated using 3-1 weighing designs or double substitutions.
Mass III – Mass standards that are usually calibrated using modified or single substitution procedures.

Notes and Comments

Mass By Customer Type

2.3 % of all mass standards were calibrated for internal use by the laboratory.
18.4 % of all mass standards were calibrated for the Weights & Measures Program.
79.3 % of all mass standards were calibrated for External customers.

Mass By Echelon Category

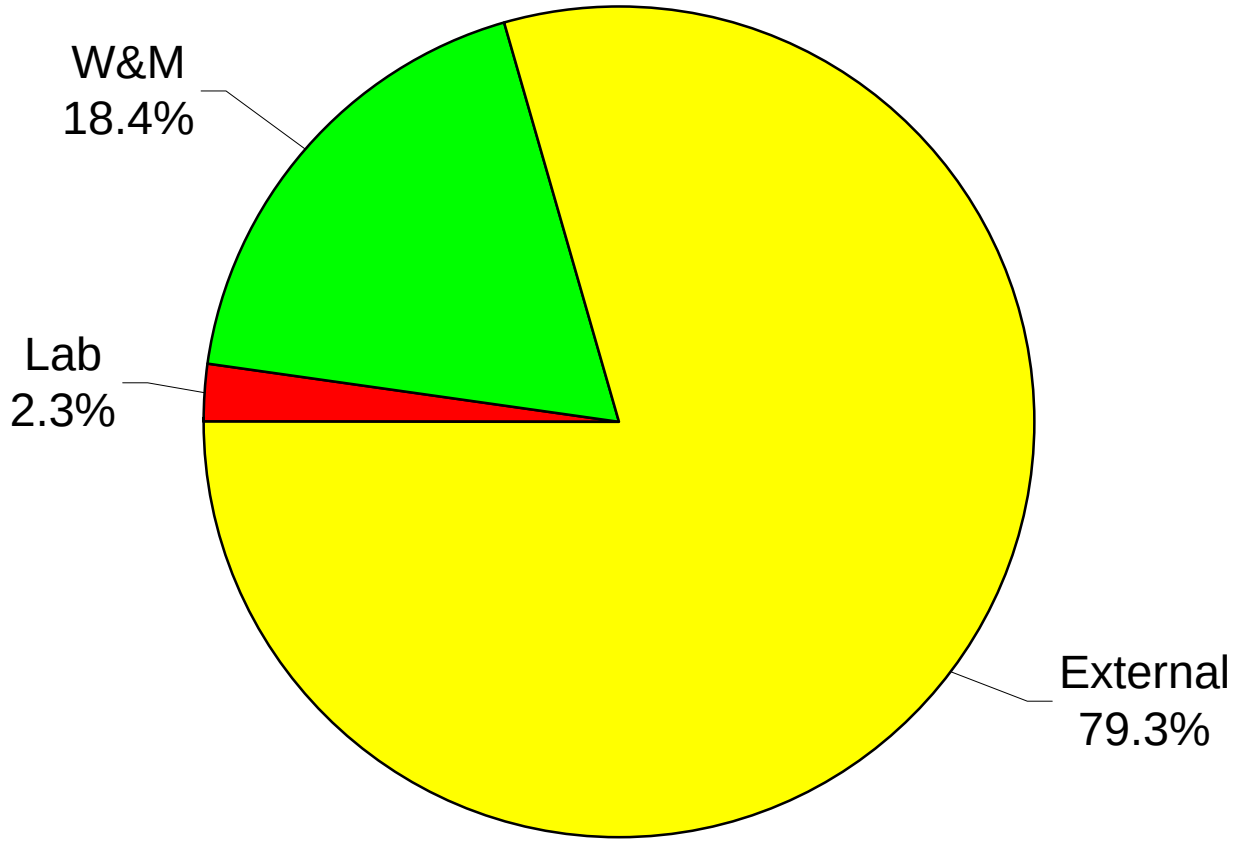
0.7 % (2,216) of all mass standards were calibrated as Mass Echelon I.

7.8 % (25,371) of all mass standards were calibrated as Mass Echelon II.

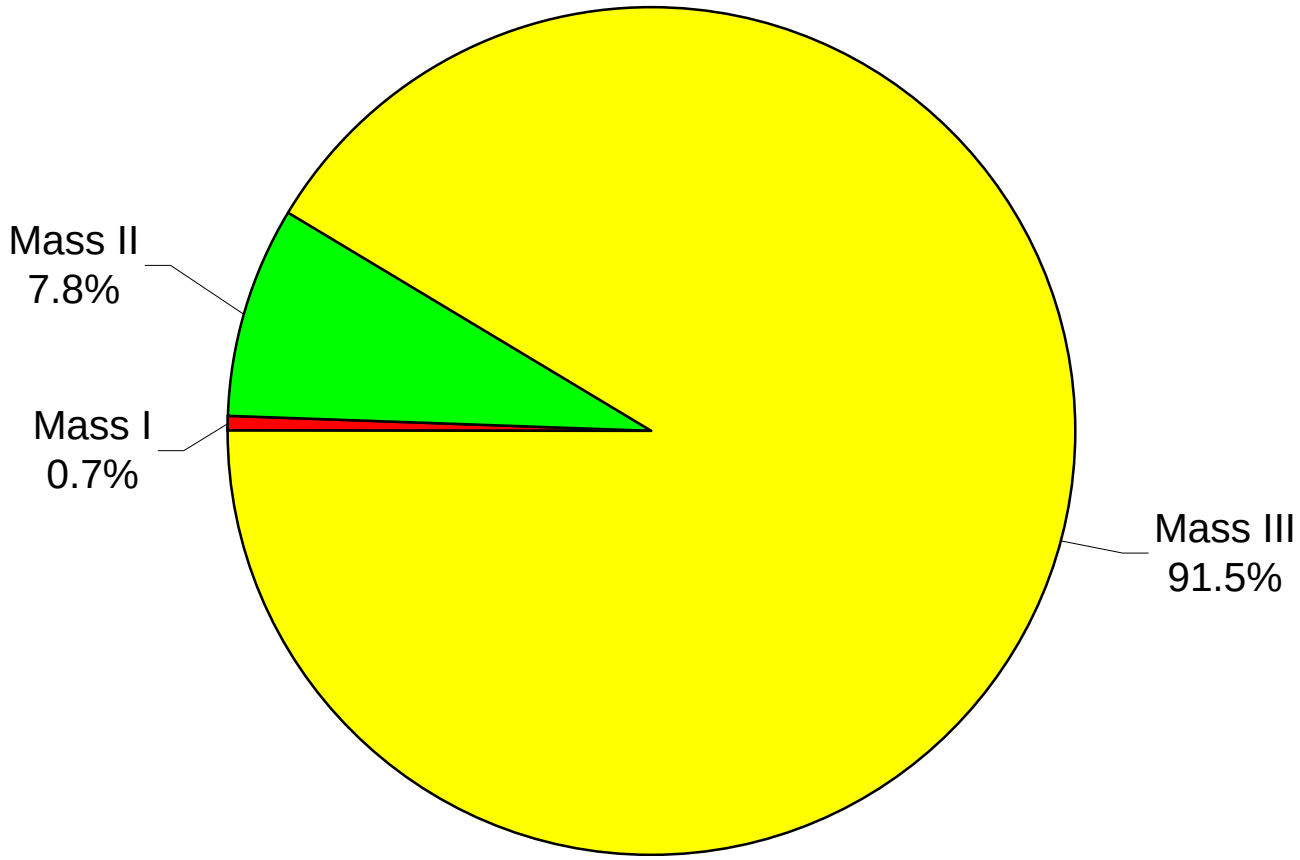
91.5 % (297,219) of all mass standards were calibrated as Mass Echelon III.
(weight carts and lottery balls were included as Mass III tests)

It has been estimated that it takes ten times the number of labor hours to calibrate an Echelon I or II weight as compared to an Echelon III weight. When this is taken into consideration, the same total number of labor hours is probably spent on Echelon I & II calibrations as is spent on Echelon III calibrations.

Total Mass by Customer Type (2008)



Total Mass by Accuracy Type (2008)



Mass Echelon I for 2008

Description

The graphs on the following page represent the total number of Mass Echelon I standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph indicating the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 17 labs tested a total of 2,216 Mass I standards.

Comparison of previous surveys

The number of laboratories performing Mass I calibrations appears to have stabilized in the range of 14 to 17. It should be noted that Mass I calibration results are typically used as calibration laboratory standards for calibrations of mass standards of lesser accuracy.

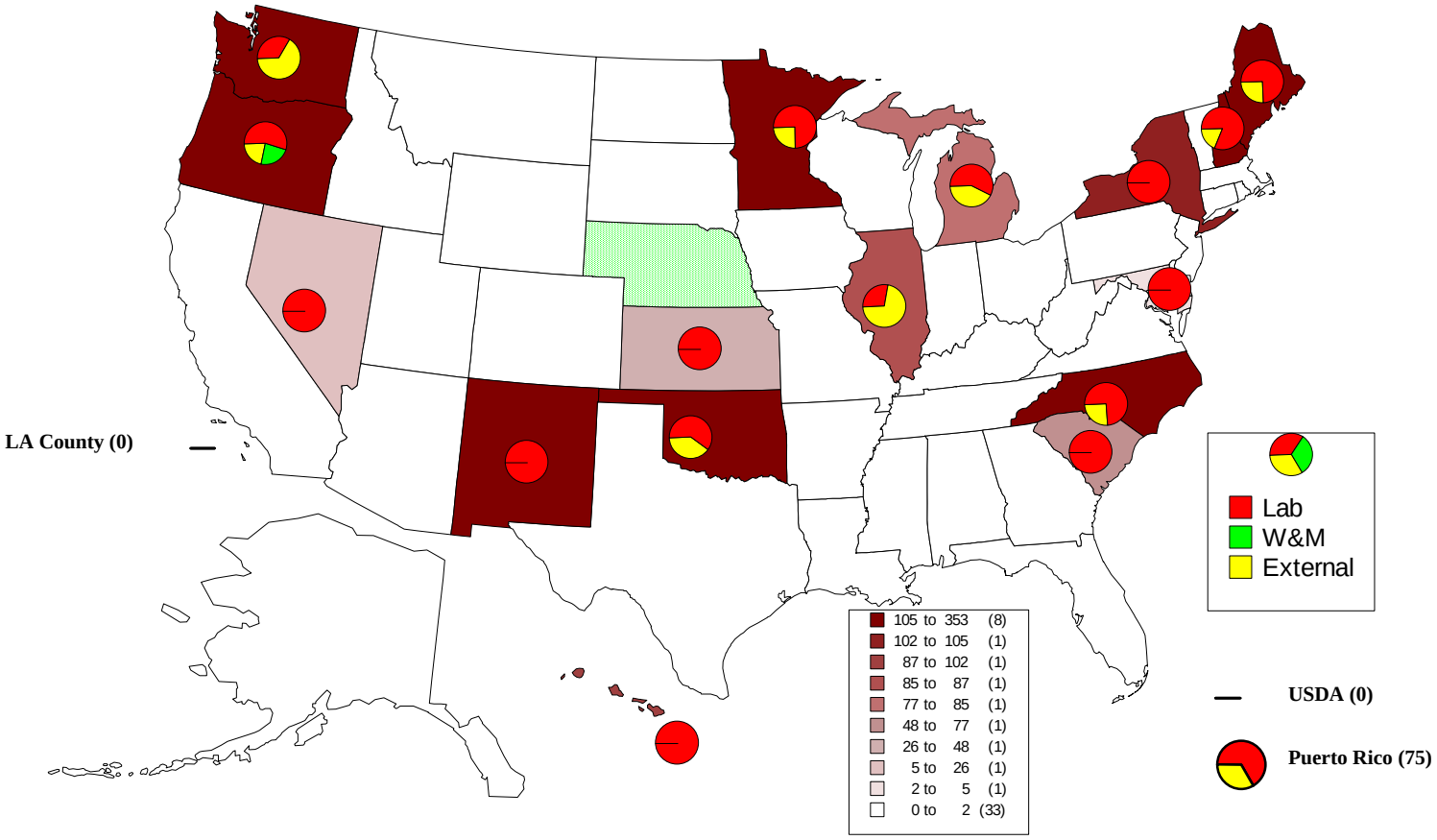
	# Labs Reporting Mass Echelon I	Total Devices	Lab Average	Change using lab averages
1998	10	2,667	267	--
1999	15	5,985	399	+ 50 %
2000	16	5,227	327	- 18 %
2002	15	5,288	353	+ 8 %
2004	14	3,707	265	- 25 %
2005	14	3,103	222	- 16 %
2006	14	3,025	216	- 3 %
2008	17	2,216	130	- 40 %

Results for Mass I cannot be compared to the 1996 survey. The 1996 survey did not use Mass Echelon I as a category. It used 'Precision Mass' as the category that included both Mass Echelon I and Mass Echelon II calibrations.

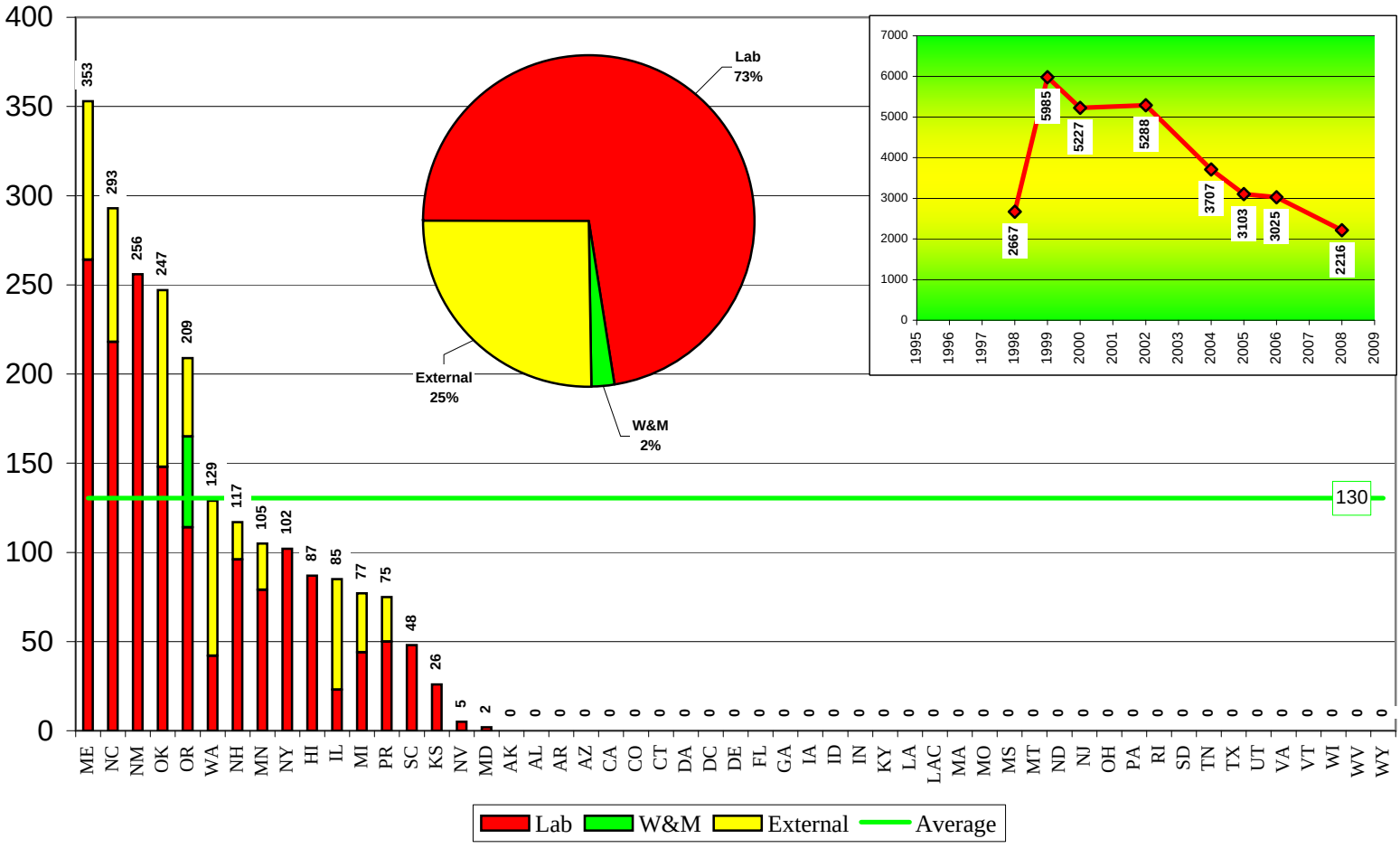
Notes and Comments

73 % of all Mass I standards were calibrated for internal use by the laboratory.
2 % of all Mass I standards were calibrated for the weight and measures program.
25 % of all Mass I standards were calibrated for external customers.

Mass Echelon I (2008)



2216 Total Devices (2008)



Mass Echelon II for 2008

Description

The graphs on the following page represent the total number of Mass Echelon II standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested above each laboratory. There is also a smaller line graph indicating the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 32 labs tested a total of 25,371 Mass II standards.

Comparison of previous surveys

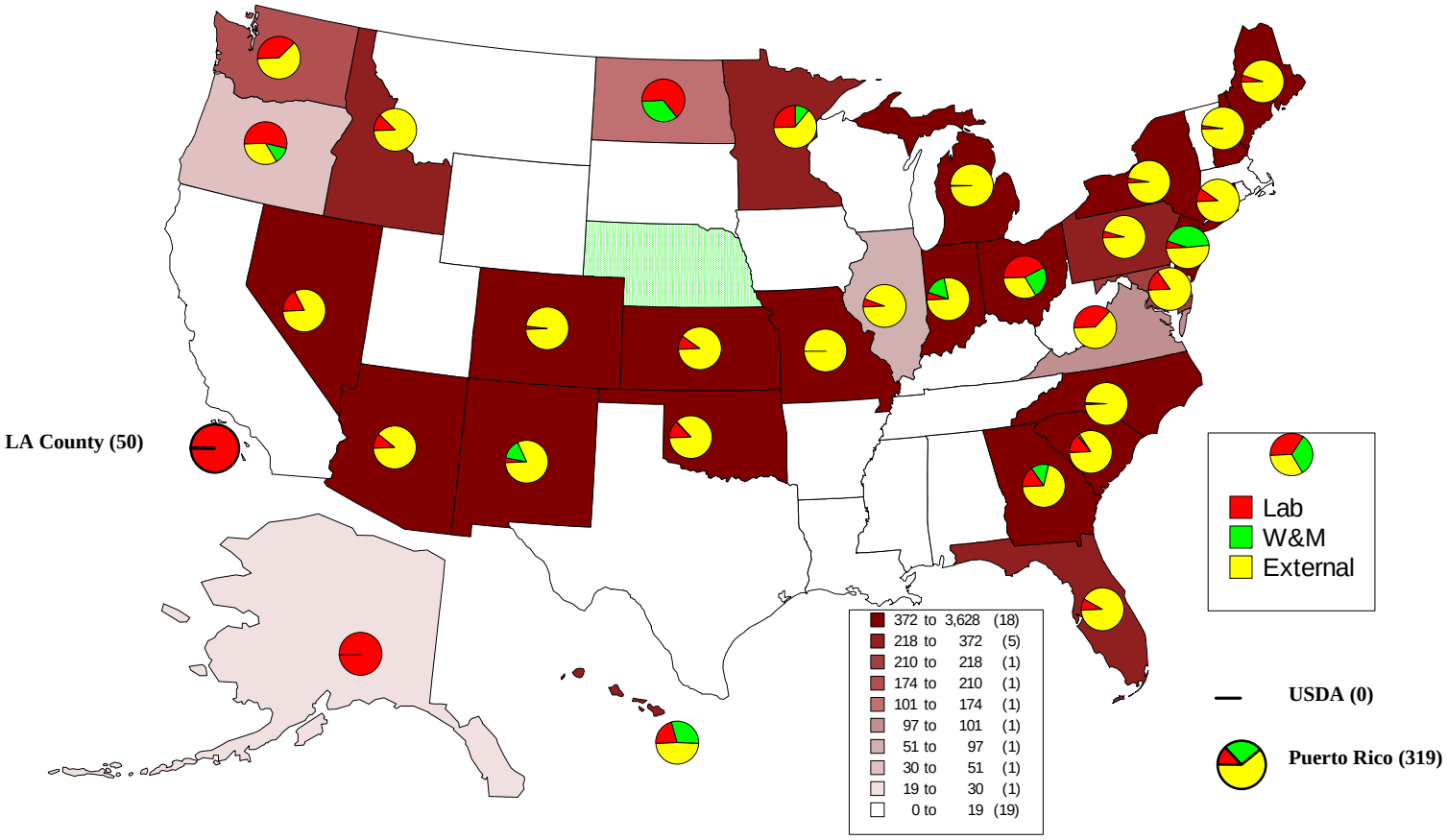
	# Labs Reporting Mass Echelon II	Total Devices	Lab Average	Change using lab averages
1996	38	37,662	991	--
1998	36	24,926	692	- 30 %
1999	35	25,807	737	+ 7 %
2000	38	26,428	695	- 6 %
2002	37	25,847	699	+ 0 %
2004	32	21,714	679	- 3 %
2005	32	20,541	642	- 5 %
2006	33	22,352	677	+ 5 %
2008	32	25,371	793	+ 17 %

The 1996 survey did not use Mass Echelon II as a category. It used 'Precision Mass' as the category that included both Mass Echelon I and Mass Echelon II calibrations.

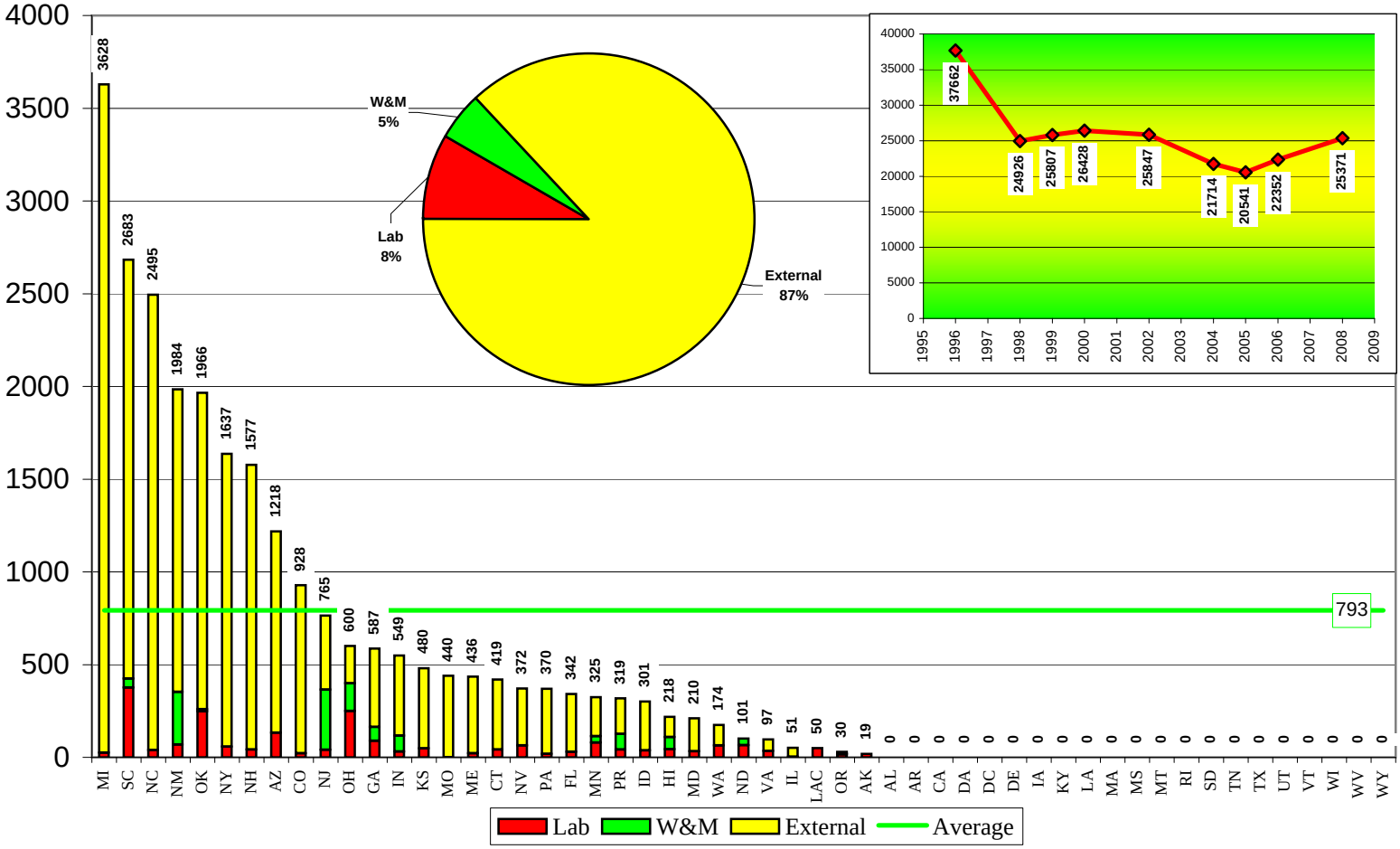
Notes and Comments

8 % of all Mass II standards were calibrated for the internal use of the laboratory.
5 % of all Mass II standards were calibrated for the weights and measures enforcement program.
87 % of all Mass II standards were calibrated for external customers.

Mass Echelon II (2008)



25371 Total Devices (2008)



Mass Echelon III for 2008

Description

The graphs on the following page represent the total number of Mass Echelon III standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph indicating the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 50 labs tested a total of 254,221 Mass III standards.

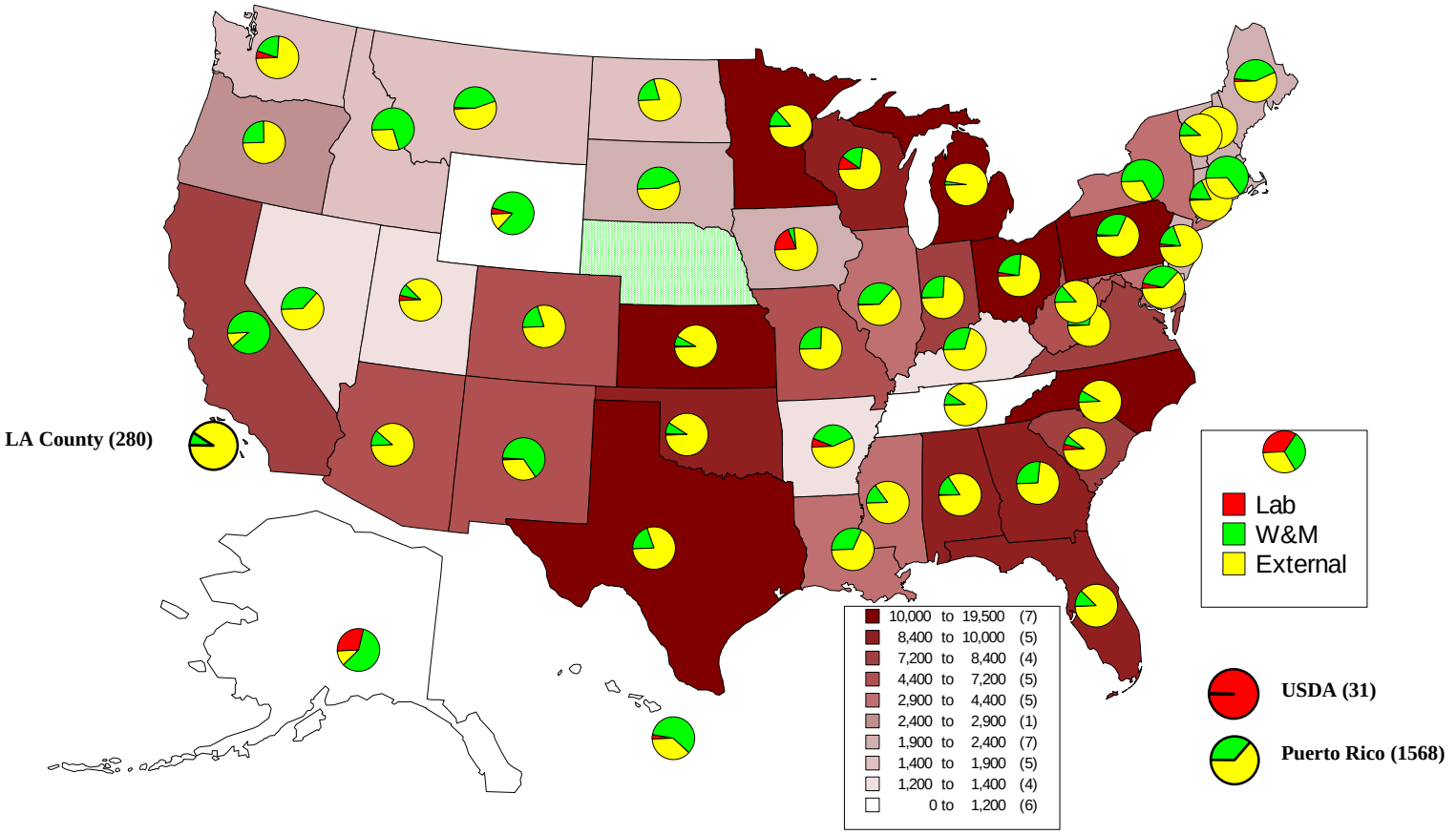
Comparison of previous surveys

	# Labs Reporting Mass III	Total Devices	Lab Average	Change using lab average
1996	51	259,713	5,092	--
1998	46	259,166	5,634	+ 11 %
1999	45	257,938	5,732	+ 2 %
2000	45	260,072	5,779	+ 1 %
2002	47	267,240	5,686	- 2 %
2004	47	248,117	5,279	- 7 %
2005	46	248,650	5,405	+ 2 %
2006	49	256,844	5,242	- 3 %
2008	50	254,221	5,084	- 3 %

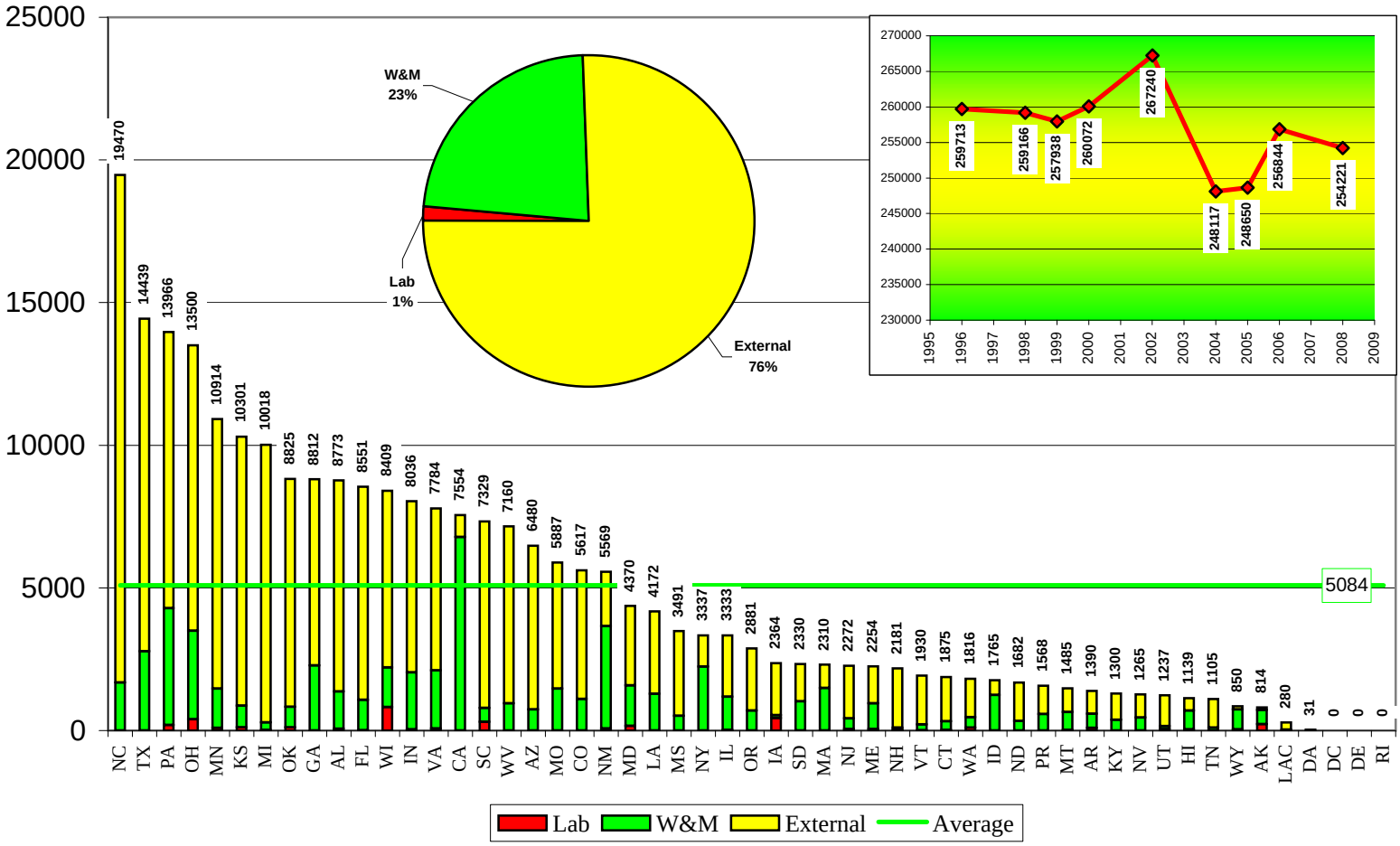
Notes and Comments

1 % of all Mass III standards were calibrated for the internal use of the laboratory.
23 % of all Mass III standards were calibrated for the weights and measures enforcement program.
76 % of all Mass III standards were calibrated for external customers.

Mass Echelon III (2008)



254221 Total Devices (2008)



Weight Carts for 2008

Description

The graphs on the following page represent the total number of weight cart mass standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 32 labs tested a total of 445 weight cart mass standards.

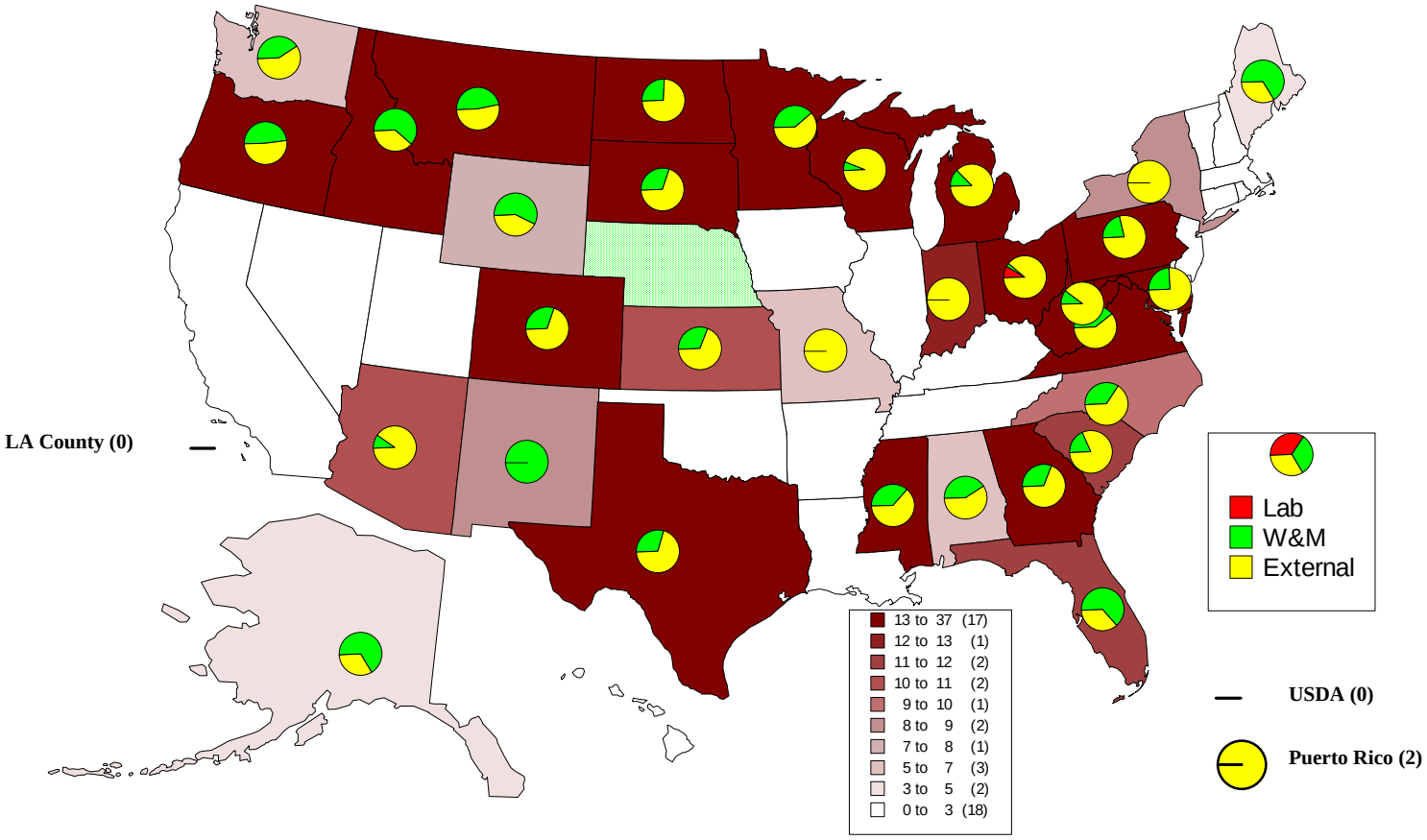
Comparison of previous surveys

	# Labs Reporting Weight Cart Tests	Total Devices	Lab Average	Change using Lab Average
1998	30	297	9.9	--
2000	27	344	12.7	+ 29 %
2002	29	388	13.4	+ 5 %
2004	33	365	11.1	- 17 %
2005	30	410	13.7	+ 23 %
2006	31	388	12.5	- 9 %
2008	32	445	13.9	+ 11 %

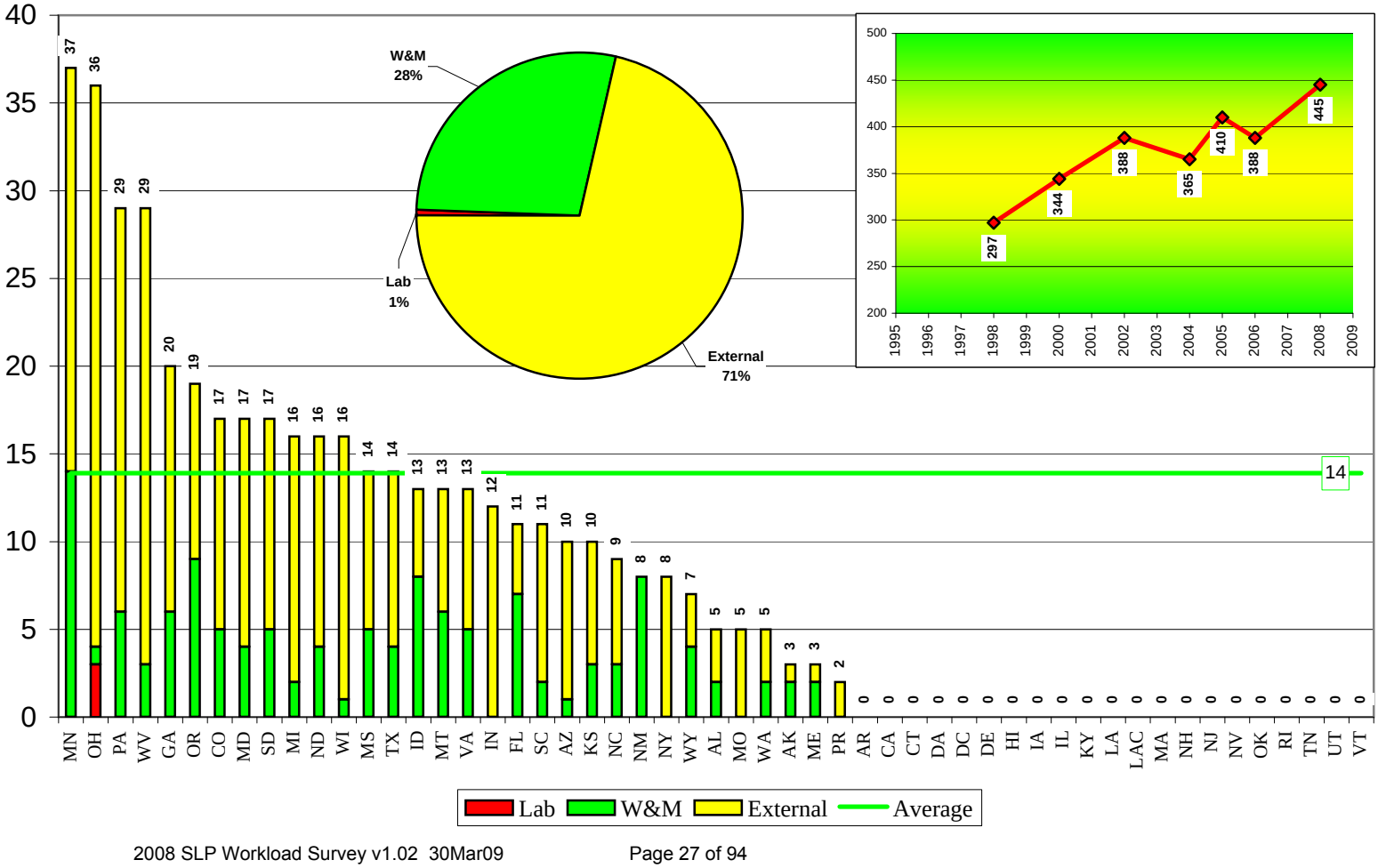
Notes and Comments

1 % of all weight cart standards were calibrated for the internal use of the laboratory.
28 % of all weight cart standards were calibrated for the weights and measures enforcement program.
71 % of all weight cart standards were calibrated for external customers.

Weight Carts (2008)



445 Total Devices (2008)



Length – Tapes for 2008

Description

The graphs on the following page represent the total number of length (tapes) standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 17 labs tested a total of 425 length (tape) standards.

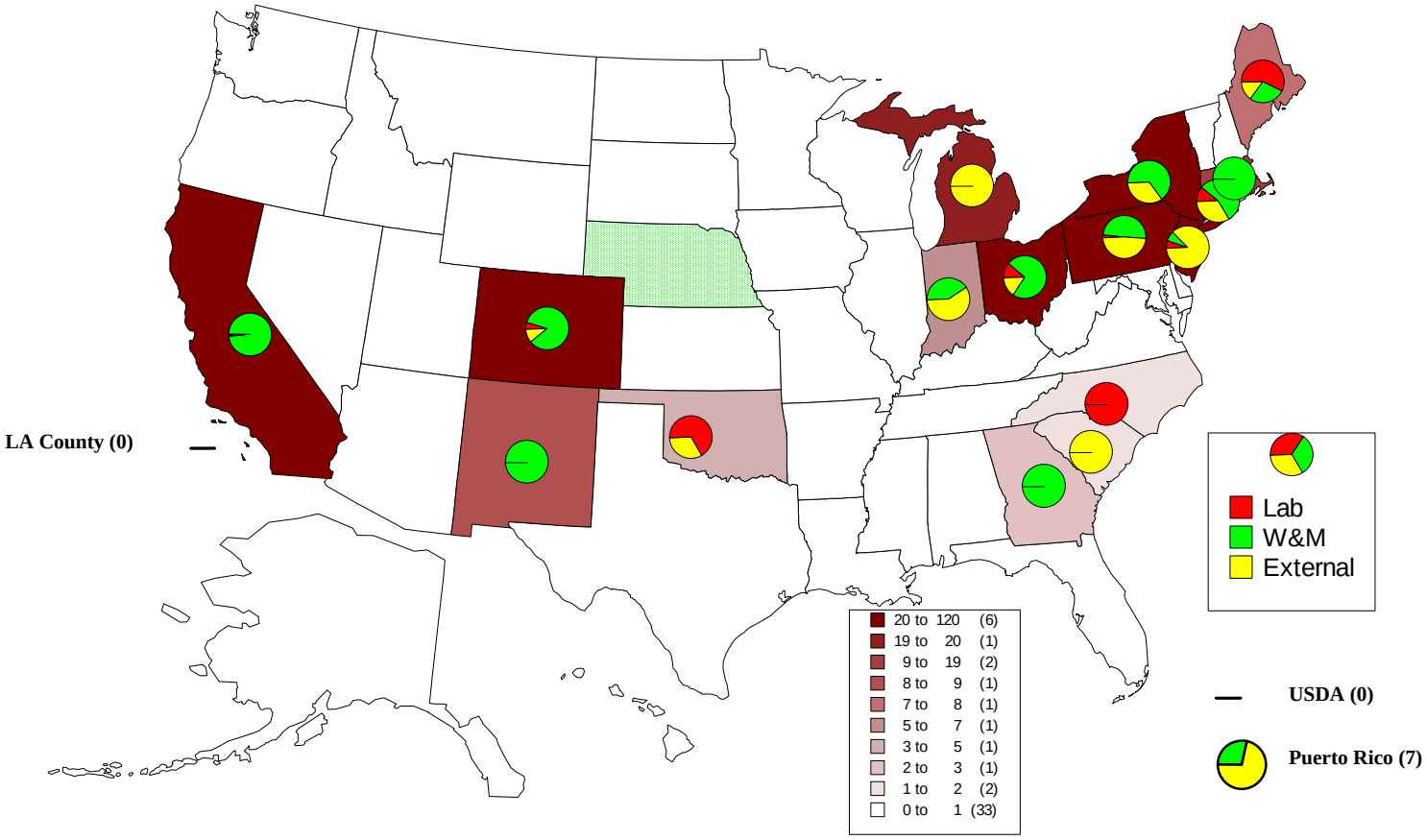
Comparison of previous surveys

	# Labs Reporting Length Tape Tests	Total Devices	Lab Average	Change using Lab Average
1996	27	707	26	--
1998	29	537	19	- 29 %
1999	21	566	27	+ 46 %
2000	22	487	22	- 18 %
2002	21	584	28	+ 26 %
2004	21	319	15	- 46 %
2005	19	304	16	- 5 %
2006	18	339	19	+ 12 %
2008	17	425	25	+ 32 %

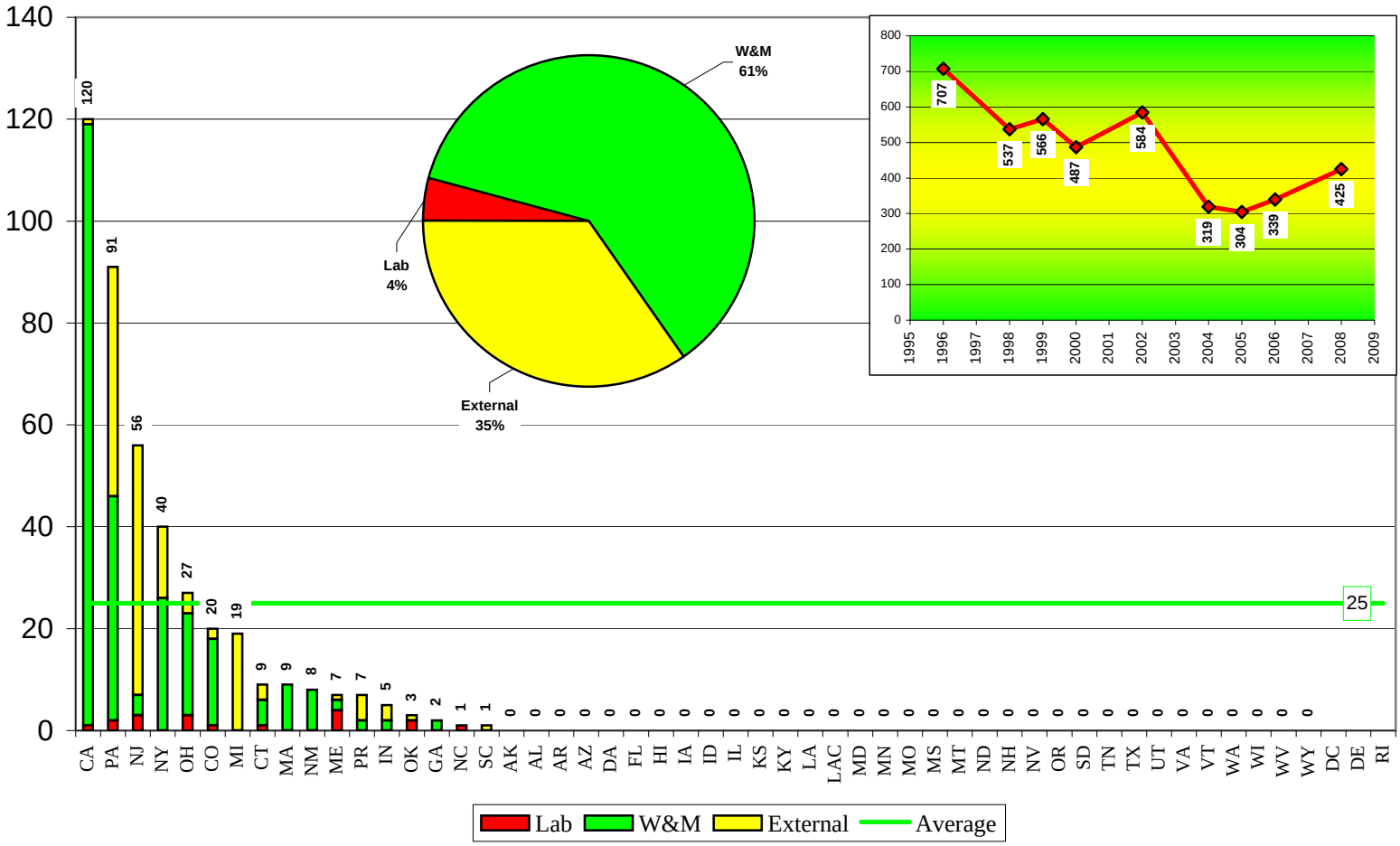
Notes and Comments

4 % of all length (tape) standards were calibrated for the internal use of the laboratory.
61 % of all length (tape) standards were calibrated for the weights and measures enforcement program.
35 % of all length (tape) standards were calibrated for external customers.

Length Tape (2008)



425 Total Devices (2008)



Length – Rigid Rules for 2008

Description

The graphs on the following page represent the total number of length (rigid rules) standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 11 labs tested a total of 88 length (rigid rule) standards.

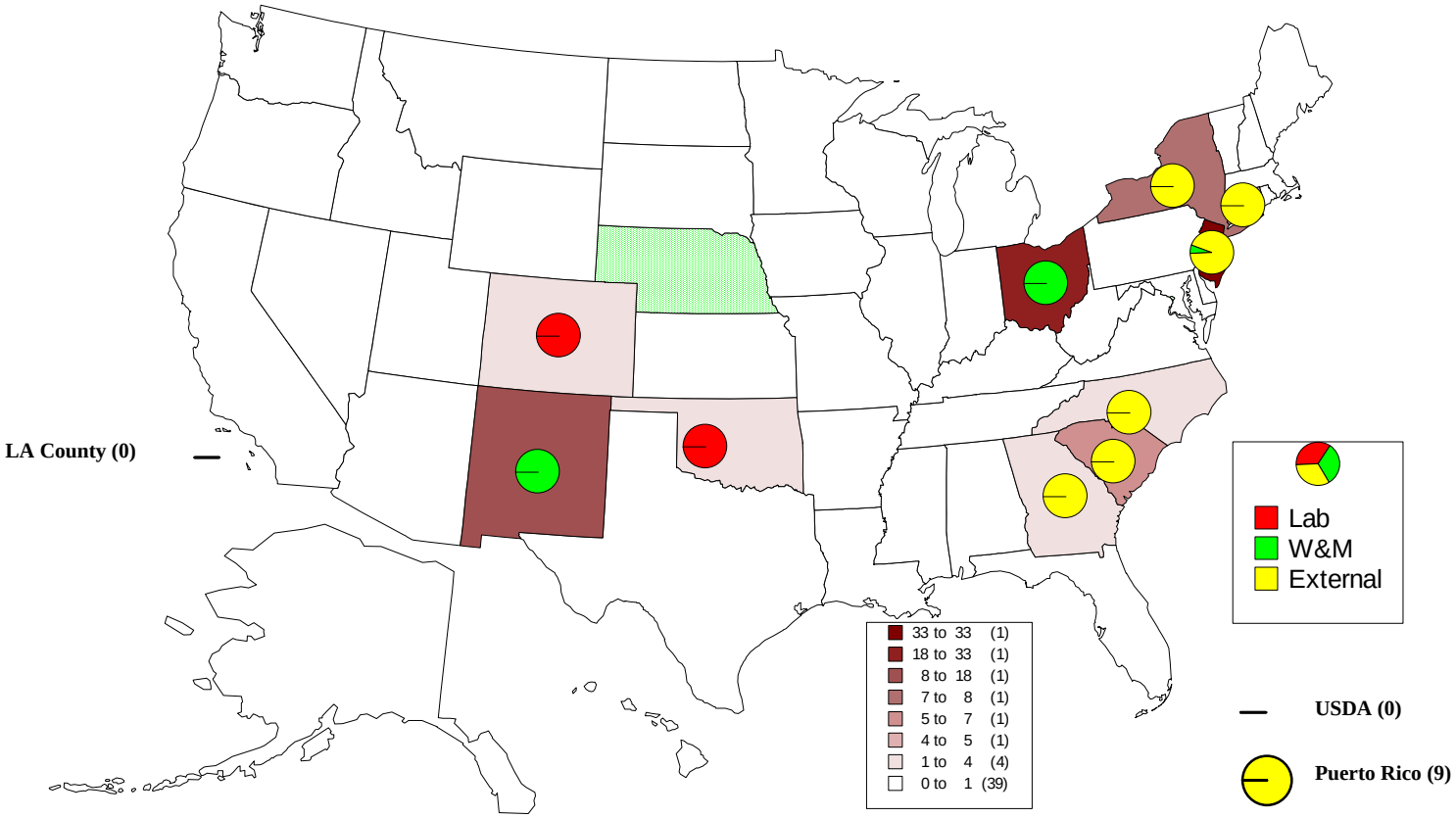
Comparison of previous surveys

	# Labs Reporting Rigid Rule Tests	Total Devices	Lab Average	Change using Lab Average
1996	26	582	22.4	--
1998	29	269	9.3	- 59 %
1999	20	413	20.6	+ 123 %
2000	16	164	10.2	- 50 %
2002	14	138	9.9	- 4 %
2004	12	98	8.2	- 17 %
2005	11	85	7.7	- 5 %
2006	11	122	11.1	+ 44 %
2008	11	88	8.0	- 28 %

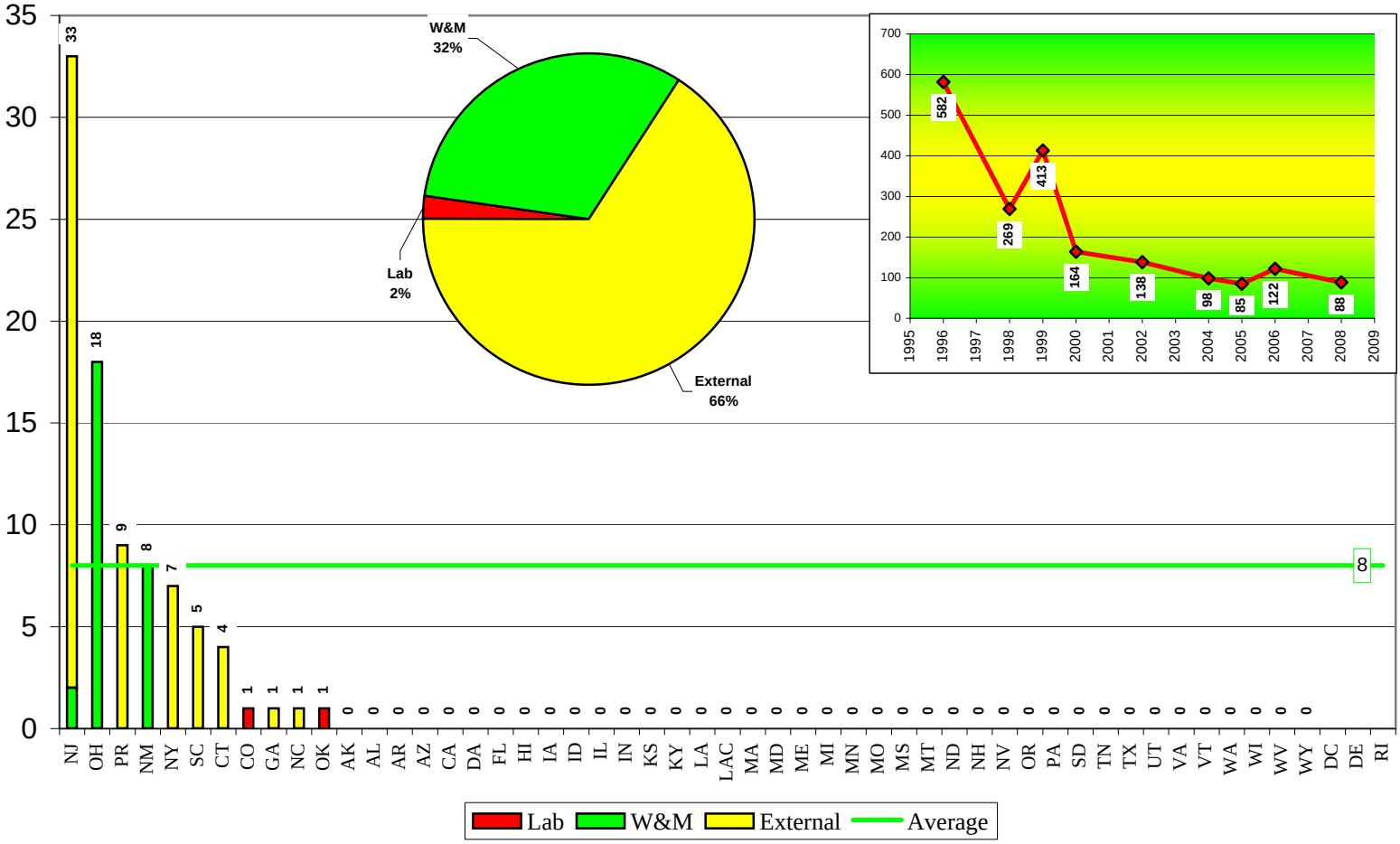
Notes and Comments

2 % of all length (rigid rule) standards were calibrated for the internal use of the laboratory.
32 % of all length (rigid rule) standards were calibrated for the weights and measures enforcement program.
66 % of all length (rigid rule) standards were calibrated for external customers.

Length Rule (2008)



88 Total Devices (2008)



Volume – Glassware for 2008

Description

The graphs on the following page represent the total number of volume (glassware) standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the breakdown of which procedure was used, volume transfer or volume gravimetric, along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Volume Categories:

- Glassware – most glassware are kits that contain volumetric standards from 1 gallon to 2 fluid ounces.
- Test Measures – most are metal volumetric standards nominally 5 gallons or less.
- Provers – most are metal volumetric standards nominally larger than 5 gallons.

Findings

Of the 50 reporting laboratories, 18 labs tested a total of 225 volumetric glassware standards.

Comparison of previous surveys

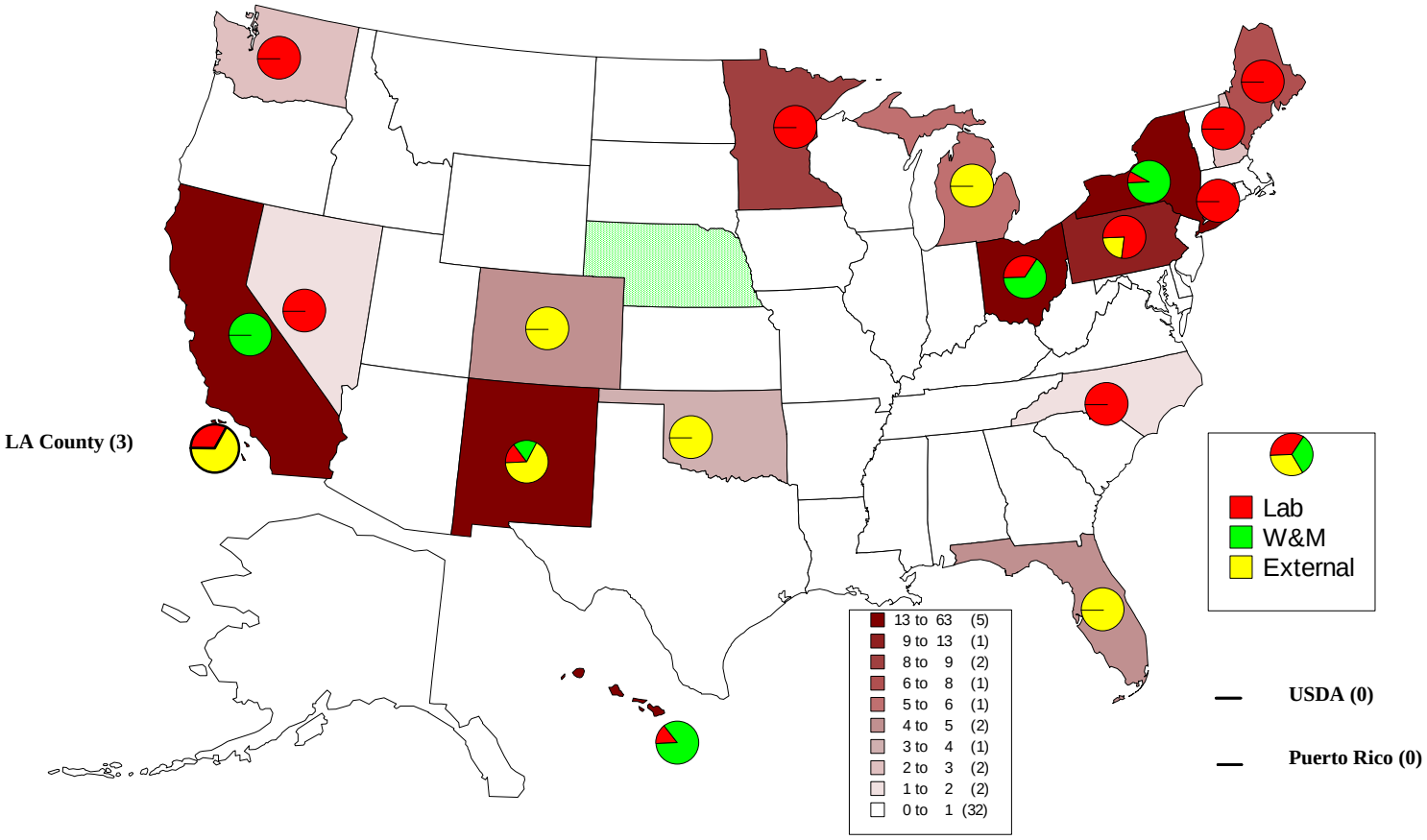
	# Labs Reporting Glassware Tests	Total Devices	Lab Average	Change using Lab Average
1996	29	1,205	41.55	--
1998	24	844	35.17	- 15 %
1999	25	853	34.12	- 3 %
2000	27	668	24.74	- 27 %
2002	24	555	23.13	- 7 %
2004	17	332	19.53	- 16 %
2005	20	209	10.45	- 46 %
2006	18	254	14.11	+ 35 %
2008	18	225	12.50	- 11 %

Notes and Comments

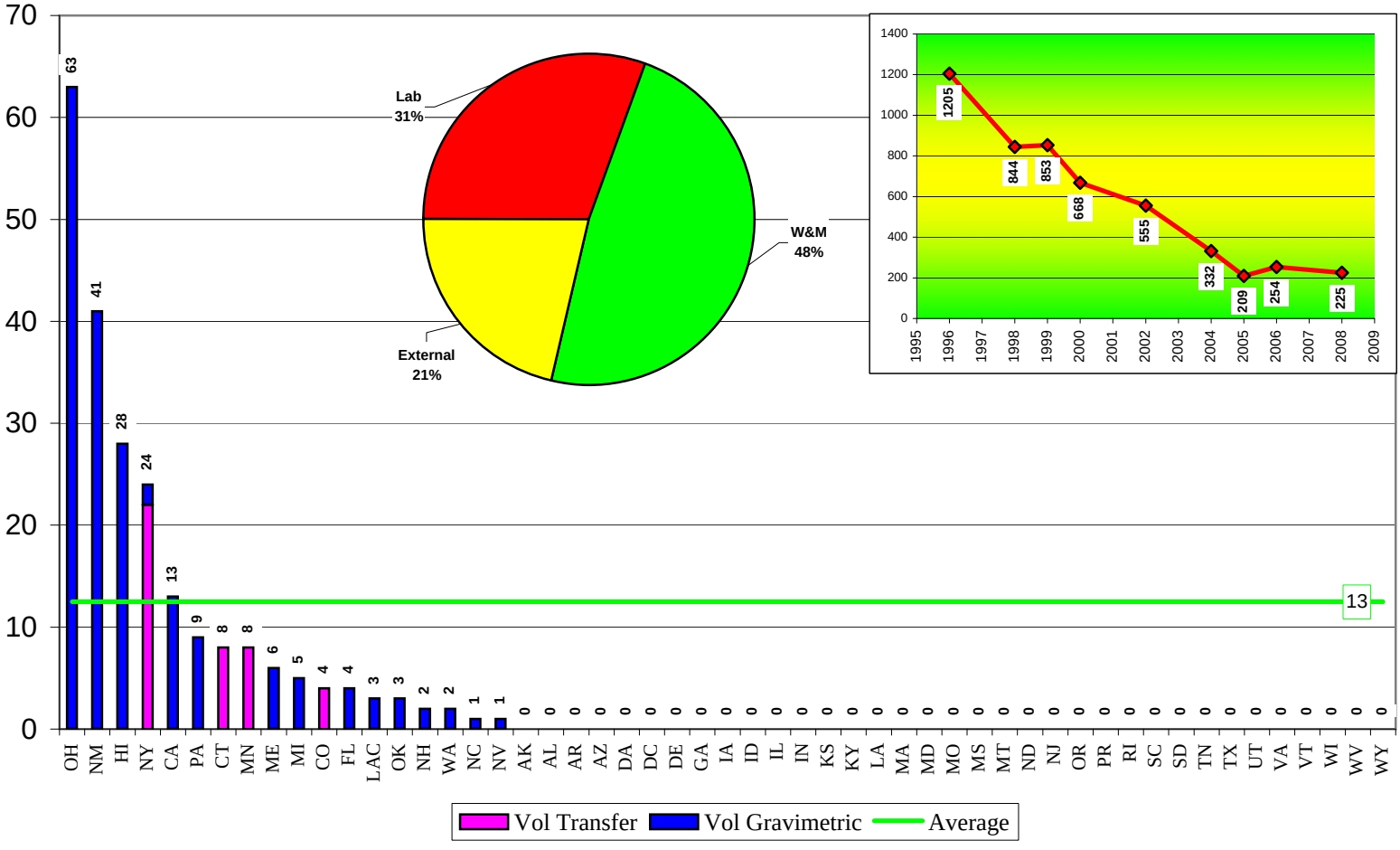
31 % of all volume (glassware) standards were calibrated for the laboratory.
48 % of all volume (glassware) standards were calibrated for weights and measures enforcement program.
21 % of all volume (glassware) standards were calibrated for external customers.

2005: Volume-Transfer 69 standards (33 %); Volume-Gravimetric 140 standards (67 %).
2006: Volume-Transfer 82 standards (32 %); Volume-Gravimetric 172 standards (68 %).
2008: Volume-Transfer 42 standards (19 %); Volume-Gravimetric 183 standards (81 %).

Volume Glassware (2008)



225 Total Devices (2008)



Volume – Test Measures for 2008

Description

The graphs on the following page represent the total number of volume (test measure) standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the breakdown of which procedure was used, volume transfer or volume gravimetric, along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

The 50 reporting laboratories, 49 labs tested a total of 7,321 volume (test measure) standards.

Comparison of previous surveys

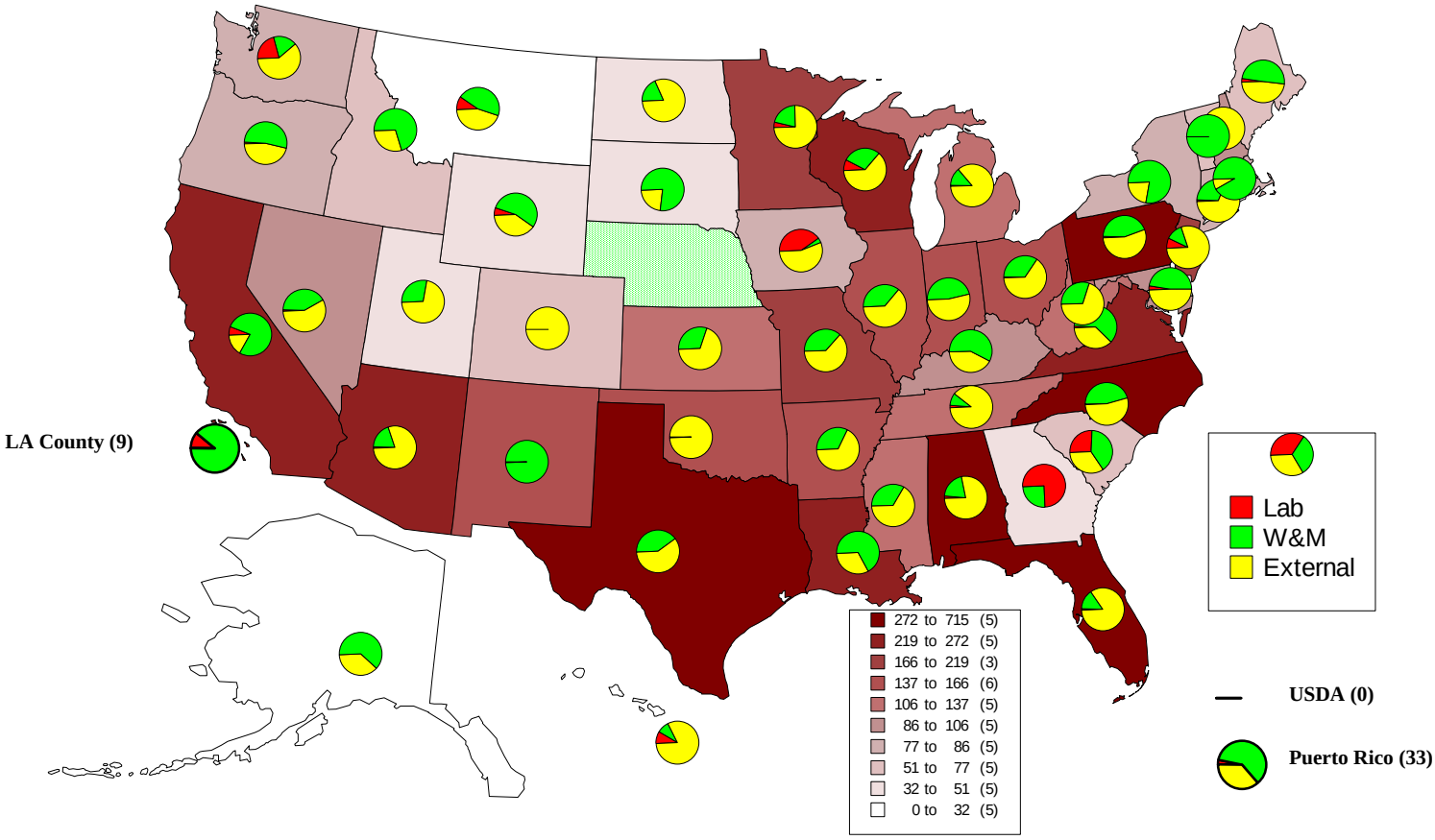
	# Labs Reporting Test Measures	Total Devices	Lab Average	Change using Lab Average
1996	48	8,290	173	--
1998	46	6,861	149	- 14 %
1999	45	6,986	155	+ 4 %
2000	45	7,368	164	+ 5 %
2002	48	6,966	145	- 11 %
2004	45	6,400	142	- 2 %
2005	42	6,925	165	+ 16 %
2006	46	7,532	164	- 1 %
2008	49	7,321	149	- 9 %

Notes and Comments

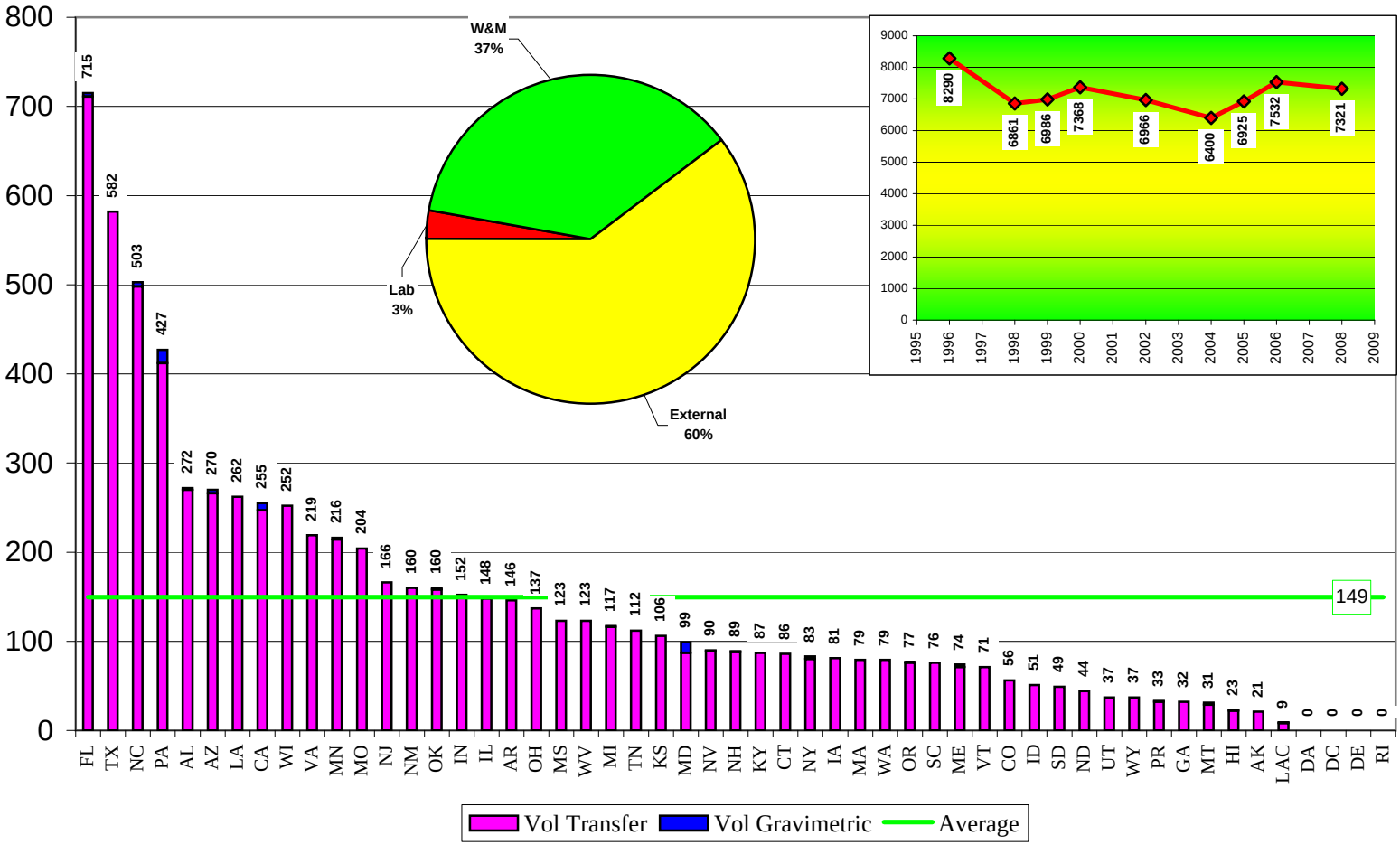
3 % of all volume (test measure) standards were calibrated for the laboratory.
37 % of all volume (test measure) standards were calibrated for weights and measures enforcement program.
60 % of all volume (test measure) standards were calibrated for external customers.

2005: Volume-Transfer 6,850 standards (99 %); Volume-Gravimetric 75 standards (1 %).
2006: Volume-Transfer 7,455 standards (99 %); Volume-Gravimetric 77 standards (1 %).
2008: Volume-Transfer 7,252 standards (99 %); Volume-Gravimetric 69 standards (1 %).

Volume Test Measures 5 gallon & smaller (2008)



7321 Total Devices (2008)



Volume – Medium Provers (> 5 gallon & ≤ 100 gallon) for 2008

Description

The graphs on the following page represent the total number of volume (provers) standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the breakdown of which procedure was used, volume transfer or volume gravimetric, along with the total number of devices tested by each laboratory.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Volume Categories:

- Glassware – most glassware are kits that contain volumetric standards from 1 gallon to 2 fluid ounces.
- Test Measures – most are metal volumetric standards nominally 5 gallons or less.
- Provers – most are metal volumetric standards nominally larger than 5 gallons.

Findings

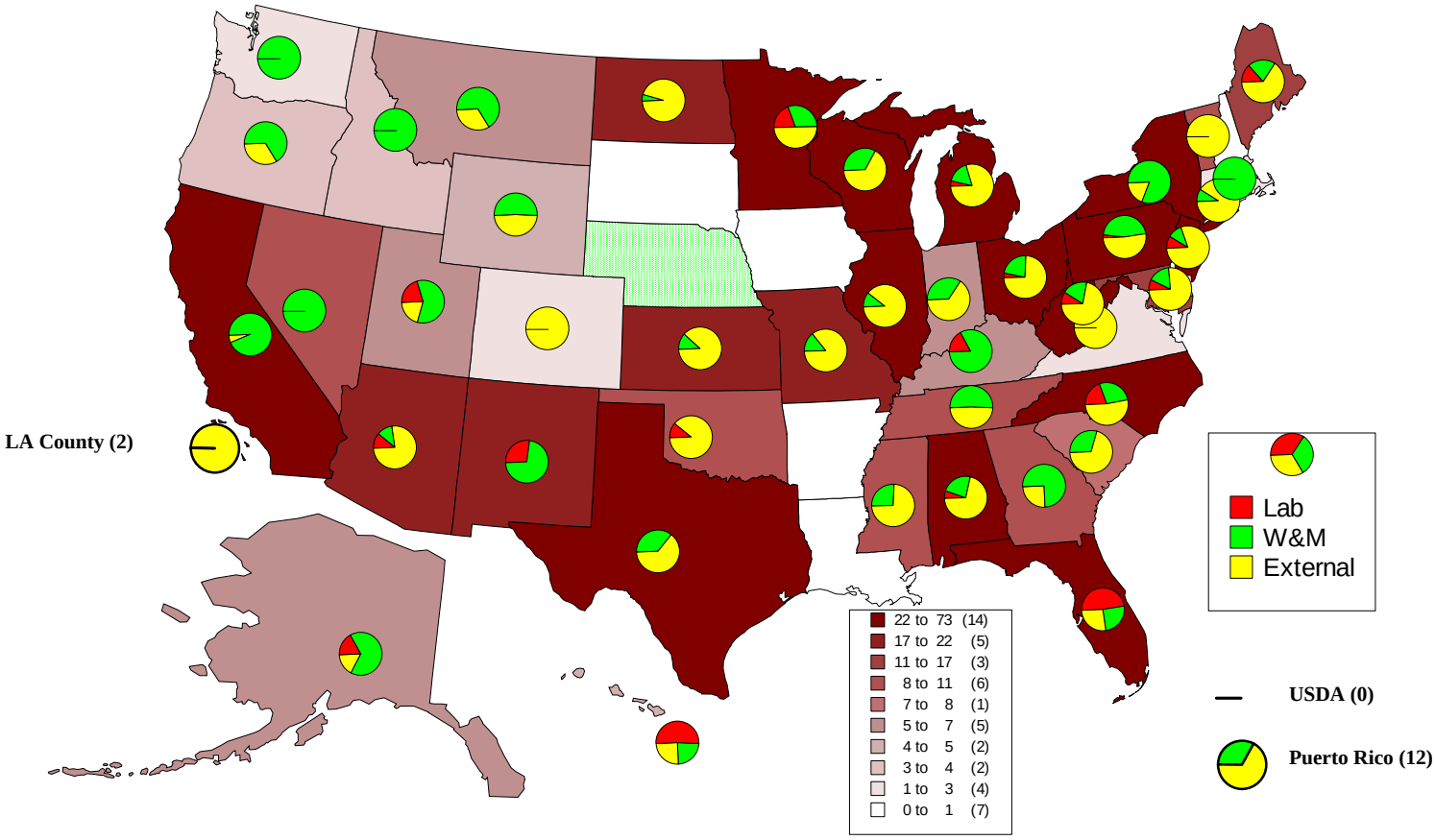
Of the 50 reporting laboratories, 44 labs tested a total of 783 medium volume standards (provers > 5 gallon and ≤ 100 gallon).

Notes and Comments

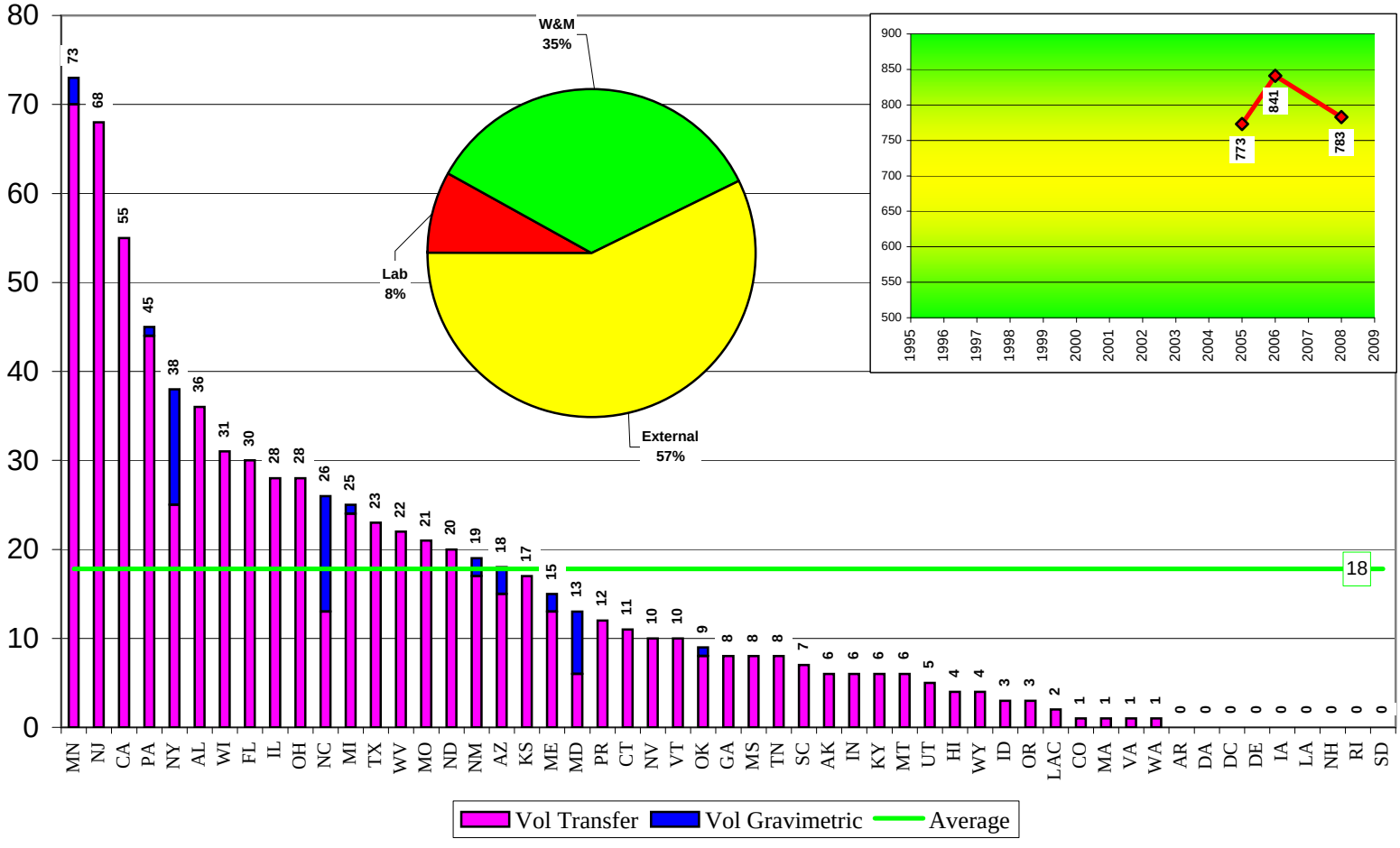
8 % of all volume (prover) standards were calibrated for the laboratory.
35 % of all volume (prover) standards were calibrated for weights and measures enforcement program.
57 % of all volume (prover) standards were calibrated for external customers.

2005: Volume-Transfer 726 standards (94 %); Volume-Gravimetric 47 standards (6 %).
2006: Volume-Transfer 760 standards (90 %); Volume-Gravimetric 81 standards (10 %).
2008: Volume-Transfer 737 standards (94 %); Volume-Gravimetric 46 standards (6 %).

Volume Medium Provers > 5 gallon up to 100 gallon (2008)



783 Total Devices (2008)



Volume -- Large Provers (> 100 gallon) for 2008

Description

The graphs on the following page represent the total number of volume (provers) standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the breakdown of which procedure was used, volume transfer or volume gravimetric, along with the total number of devices tested by each laboratory.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Volume Categories:

- Glassware – most glassware are kits that contain volumetric standards from 1 gallon to 2 fluid ounces.
- Test Measures – most are metal volumetric standards nominally 5 gallons or less.
- Provers – most are metal volumetric standards nominally larger than 5 gallons.

Findings

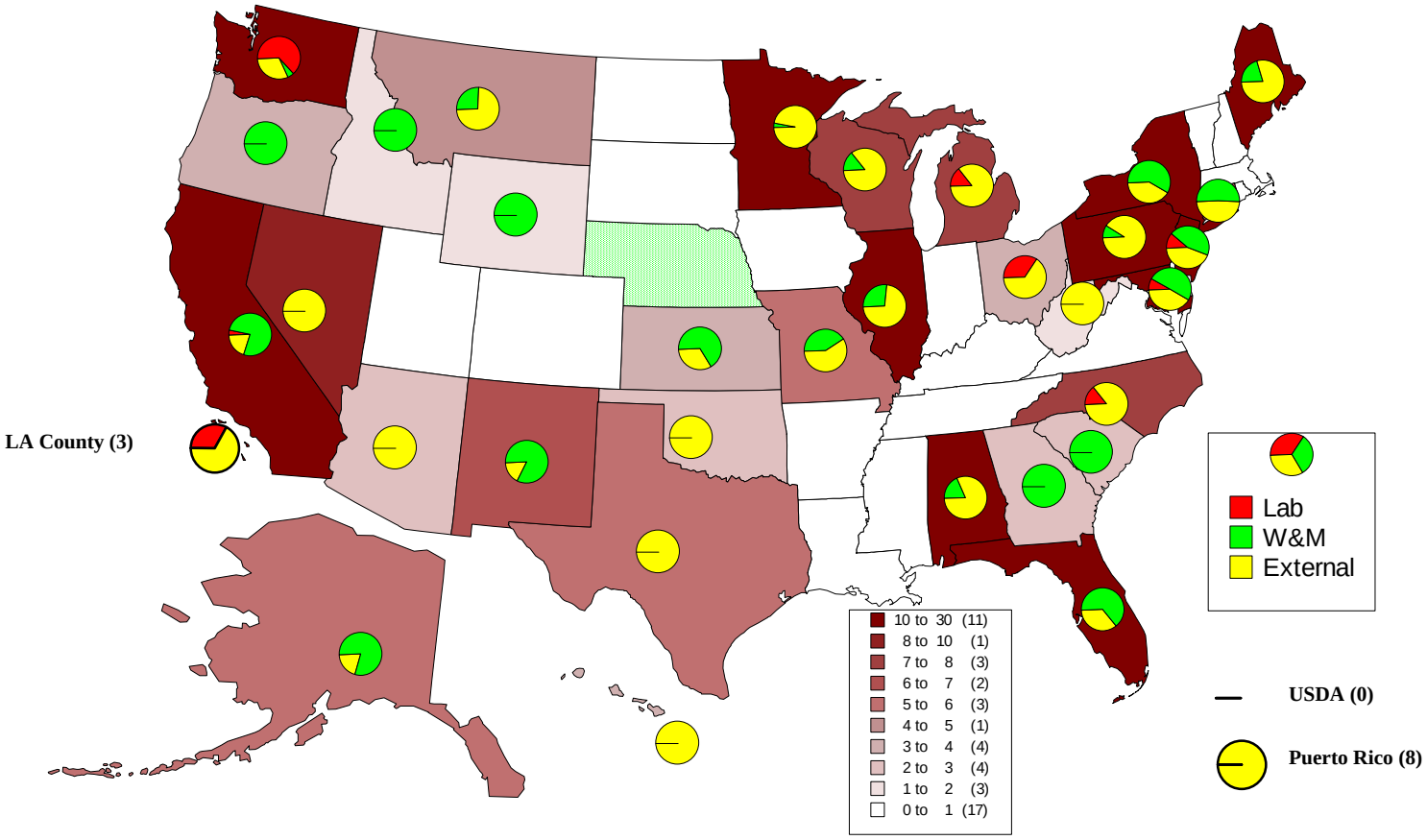
Of the 50 reporting laboratories, 34 labs tested a total of 284 large volume standards (provers > 100 gallon).

Notes and Comments

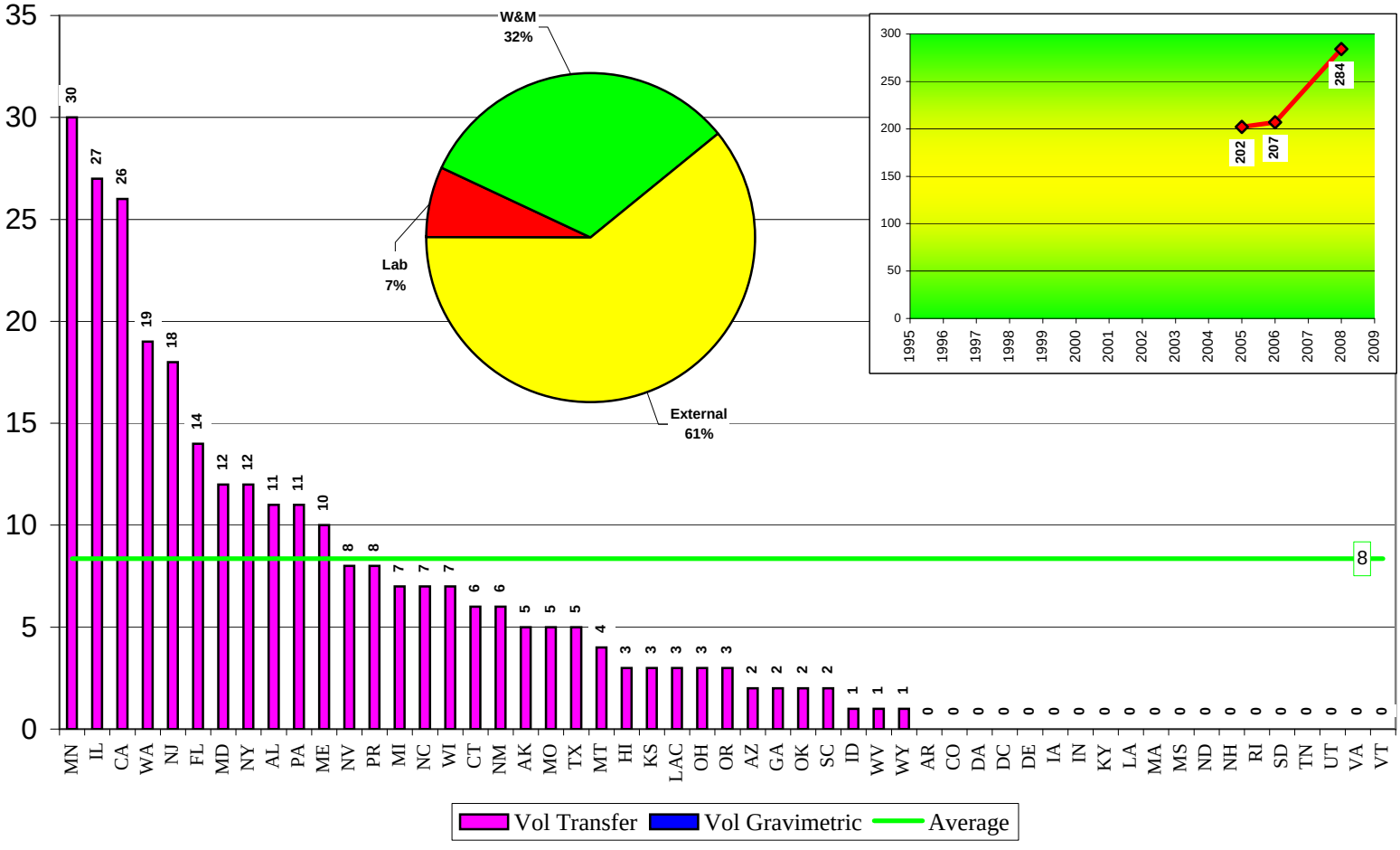
7 % of all volume (prover) standards were calibrated for the laboratory.
32 % of all volume (prover) standards were calibrated for weights and measures enforcement program.
61 % of all volume (prover) standards were calibrated for external customers.

2005: Volume-Transfer 201 standards (99.5 %); Volume-Gravimetric 1 standards (0.5 %).
2006: Volume-Transfer 202 standards (98 %); Volume-Gravimetric 5 standards (2 %).
2008: Volume-Transfer 284 standards (100 %); Volume-Gravimetric 0 standards (0 %).

Volume Large Provers > 100 gallon (2008)



284 Total Devices (2008)



Volume -- LPG Provers for 2008

Description

The graphs on the following page represent the total number of LPG volume (provers) standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the breakdown of which procedure was used, volume transfer or volume gravimetric, along with the total number of devices tested by each laboratory.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

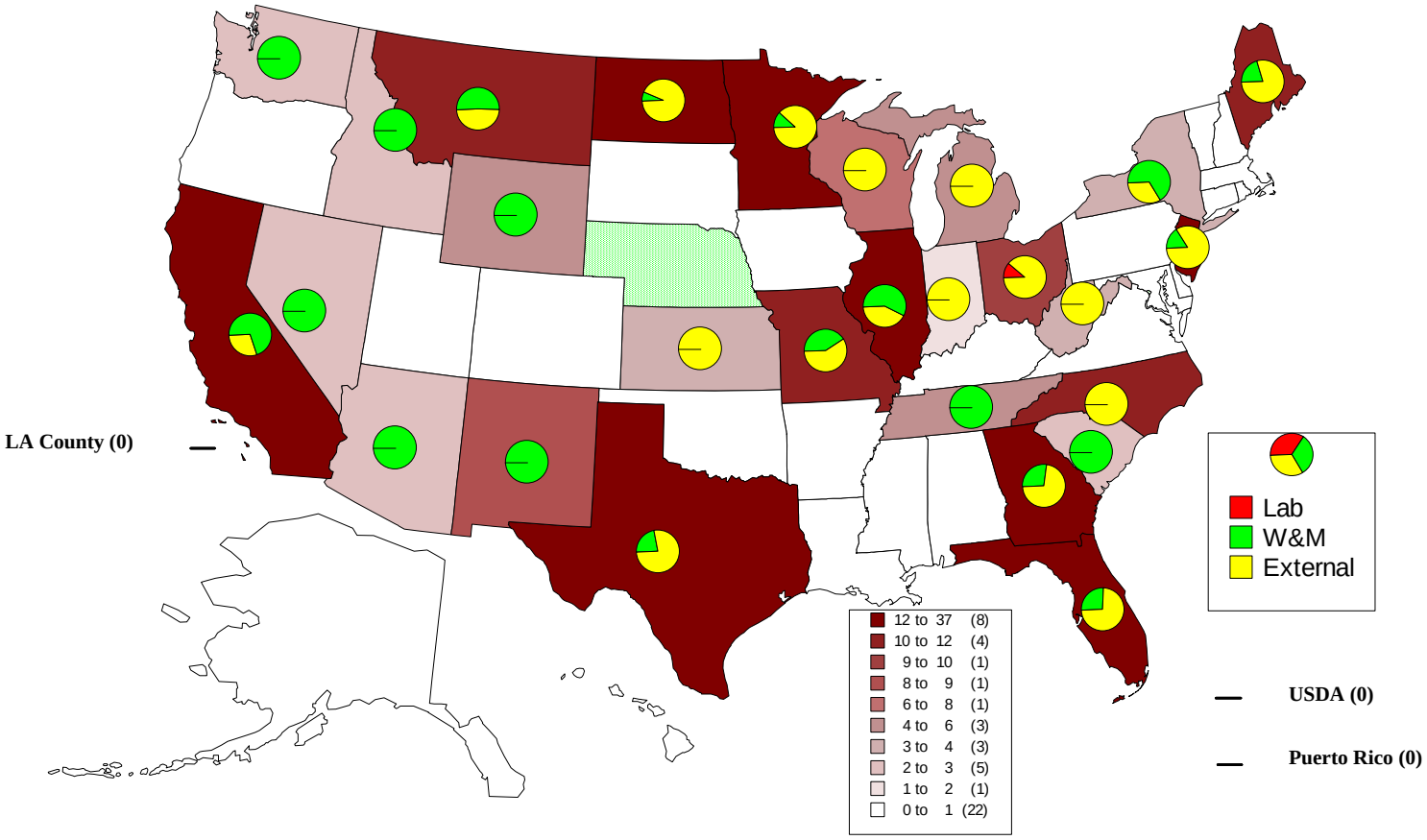
Of the 50 reporting laboratories, 27 labs tested a total of 249 LPG provers.

Notes and Comments

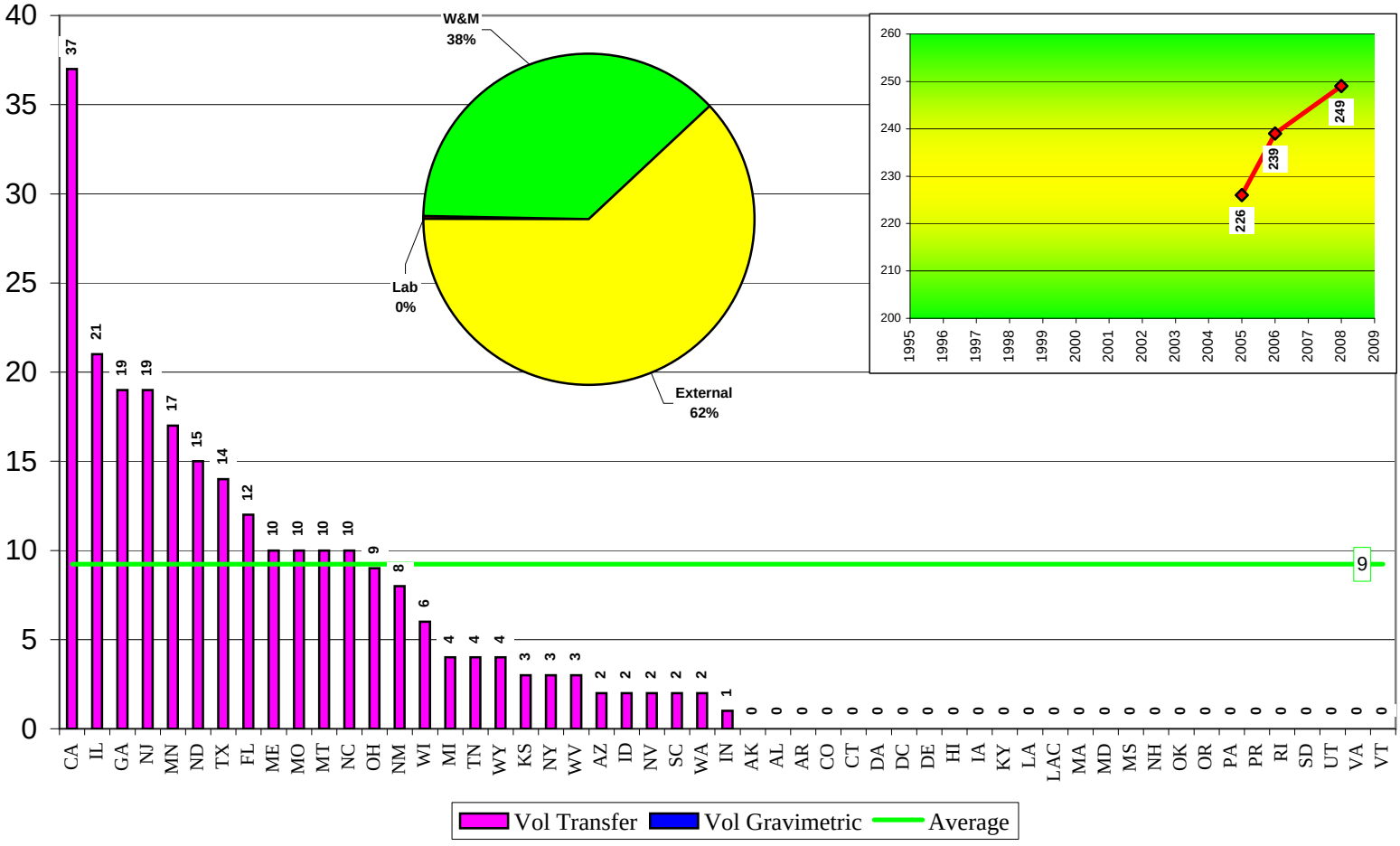
0 % of all volume (prover) standards were calibrated for the laboratory.
38 % of all volume (prover) standards were calibrated for weights and measures enforcement program.
62 % of all volume (prover) standards were calibrated for external customers.

2005: Volume-Transfer 226 standards (100 %); Volume-Gravimetric 0 standards (0 %).
2006: Volume-Transfer 239 standards (100 %); Volume-Gravimetric 0 standards (0 %).
2008: Volume-Transfer 249 standards (100 %); Volume-Gravimetric 0 standards (0 %).

Volume LPG (2008)



249 Total Devices (2008)



Volume – SVP (Small Volume Provers) for 2008

Description

The graphs on the following page represent the total number of SVP (small volume provers) tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the breakdown of which procedure was used, volume transfer or volume gravimetric, along with the total number of devices tested by each laboratory.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

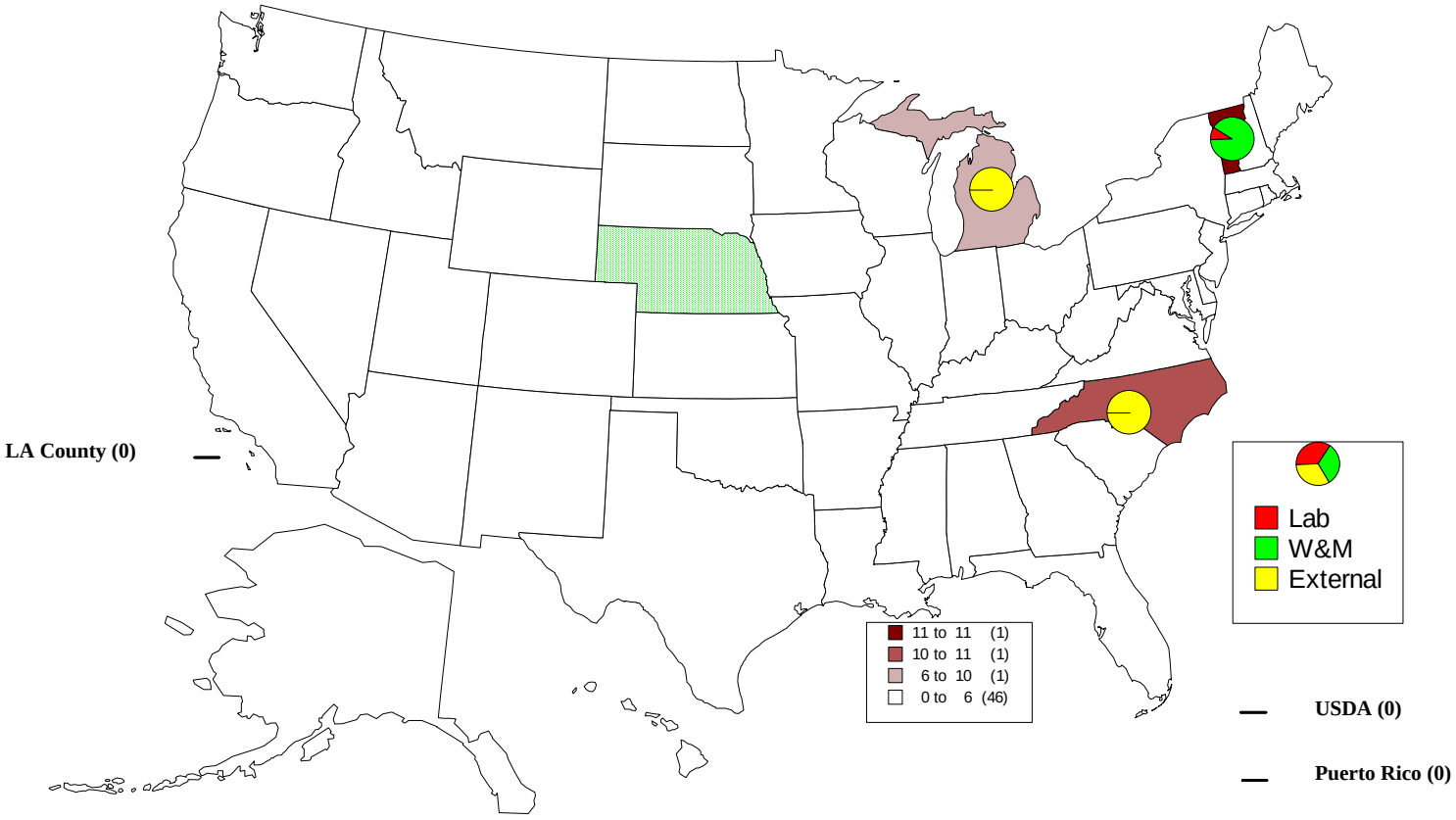
Of the 50 reporting laboratories, 3 labs tested a total of 27 SVP (small volume provers).

Notes and Comments

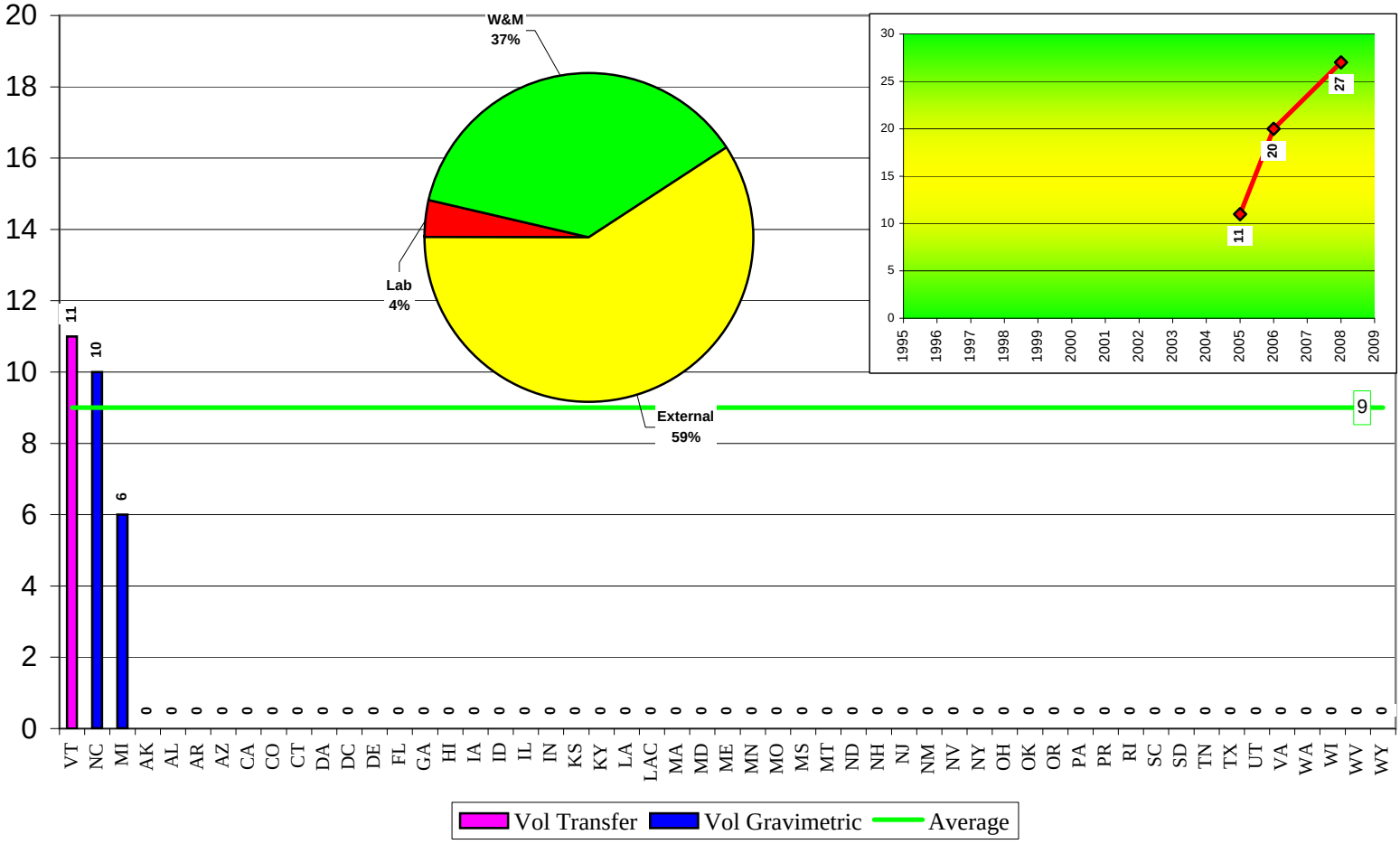
4 % of all volume (prover) standards were calibrated for the laboratory.
37 % of all volume (prover) standards were calibrated for weights and measures enforcement program.
59 % of all volume (prover) standards were calibrated for external customers.

2005: Volume-Transfer 0 standards (0 %); Volume-Gravimetric 11 standards (100 %).
2006: Volume-Transfer 0 standards (0 %); Volume-Gravimetric 20 standards (100 %).
2008: Volume-Transfer 11 standards (41 %); Volume-Gravimetric 16 standards (59 %).

Small Volume Provers (SVP) (2008)



27 Total Devices (2008)



Summary Volume – SVP, Test Measures, & Provers for 2008

Description

The graphs on the following page represent the total number of SVP (small volume provers) and all metal volume standards tested by the 50 reporting laboratories. Note that this data excludes glassware. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the breakdown of which procedure was used, volume transfer or volume gravimetric, along with the total number of devices tested by each laboratory.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 49 labs tested a total of 8,664 SVPs (small volume provers), test measures, and provers.

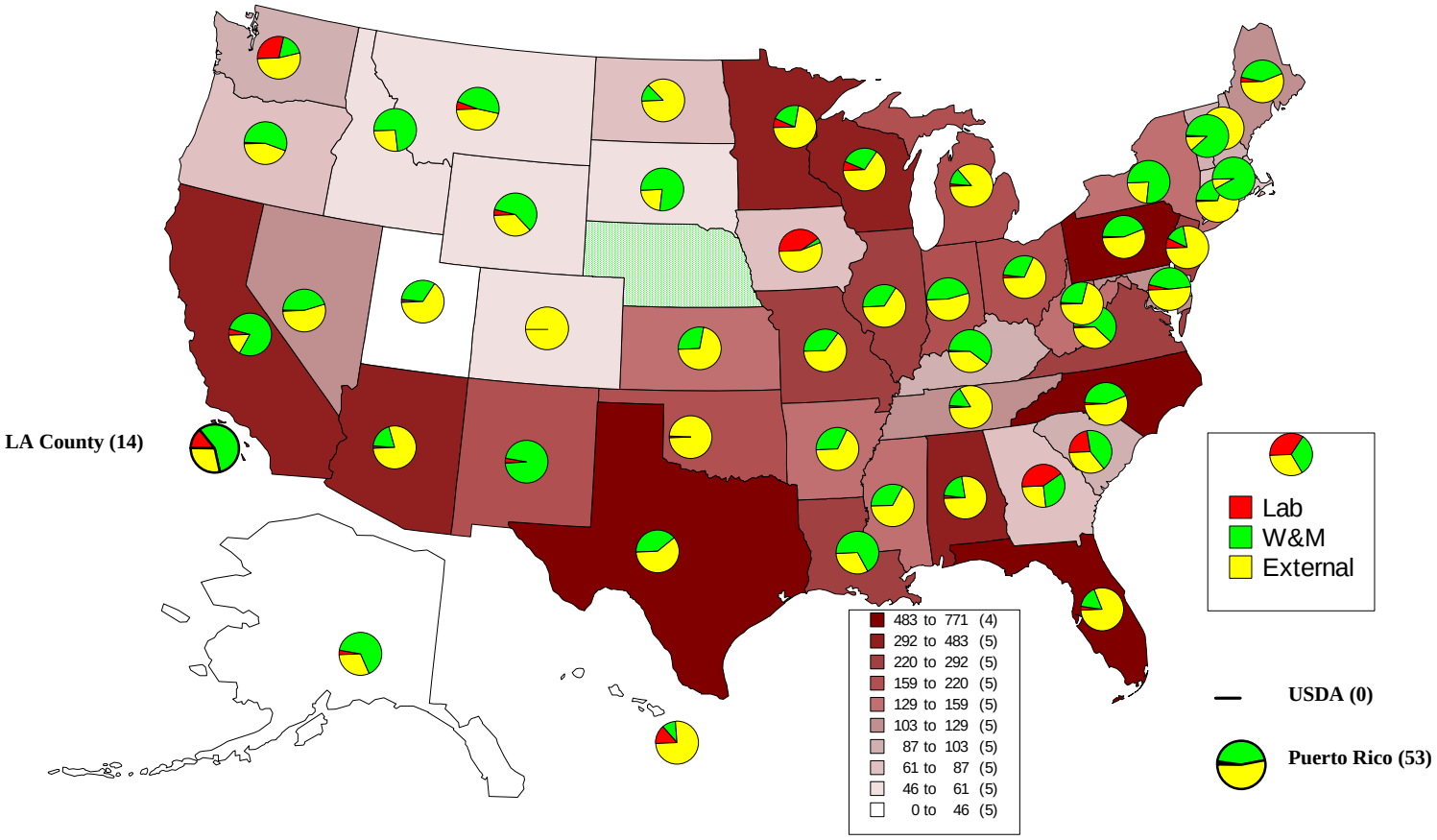
Notes and Comments

3 % of all volume (prover) standards were calibrated for the laboratory.
37 % of all volume (prover) standards were calibrated for weights and measures enforcement program.
60 % of all volume (prover) standards were calibrated for external customers.

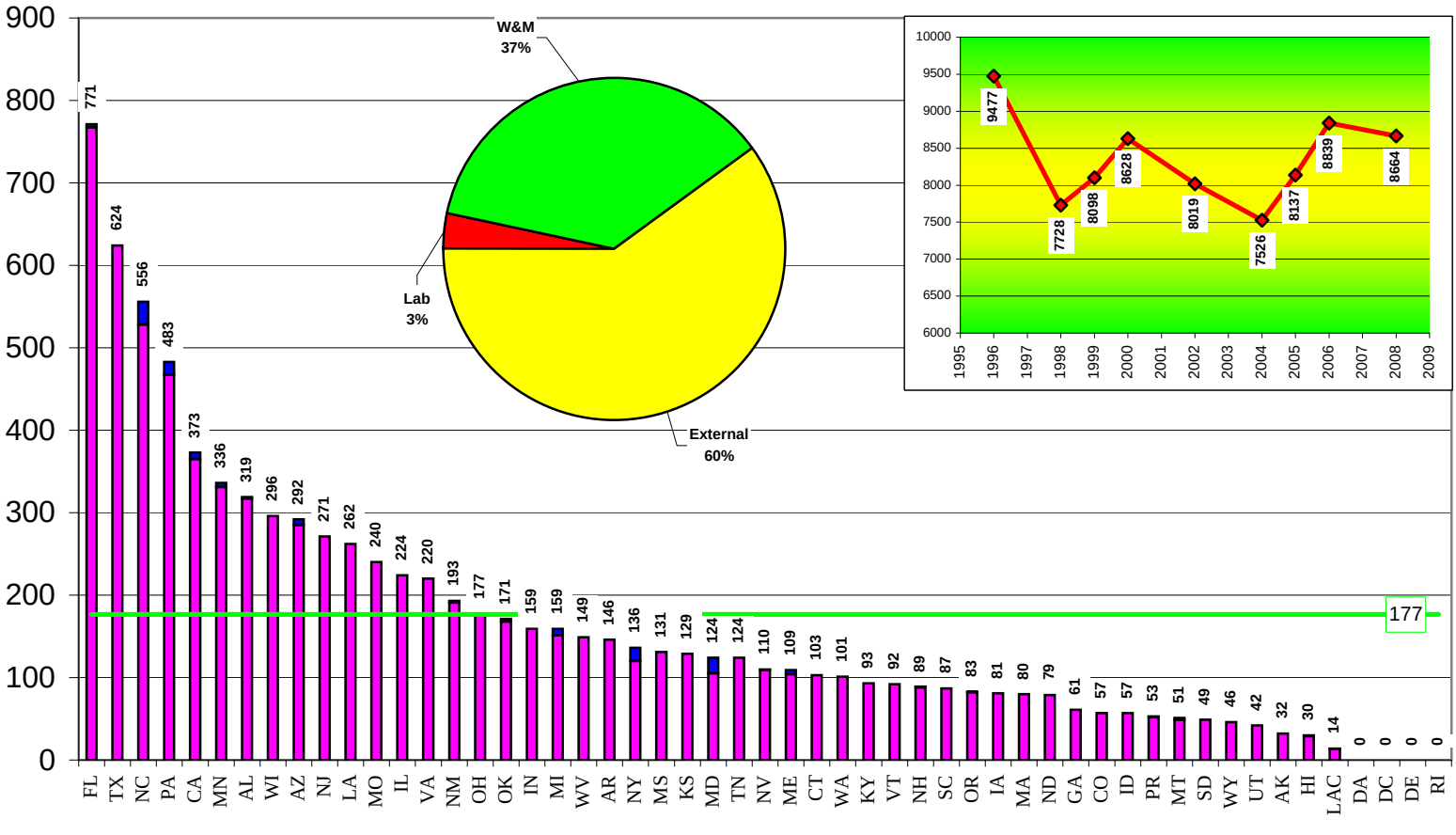
2005: Volume-Transfer 8,003 standards (98 %); Volume-Gravimetric 134 standards (2 %).
2006: Volume-Transfer 8,656 standards (98 %); Volume-Gravimetric 183 standards (2 %).
2008: Volume-Transfer 8,533 standards (98 %); Volume-Gravimetric 131 standards (2 %).

Summary Volume - SVP, Test Measures, & Provers (2008)

(excluding glassware)



8664 Total Devices (2008)



Temperature for 2008

Description

The graphs on the following page represent the total number of temperature standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 13 labs tested a total of 498 temperature standards.

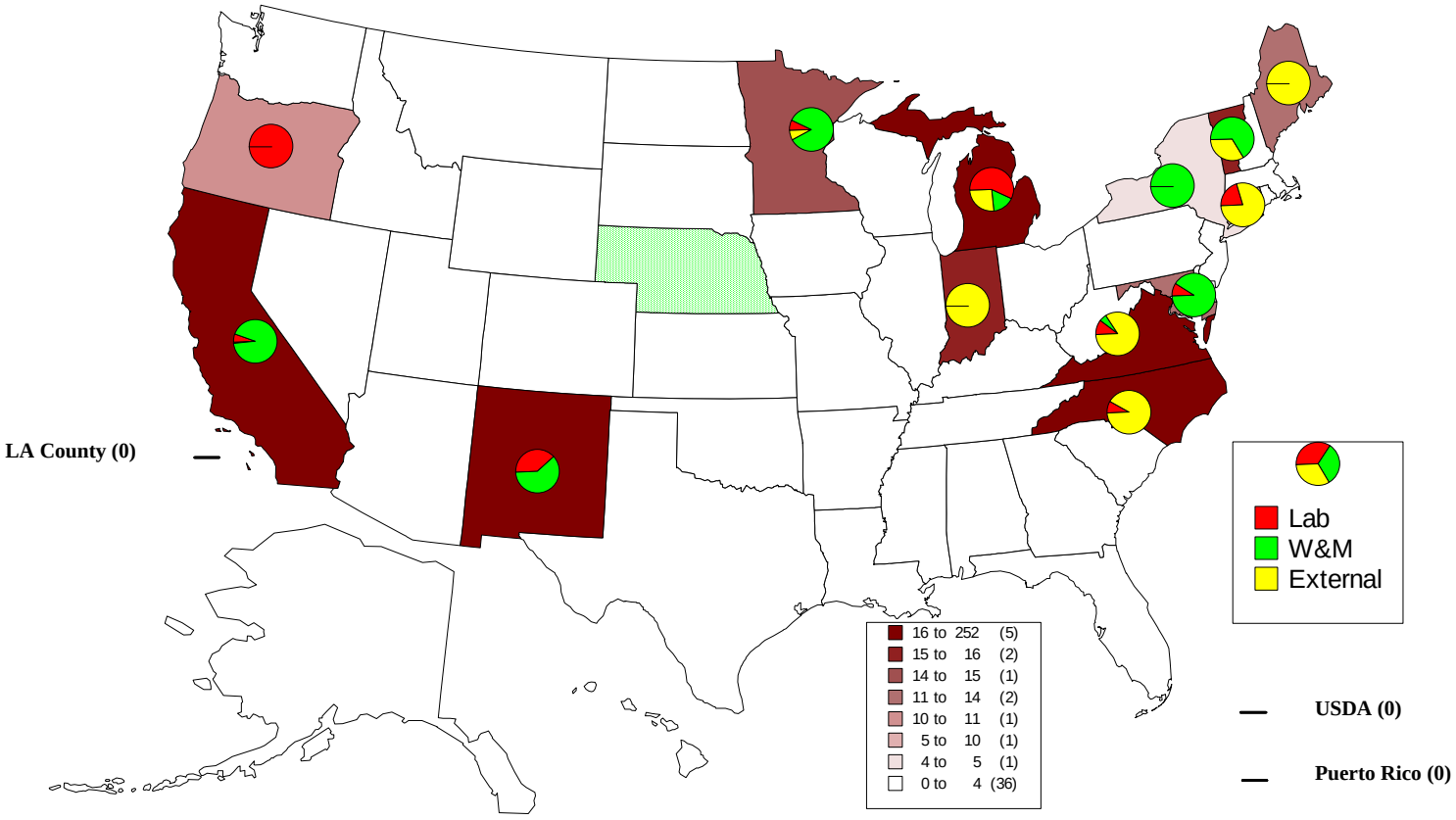
Comparison of previous surveys

	# Labs Reporting Temperature tests	Total Devices	Lab Average	Change using Lab Average
1996	20	447	22	--
1998	11	378	34	+ 54 %
1999	12	514	43	+ 25 %
2000	16	460	29	- 33 %
2002	13	456	35	+ 22 %
2004	12	315	26	- 25 %
2005	15	418	28	+ 6 %
2006	12	281	23	- 16 %
2008	13	498	38	+ 65 %

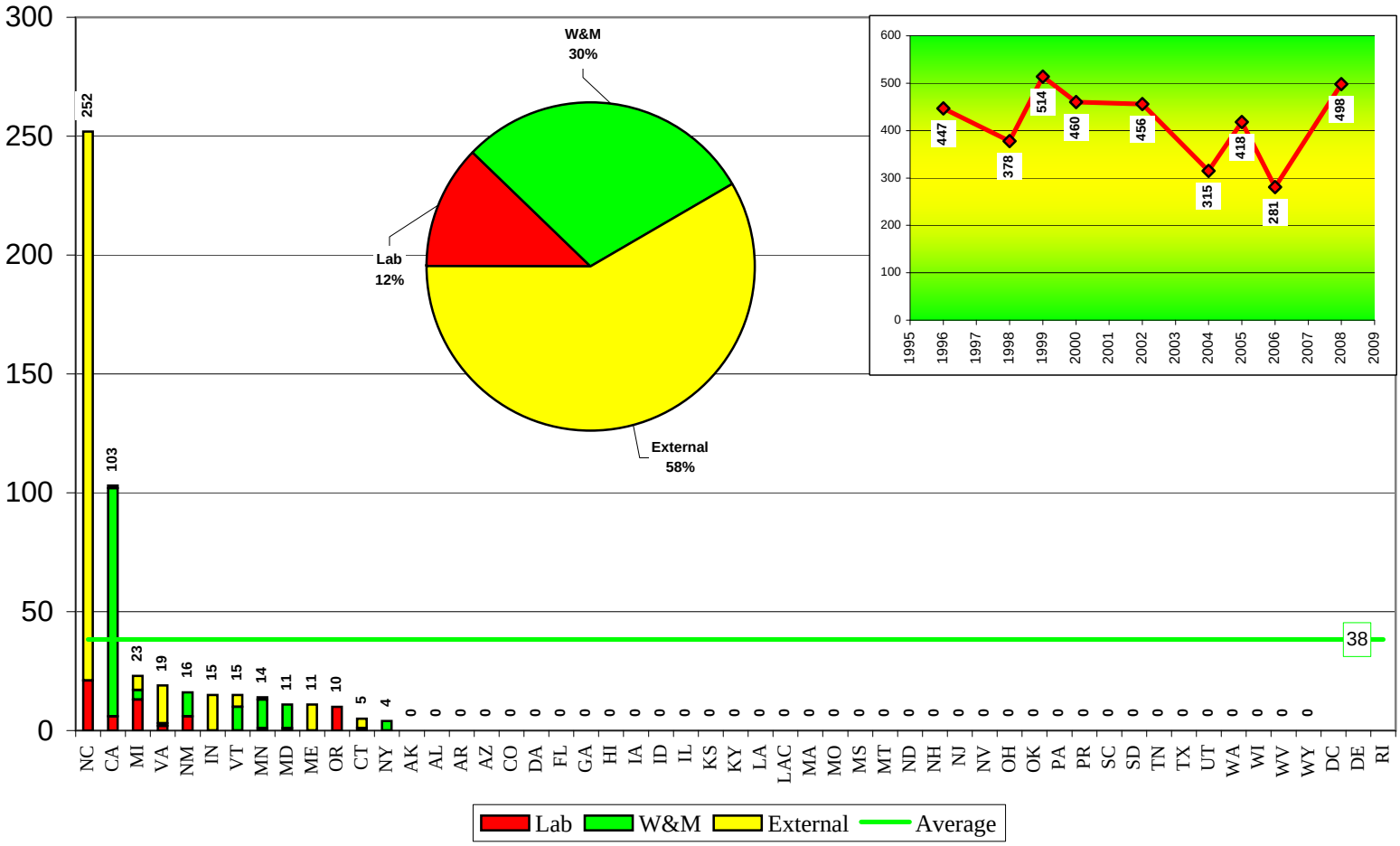
Notes and Comments

12 % of all temperature standards were calibrated for the laboratory.
30 % of all temperature standards were calibrated for weights and measures enforcement program.
58 % of all temperature standards were calibrated for external customers.

Temperature (2008)



498 Total Devices (2008)



Frequency for 2008

Description

The graphs on the following page represent the total number of frequency standards tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 4 labs tested a total of 15,058 frequency standards.

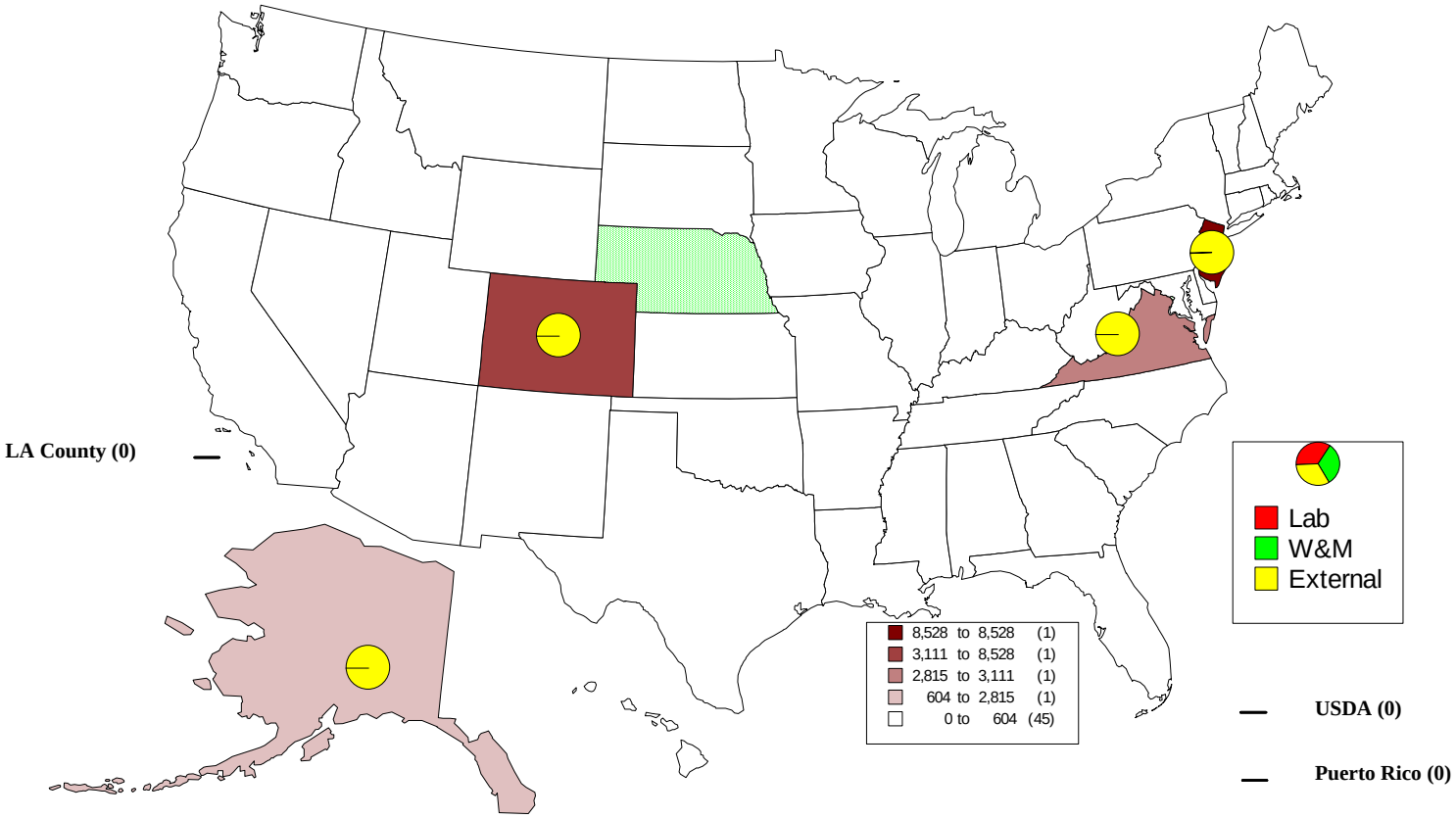
Comparison of previous surveys

	# Labs Reporting Frequency Tests	Total Devices	Lab Average	Change using Lab Average
1996	6	12,518	2,086	--
1998	4	11,561	2,890	+ 39 %
1999	5	13,518	2,704	- 6 %
2000	7	14,670	2,096	- 22 %
2002	6	13,785	2,298	+ 10 %
2004	3	14,772	4,924	+ 114 %
2005	4	15,162	3,791	- 23 %
2006	4	14,832	3,708	- 2 %
2008	4	15,058	3,765	+ 2 %

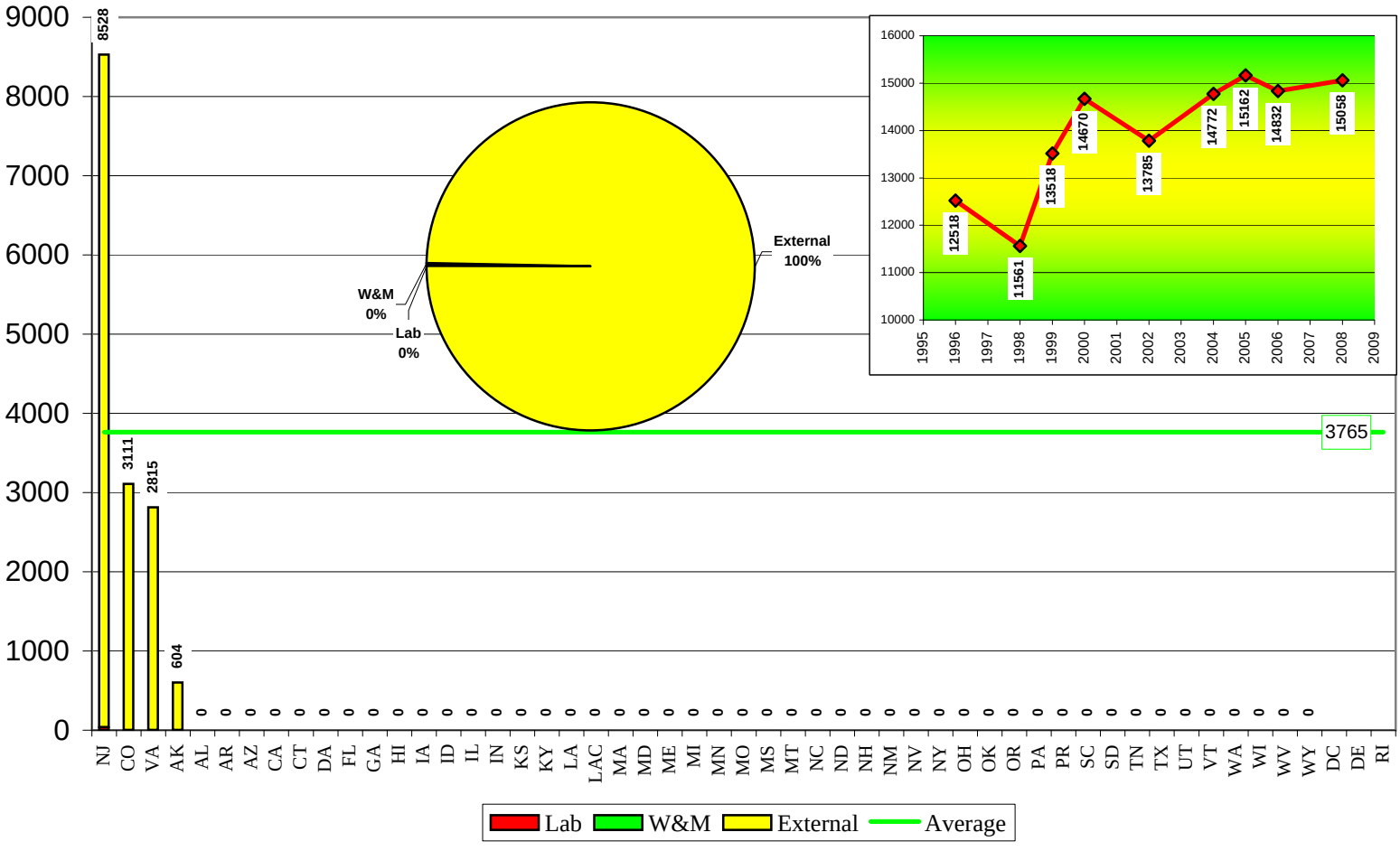
Notes and Comments

0 % of all frequency standards were calibrated for the laboratory.
0 % of all frequency standards were calibrated for weights and measures enforcement program.
100 % of all frequency standards were calibrated for external customers.

Frequency (2008)



15058 Total Devices (2008)



Time for 2008

Description

The graphs on the following page represent the total number of timing devices tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 11 labs tested a total of 401 timing devices.

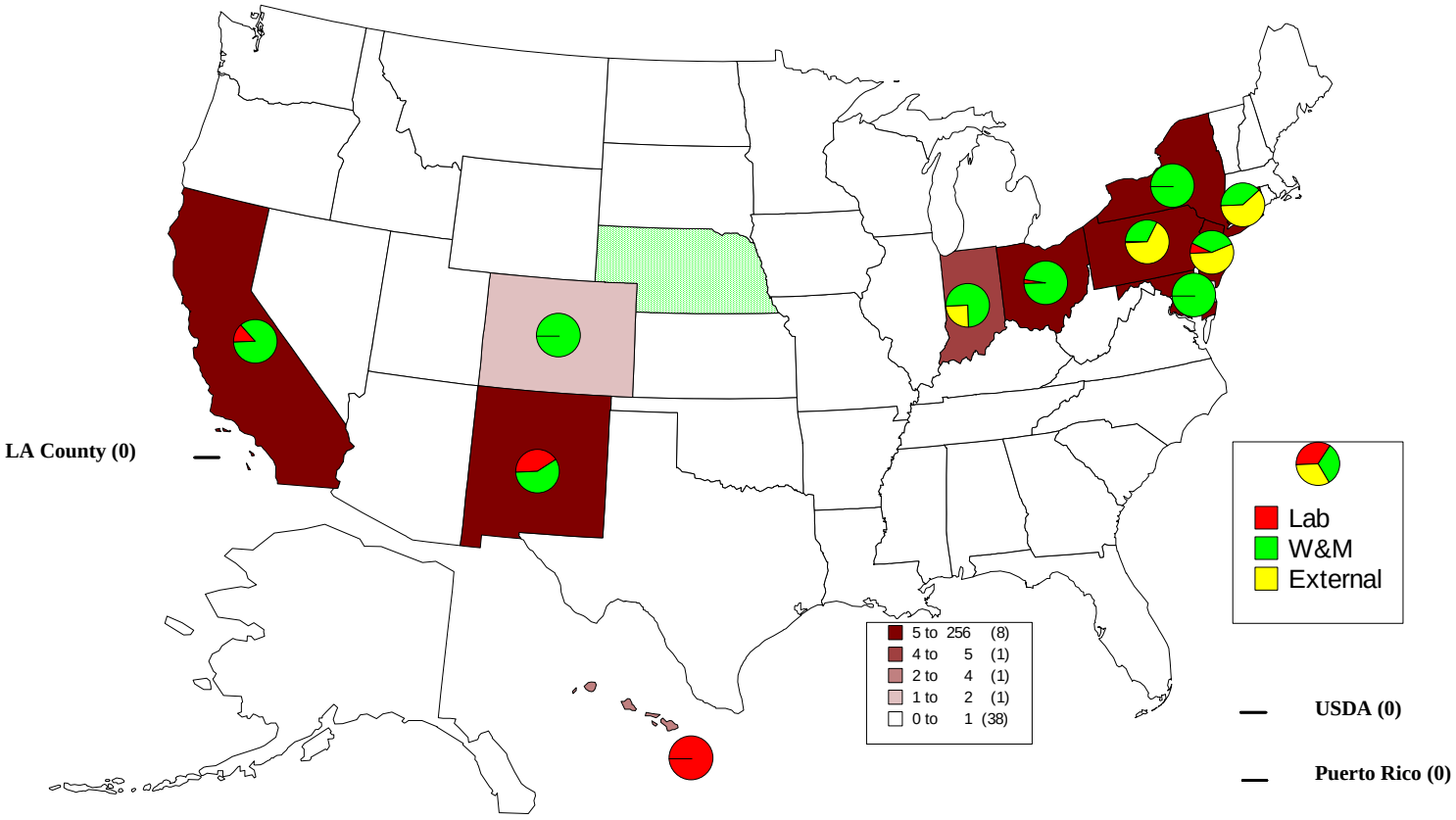
Comparison of previous surveys

	# Labs Reporting Time Tests	Total Devices	Lab Average	Change using Lab Average
1996	13	161	12	--
1998	11	380	35	+ 179 %
1999	14	451	32	- 7 %
2000	13	554	43	+ 32 %
2002	11	479	44	+ 2 %
2004	9	951	106	+ 143 %
2005	8	387	48	- 54 %
2006	11	365	33	- 31 %
2008	11	401	36	+ 9 %

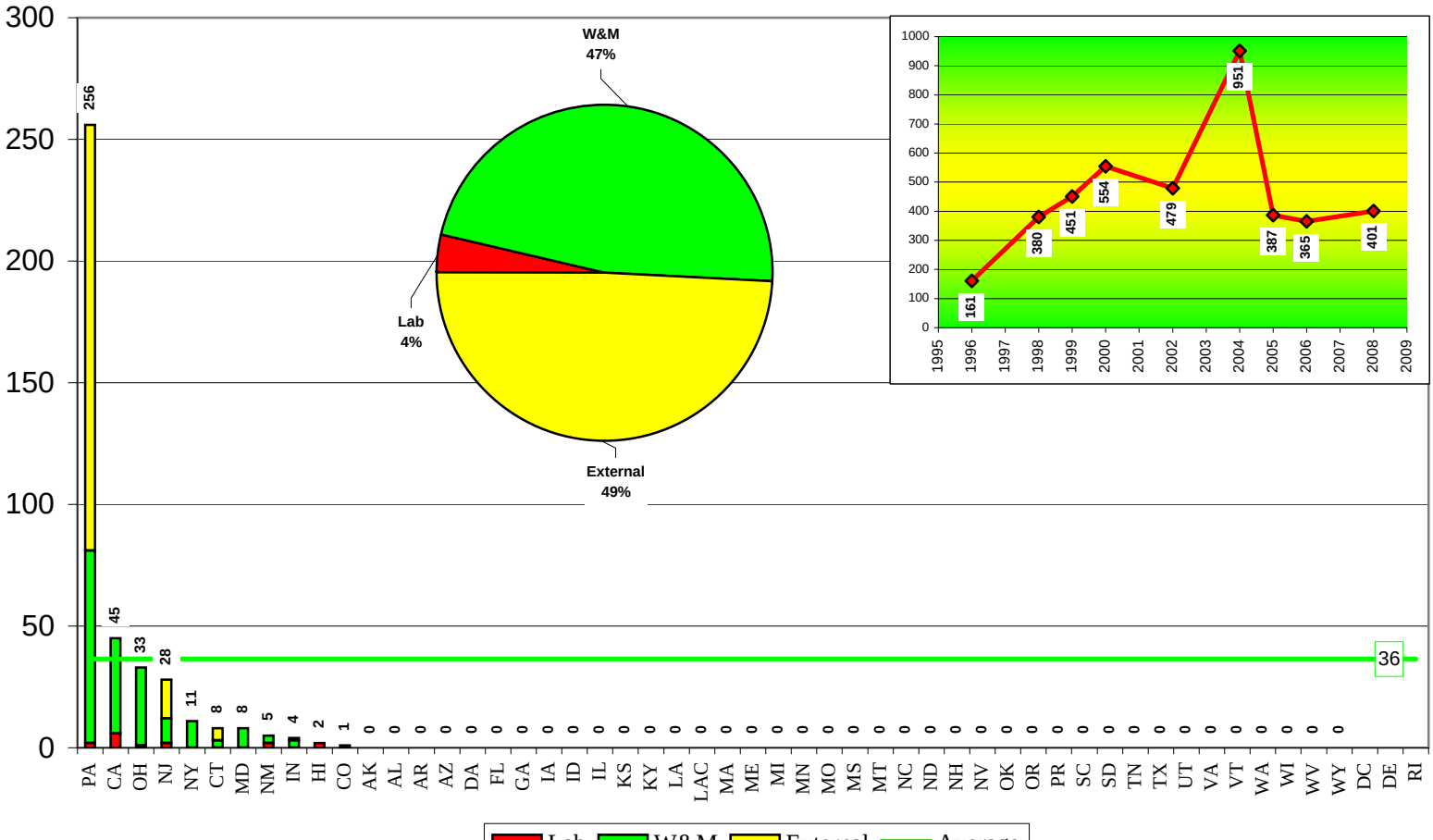
Notes and Comments

4 % of all timing devices were calibrated for the laboratory.
47 % of all timing devices were calibrated for weights and measures enforcement program.
49 % of all timing devices were calibrated for external customers.

Time (2008)



401 Total Devices (2008)



Wheel Load Weighers for 2008

Description

The graphs on the following page represent the total number of wheel load weighers tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 22 labs tested a total of 10,191 wheel load weighers.

Comparison of previous surveys

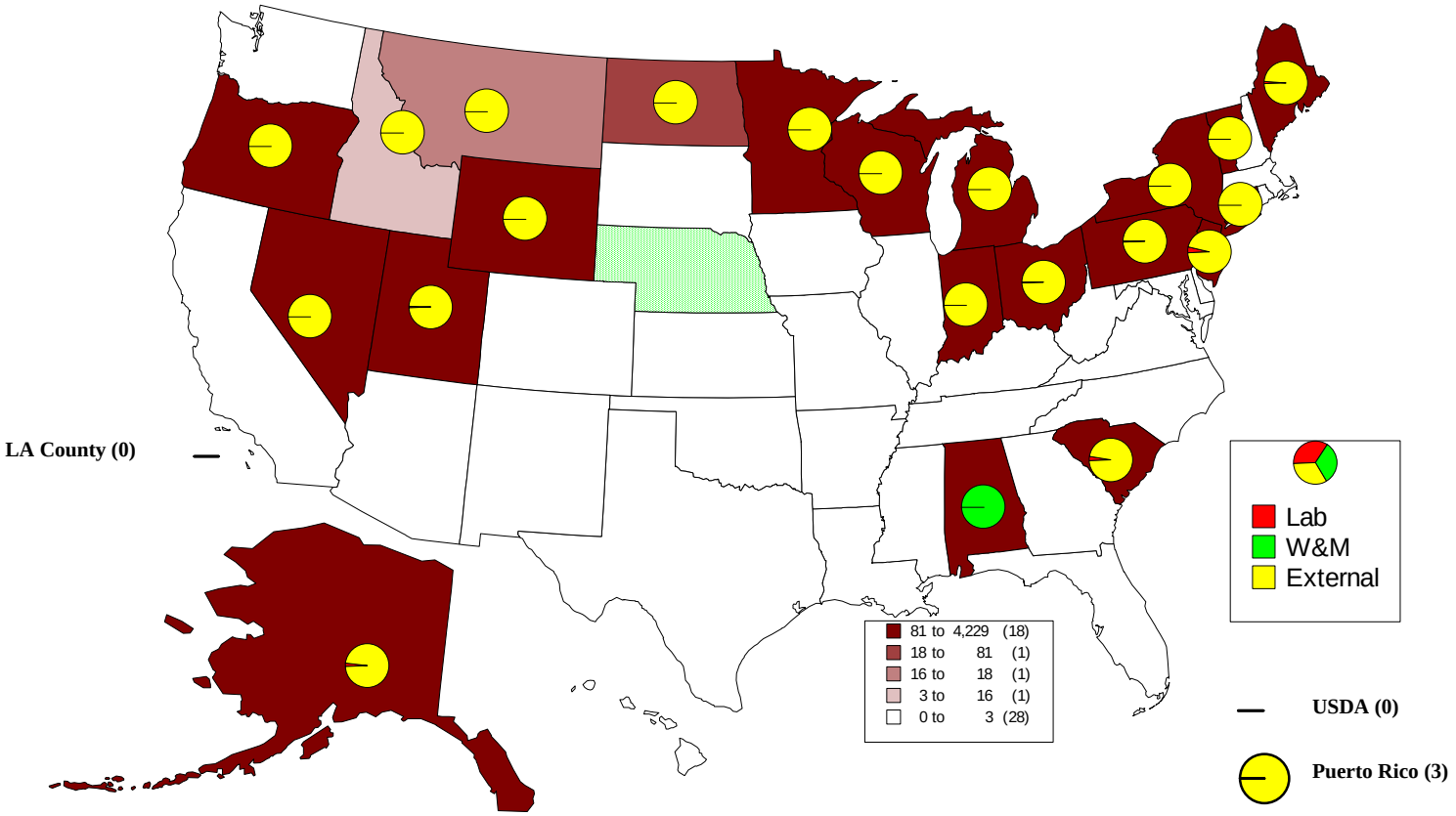
	# Labs Reporting Wheel Load Weigher Tests	Total Devices	Lab Average	Change using Lab Average
1998	19	12,178	641	--
1999	20	12,781	639	0 %
2000	22	13,699	623	- 3 %
2002	23	10,350	450	- 28 %
2004	21	10,884	518	+ 15 %
2005	19	9,748	513	- 1 %
2006	20	10,567	528	+ 3 %
2008	22	10,191	463	- 12 %

Notes and Comments

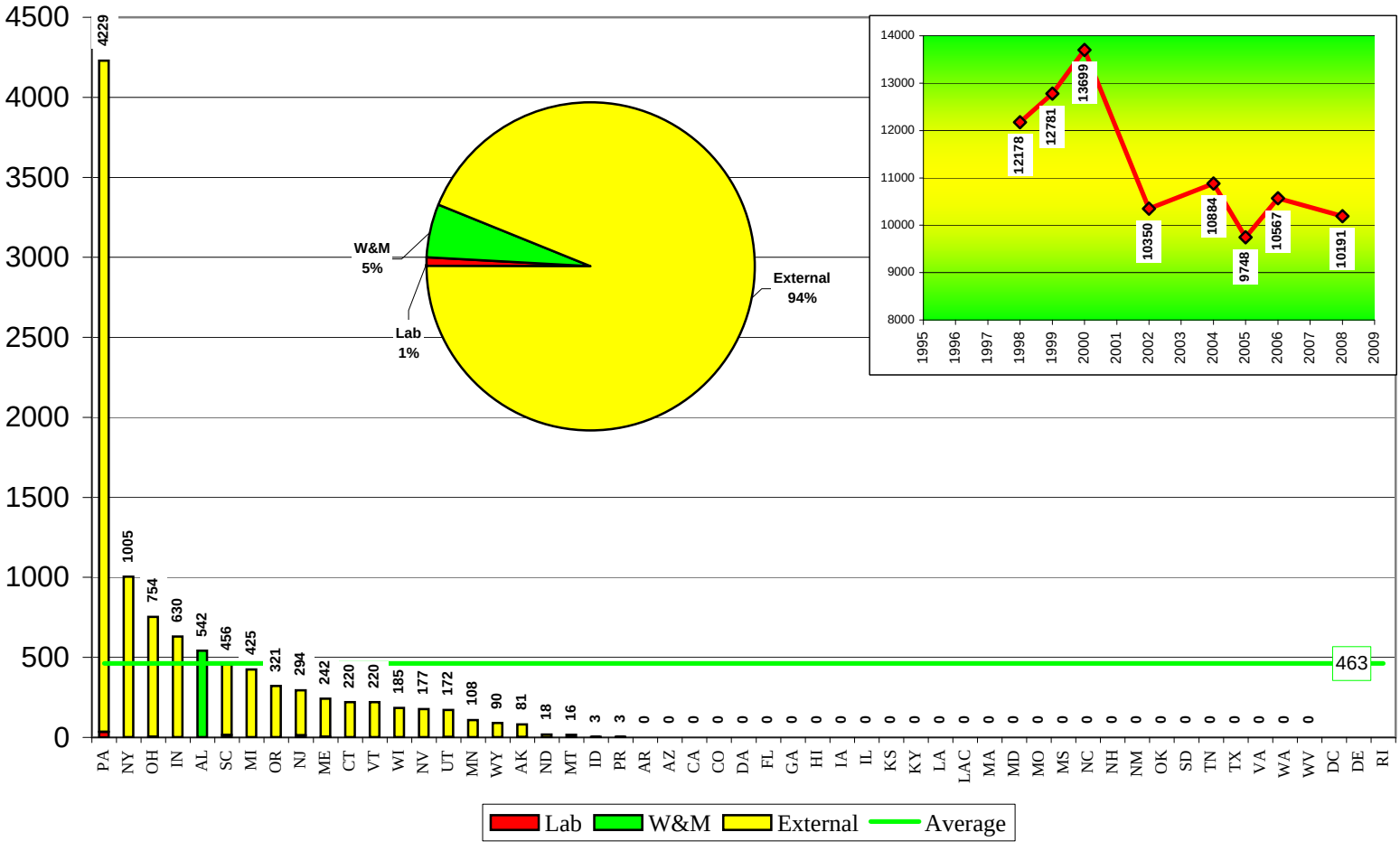
1 % of all wheel load weighers were calibrated for the laboratory.
5 % of all wheel load weighers were calibrated for weights and measures enforcement program.
94 % of all wheel load weighers were calibrated for external customers.

Pennsylvania laboratory performed 4,229 tests on wheel load weighers (41 % of the national total).

Wheel Load Weighers (2008)



10191 Total Devices (2008)



Lottery Balls for 2008

Description

The graphs on the following page represent the total number of lottery balls tested by the 50 reporting laboratories. The map graph gives a geographical distribution of these standards. Darker shading indicates more devices were tested. There are pie graphs located on the map for each individual lab and a larger pie graph that reflects the totals. The pie graphs provide a breakdown into the customer categories of Lab, W&M, and External. The bar graph at the bottom of the page shows the same breakdown along with the total number of devices tested by each laboratory. There is also a smaller line graph that reflects the totals from previous surveys.

Lab – work done for the internal use of the metrology laboratory.
W&M – work done for the weights and measures enforcement program.
External – work done for customers who do not fall into any of the above categories.

Findings

Of the 50 reporting laboratories, 10 labs tested a total of 42,553 lottery balls.

Comparison of previous surveys

	# Labs Reporting Tests on Lottery Balls	Total Devices	Lab Average	Change using Lab Average
1999	9	19,982	2,220	--
2000	13	24,702	1,900	- 14 %
2002	11	35,818	3,256	+ 71 %
2004	11	40,939	3,722	+ 14 %
2005	9	47,920	5,324	+ 43 %
2006	9	41,068	4,563	- 14 %
2008	10	42,553	4,255	- 7 %

Notes and Comments

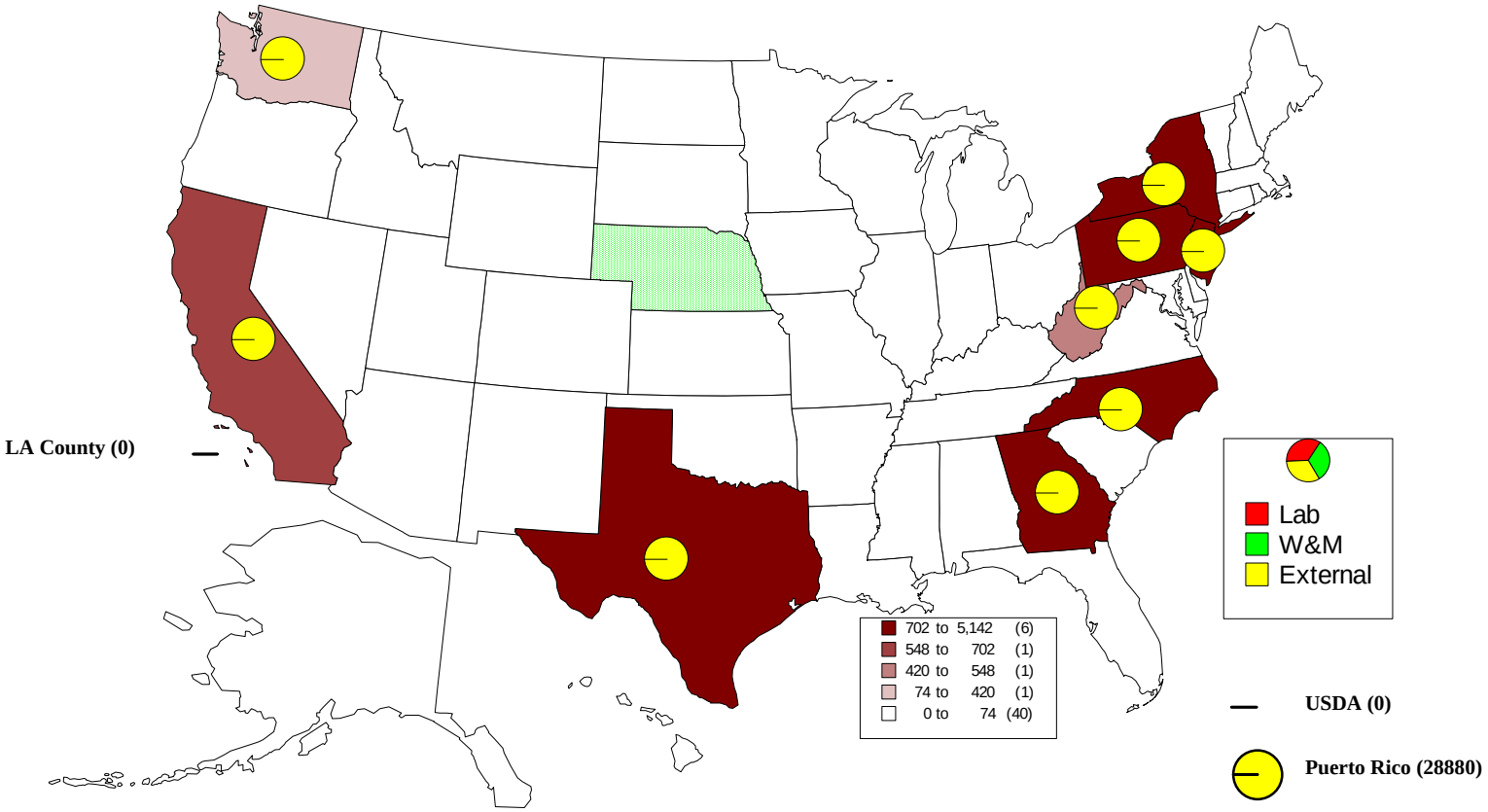
0 % of all lottery balls were calibrated for the laboratory.
0 % of all lottery balls were calibrated for weights and measures enforcement program.
100 % of all lottery balls were calibrated for external customers.

Puerto Rico laboratory performed 28,880 tests on lottery balls (68 % of the national total).

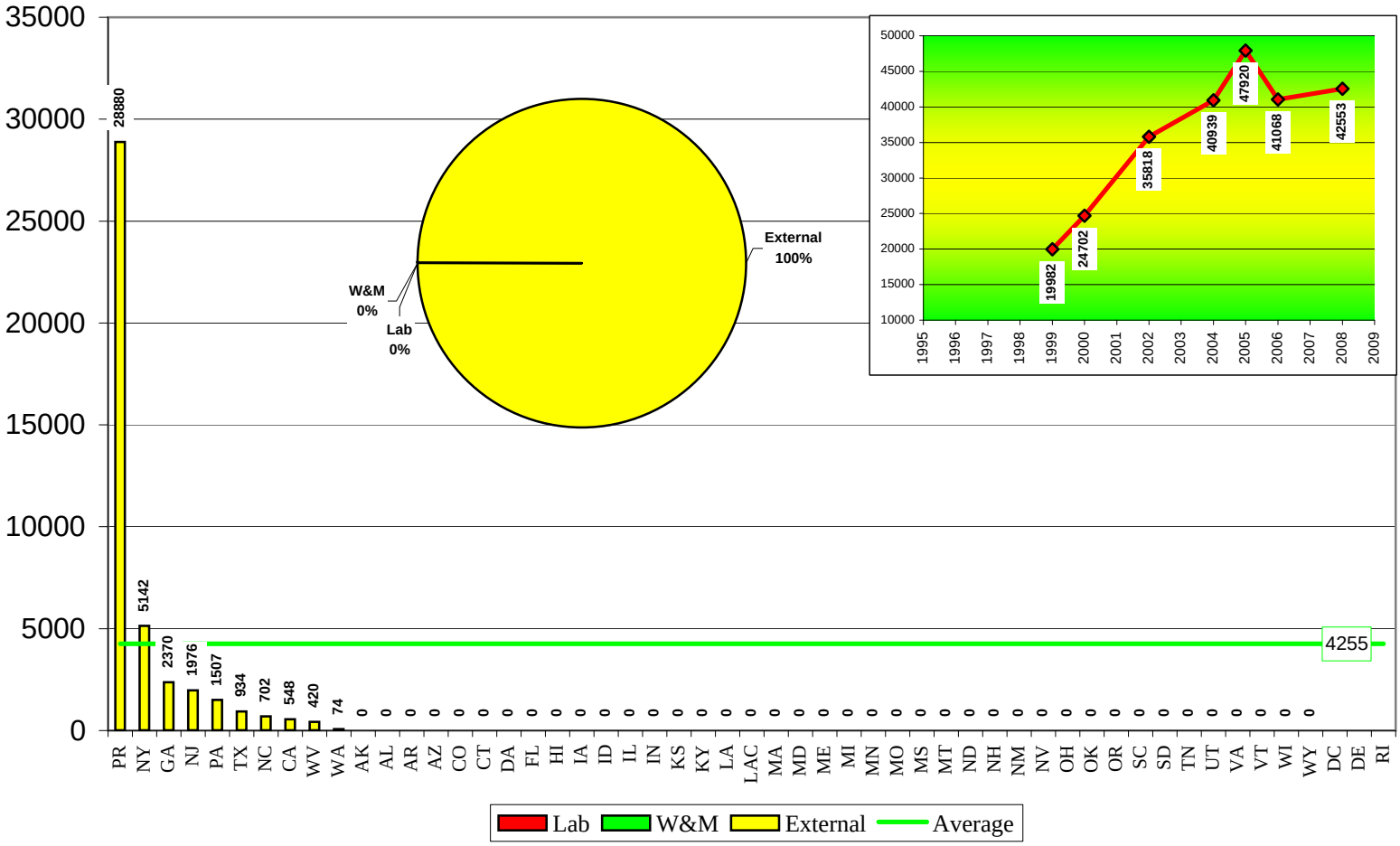
A supplemental question on lottery balls asked what characteristics were tested.

1 laboratory tested diameters only.
4 laboratories tested mass only.
1 laboratory tested mass and condition (cracks)
4 laboratories tested the diameters and mass.

Lottery Balls (2008)



42553 Total Devices (2008)



Summary of "Other Tests" for 2008

Description

The category "Other Tests" was for tests performed by the metrology laboratory that did not fit into any of the listed categories in the survey.

The graphs on the following page represent the total number of "Other Tests" performed by 18 reporting laboratories. The pie graph provides a further breakdown into the following categories:

Hydrometers	1 laboratory [VT]	2,710 tests
Filters-EPA	1 laboratory [ME]	3,024 tests
Speed Detection †	1 laboratory [AK]	439 tests
Scales	6 laboratories [CT, NJ, OH, WY, PR, WI]	317 tests
Special Linear/Dimensional	2 laboratories [ME, NJ]	154 tests
Special Mass	5 laboratories [NJ, PR, NC, NV, NH]	124 tests
Special Volume	3 laboratories [AZ, OR, MI]	81 tests
Electrical	2 laboratory [AK, CA]	65 tests
Railroad Test Cars	4 laboratories [WY, OR, MN, MO]	55 tests
Density	2 laboratory [ME, MI]	7 tests
Parking Meters	1 laboratories [PR]	4 tests

† *(Includes electronic testing of the radar unit, not just calibration of the tuning forks)*

The bar graph at the bottom of the page shows the same breakdown in categories along with the total number of "Other Tests" performed above each laboratory.

Findings

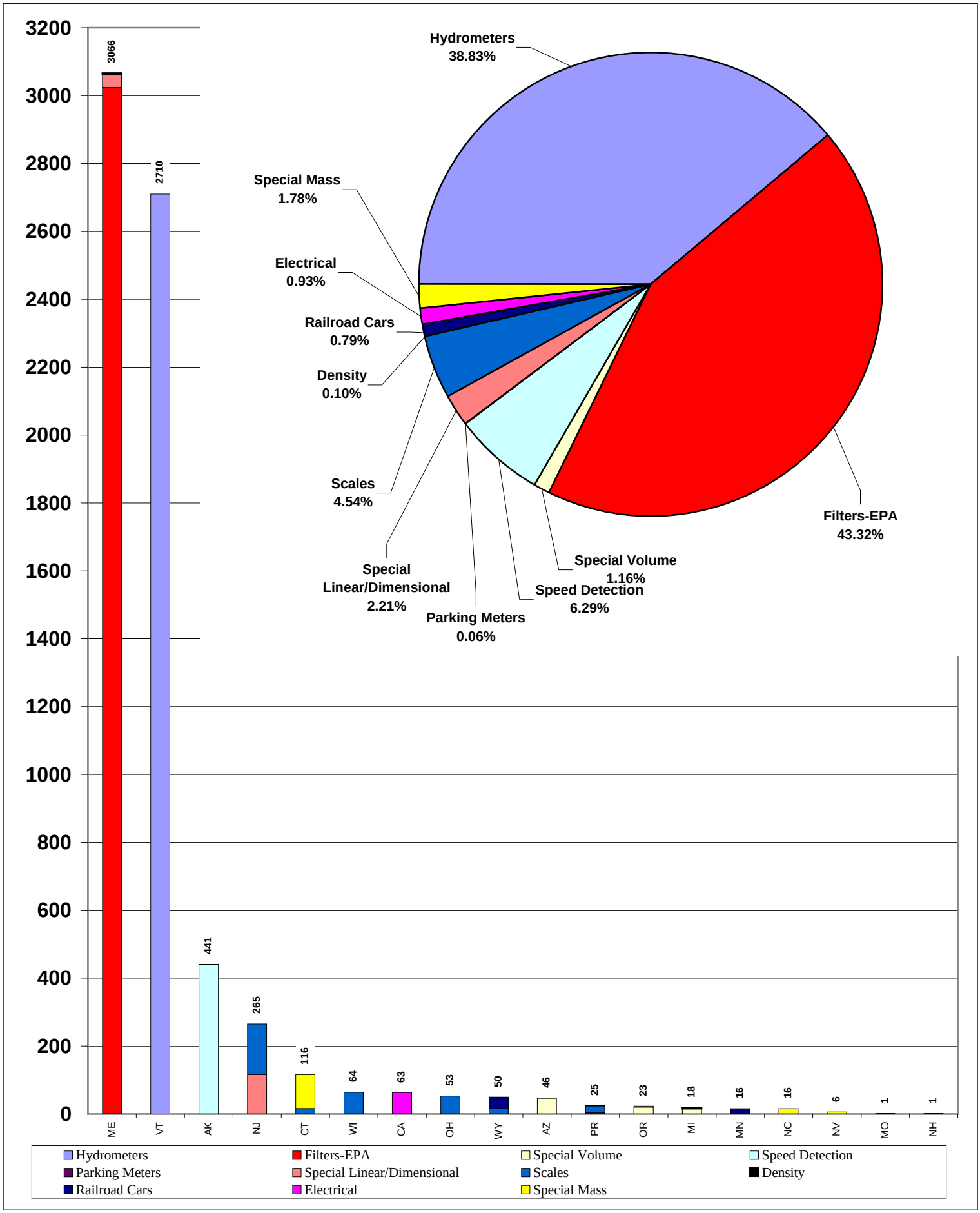
Comparison of previous surveys

	# Labs Reporting Other Tests	Total Devices Tested	Lab Average	Change using Lab Average
1999	24	25,350	1,056	--
2000	26	30,199	1,162	+ 10 %
2002	24	42,282	1,762	+ 52 %
2004	22	6,006	273	- 85 %
2005	16	5,980	374	+ 37 %
2006	15	5,728	382	+ 2 %
2008	18	6,980	388	+ 2 %

In 2004, the main reason for the decrease in the number of 'Other Tests' is that 'Lottery Balls' and 'LPG Provers' have been moved to separate categories.

Summary of Other Tests (2008)

6980 Total Devices



Laboratory Customers for 2008

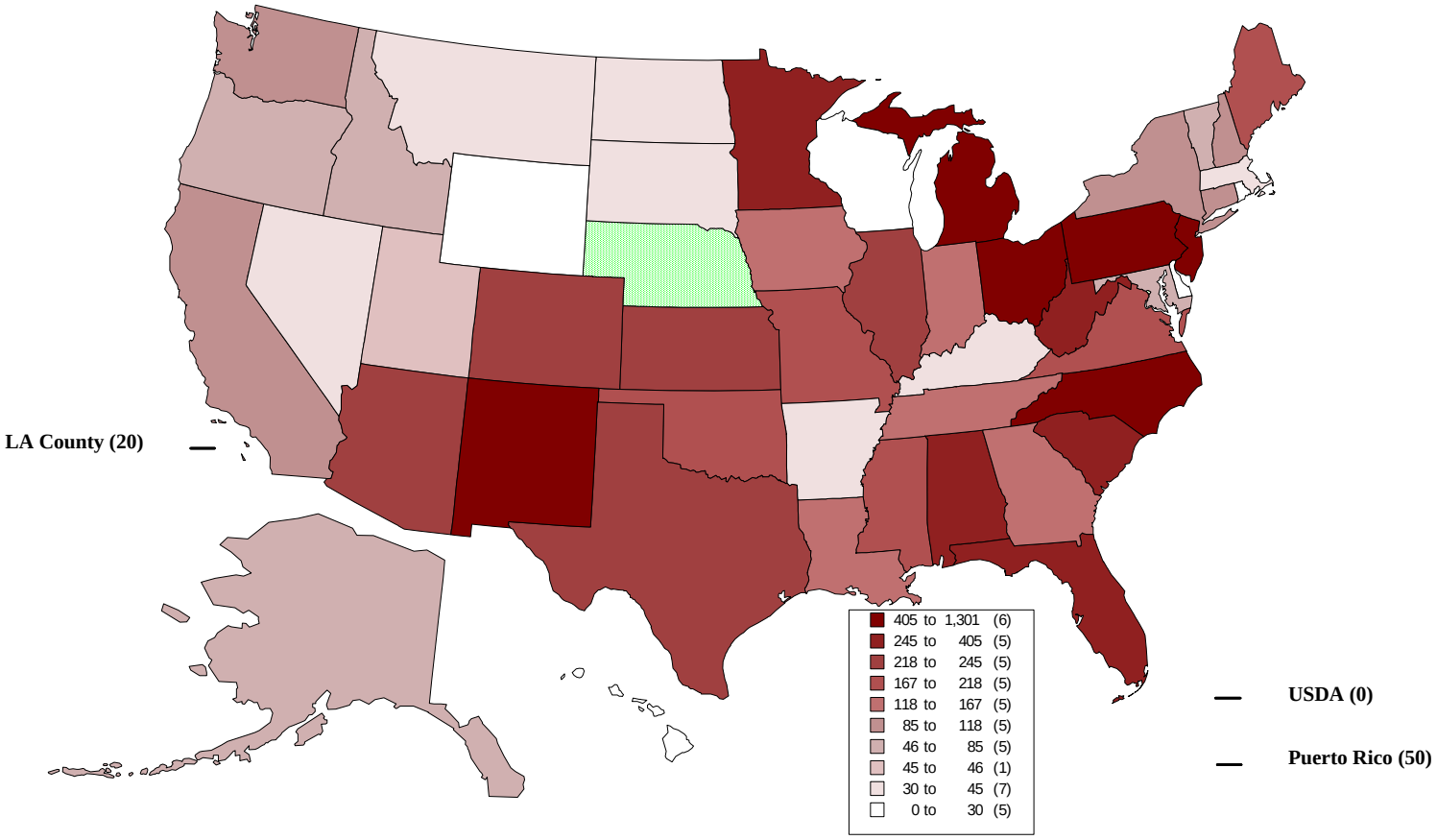
Description

The graphs on the following page represent the total number of laboratory customers served by the 50 reporting laboratories. The map graph gives a geographical distribution of these customers. Darker shading indicates more customers. The bar graph at the bottom of the page shows the same breakdown along with the total number of customers served by each laboratory. There is also a smaller line graph indicating the totals from previous surveys.

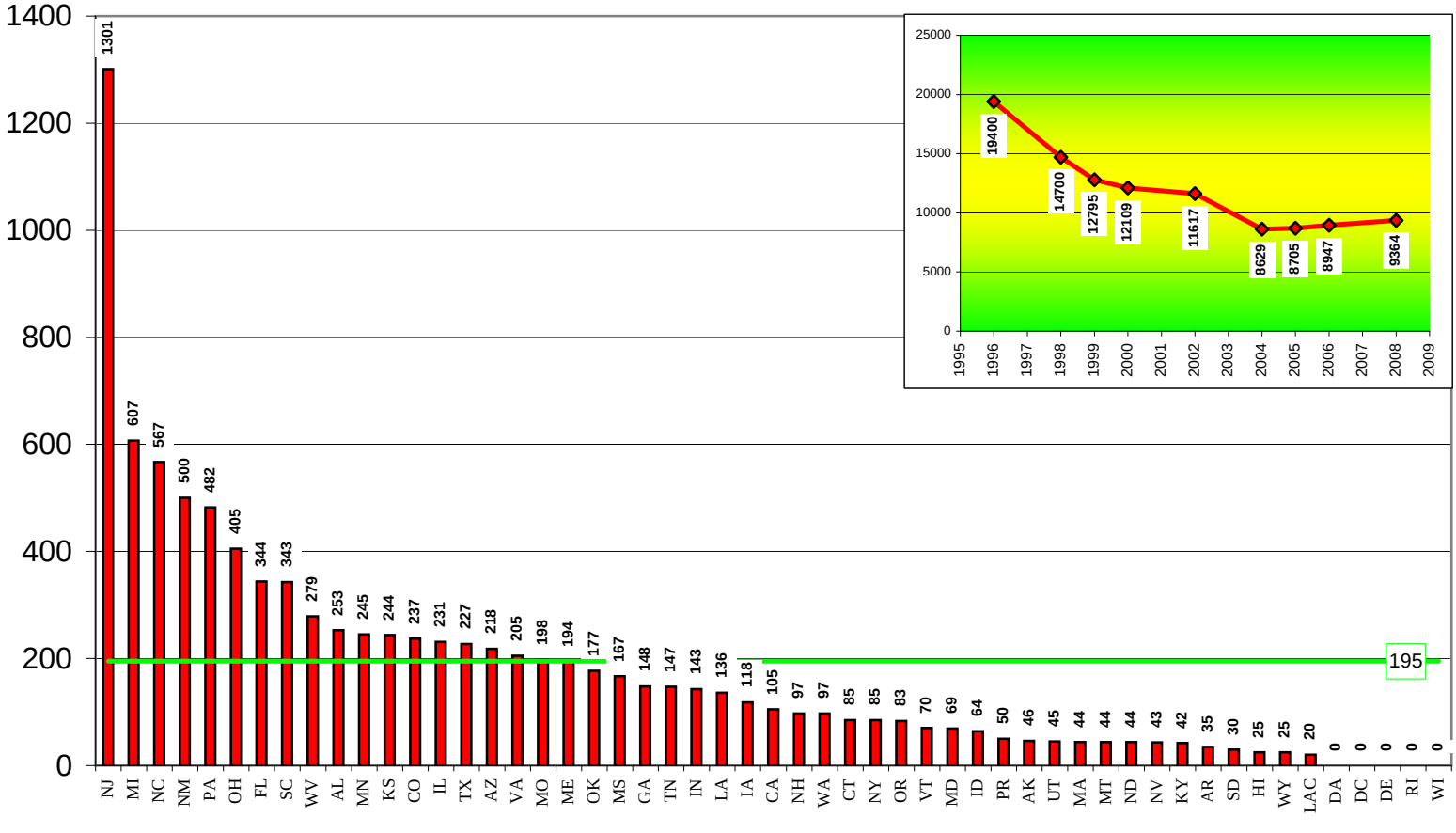
Findings

Of the 50 reporting laboratories, 48 labs served a total of 9,364 customers.

Lab Customers (2008)



9364 Total Customers (2008)



Laboratory Facilities for 2008

Description

Size of Laboratory Facility:

The top graph on the next page represents the size of the laboratory facility in square feet as reported by each laboratory. Office square footage is yellow and laboratory square footage is blue.

Age of Laboratory Facility:

The bottom graph on the next page represents the age of the laboratory facility as reported by each laboratory.

Notes and Comments

Size of Laboratory Facility:

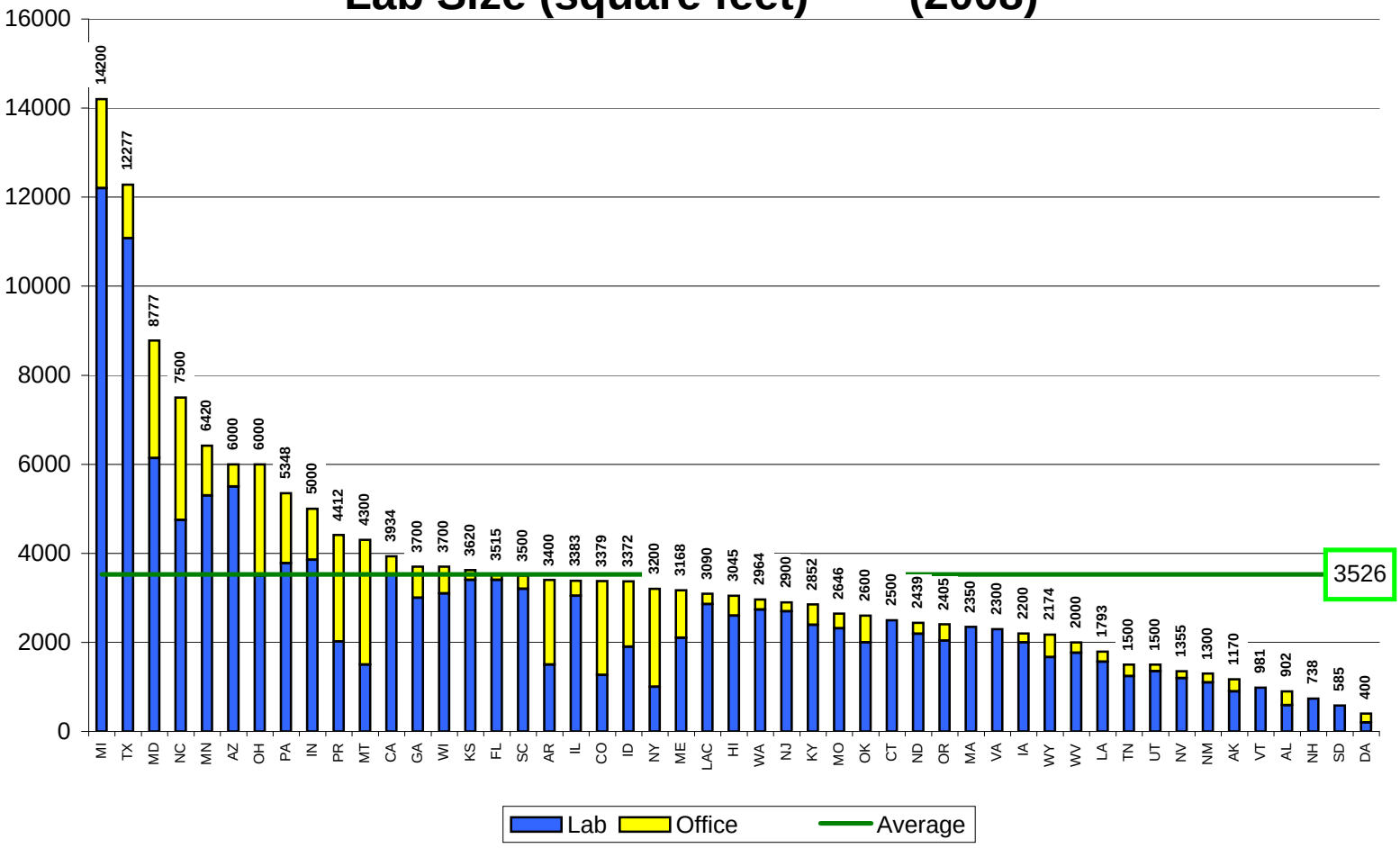
Average	3,526 sq ft	(772 sq ft office space) (2,754 sqft laboratory space)
Maximum	14,200 sq ft	
Minimum	400 sq ft	

Age of Laboratory Facility:

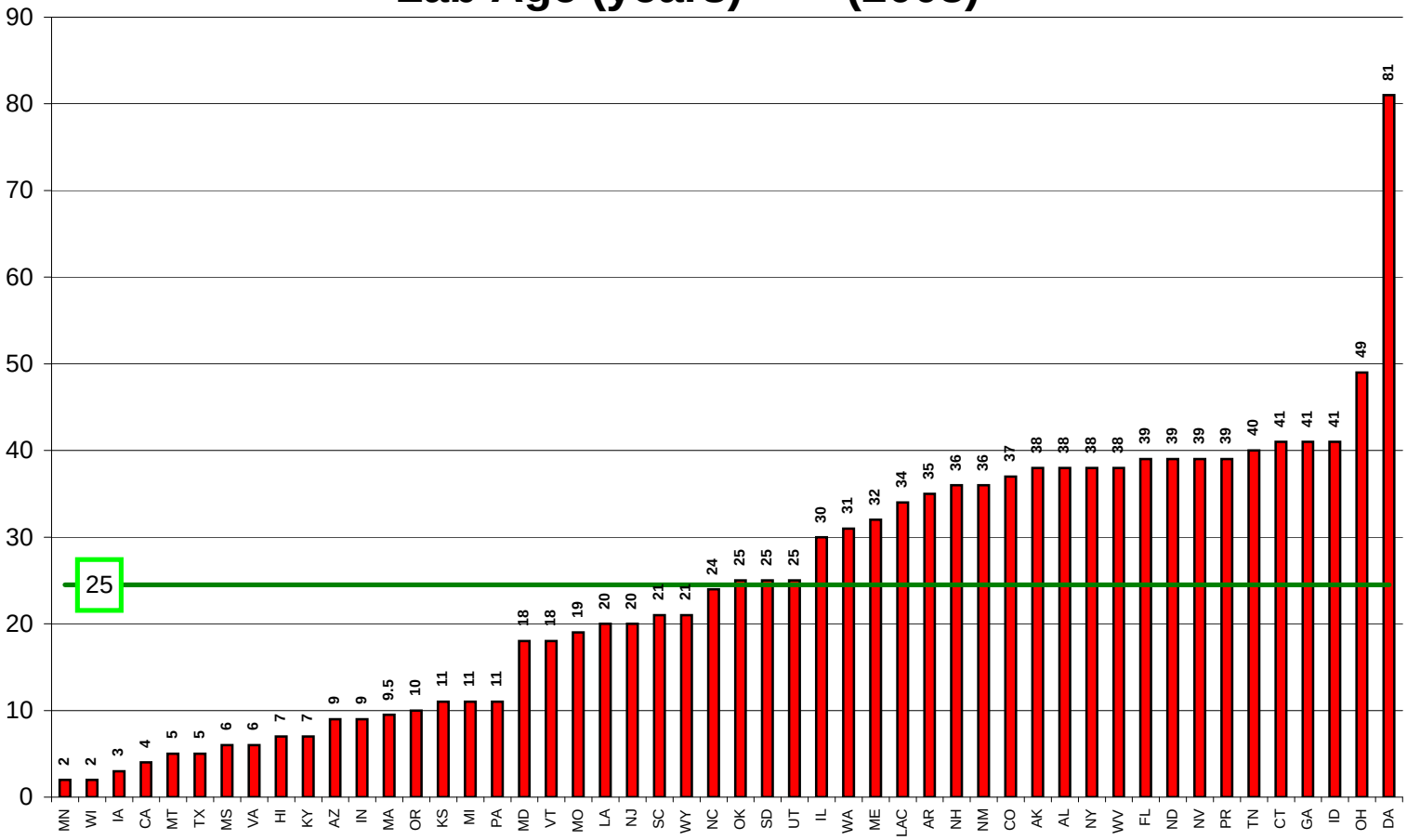
Average	25 years
Maximum	81 years
Minimum	2 year

NOTE: The age of laboratories that are noted here may be somewhat misleading due to the fact that a number of laboratories have had significant renovations to their facility. Many renovations included significant updates to environmental controls and improved security or limited access.

Lab Size (square feet) (2008)



Lab Age (years) (2008)



Fees for 2008

Description

This information would be valuable for those labs that are attempting to implement fees for the first time and also to those labs that may be in the process of amending their fees. The next seven pages contain eight graphs. In the past surveys the fee schedule or hourly rate that each lab provided was used to calculate the fees for certain routine work. However a problem arises when using hourly rates. The time it takes to calibrate a particular artifact will vary from state to state depending on weight handling equipment, balances, experience and number of employees. Another factor is that while one state may track the total time it takes to log in, unpack, test, re-pack, and log out an item, another state may only track the actual time required to complete the test. In an attempt to gain more accurate information, we asked each lab to quote the typical fee that they would charge for the various routine calibrations. The fees indicated are typical. Actual fees charged may differ from those indicated.

Oklahoma, North Carolina, and Georgia have provisions for charging double their normal fee for out-of-state customers.

Hawaii and Wyoming are the only active laboratories that do not charge fees. Hawaii is currently in the process of adopting fees.

Mass Echelon I - Class 0 Precision Weight Kit for 2008

Description

The top graph represents the fees charged for calibrating a Class 0 precision weight kit containing 21 individual weights from 100 gram down to 1 milligram using Mass Echelon I procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2004	15	$617.87	--
2006	16	$758.75	+ 23 %
2008	14	$700.07	- 8 %

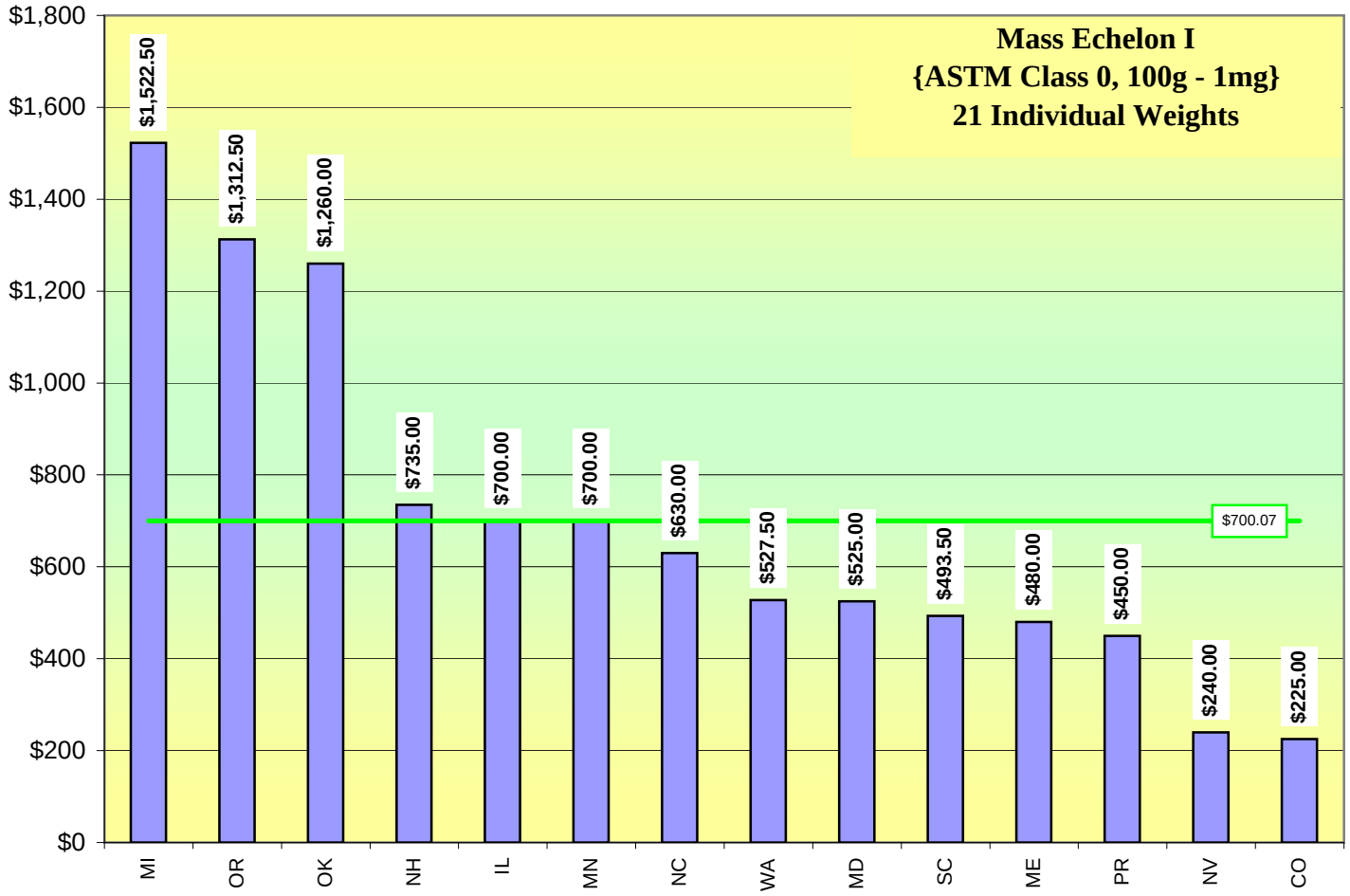
Mass Echelon II - Class 2 Precision Weight Kit for 2008

Description

The bottom graph represents the fees charged for calibrating a Class 2 precision weight kit that contains 21 individual weights from 100 gram down to 1 milligram using Mass Echelon II procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2000	33	$334.00	--
2002	39	$414.32	+ 24 %
2004	30	$431.43	+ 4 %
2006	31	$482.87	+ 12 %
2008	29	$496.18	+ 3 %


Mass Echelon I
{ASTM Class 0, 100g - 1mg}
21 Individual Weights
$1,800
$1,600
$1,400
$1,200
$1,000
$800
$600
$400
$200
$0
$1,522.50
$1,312.50
$1,260.00
$735.00
$700.00
$700.00
$630.00
$527.50
$525.00
$493.50
$480.00
$450.00
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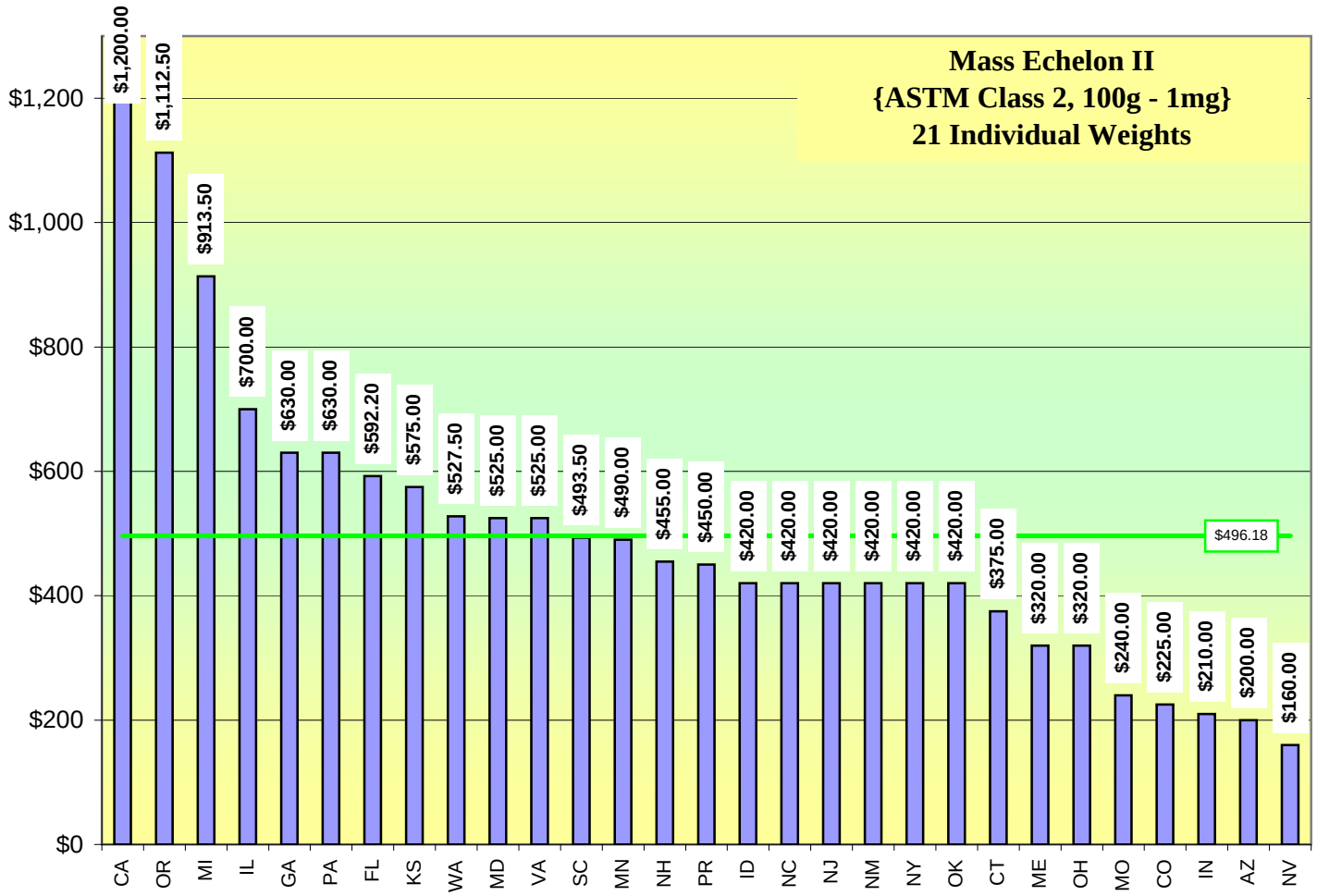
PR
NV
CO


Mass Echelon II
{ASTM Class 2, 100g - 1mg}
21 Individual Weights
$1,200
$1,000
$800
$600
$400
$200
$0
$1,200.00
$1,112.50
$913.50
$700.00
$630.00
$630.00
$592.20
$575.00
$527.50
$525.00
$525.00
$493.50
$490.00
$455.00
$450.00
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$420.00
$420.00
$420.00
$375.00
$320.00
$320.00
$240.00
$225.00
$210.00
$200.00
$160.00
$496.18
CA
OR
MI
IL
GA
PA
FL
KS
WA
MD
VA
SC
MN
NH
PR
ID
NC
NJ
NM
NY
OK
CT
ME
OH
MO
CO
IN
AZ
NV

Mass Echelon III - Class F Weight Kit for 2008
{31 lb kit} 22 Individual Weights

Description

The top graph represents the fees charged for calibrating a Class F weight kit that contains 22 individual weights using Mass Echelon III procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2000	36	$77.00	--
2002	41	$94.99	+ 23 %
2004	38	$121.13	+ 28 %
2006	42	$135.64	+ 12 %
2008	44	$156.93	+ 15 %

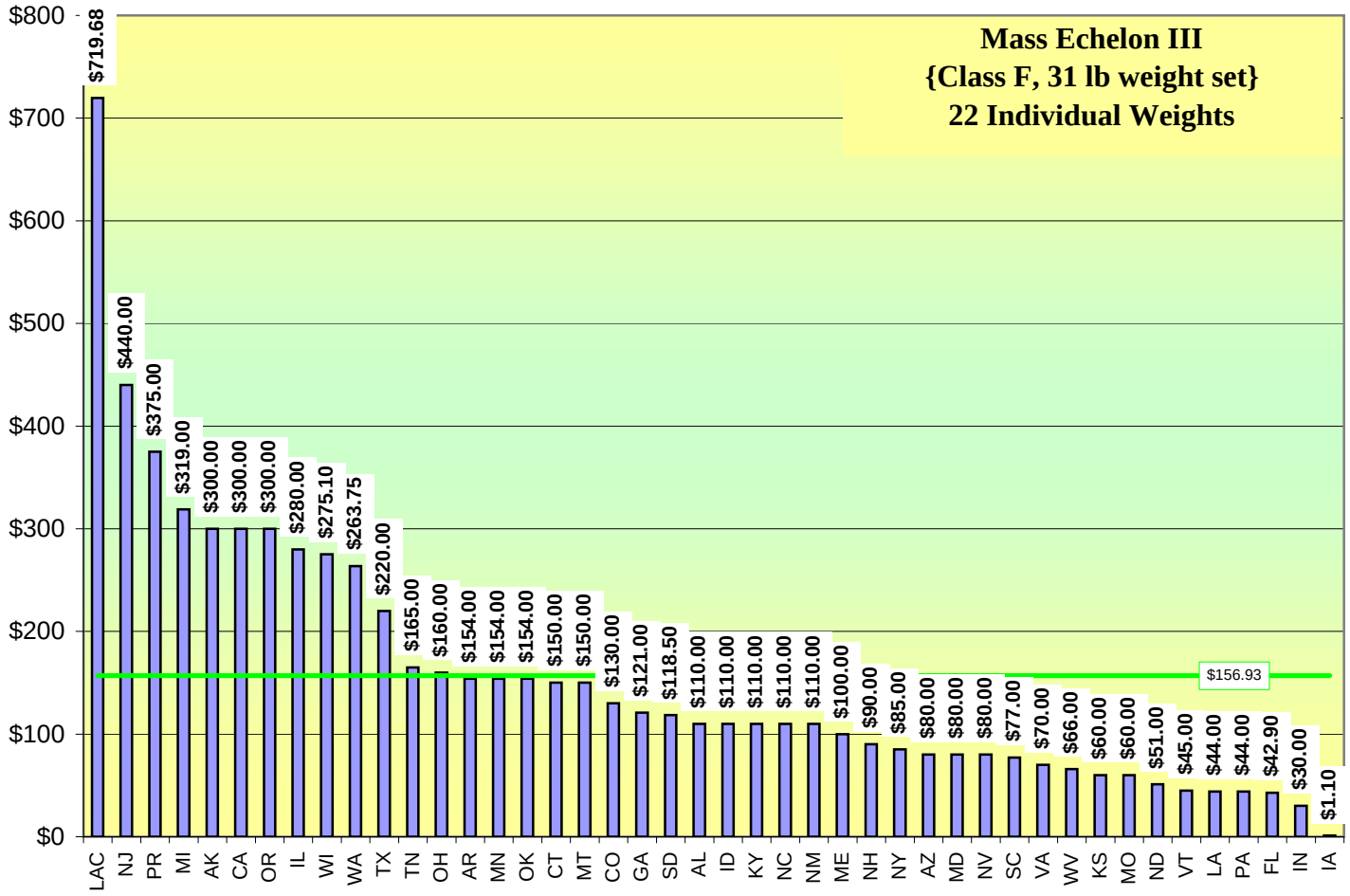
Mass Echelon III - 5000 lb Weight Cart for 2008

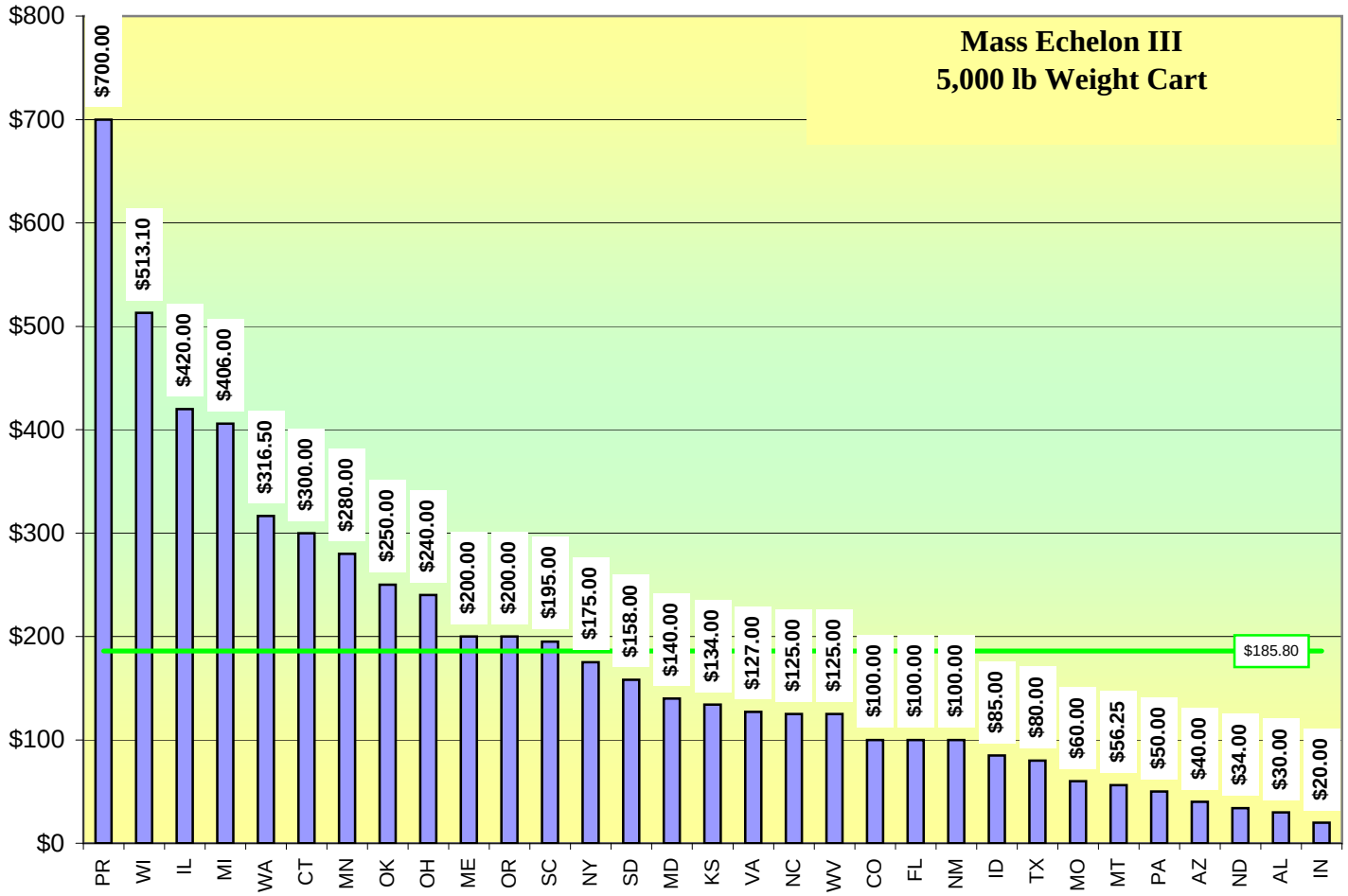
Description

The bottom graph represents the fees charged for calibrating a 5000 lb weight cart using Mass Echelon III procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2004	28	$163.27	--
2006	31	$205.74	+ 26 %
2008	31	185.80	- 10 %


Mass Echelon III
{Class F, 31 lb weight set}
22 Individual Weights
$800
$700
$600
$500
$400
$300
$200
$100
$0
$719.68
$440.00
$375.00
$319.00
$300.00
$300.00
$300.00
$280.00
$275.10
$263.75
$220.00
$165.00
$160.00
$154.00
$154.00
$154.00
$150.00
$150.00
$130.00
$121.00
$118.50
$110.00
$110.00
$110.00
$110.00
$110.00
$100.00
$90.00
$85.00
$80.00
$80.00
$80.00
$77.00
$70.00
$66.00
$60.00
$60.00
$51.00
$45.00
$44.00
$44.00
$42.90
$30.00
$1.10
$156.93
LAC
NJ
PR
MI
AK
CA
OR
IL
WI
WA
TX
TN
OH
AR
MN
OK
CT
MT
CO
GA
SD
AL
ID
KY
NC
NM
ME
NH
NY
AZ
MD
NV
SC
VA
WV
KS
MO
ND
VT
LA
PA
FL
IN
IA


Mass Echelon III
5,000 lb Weight Cart
$800
$700
$600
$500
$400
$300
$200
$100
$0
$700.00
$513.10
$420.00
$406.00
$316.50
$300.00
$280.00
$250.00
$240.00
$200.00
$200.00
$195.00
$175.00
$158.00
$140.00
$134.00
$127.00
$125.00
$125.00
$100.00
$100.00
$100.00
$85.00
$80.00
$60.00
$56.25
$50.00
$40.00
$34.00
$30.00
$20.00
$185.80
PR
WI
IL
MI
WA
CT
MN
OK
OH
ME
OR
SC
NY
SD
MD
KS
VA
NC
WV
CO
FL
NM
ID
TX
MO
MT
PA
AZ
ND
AL
IN

Mass Echelon III - Class F Typical Scale Truck for 2008
24 – 1000 lb (5 adjusted)
20 – 50 lb (5 adjusted)
2 – 31 lb Weight Kits (22 weights each)

Description

The top graph represents the fees charged for calibrating a typical scale truck using Mass Echelon III procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2004	39	$1,050.56	--
2006	43	$1,060.77	+ 1 %
2008	42	$1,300.30	+ 23 %

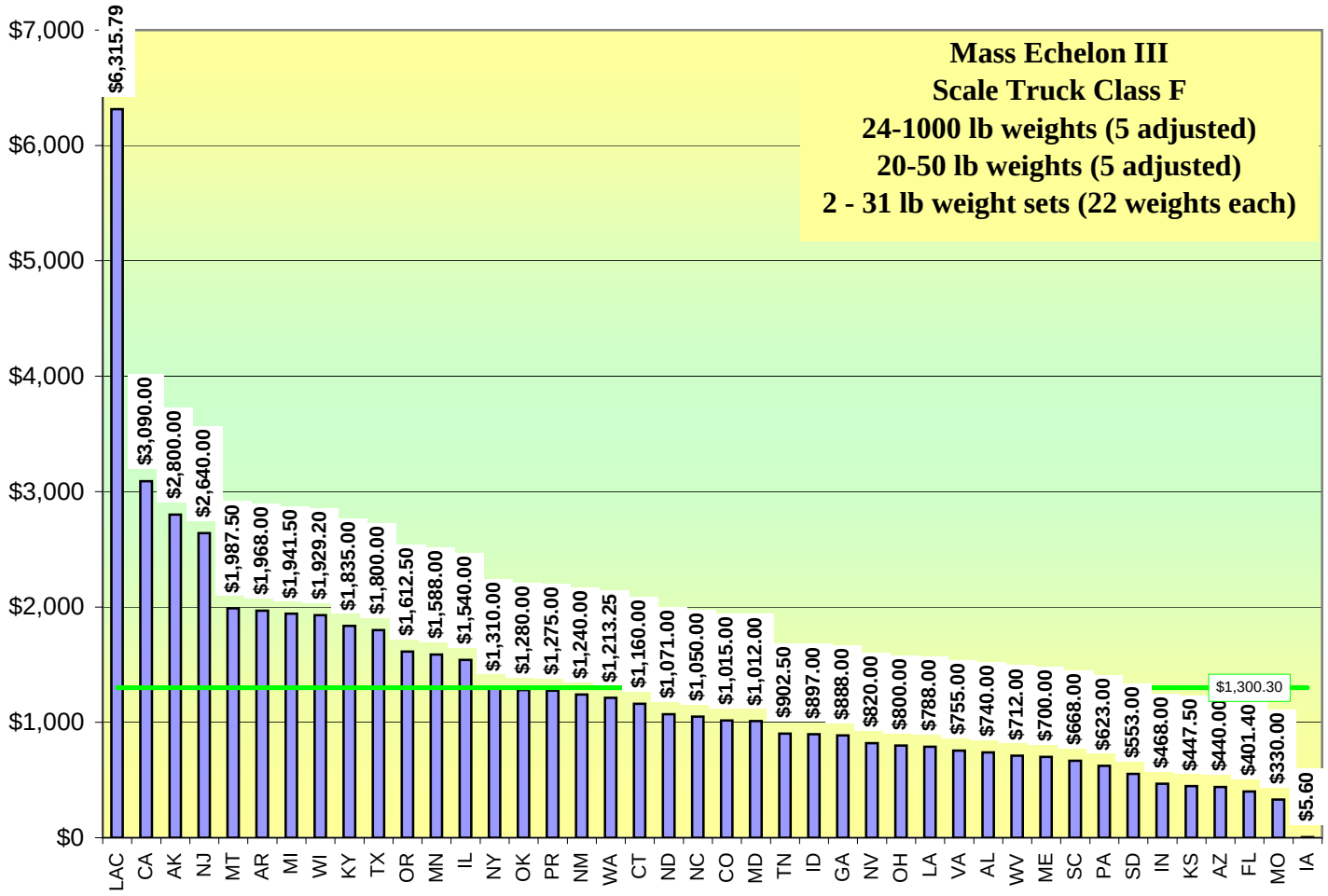
100 foot Tape for 2008
19 Points Tested

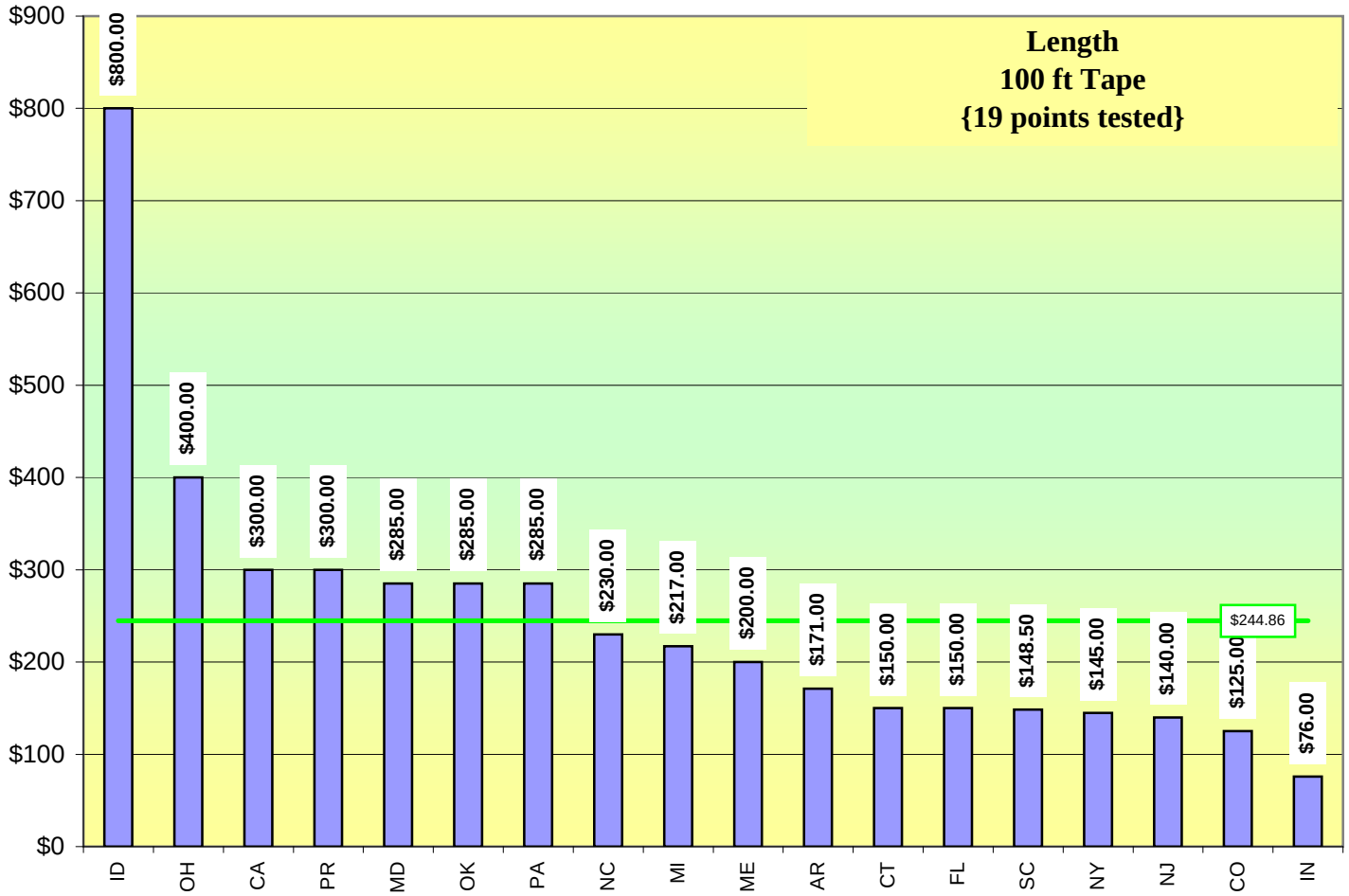
Description

The bottom graph represents the fees charged for a 100 foot steel tape that contained 19 points to be calibrated.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2000	33	$133.00	--
2002	36	$173.07	+ 30 %
2004	22	$250.89	+ 45 %
2006	22	$261.23	+ 4 %
2008	18	$244.86	- 6 %


Mass Echelon III
Scale Truck Class F
24-1000 lb weights (5 adjusted)
20-50 lb weights (5 adjusted)
2 - 31 lb weight sets (22 weights each)
$7,000
$6,000
$5,000
$4,000
$3,000
$2,000
$1,000
$0
$1,300.30
LAC $6,315.79
CA $3,090.00
AK $2,800.00
NJ $2,640.00
MT $1,987.50
AR $1,968.00
MI $1,941.50
WI $1,929.20
KY $1,835.00
TX $1,800.00
OR $1,612.50
MN $1,588.00
IL $1,540.00
NY $1,310.00
OK $1,280.00
PR $1,275.00
NM $1,240.00
WA $1,213.25
CT $1,160.00
ND $1,071.00
NC $1,050.00
CO $1,015.00
MD $1,012.00
TN $902.50
ID $897.00
GA $888.00
NV $820.00
OH $800.00
LA $788.00
VA $755.00
AL $740.00
WV $712.00
ME $700.00
SC $668.00
PA $623.00
SD $553.00
IN $468.00
KS $447.50
AZ $440.00
FL $401.40
MO $330.00
IA $5.60


Length
100 ft Tape
{19 points tested}
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
$244.86
ID $800.00
OH $400.00
CA $300.00
PR $300.00
MD $285.00
OK $285.00
PA $285.00
NC $230.00
MI $217.00
ME $200.00
AR $171.00
CT $150.00
FL $150.00
SC $148.50
NY $145.00
NJ $140.00
CO $125.00
IN $76.00

5 Gallon Test Measure – Volume Transfer for 2008

Description

The top graph represents the fees charged for calibrating a 5 gallon test measure using volume-transfer procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2000	35	$35.00	--
2002	41	$41.46	+ 18 %
2004	39	$42.06	+ 1 %
2006	43	$43.93	+ 4 %
2008	43	$56.89	+ 30 %

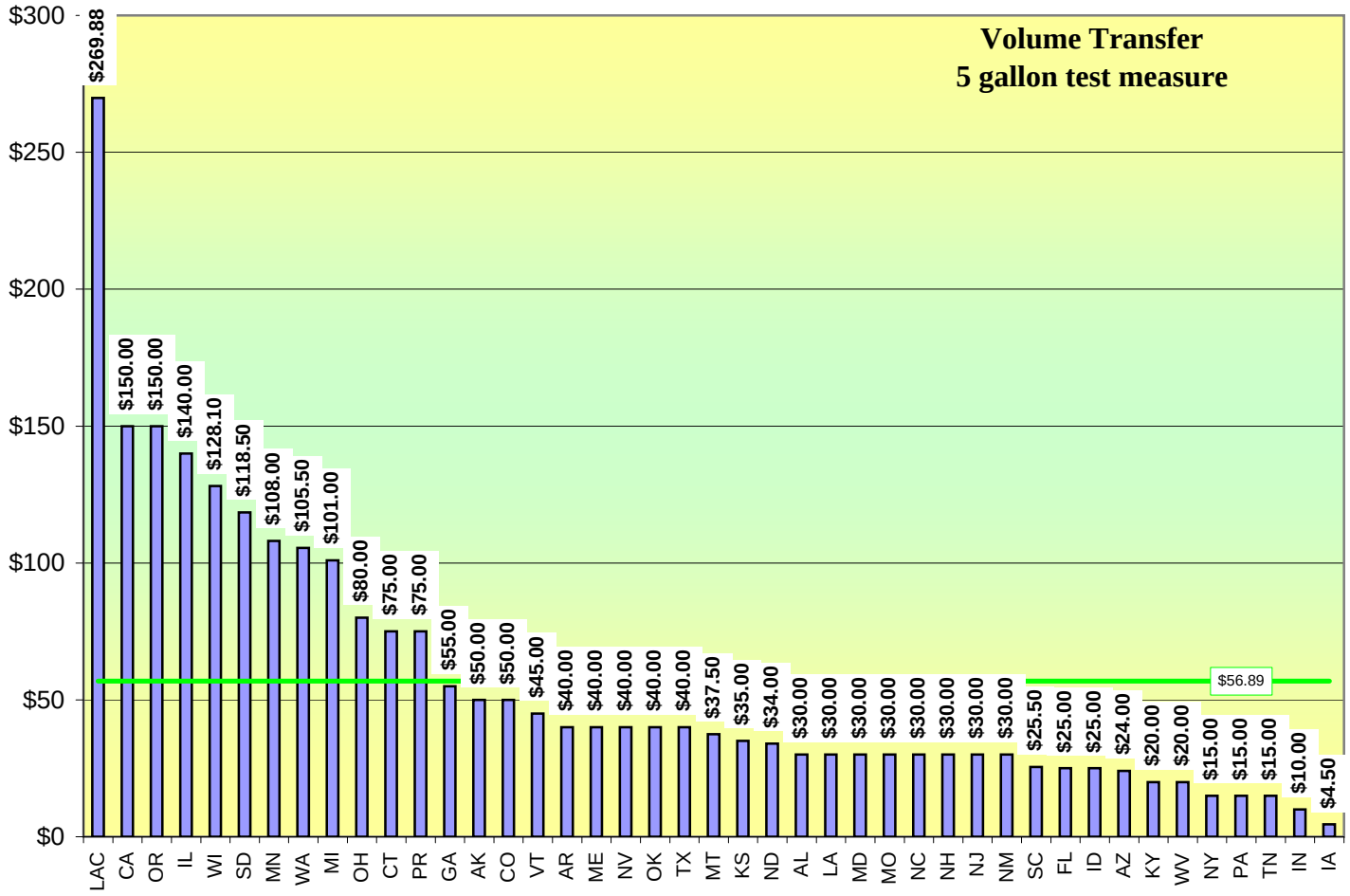
5 Gallon Test Measure – Volume Gravimetric for 2008

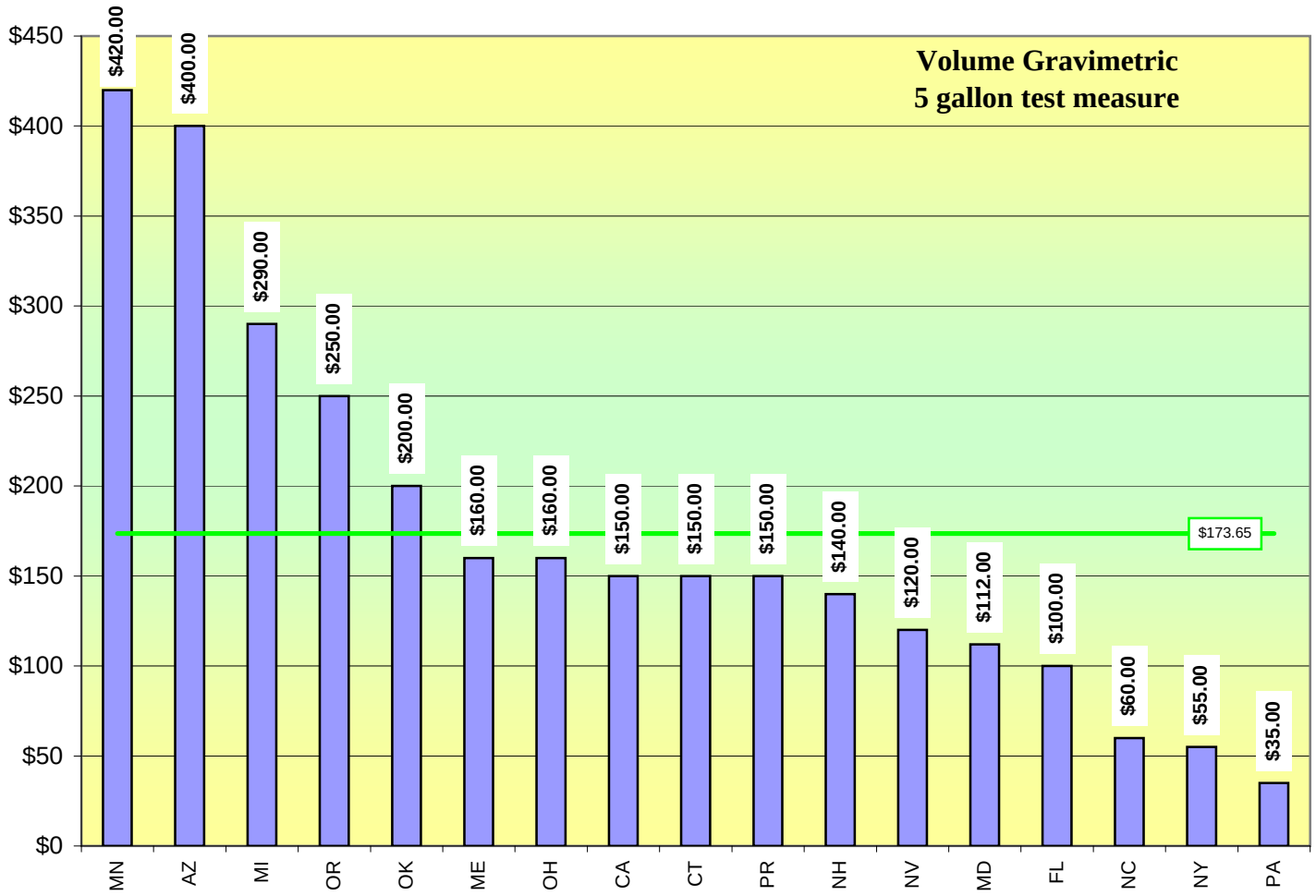
Description

The bottom graph represents the fees charged for calibrating a 5 gallon test measure using volume-gravimetric procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2006	20	$177.95	--
2008	17	$173.65	- 2 %


Volume Transfer
5 gallon test measure
$300
$250
$200
$150
$100
$50
$0
$269.88
$150.00
$150.00
$140.00
$128.10
$118.50
$108.00
$105.50
$101.00
$80.00
$75.00
$75.00
$55.00
$50.00
$50.00
$45.00
$40.00
$40.00
$40.00
$40.00
$40.00
$37.50
$35.00
$34.00
$30.00
$30.00
$30.00
$30.00
$30.00
$30.00
$30.00
$30.00
$25.50
$25.00
$25.00
$24.00
$20.00
$20.00
$15.00
$15.00
$15.00
$10.00
$4.50
$56.89
LAC
CA
OR
IL
WI
SD
MN
WA
MI
OH
CT
PR
GA
AK
CO
VT
AR
ME
NV
OK
TX
MT
KS
ND
AL
LA
MD
MO
NC
NH
NJ
NM
SC
FL
ID
AZ
KY
WV
NY
PA
TN
IN
IA


Volume Gravimetric
5 gallon test measure
$450
$400
$350
$300
$250
$200
$150
$100
$50
$0
$420.00
$400.00
$290.00
$250.00
$200.00
$160.00
$160.00
$150.00
$150.00
$150.00
$140.00
$120.00
$112.00
$100.00
$60.00
$55.00
$35.00
$173.65
MN
AZ
MI
OR
OK
ME
OH
CA
CT
PR
NH
NV
MD
FL
NC
NY
PA

100 Gallon Prover – Volume Transfer for 2008

Description

The top graph represents the fees charged for calibrating a 100 gallon prover using volume-transfer calibration procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2000	35	$108.00	--
2002	40	$125.19	+ 16 %
2004	35	$138.73	+ 11 %
2006	37	$145.32	+ 5 %
2008	36	$191.83	+ 32 %

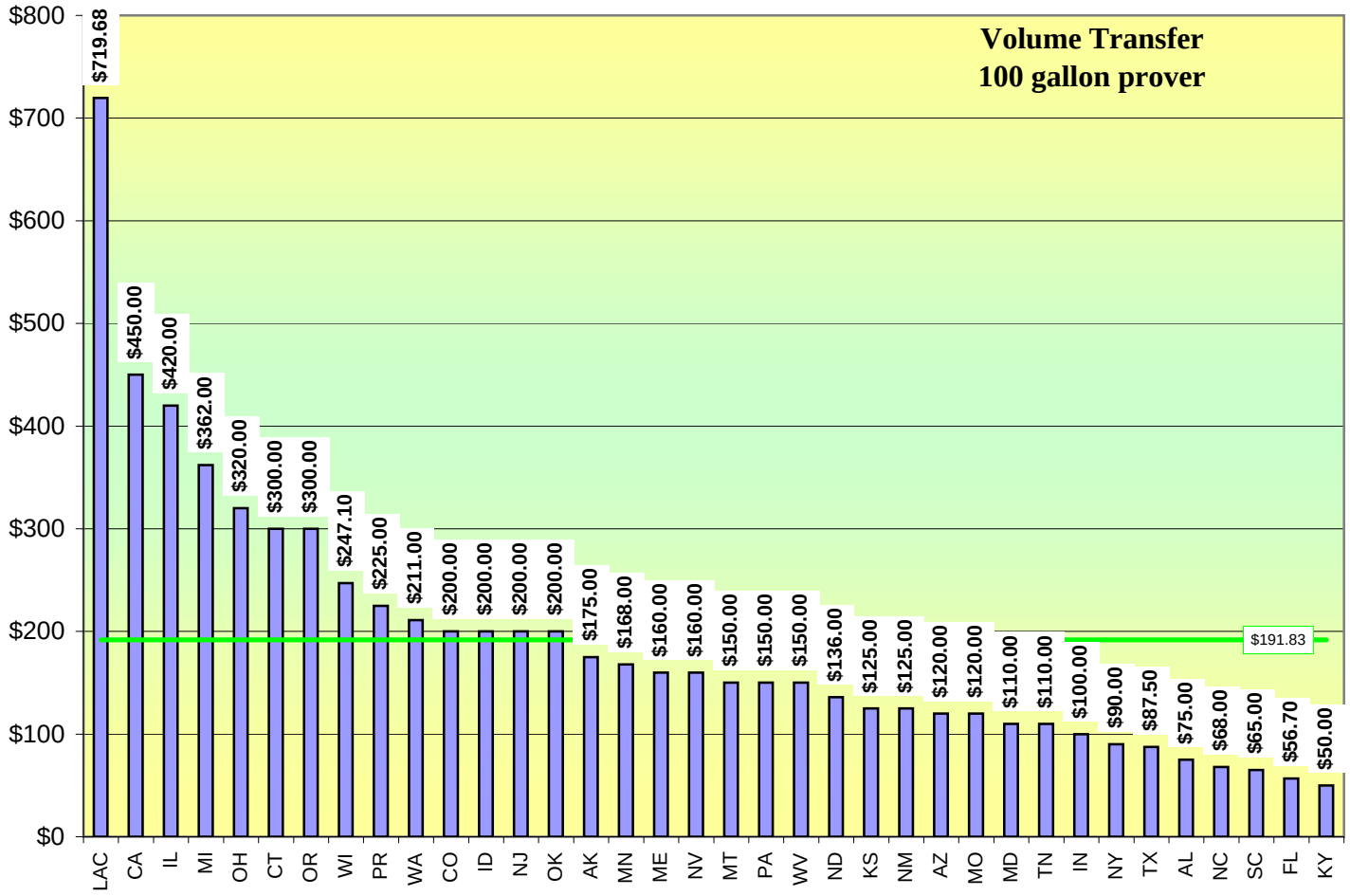
100 Gallon Prover – Volume Gravimetric for 2008

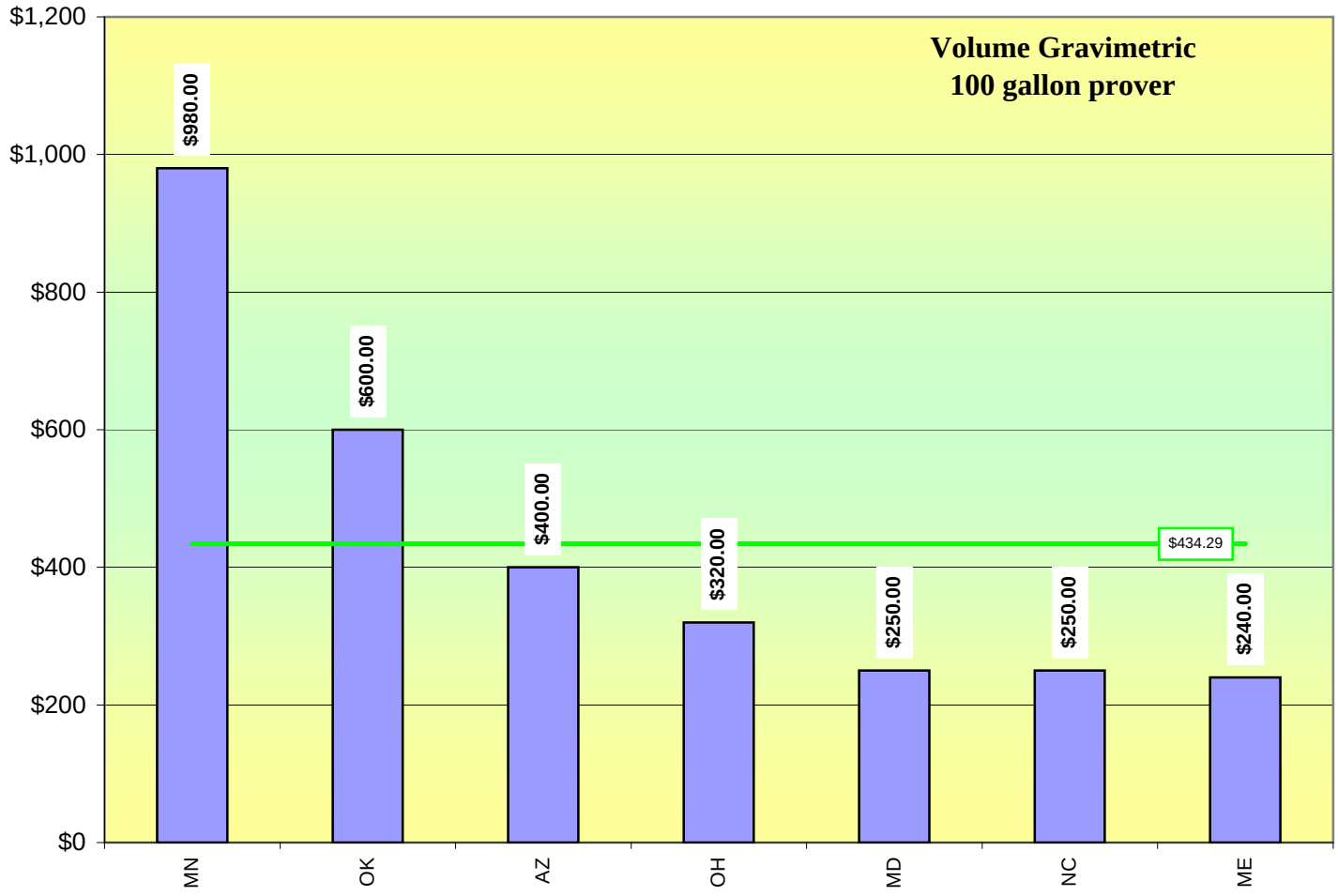
Description

The bottom graph represents the fees charged for calibrating a 100 gallon prover using volume-gravimetric calibration procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2006	4	$265.00	--
2008	7	$434.29	+ 64 %


Volume Transfer
100 gallon prover
$800
$700
$600
$500
$400
$300
$200
$100
$0
$719.68
$450.00
$420.00
$362.00
$320.00
$300.00
$300.00
$247.10
$225.00
$211.00
$200.00
$200.00
$200.00
$200.00
$175.00
$168.00
$160.00
$160.00
$150.00
$150.00
$150.00
$136.00
$125.00
$125.00
$120.00
$120.00
$110.00
$110.00
$100.00
$90.00
$87.50
$75.00
$68.00
$65.00
$56.70
$50.00
$191.83
LAC
CA
IL
MI
OH
CT
OR
WI
PR
WA
CO
ID
NJ
OK
AK
MN
ME
NV
MT
PA
WV
ND
KS
NM
AZ
MO
MD
TN
IN
NY
TX
AL
NC
SC
FL
KY


Volume Gravimetric
100 gallon prover
$1,200
$1,000
$800
$600
$400
$200
$0
$980.00
$600.00
$400.00
$320.00
$250.00
$250.00
$240.00
$434.29
MN
OK
AZ
OH
MD
NC
ME

20 Gallon SVP – Volume Transfer for 2008

Description

The top graph represents the fees charged for calibrating a 20 gallon SVP using volume-transfer calibration procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2006	3	$113.33	--
2008	2	$123.75	+ 9 %

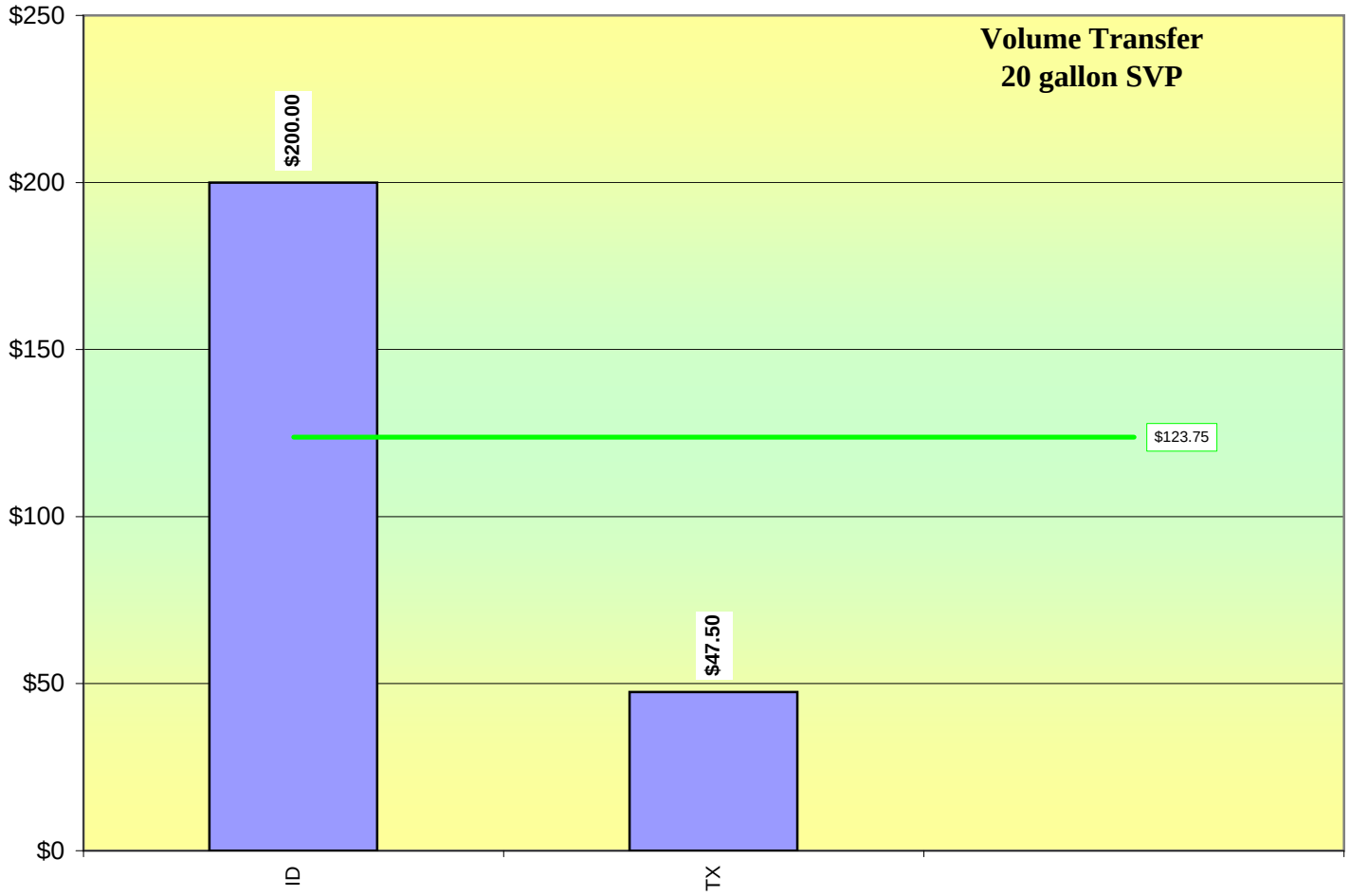
20 Gallon SVP – Volume Gravimetric for 2008

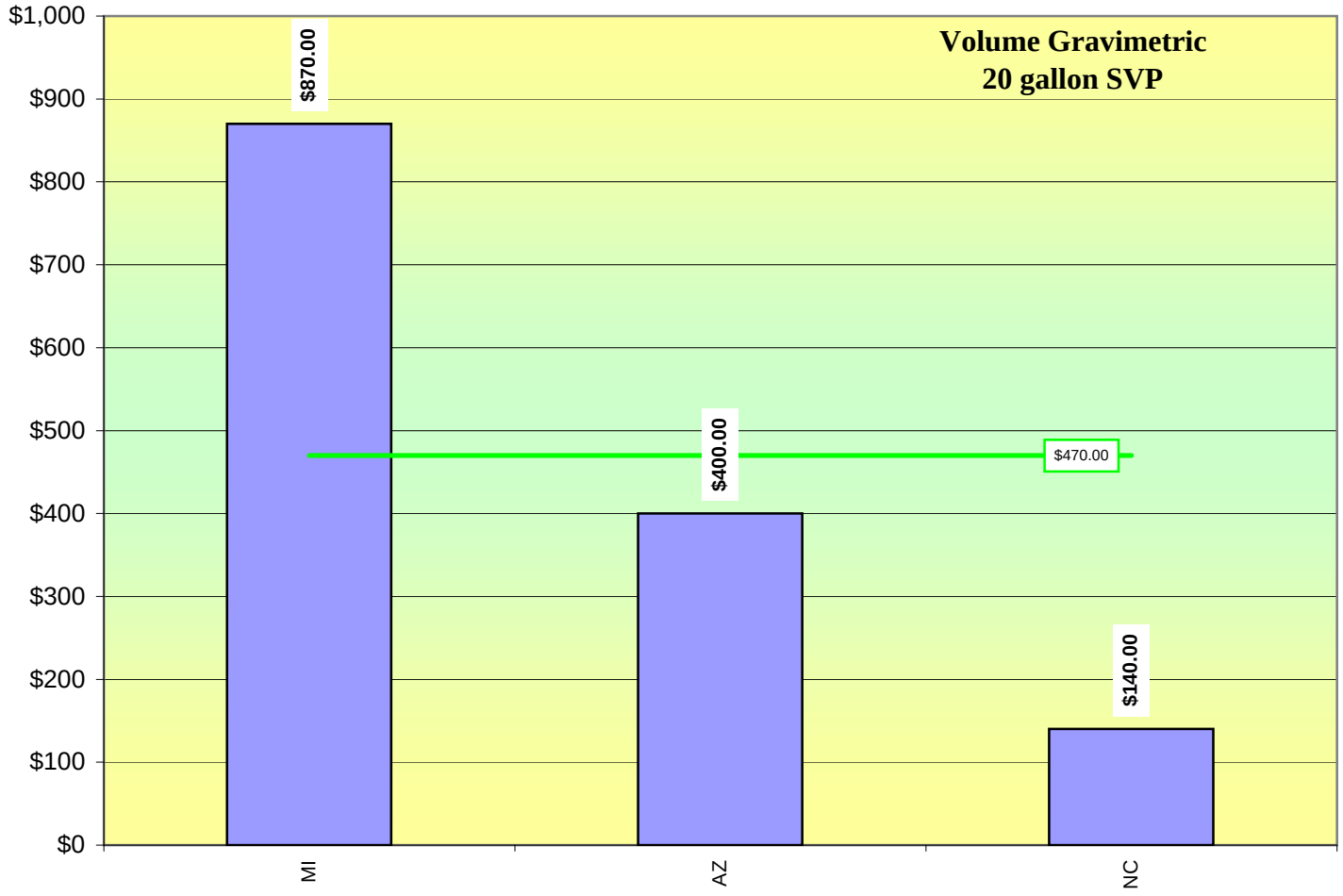
Description

The bottom graph represents the fees charged for calibrating a 20 gallon SVP using volume-gravimetric calibration procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2006	3	$470.00	--
2008	3	$470.00	0 %


Volume Transfer
20 gallon SVP
$250
$200
$150
$100
$50
$0
$200.00
$47.50
$123.75
ID
TX


Volume Gravimetric
20 gallon SVP
$1,000
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
$870.00
$400.00
$140.00
$470.00
MI
AZ
NC

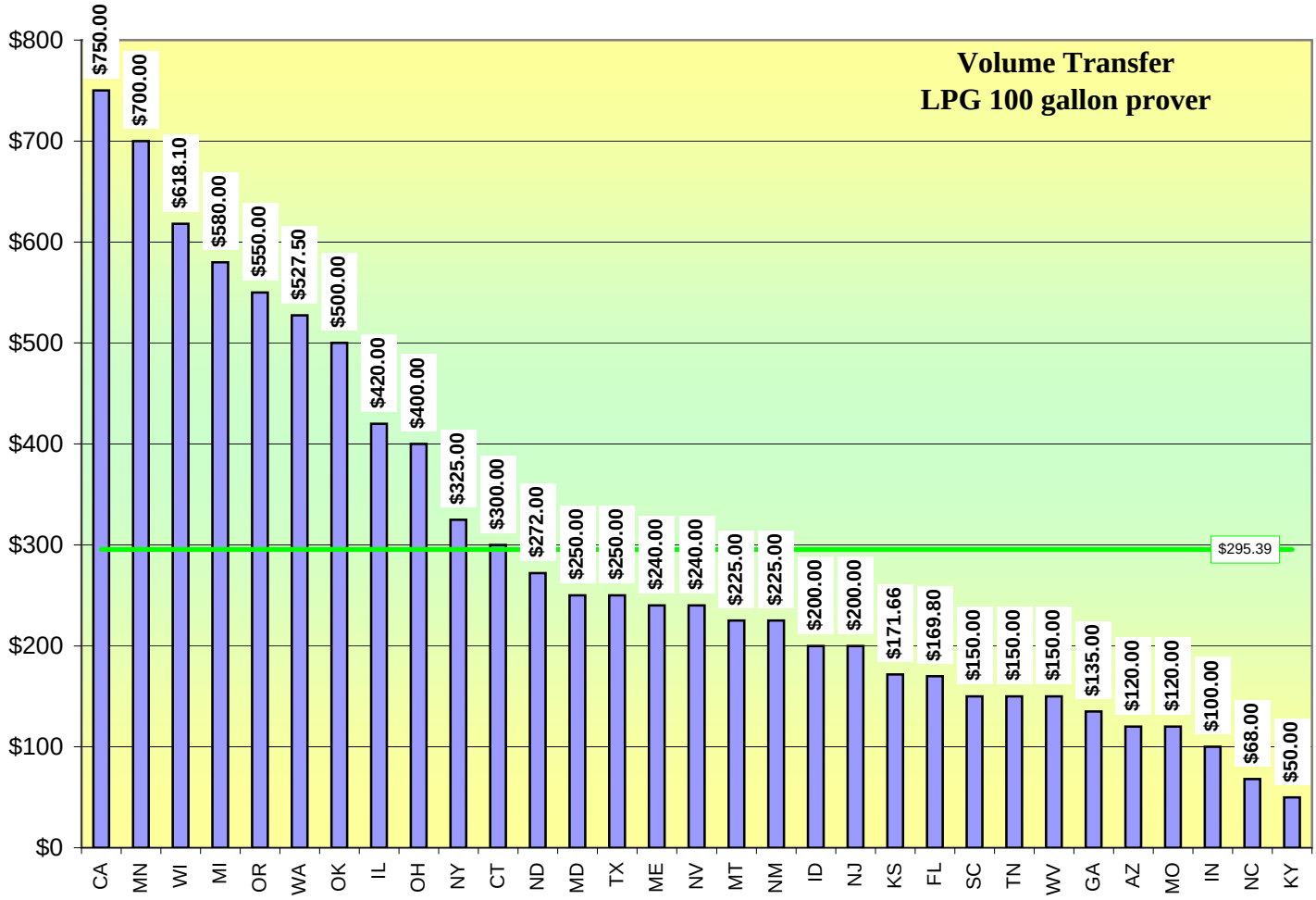
100 Gallon LPG Prover – Volume Transfer for 2006

Description

The graph represents the fees charged for calibrating a 100 gallon LPG prover using volume-transfer calibration procedures.

Comparison of previous surveys

	# of Labs	Average Fee	% Change
2006	32	$255.78	--
2008	31	$295.39	+15 %


Volume Transfer
LPG 100 gallon prover
$800
$700
$600
$500
$400
$300
$200
$100
$0
$295.39
CA $750.00
MN $700.00
WI $618.10
MI $580.00
OR $550.00
WA $527.50
OK $500.00
IL $420.00
OH $400.00
NY $325.00
CT $300.00
ND $272.00
MD $250.00
TX $250.00
ME $240.00
NV $240.00
MT $225.00
NM $225.00
ID $200.00
NJ $200.00
KS $171.66
FL $169.80
SC $150.00
TN $150.00
WV $150.00
GA $135.00
AZ $120.00
MO $120.00
IN $100.00
NC $68.00
KY $50.00

Metrology Positions – Monthly Salary Ranges for 2008

Description

Listed in the table below are the position title for each position that performs metrology functions.

Lab ID	Position Title	Minimum	Maximum	Mid-Point	Category
AK	State Metrologist II	$4,259.00	$6,047.00	$5,153.00	Laboratory Supervisor
AK	State Metrologist I	$3,697.00	$5,288.00	$4,492.50	Metrology/Calibration Technician
AL	Graduate Engineer	$3,438.20	$6,057.20	$4,747.70	
AL	Laboratory Supervisor	$2,690.60	$4,077.00	$3,383.80	
AL	Consumer W&M Protection Specialist: Lab	$2,376.40	$3,979.80	$3,178.10	
AR	Laboratory Supervisor	$3,100.00	$3,100.00	$3,100.00	Laboratory Supervisor
AR	Metrologist	$2,416.00	$2,416.00	$2,416.00	Metrology/Calibration Technician
AR	Metrologist	$2,416.00	$2,416.00	$2,416.00	Metrology/Calibration Engineer
AR	Moisture Technician	$2,416.00	$2,416.00	$2,416.00	Metrology/Calibration Technician
AR	Moisture Meter Inspector	$2,000.00	$2,000.00	$2,000.00	Support Staff
AZ	Admin Services Officer II	$3,882.80	$6,618.70	$5,250.75	Laboratory Supervisor
AZ	Metrology Technician	$3,246.20	$5,530.50	$4,388.35	Metrology/Calibration Technician
CA	Pricipal State Metrologist	$6,313.00	$6,961.00	$6,637.00	
CA	Measurement Standards Specialist I	$2,986.00	$4,990.00	$3,988.00	
CA	Staff Services Analyst	$2,817.00	$4,446.00	$3,631.50	
CO	Lead Metrologist	$4,165.00	$5,979.00	$5,072.00	Laboratory Supervisor
CO	Metrologist	$3,779.00	$5,423.00	$4,601.00	Metrology/Calibration Engineer
CT	Metrologist	$4,074.00	$5,778.00	$4,926.00	Laboratory Supervisor
FL	Senior Metrologist	$2,763.40	$4,617.01	$3,690.21	Laboratory Supervisor
FL	Metrologist	$2,350.39	$3,717.22	$3,033.81	Metrology/Calibration Technician
FL	Lab Technician IV	$2,125.81	$3,308.32	$2,717.07	Support Staff
GA	State Metrologist	$2,875.28	$5,107.68	$3,991.48	
GA	Assistant State Metrologist	$2,622.84	$4,589.39	$3,606.12	
GA	Metrologist 2	$1,967.80	$3,450.16	$2,708.98	
GA	Metrologist 1	$1,786.24	$3,128.98	$2,457.61	
DA	Industrial Specialist	$5,000.00	$6,500.00	$5,750.00	Metrology/Calibration Technician
HI	Metrologist V	$4,625.00	$6,844.00	$5,734.50	Laboratory Supervisor
HI	Metrologist IV	$4,276.00	$6,330.00	$5,303.00	Metrology/Calibration Engineer
HI	Metrologist III	$3,798.00	$5,624.00	$4,711.00	Metrology/Calibration Engineer
HI	Metrologist II	$3,511.00	$5,202.00	$4,356.50	Metrology/Calibration Technician
HI	Metrologist I	$3,249.00	$4,809.00	$4,029.00	Metrology/Calibration Technician
IA	State Metrologist	$3,697.20	$5,626.40	$4,661.80	
ID	Program Manager	$4,394.00	$7,845.08	$6,119.54	Laboratory Supervisor
ID	Section Manager	$4,054.25	$7,241.83	$5,648.04	Laboratory Supervisor
IL	State Metrologist - Public Service Administrator	$3,894.00	$5,863.00	$4,878.50	Metrology/Calibration Engineer
IL	Product & Standards Inspector	$3,437.00	$4,502.00	$3,969.50	Metrology/Calibration Technician
IL	Metrologist Associate	$3,228.00	$4,698.00	$3,963.00	Metrology/Calibration Technician

Lab ID	Position Title	Minimum	Maximum	Mid-Point	Category
IN	Weights and Measures Inspector I	$2,051.83	$3,555.50	$2,803.67	
IN	Metrologist V	$1,980.33	$3,581.50	$2,780.92	
KS	State Metrologist/Public Service Adminstrator II	$3,221.00	$4,530.00	$3,875.50	Laboratory Supervisor
KS	Agriculture Inspector III / Metrologist	$3,066.00	$4,317.00	$3,691.50	Metrology/Calibration Technician
KY	Metrology Lab Supervisor	$3,230.84	$5,329.36	$4,280.10	Laboratory Supervisor
KY	Program Coordintaor	$2,670.20	$4,439.20	$3,554.70	Laboratory Supervisor
KY	Metrology Lab Technician II	$2,427.44	$4,004.00	$3,215.72	Metrology/Calibration Engineer
KY	Metrology Lab Technician I	$2,006.08	$3,309.32	$2,657.70	Metrology/Calibration Technician
KY	Agricutural Inspector I	$1,823.90	$3,008.54	$2,416.22	Metrology/Calibration Technician
LA	Assistant Division Director/Lab Supervisor	$4,577.75	$9,110.42	$6,844.08	
LA	Metrologist	$3,050.67	$6,071.83	$4,561.25	
MA	Compliance Officer II	$2,739.00	$4,157.00	$3,448.00	Metrology/Calibration Engineer
MD	Laboratory Program Manager	$3,023.33	$4,797.25	$3,910.29	Laboratory Supervisor
MD	Metrologist II	$3,023.33	$4,797.25	$3,910.29	Metrology/Calibration Engineer
MD	Metrologist I	$2,842.75	$4,495.33	$3,669.04	Metrology/Calibration Technician
MD	Metrologist Trainee	$2,231.92	$3,484.67	$2,858.30	Metrology/Calibration Technician
ME	Metrologist	$3,356.00	$4,603.70	$3,979.85	Laboratory Supervisor
ME	Metrologist Assistant	$2,500.00	$3,380.00	$2,940.00	Metrology/Calibration Technician
ME	Consumer Protection Inspector	$2,500.00	$3,380.00	$2,940.00	Metrology/Calibration Technician
MI	Metrologist Manager - 14	$4,382.00	$6,448.00	$5,415.00	Laboratory Supervisor
MI	Metrology Specialist - 13	$4,070.00	$5,973.00	$5,021.50	Metrology/Calibration Engineer
MI	Metrologist - 12	$3,748.00	$5,463.00	$4,605.50	Metrology/Calibration Engineer
MI	Metrologist - P11	$3,571.00	$5,027.00	$4,299.00	Metrology/Calibration Engineer
MI	Metrologist - 10	$3,083.00	$4,349.00	$3,716.00	Metrology/Calibration Technician
MI	Metrologist - 9	$2,983.00	$4,254.00	$3,618.50	Metrology/Calibration Technician
MN	Weights & Measures Assistant Director	$4,895.00	$7,035.00	$5,965.00	
MN	State Program Administrator, Principal	$3,859.00	$5,688.00	$4,773.50	
MN	State Program Admin., Technical Specialist	$2,802.00	$3,945.00	$3,373.50	
MO	Metrologist	$3,040.00	$4,945.00	$3,992.50	Laboratory Supervisor
MO	Metrology Specialist	$2,625.00	$3,706.00	$3,165.50	Metrology/Calibration Technician
MS	State Metrologist	$2,472.00	$4,325.00	$3,398.50	Laboratory Supervisor
MS	Assistant State Metrologist	$2,229.00	$3,901.00	$3,065.00	Metrology/Calibration Technician
MT	State Metrologist	$3,063.00	$3,637.00	$3,350.00	
MT	Inspector/Assistant Metrologist	$2,553.00	$3,032.00	$2,792.50	
NC	Standards Laboratory Manager	$3,569.42	$5,875.00	$4,722.21	Laboratory Supervisor
NC	Metrologist II (Quality Assurance Manager)	$2,944.75	$4,694.17	$3,819.46	Metrology/Calibration Engineer
NC	Grain Moisture Program Supervisor	$2,944.75	$4,694.17	$3,819.46	Metrology/Calibration Engineer
NC	Metrologist I	$2,733.00	$4,287.17	$3,510.09	Metrology/Calibration Engineer
ND	Assistant Director/State Metrologist	$2,736.00	$4,560.00	$3,648.00	Laboratory Supervisor
ND	Heavy W & M Inspector/Assistant Metrologist	$1,867.00	$3,111.00	$2,489.00	Metrology/Calibration Technician
NH	Director	$3,729.00	$5,047.00	$4,388.00	Laboratory Supervisor
NH	Weights and Measures Metrologist	$2,795.00	$3,712.00	$3,253.50	Metrology/Calibration Technician

Lab ID	Position Title	Minimum	Maximum	Mid-Point	Category
NJ	Supervisor of Licensing/Metrology	$5,659.00	$8,208.00	$6,933.50	Laboratory Supervisor
NJ	Inspector I / Metrologist	$5,135.00	$7,447.00	$6,291.00	
NJ	Inspector II / Metrologist	$4,435.00	$6,432.00	$5,433.50	
NJ	Inspector III / Metrologist	$3,831.00	$5,557.00	$4,694.00	
NM	Specialist III	$3,066.67	$4,601.17	$3,833.92	Laboratory Supervisor
NM	Specialist I	$2,372.33	$3,558.50	$2,965.42	Metrology/Calibration Technician
NV	Metrologist	$3,403.00	$5,562.00	$4,482.50	Laboratory Supervisor
NY	Specialist I (Metrologist)	$3,988.00	$4,945.00	$4,466.50	Metrology/Calibration Technician
OH	Weights & Measures Technologist	$3,183.00	$4,137.00	$3,660.00	Metrology/Calibration Technician
OK	State Metrologist	$3,492.17	$5,820.25	$4,656.21	Laboratory Supervisor
OK	Metrologist III	$3,146.00	$5,243.33	$4,194.67	Metrology/Calibration Engineer
OK	Environmental Chemist III	$2,834.33	$4,723.83	$3,779.08	Metrology/Calibration Technician
OK	Metrologist II	$2,576.67	$4,294.50	$3,435.59	Metrology/Calibration Technician
OK	Metrologist I	$2,144.17	$3,573.67	$2,858.92	Metrology/Calibration Technician
OR	Metrologist	$3,383.00	$4,951.00	$4,167.00	Metrology/Calibration Technician
PA	Quality Assurance Supervisor	$3,901.00	$5,925.00	$4,913.00	Laboratory Supervisor
PA	Metrologist (with NIST Intermediate Training)	$3,985.00	$5,195.00	$4,590.00	Metrology/Calibration Technician
PA	Metrologist (with NIST Basic Training)	$3,818.00	$5,195.00	$4,506.50	Metrology/Calibration Technician
PA	Metrologist	$3,650.00	$5,195.00	$4,422.50	Metrology/Calibration Technician
PA	Laboratory Administrative Assistant	$2,344.00	$3,495.00	$2,919.50	Support Staff
SC	Program Coordinator I	$2,522.83	$4,667.92	$3,595.38	Laboratory Supervisor
SC	Lab Technician II	$2,522.83	$4,667.92	$3,595.38	Metrology/Calibration Technician
SD	State Inspector	$2,419.95	$4,009.83	$3,214.89	Laboratory Supervisor
TX	Program Specialist IV	$3,687.83	$5,605.83	$4,646.83	Laboratory Supervisor
TX	Inspector IV	$2,717.58	$3,855.00	$3,286.29	Metrology/Calibration Engineer
TX	Laboratory Technician I	$2,069.33	$2,827.42	$2,448.38	Metrology/Calibration Technician
UT	State Metrologist	$3,650.00	$4,791.00	$4,220.50	Metrology/Calibration Technician
VA	Metrologist	$2,612.67	$5,362.25	$3,987.46	Metrology/Calibration Engineer
VT	Weights and Measures Specialist	$1,720.00	$4,800.00	$3,260.00	Metrology/Calibration Technician
WA	State Metrologist	$2,994.00	$3,918.00	$3,456.00	Laboratory Supervisor
WI	Metrologist	$3,650.00	$7,675.00	$5,662.50	
WV	Metrologist	$2,020.00	$3,475.00	$2,747.50	Laboratory Supervisor
WV	Labor Inspector II / Assigned to Laboratory	$1,539.00	$2,695.00	$2,117.00	Metrology/Calibration Technician
WY	State Metrologist/Lead inspector	$3,945.00	$5,323.00	$4,634.00	Laboratory Supervisor
LAC	ACWM Inspector III	$4,313.00	$5,657.00	$4,985.00	Laboratory Supervisor
LAC	Metrology Technician II	$4,260.73	$5,588.36	$4,924.55	Metrology/Calibration Engineer
LAC	Metrology Technician I	$4,036.45	$5,294.00	$4,665.23	Metrology/Calibration Technician

From which labs will your State W&M acknowledge calibration certificates?

	Your State Lab ONLY :	Any State Lab regardless of status :	Any NIST/WMD Recognized Lab :	Any NVLAP Accredited Lab :	Any Weight Manufacturer, regardless of accreditation status :	Any Company or Lab that is Accredited by an Accreditation Body that is an ILAC signatory :
AK			Yes	Yes		Yes
AL			Yes			
AR						Yes
AZ			Yes	Yes		Yes
CA			Yes	Yes		Yes
CO			Yes	Yes		
CT	Yes		Yes			
DA			Yes			Yes
FL			Yes			
GA			Yes			
HI			Yes	Yes		Yes
IA			Yes	Yes		
ID			Yes			
IL			Yes	Yes		
IN			Yes			
KS	Yes		Yes	Yes		
KY			Yes	Yes		Yes
LA			Yes	Yes		
LA			Yes			
MA			Yes	Yes		Yes
MD			Yes			
ME	Yes		Yes	Yes		
MI			Yes	Yes		
MN			Yes			
MO			Yes	Yes		
MS	Yes		Yes	Yes		Yes
MT			Yes	Yes		Yes
NC	Yes		Yes	Yes		Yes
ND			Yes	Yes		Yes
NH			Yes	Yes		Yes
NJ			Yes	Yes		
NM			Yes	Yes		Yes
NV			Yes	Yes		Yes
NY			Yes	Yes		Yes
OH			Yes	Yes		
OK			Yes	Yes		Yes
OR			Yes	Yes		Yes
PA	Yes		Yes			
PR	Yes					
SC			Yes	Yes		Yes
SD			Yes	Yes		Yes
TN			Yes			
TX			Yes	Yes		
UT			Yes			
VA			Yes	Yes		Yes
VT		Yes	Yes	Yes		
WA			Yes	Yes		Yes
WI			Yes	Yes		
WV			Yes	Yes		Yes
WY		Yes	Yes	Yes		Yes

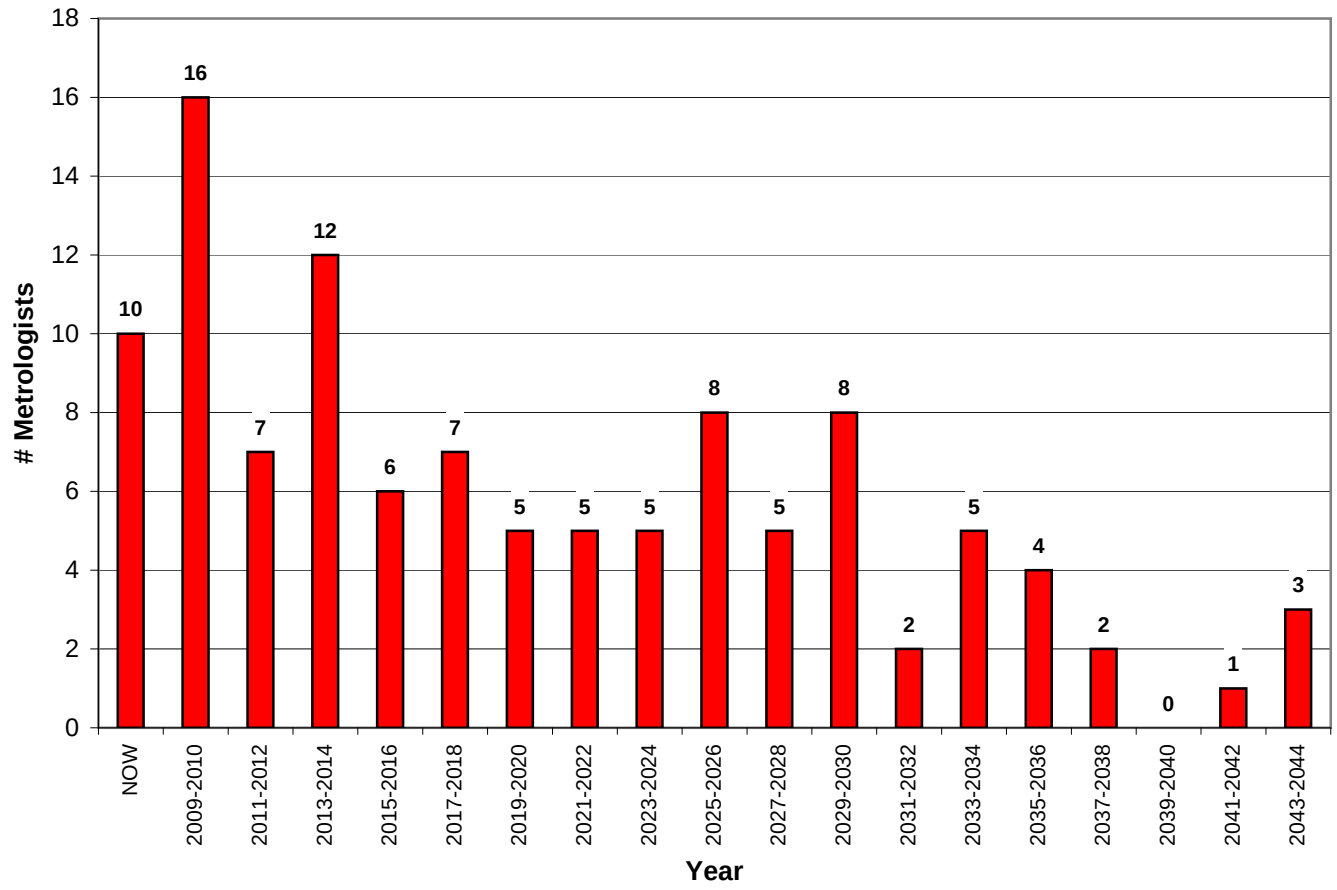
2008 State Laboratory Metrologists

	Name	Authorized Calibrations F=Full P=Partial N=None									What Year Eligible for Retirement?	#Yrs Metrology Experience		
		Mass I	Mass II	Mass III	Vol Trans	Vol Grav	Length	Time/Frequency	Temperature	Grain Moisture		State Lab Metrology	Other Metrology	Total Metrology Experience
AK	Russ Campbell	N	P	F	F	P	N	F	N	N	2017	10	1	11
AK	Garret Brown	N	P	F	F	P	N	F	N	N	2023	4	8	12
AL	Wes Seals			F	F						2011	7		7
AL	David Morse			F	F						2015	3		3
AR	Ray Curtis		F	F	F		F			F	2015	10	0	10
AR	Clinton Phifer			F	F		F				2028	1	0	1
AR	Randy Burns		F	F	F		F			F	2000	28	0	28
AZ	Kelley Larson		F	F	F	F					2009	21		21
AZ	Brian Sellers		F	F	F	F					2024	4.5		4.5
AZ	Judy Voight		P	F	F						2009	10		10
CA	Anthony Gruneisen	N	P	F	F	F	F	F	F	N	2023	7	0	7
CA	Jimmy Jew	N	N	F	F	F	F	N	N	N	2002	11	0	11
CA	George Terrell	N	F	F	F	F	F	F	F	N	2007	9	27	36
CA	Greg Boers	N	F	F	F	F	F	F	F	N	2010	10	3	13
CO	Diane Wise	P	F	F	F	F	F	F	N	F	2014	14		14
CO	Jennifer Oznoff	N	F	F	F	F	F	F	N	F	2030	8		8
CT	Michael Dynia		F	F	F	F	F	F	F		2009	25.5		25.5
FL	Mike Cook	N	F	F	F	F	F	N	F	F	2007	22	0	22
FL	Davis Terry	N	F	F	F	F	F	N	N	F	2030	9	0	9
GA	Dale Gann		F	F	F	F	F			F	2012	9		9
GA	Kontz Bennett		F	F	F	F	F			P	2026	8		8
GA	Brian Grace		P	F	P	P				F	2032	2		2
GA	Quinton Stewart		N	P	P					P	2034	0.5		0.5
DA	Cary Brown			P							2014	0	12	12
DA	Al Rupert			P							2014	0	10	10
DA	Byron School			P							2014	0	14	14
HI	Michael Tang	F	F	F	F	F	F	F	N	N	2019	8	0	8
IA	Andrew Blackburn			N	N						2028	3	17	20
ID	Kevin Merritt		F	F	F	F	F	N	N	N	2013	13		13
IL	Mike Rockford	F	F	F	F						2014	20		20
IL	Matt Williams			F	F						2013	9		9
IL	Karl Cunningham			F	F						2028	4		4
IN	Jerry Clingaman	P	F	F	F	F	F	F	F	F	2012	16		16
IN	Kristin Winningham		P	P	P				P		2035	0.5		0.5
IN	Terrell Sharlow		P	P			P		P		2001	9		9
KS	Karl Herken	F	F	F	F	F	N	N	P	N	2014	18	12	30
KS	Kevin Nutter	N	F	F	F	F	N	N	P	N	2015	14	10	24
KY	William Baker	N	N	P	P	N	N	N	N	N	2035	1.5	0	1.5
KY	Chester Watson	N	N	P	P	N	N	N	N	N	2034	1.5	0	1.5
KY	Jason Glass	N	N	F	F	N	N	N	N	N	2029	5	0	5
LA	Richert Williams	N	N	F	F	N	F	N	N	N	2008	8	0	8
LA	Carl Decker	N	N	F	F	N	F	N	P	N	2014	16	0	16
MA	Donnie Smith			F	F		F				2008	31		31
MD	Stephen Barry	F	F	F	F	F	F	F	F		2018	20		20
MD	Zenon Waclawiw	F	F	F	F	F	F	F			2028	10		10
ME	Danny Newcombe	F	F	F	F	F	F	F	F	N	2010	20		20
ME	George O'Connor	N	P	F	P	F	F	N	P	N	2015	4		4

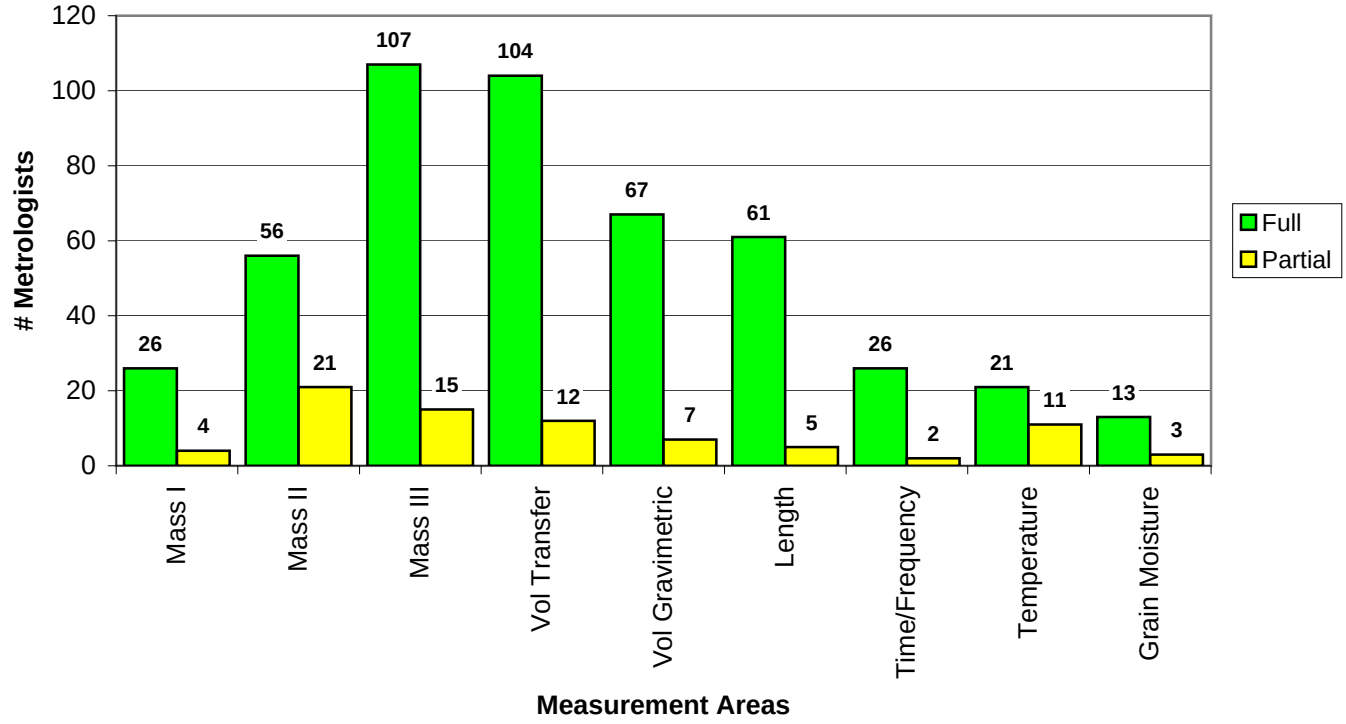
	Name	Authorized Calibrations F=Full P=Partial N=None									What Year Eligible for Retirement?	#Yrs Metrology Experience		
		Mass I	Mass II	Mass III	Vol Trans	Vol Grav	Length	Time/Frequency	Temperature	Grain Moisture		State Lab Metrology	Other Metrology	Total Metrology Experience
ME	Donald Langley	N	N	P	N	N	N	N	N	N	2009	4		4
MI	Craig VanBuren	F	F	F	F	F	F		F			9	0	9
MI	William Erickson	F	F	F	F	F	F		F		2009	14	0	14
MI	Terry Gawel			F	F	F	F				2009	11	0	11
MI	Neil Jones	F	F	F							2009	9	0	9
MN	Heidi Jones	N	N	P	N	N	N	N	N	N		9		9
MN	Nils Fleming	F	F	F	F	F	F	N	N	N		2.5		2.5
MN	Mark Zasadny	F	F	F	F	F	F	N	N	N		8		8
MN	Bruce Adams	F	F	F	F	F	F	N	F	N		18		18
MN	Steven Harrington	F	F	F	F	F	F	N	F	N		3.5		3.5
MO	Tom Hughes			F	F		F			F	2022	10		10
MO	Bob Wittenberger		F	F	F	F	F				2007	33		33
MS	William Bell			F	F						2035	4		4
MS	Mel Lasigi			F	F							6		6
MS	John L. Sullivan			F	F						2033	6		6
MT	Keith Reimund	N	P	F	F	P	F	N	N	N	2017	8	4	12
MT	Don Reimer	N	N	P	P	N	N	N	N	N	2012	12	16	28
NC	Tal Anderson	F	F	F	F	F	F	N	F	N	2028	12	0	12
NC	Van Hyder	F	F	F	F	F	F	N	P	N	2025	15	0	15
NC	Cliff Murray	F	F	F	F	F	F	N	F	N	2012	8	16	24
NC	Gerald Price	N	P	F	F	F	F	N	P	N	2029	3	6	9
NC	Sharon Woodard	F	F	F	F	F	F	N	F	N	2022	18	0	18
NC	Cheryl Tew	N	N	N	N	N	N	N	N	F	2014	25	0	25
ND	Kevin Hanson	N	P	F	F	N	N	N	N	N	2021	9	4	13
ND	JP Robbins	N	P	F	F	N	N	N	N	N		2	3	5
NH	Richard Cote	F	F	F	F	F	N	N	N	N	2010	15	0	15
NH	Tim Osmer	P	F	F	F	F	N	N	N	N	2042	3.5	0	3.5
NJ	Raymond Szpond		F	F	F	F	F	F			2022	10	0	10
NJ	Craig Gerhartz			F	F		F	F			2034	5	0	5
NJ	Michael Cecere			F	F		F	F			2022	3	0	3
NM	Benny Ontiveros		F	F	F	F					2029	5	0	5
NM	Steve Sumner	F	F	F	F	F	F	F	F	N	2012	12	20	32
NV	Steve Schultz	F	F	F	F	F	P	N	N	N	2015	6	6	12
NV	David Walch	N	N	P	P	N	N	N	N	N	2018	10	0	10
NY	Ed Szesnat	P	F	F	F	F	F	F	F		2009	16		16
NY	Robert Acheson		P	F	F	F	F	F	P		2009	6		6
NY	Bill Fishman		P	P	P	P	P	P	P		2009	20		20
NY	Mike Sikula		P	F	F	F	F	F	F		2019	9	7	16
OH	Ken Johnson		F	F	F	F	F					18		18
OH	Earl Matthews		F	F	F	F	F					9		9
OK	Ken Fraley	F	F	F	F	F	F				2001	33	5	38
OK	Richard Gonzales	F	F	F	F	F	F				2012	22	0	22
OK	Jeremy Nading	N	N	F	F	F	F				2037	3	0	3
OK	Mickey Whitney	N	N	P	P	N	N				2026	1	0	1
OR	Aaron Aydelotte	F	F	F	F	F			P		2044	8		8
OR	Ray Nekuda			F	F						2037	1		1
PA	James Gownley	N	F	F	F	F	F	F	N	N	2030	7	0	7
PA	Paul Sprout	N	P	F	F	P	F	F	N	N	2010	5	16	21
PA	Terrance Shingara	N	P	F	F	P	F	F	N	N	2006	4	0	4

	Name	Authorized Calibrations F=Full P=Partial N=None									What Year Eligible for Retirement?	#Yrs Metrology Experience		
		Mass I	Mass II	Mass III	Vol Trans	Vol Grav	Length	Time/Frequency	Temperature	Grain Moisture		State Lab Metrology	Other Metrology	Total Metrology Experience
PA	Christopher Drupp	N	N	F	F	N	F	F	N	N	2034	1	0	1
PA	Richard Radel	N	N	P	P	N	P	P	N	N	2025	0.5	0	0.5
PA	Betty Daniels	N	N	N	N	N	N	N	N	N	2017	0	0	0
PR	Jose Torres	F	F	F	F	F	F	N	N	N	2018	21		21
PR	Abner Rodriguez	N	F	F	F	F	F	N	N	N	2044	5		5
PR	Julio Troche	N	N	N	P	N	N	N	N	N	2044	5		5
SC	Robert McGee	F	F	F	F	F	F			F	2023	14		14
SC	Edward Mendenhall	N	F	F	F	F	F			P	2032	5		5
SC	Billy Kennington	N	F	F	F	F	F			F		29		29
SD	Brad Stover	N	N	F	F	N	N	N	N	N	2026	6	0	6
TX	Harvey Fischer	N	P	F	F	F	N	N	N	N	2009	3	27	30
TX	Preston Adachi	N	F	F	F	F	N	N	N	N	2015	3	30	33
TX	Daniel Gibbons	N	F	F	F	F	N	N	N	N	2024	5	0	5
TX	Philip Wright	N	P	F	F	F	N	N	N	N	2029	1	0	1
TX	Lisa Jatzlau	N	P	F	F	F	N	N	N	N	2035	1	0	1
UT	Bill Rigby	N	N	F	F	N	P	N	N	N	2019	4	0	4
VA	William Loving	N	F	F	F	F	N	F	F	N	2019	6	0	6
VA	Edd Tatum	N	P	F	F	F	N	F	F	N	2013	3	0	3
VT	Ray Cioffi			F	F		F		F					
WA	Dan Wright	F	F	F	F	F	N	N	N	N	2014	14	16	30
WI	Jeff Houser			F	F						2018	2		2
WI	Rich McCann			F	F						2025	5	5	10
WI	Alan Porter			F	F						2002	22		22
WV	Dan Mace	N	N	F	F	N	N	N	N	N	2026	12	0	12
WV	Anthony O'Brien	N	N	F	F	N	N	N	N	N	2026	10	0	10
WY	Robert Weidler			F	F						2029	1		1
LAC	Kai-Cheung Chow			F	F	F	N				2009	9.2		9.2
LAC	Donald Franks			F	F	F	N				2019	2.3		2.3
LAC	Lina Ng			F	F	F	N					0.3		0.3
TN	Ken Wilmoth	N	N	F	F	N	N	N	N	N	1999	3	2	5

Retirement Eligibility Histogram



Authorized Calibrations



Metrology Experience for 2008
(By Individual)

Description

Total Metrology Experience:

The bar graph on the next page represents the total metrology experience by individual metrologist. The graph is a stacked bar, the blue portion represents "other metrology experience" and the red portion represents "state laboratory program experience".

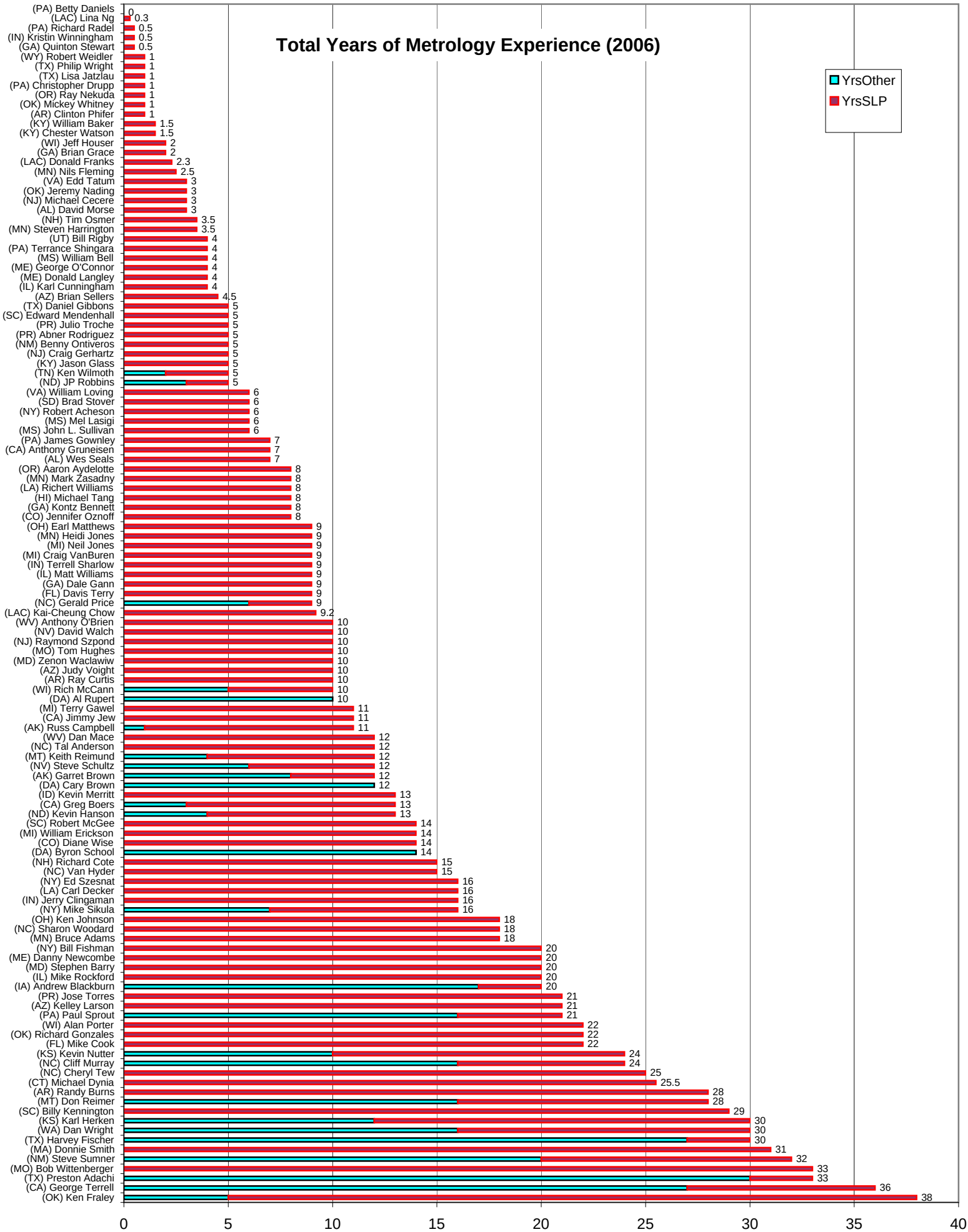
Comparison of previous surveys

	Number of Metrologists	Average SLP Experience	Average Other Experience	Average Total Experience
2000	111	8.7	2.4	11.0
2002	113	9.1	2.1	11.2
2004	111	8.1	2.6	10.8
2006	112	8.3	3.1	11.4
2008	125	9.2	2.4	11.6

Comments:

Of the 50 responding laboratories:

125 individual metrologists
Average SLP experience – 9.2 years
Average Other experience – 2.4 years
(26 metrologists reported 'other experience'; their average is 11.4 years.)
Average Total experience – 11.6 years


Total Years of Metrology Experience (2006)
YrsOther
YrsSLP
(PA) Betty Daniels 0
(LAC) Lina Ng 0.3
(PA) Richard Radel 0.5
(IN) Kristin Winningham 0.5
(GA) Quinton Stewart 0.5
(WY) Robert Weidler 1
(TX) Philip Wright 1
(TX) Lisa Jatzlau 1
(PA) Christopher Drupp 1
(OR) Ray Nekuda 1
(OK) Mickey Whitney 1
(AR) Clinton Phifer 1
(KY) William Baker 1.5
(KY) Chester Watson 1.5
(WI) Jeff Houser 2
(GA) Brian Grace 2
(LAC) Donald Franks 2.3
(MN) Nils Fleming 2.5
(VA) Edd Tatum 3
(OK) Jeremy Nading 3
(NJ) Michael Cecere 3
(AL) David Morse 3
(NH) Tim Osmer 3.5
(MN) Steven Harrington 3.5
(UT) Bill Rigby 4
(PA) Terrance Shingara 4
(MS) William Bell 4
(ME) George O'Connor 4
(ME) Donald Langley 4
(IL) Karl Cunningham 4
(AZ) Brian Sellers 4.5
(TX) Daniel Gibbons 5
(SC) Edward Mendenhall 5
(PR) Julio Troche 5
(PR) Abner Rodriguez 5
(NM) Benny Ontiveros 5
(NJ) Craig Gerhartz 5
(KY) Jason Glass 5
(TN) Ken Wilmoth 5
(ND) JP Robbins 5
(VA) William Loving 6
(SD) Brad Stover 6
(NY) Robert Acheson 6
(MS) Mel Lasigi 6
(MS) John L. Sullivan 6
(PA) James Gownley 7
(CA) Anthony Gruneisen 7
(AL) Wes Seals 7
(OR) Aaron Aydelotte 8
(MN) Mark Zasadny 8
(LA) Richert Williams 8
(HI) Michael Tang 8
(GA) Kontz Bennett 8
(CO) Jennifer Oznoff 8
(OH) Earl Matthews 9
(MN) Heidi Jones 9
(MI) Neil Jones 9
(MI) Craig VanBuren 9
(IN) Terrell Sharlow 9
(IL) Matt Williams 9
(GA) Dale Gann 9
(FL) Davis Terry 9
(NC) Gerald Price 9
(LAC) Kai-Cheung Chow 9.2
(WV) Anthony O'Brien 10
(NV) David Walch 10
(NJ) Raymond Szpond 10
(MO) Tom Hughes 10
(MD) Zenon Waclawiw 10
(AZ) Judy Voight 10
(AR) Ray Curtis 10
(WI) Rich McCann 10
(DA) Al Rupert 10
(MI) Terry Gawel 11
(CA) Jimmy Jew 11
(AK) Russ Campbell 11
(WV) Dan Mace 12
(NC) Tal Anderson 12
(MT) Keith Reimund 12
(NV) Steve Schultz 12
(AK) Garret Brown 12
(DA) Cary Brown 12
(ID) Kevin Merritt 13
(CA) Greg Boers 13
(ND) Kevin Hanson 13
(SC) Robert McGee 14
(MI) William Erickson 14
(CO) Diane Wise 14
(DA) Byron School 14
(NH) Richard Cote 15
(NC) Van Hyder 15
(NY) Ed Szesnat 16
(LA) Carl Decker 16
(IN) Jerry Clingaman 16
(NY) Mike Sikula 16
(OH) Ken Johnson 18
(NC) Sharon Woodard 18
(MN) Bruce Adams 18
(NY) Bill Fishman 20
(ME) Danny Newcombe 20
(MD) Stephen Barry 20
(IL) Mike Rockford 20
(IA) Andrew Blackburn 20
(PR) Jose Torres 21
(AZ) Kelley Larson 21
(PA) Paul Sprout 21
(WI) Alan Porter 22
(OK) Richard Gonzales 22
(FL) Mike Cook 22
(KS) Kevin Nutter 24
(NC) Cliff Murray 24
(NC) Cheryl Tew 25
(CT) Michael Dynia 25.5
(AR) Randy Burns 28
(MT) Don Reimer 28
(SC) Billy Kennington 29
(KS) Karl Herken 30
(WA) Dan Wright 30
(TX) Harvey Fischer 30
(MA) Donnie Smith 31
(NM) Steve Sumner 32
(MO) Bob Wittenberger 33
(TX) Preston Adachi 33
(CA) George Terrell 36
(OK) Ken Fraley 38
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2008 Workload Survey
State Metrology Laboratories
for
Jan 1, 2008 – Dec 31, 2008

November 3, 2008

To: State Metrology Laboratories

DUE by February 15, 2009

Instructions

The deadline for submitting your data has been moved to February 15, 2009 in order to have enough time to publish the workload survey results before the Combined Regional Metrology Meeting that will be held in April 2009.

This year's workload survey will cover one year of workload data. The preferred time period is Jan 1, 2008 – Dec 31, 2008.

There are two options for submitting your survey results. The preferred method is to use the attached Excel spreadsheet. If you are unable to use the spreadsheet, you may print out the 'Word' document and complete it by hand (make sure it is legible) and fax it to 405-522-5461.

Frequently Asked Questions & General Guidance

Contact Information for Person Completing this Survey:

This is needed in case I have a question or need clarification on the information provided in your survey.

Laboratory Information:

This will be used for verifying the mailing address for the lab.

Laboratory Age & Size:

Size of Lab – We are attempting to determine the size of the metrology lab excluding offices and warehouses.

List all Job Titles that could be utilized to perform metrology measurements or functions:

We do not want names of personnel in this section. The results of this section will be used to see the different 'official titles' and associated pay bands of the positions that perform measurements or other metrology functions. This information is not confidential and is usually public records in each state.

Job Titles/Salary Ranges (make sure they are monthly salaries):

Example:

Metrologist I	$1,800.00	$2,400.00	Calibration Technician
Metrologist II	$2,000.00	$2,800.00	Calibration Engineer
Metrologist III	$2,600.00	$3,200.00	Laboratory Supervisor

Number of Laboratory Customers served during the reporting period

This information is used to demonstrate the wide impact of the State Laboratory Program. Count different locations of the same parent company as separate customers. If there are separate divisions within the same parent company, count each as a separate customer.

From which labs will your State W&M acknowledge calibration certificates?

This is a new question for the survey. Your State W&M program probably requires licensed repairmen to have their standards periodically calibrated. We are trying to determine what criterion is required for the laboratories that perform these calibrations. In this section, check each one that applies to your jurisdiction.

Staff information:

Authorized Calibrations enter F (Full), P (Partial), or N (None).

'Experience' is asking for the number of years of experience in an SLP laboratory and the number of years of other experience in metrology and the total number of years of metrology experience.

Workload Section:

The survey covers the workload of your lab for a twelve-month period, preferably Jan 1 through Dec 31, 2008. If the reporting period covers a different period make sure it is noted.

Each category is also broken down into the following customers: Lab, W&M Program, and External Customers.

Lab – Those standards calibrated for use by the metrology laboratory, including working standards, surveillance calibrations on primary standards, etc. These tests are also referred to as internal calibrations.

W&M Program – Those standards calibrated for state government weights and measures regulatory agencies.

External Customers – All other standards calibrated by the laboratory.

In general, the survey is asking for the number of individual devices calibrated by the metrology laboratory. Use the following examples as guidelines for reporting numbers for this survey.

Example: A "31 pound weight kit" is not counted as one device; make sure each weight in the kit is counted.

Example: A 100 foot tape is counted as one device; do not count each point tested.

Example: If three double substitutions are used to calibrate a single standard it is counted as one device; do not count it as three devices.

Example: A 100g standard calibrated using a 3-1 weighing design is counted as one device; do not count the check standard. (Same with advanced weighing designs using the mass code, do not count the check standards as they are used solely for defining the measurement process.)

Workload Categories:
Mass Echelon I – The number of precision mass standards that were calibrated using the Mass Code for data reduction, regardless of accuracy class.
Mass Echelon II – The number of precision mass standards that were calibrated not using the Mass Code for data reduction. Typically, SOP 4 w/ABC or SOP 5 are used.
Mass Echelon III – Do not count weight carts in this category; weight carts have their own category.
Volume – All volume calibrations are broken down into two categories, depending on the procedure used, volume transfer and volume gravimetric procedures.

We would also like to know of any other work that is done by your metrology laboratory which was not covered in this survey, therefore, there are several "blank categories" at the end of the survey for any calibrations or tests that do not fall into any of the prescribed categories. Please provide enough detail about these additional tests for it to be clear what is being done.

Calibration Fees:

At the end of the survey there is a section for calibration fees. Please include all fees that would normally be charged including cleaning, shipping, packing, etc.

ASSISTANCE/QUESTIONS??
You may contact me at:

Phone: (405) 522-5459
Fax: (405) 522-5461
Email: ken.fraley@oda.state.ok.us

Ken Fraley
Oklahoma Bureau of Standards
2800 N. Lincoln Blvd.
Oklahoma City, Oklahoma 73105

2008 State Laboratory Program Survey
DUE by February 15, 2009

Mail or Fax to:	Ken Fraley Oklahoma Bureau of Standards 2800 N Lincoln Oklahoma City, OK 73105
Fax: 405-522-5461	

1. Contact Information for Person Completing this Survey

Name: _____

Phone: _____

Fax: _____

2. Laboratory Information

Laboratory: _____

Mail Address: _____

City, State, Zip: _____

Web Site: http:// _____

3. Laboratory Age & Size

Age of Lab: _____ yrs

Office Space: _____ sq ft

Active Lab Space (used for calibration): _____ sq ft

4. List all Job Titles which could be utilized to perform metrology measurements or functions

Job Title	Min Monthly Salary	Max Monthly Salary	(Select – Best Match) Lab Supervisor Metrology/Calibration Engineer Metrology/Calibration Technician Support Staff

5. Number of Laboratory Customers served during the reporting period

Count different locations of the same parent company as separate customers. If there are separate divisions within the same parent company, count each as a separate customer.

Laboratory Customers _____

6. From which labs will your State W&M acknowledge calibration certificates

(Check all that apply)

- ☐ Your State Lab ONLY
- ☐ Any State Lab regardless of status
- ☐ Any NIST/WMD Recognized Lab
- ☐ Any NVLAP accredited Lab
- ☐ Any Weight Manufacturer, regardless of accreditation status
- ☐ Any Company or Lab that is Accredited by an Accreditation Body that is an ILAC signatory (e.g. NVLAP, A2LA, LAB, IAS, ACLASS)

7. Please list all personnel which perform metrology measurements or functions in the laboratory

Name	e-mail	Authorized Calibrations F = Full P = Partial N = None								Year Eligible for Retirement	#Yrs Metrology Experience		
		Mass I	Mass II	Mass III	Vol Trans	Vol Grav	Length	Time/Frequency	Temperature	Grain Moisture		State Lab Metrology	Other Metrology	Total Metrology Experience

2008 Workload Information

NOTE: The following information should be based on a 12 month period, preferably Jan 1, 2008 through Dec 31, 2008 or the most recent fiscal year. Reported data should not be estimates. If unable to quote actual data, please attach your comments to the end of this survey.

Actual Period of Time Covered: From _____ To _____

8. Mass Echelon I			
Number of mass standards calibrated using Advanced Weighing Designs and Mass Code Data Reduction. Regardless of Class.	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		
9. Mass Echelon II			
Number of mass standards. ASTM Class 1, 2, 3 OIML Class E2, F1	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		
10. Mass Echelon III			
Number of mass standards (except weight carts). ASTM Class 4, 5, 6, 7 OIML Class F2, M1, M2, M3 NIST Class F	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		
11. Weight Carts			
Number of weight carts calibrated.	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		
12. Volume – Glassware			
Number of individual pieces of volumetric glassware calibrated. Note: Indicate number of Volume Transfer (V-T) and/or Gravimetric test methods.		Vol-Transfer	Gravimetric
	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		
13. Volume – SVP (Small Volume Provers) (NOT 5 gallon test measures)			
Number of small volume provers calibrated. Note: Indicate number of Volume Transfer (V-T) and/or Gravimetric test methods. If you don't know what a SVP is, your answer is probably zero.		Vol-Transfer	Gravimetric
	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		
14. Volume – LPG			
Number of individual LPG provers calibrated. Note: Indicate number of Volume Transfer (V-T) and/or Gravimetric test methods.		Vol-Transfer	Gravimetric
	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		

15. Volume – Non-Pressurized Small Metal Standards (≤ 5 gallon)			
Number of metal volumetric standards (20 liter / 5 gallon and smaller). Note: Indicate number of Volume Transfer (V-T) and/or Gravimetric test methods.		Vol-Transfer	Gravimetric
	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		

16. Volume – Non-Pressurized Medium Metal Standards (> 5 gallon and ≤ 100 gallon)			
Number of metal volumetric standards (larger than 20 liter / 5 gallon and less than or equal to 400 liter / 100 gallon). Note: Indicate number of Volume Transfer (V-T) and/or Gravimetric test methods.		Vol-Transfer	Gravimetric
	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		

17. Volume – Non-pressurized Large Metal Standards (> 100 gallon)			
Number of metal volumetric standards (greater than 400 liter / 100 gallon). Note: Indicate number of Volume Transfer (V-T) and/or Gravimetric test methods.		Vol-Transfer	Gravimetric
	Lab (Internal)		
	W&M Program		
	External Customers		
	Total		

18. Length - Tapes		
Number of individual tapes (metal, fiberglass, woven fiberglass, cloth, etc.). Please enter #devices tested, NOT number of points tested.	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

19. Length - Rigid Rules		
Number of rigid rules calibrated.	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

20. Thermometry		
Number of thermometers tested (mechanical, liquid-in-glass, thermocouples, thermistors, PRTs, SPRTs).	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

21. Frequency		
Number of frequency standards tested (includes tuning forks).	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

22. Timing Devices		
Number of timing devices tested (stopwatches).	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

23. Wheel Load Weighers		
Number of wheel load weighers tested :	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

24. Lottery Balls		
Number of lottery balls tested : Characteristic Tested: ❑ Mass ❑ Diameter ❑ Other *Describe Other*_____	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

25. (A) Other Types of Measurements not covered in this survey		
Describe type of measurement:	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

26. (B) Other Types of Measurements not covered in this survey		
Describe type of measurement:	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

27. (C) Other Types of Measurements not covered in this survey		
Describe type of measurement:	Lab (Internal)	
	W&M Program	
	External Customers	
	Total	

28. Laboratory Fees		
In this section please estimate the <u>typical</u> fees charged for each of the described examples.		
Does your laboratory charge fees for external customers? YES ❑ NO ❑		
Do you have a minimum fee?		$
[Mass Echelon I] ASTM Class 0 Precision mass set 100 g to 1 mg (21 weights)		$
[Mass Echelon II] ASTM Class 2 Precision mass set 100 g to 1 mg (21 weights)		$
One – 31 lb Class F weight set (22 weights)		$
5,000 lb weight cart		$
Scale test truck:	24-1000 lb weights (5 adjusted)	$
	20 - 50 lb weights (5 adjusted)	$
	2 -31 lb weight sets (22 weights each)	$
	TOTAL	$
One – 5 gallon test measure using volume transfer method:		$
One – 5 gallon test measure using gravimetric method:		$
One – 100 gallon prover using volume transfer method:		$
One – 100 gallon prover using gravimetric method:		$
One – 100 gallon LPG prover:		$
One – 20 gallon SVP (small volume prover) using volume transfer method:		$
One – 20 gallon SVP (small volume prover) using gravimetric method:		$
One- 100 foot tape with 19 points tested:		$
Are out-of-state customers charged more than your in-state customers? YES ❑ NO ❑ If YES, please explain in the comment section.		

29.Comments on Survey

MAIL OR FAX COMPLETED SURVEY TO:

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Oklahoma Bureau of Standards
2800 N Lincoln Blvd.
Oklahoma City, Oklahoma 73105

Telephone: (405) 522-5459
FAX: (405) 522-5461
Email: ken.Fraley@oda.state.ok.us