



# REAPPRAISAL PLANNING & STATISTICAL TOOLS

PRESENTATION TO THE ASSESSORS'  
ASSOCIATION OF PENNSYLVANIA

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<b>LOCATION:</b>	Seven Springs Mountain Resort
<b>DATE:</b>	May 10, 2024
<b>TIME:</b>	8:30 AM – 11:30 AM
<b>SPEAKER:</b>	Shannon Hiss, RES, RMA

## AGENDA ITEMS

- I. What **IS** mass appraisal?
- II. Reassessment time – **are you ready?**
  - a) Self- evaluation highlights
- III. Tools to help ensure success.



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## Analysis of resources

- Resources available to assessors fall into four primary categories:



1. Financial
2. Personnel
3. Existing Data Elements
4. Data Processing

To be able to successfully complete a reappraisal project there must be adequate resources in **EACH** category



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## Personnel

Knowing **how much work can be completed** by staff is as important as knowing **how much needs to be done** when determining personnel requirements

- How to accurately estimate work production and timeline expectations
  - Use historical information on workloads and production rates for tasks
- OR**
- Industry standards or the experience of other jurisdictions of similar size and property type
- Determine the number of available workdays



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# Personnel

- The most accurate way to know what is required is to use historical information on workloads and production rates

★ THESE ARE PURELY SUGGESTIONS! ★

Typical Production Rates (parcels per day)				
Property Type	Type of Appraisal Activities			
	New Work	Field Canvass	Field Review	Model Review
Single Family Residential	8 - 10	16 - 20	50 - 100	200 - 250
Apartments	2 - 4	5 - 10	15 - 20	100
Commercial/Industrial	2 - 4	5 - 10	15 - 20	100
Agricultural	2 - 4	4 - 6	N/A	50
Vacant Land	30 - 50	50 - 75	100 - 150	400

- This assumes low staff turnover and reappraisals regularly occur in the jurisdiction
- Alternatively, industry standards or experience of other, similarly sized jurisdictions and property type composition can be used

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# Personnel

The **Gantt Chart** is a graphical scheduling technique where output is shown on one axis and units on the other axis

- **Jobs** to be done are typically shown on the **vertical axis**
- **Time** on the **horizontal axis**



## Henry L. Gantt

Developed the Gantt Chart in 1917




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Phase	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan
Final Valuation													
Valuation Quality Control Review - Office													
Value Notifications													
Informal Appeals													
Formal Appeals													
Sales Reviews - Field													
Permits - Field													
Quality Control Review - Field													
Data Entry - Office													
Data Analysis													
Land Valuation - Office													
Depreciation Analysis - Office													
Model Review & Calibration - Office													

## Personnel


$$S = P \div (R \times T)$$




**S**  
Number of  
**Staff**  
Persons  
Required




**P**  
Number of  
**Parcels**  
or  
**Properties**



**R**  
Production  
**Rate**



**T**  
**Time**  
Available



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# Personnel

Phase	Units	Daily Rate
Final Valuation	20,841	175
Valuation QC	28,226	350
Value Notices	28,226	1,500
Informal Appeals	4,091	12
Formal Appeals	675	6
Sales Review	432	10
Permits & Data Collection	4,366	6
Data Collection QC	750	15
Data Entry	5,548	25
Data Analysis	28,226	75
Land Valuation	7,385	200
Depreciation Analysis	20,841	350
Model Review & Calibration	28,226	175

**Tioga County Statistics\***  
 \* As *embellished* by Shannon for the purposes of this demonstration\*

Holidays	12
Vacation	10
Professional Development	10
Sick	5
Inclement Weather	5



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# Personnel

Putting it all together in a calculator tool...



- **Step 1: Calculate number of available workdays**
  - Fill in the white cells with typical number of days for each category
    - Categories can be added or modified to better reflect your county

Available workdays	
Weeks	52
Workdays	5
Potential	260
Holidays	
Vacation	
Professional Development	
Sick	
Inclement Weather	
<b>Net</b>	<b>218</b>
<b>Per Month</b>	<b>18</b>



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# Personnel

Phase	Units	Production Rate	Months	Staff Needed
Final Valuation				
Valuation Quality Control Review				
Value Notifications				
Informal Appeals				
Formal Appeals				
Sales Reviews				
Permits & Data Collection				
Data Collection Quality Control Review				
Data Entry				
Data Analysis				
Land Valuation				
Depreciation Analysis				
Model Review & Calibration				

- Step 2: Fill in the columns and categories for **Units**, **Production Rate**, and **Months**



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# Personnel

Phase	Units	Production Rate	Months	Staff Needed	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Final Valuation																
Valuation Quality Control Review																
Value Notifications																
Informal Appeals																
Formal Appeals																
Sales Reviews																
Permits & Data Collection																
Data Collection Quality Control Review																
Data Entry																
Data Analysis																
Land Valuation																
Depreciation Analysis																
Model Review & Calibration																
<b>Estimated FTE Staffing need by month</b>					0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

- Step 3: Fill in the staff needed to match previously established **Gantt Chart**



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## Performance expectation



**STANDARD ON  
Ratio Studies**  
A criterion for measuring fairness,  
quality, equity and accuracy  
(Approved April 2013)

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INTERNATIONAL ASSOCIATION  
OF APPRAISING OFFICERS

### IAAO Standard on Ratio Studies

Level of appraisal as measured by the median ratio:  
**0.90 – 1.10**

Appraisal uniformity as measured by the PRD:  
**0.98 – 1.03**



**STANDARDS**



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## Statistics in mass appraisal

### Ratio Studies

- A ratio study is the most effective means of evaluating the accuracy of appraisals

#### Finding the Sales Ratio

$$\text{Sales Ratio} = \frac{\text{Appraised value}}{\text{Recent sale price}}$$

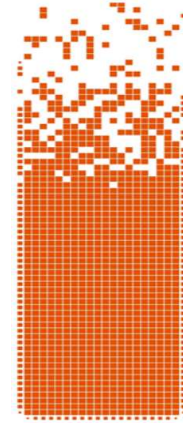


# Measures of dispersion

## Steps for calculating COD

There are 6 steps in calculating the COD:

1. Calculate and **array the ratios**
2. Find the **median ratio**
3. Calculate the **absolute difference** between the median and each ratio in the sample
4. Find the **sum of the absolute differences**
5. Divide by the number of sales to find the **average absolute deviation**
6. Divide the average absolute deviation (from step 5) by the median and **multiply it by 100** to convert the answer into a percentage



# Measures of dispersion

## Performance Standards

When using COD to measure appraisal uniformity among strata, the levels for individual strata should be within 5% of overall level

### Single-family residential homes and condos

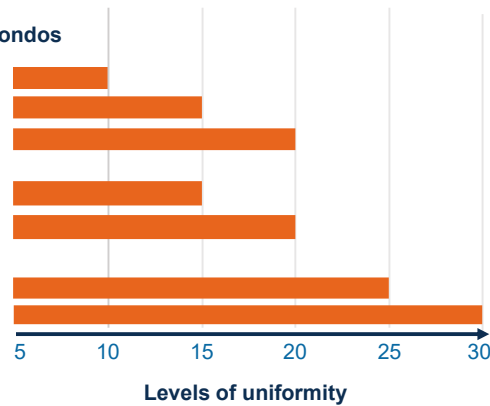
- Newer/homogenous: 5.0 – 10.0
- Older/heterogeneous: 5.0 – 15.0
- Other residential areas: 5.0 – 20.0

### Income-producing properties

- Large urban: 5.0 – 15.0
- Smaller: 5.0 – 20.0

### Vacant land (non-agricultural)

- Larger jurisdictions: 5.0 – 25.0
- Smaller jurisdictions: 5.0 – 30.0





## Assessment uniformity

### Price-Related Differential (PRD)



There are 3 steps in calculating the PRD:

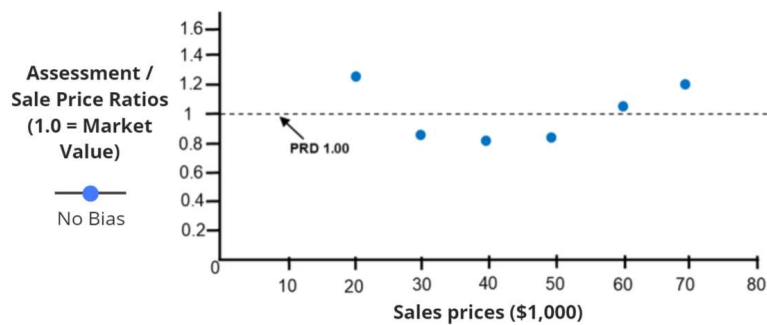
1. Find the **mean ratio**
2. Find the **weighted mean ratio**
3. Find the PRD by **dividing the mean ratio by the weighted mean ratio**



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## Assessment uniformity

### Price-Related Differential (PRD) – Example 1



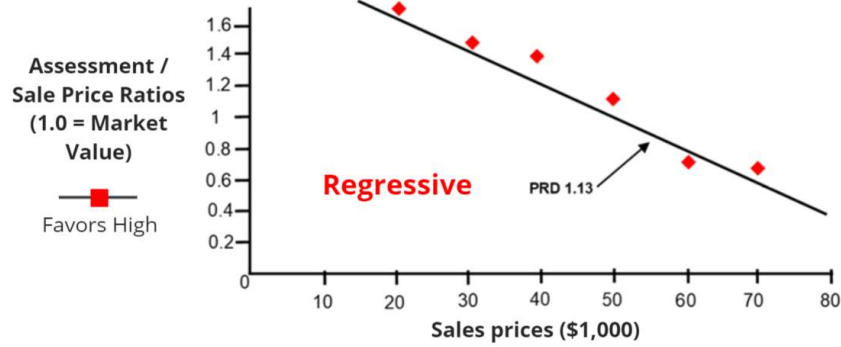
The **ideal PRD is 1.00**, which indicates there is no bias in the appraisal



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## Assessment uniformity

### Price-Related Differential (PRD) – Example 2

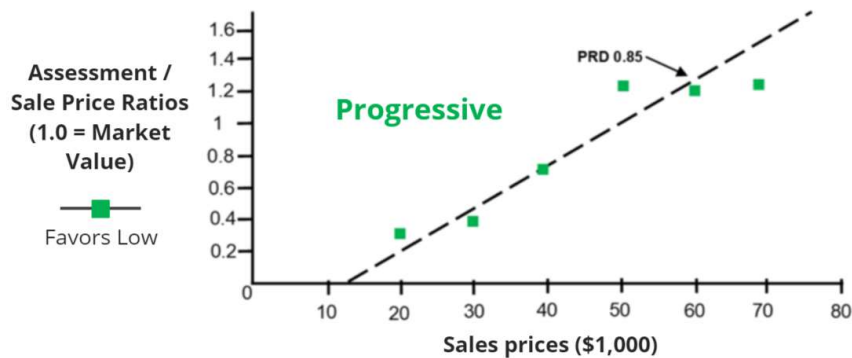


A **PRD greater than 1.03** suggests that high-value parcels are under-appraised



## Assessment uniformity

### Price-Related Differential (PRD) – Example 2



A **PRD less than 0.98** indicates that high-value parcels are relatively over-appraised

