

Average Market Rate Recommendations

Executive Summary:

The Office of Research and Analysis (ORA) recommends the following Average Market Rates (AMRs) for use by the Department of Revenue (Department) in levying the excise tax on the sale or transfer of Retail Marijuana from a Retail Marijuana Cultivation Facility:

| | Flower Rate (\$/lb) | Trim Rate (\$/lb) | Immature Plant Rate (\$/EA) | Wet whole Plant Rate (\$/lb) | Seed Rate (\$/seed) |
|---------------------|------------------------|----------------------|--------------------------------|------------------------------------|------------------------|
| Average Market Rate | \$1,471 | \$499 | \$10 | \$223 | \$6 |

The AMRs were calculated based on retail marijuana transactions recorded from May 1, 2016 through October 31, 2016. The methodology used to calculate the AMRs is the same as was used for the last rate calculations. Transactions excluded the following two types of data: 1) Identified manifests containing the processed products (e.g., PreRolls, PreRoll Cones, Joints, and Kief); and 2) Medical Marijuana transfers.

Detailed information related to the methodology and estimation techniques used to arrive at these results can be found on pages 2-7 of this document.

Average Market Rate Methodology

The Department's Taxation Division determined that the excise tax upon wholesale sales of Retail Marijuana can effectively be levied upon five product categories:

1. Flower (or bud, smoke-able product);
2. Trim (remaining parts of the plant that contain some amount of THC);
3. Immature Plants (plants that can be transferred to other Licensees);
4. Wet Whole Plants (plants that are cut off just above the roots and are not trimmed, dried, or cured; the plant must be weighed within 2 hours of the plant being harvested and without any further processing); and
5. Seeds (the seeds of the marijuana plant).

The Department utilized the modifications on the data collection in METRC established for the last rate calculation. In order to estimate the AMR for each of the categories and in order to comply with the rate-setting requirements of §39-28.8-101(1), C.R.S., ORA calculated the AMRs for January 1, 2017 based on wholesale transactions recorded by manifest numbers from May 1, 2016 through October 31, 2016 in METRC. Manifest transactions excluded the following two types of data: 1) Identified manifests containing the processed products (e.g., PreRolls, PreRoll Cones, Joints, and Kief); and 2) Medical Marijuana transfers.

Pursuant to §12-43.4-104, C.R.S., October 1, 2014 marked the beginning of the retail marijuana market for businesses which did not previously hold medical marijuana licenses. At that time, the Marijuana Enforcement Division updated the marijuana enforcement tracking reporting compliance (METRC) system and required that price data be entered and recorded for wholesale marijuana transfers. Initially, price data for entire manifests containing multiple categories was entered into METRC, and as a result, category prices were not able to be calculated. However, in February 2015, the price field was revised to allow prices with multiple categories under the same manifest number.

Two new categories, Whole Wet Plants and Seeds were added to the AMRs for the July 1, 2016 rate calculation. Additionally, in March 2016, the Department made modifications on the data collection in METRC by including the receiver wholesale price and item descriptions.

For each taxable category, prices were calculated from each individual item of the manifest and their frequencies were used to assess their distribution and identify any outliers. The following tables and graphs display the raw data of all single item transfer manifests from May 1, 2016 through October 31, 2016.

Raw Frequencies

Flower

| Rate (\$/lb) | Frequency |
|--------------------|-----------|
| \$0.01 - \$599.99 | 7,790 |
| \$600 - \$1199.99 | 8,547 |
| \$1200 - \$1799.99 | 13,398 |
| \$1800 - \$2399.99 | 9,141 |
| \$2400 - \$2999.99 | 334 |
| \$3000 and over | 308 |

Raw Frequencies

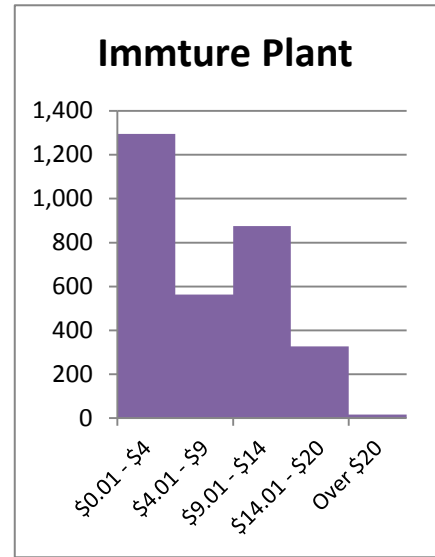
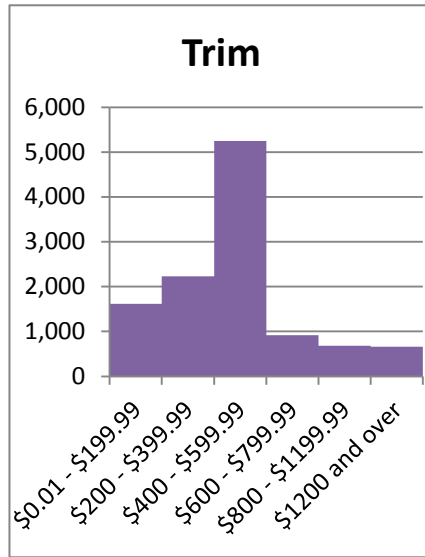
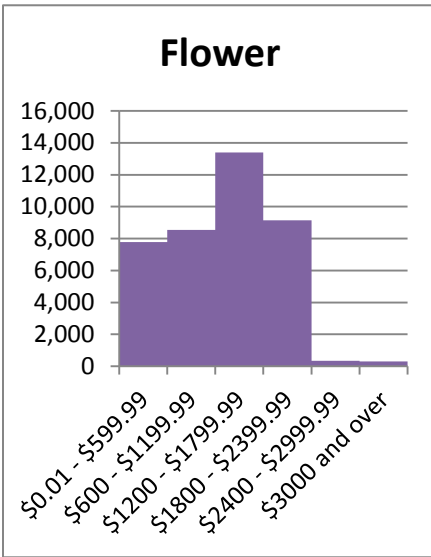
Trim/Shake

| Rate (\$/lb) | Frequency |
|-------------------|-----------|
| \$0.01 - \$199.99 | 1,617 |
| \$200 - \$399.99 | 2,230 |
| \$400 - \$599.99 | 5,252 |
| \$600 - \$799.99 | 916 |
| \$800 - \$1199.99 | 685 |
| \$1200 and over | 664 |

Raw Frequencies

Immature Plant

| Rate (\$/each) | Frequency |
|----------------|-----------|
| \$0.01 - \$4 | 1,295 |
| \$4.01 - \$9 | 563 |
| \$9.01 - \$14 | 875 |
| \$14.01 - \$20 | 326 |
| Over \$20 | 16 |



Raw Frequencies

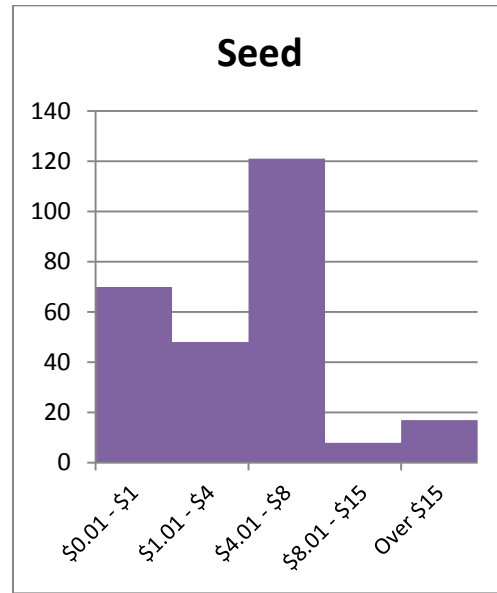
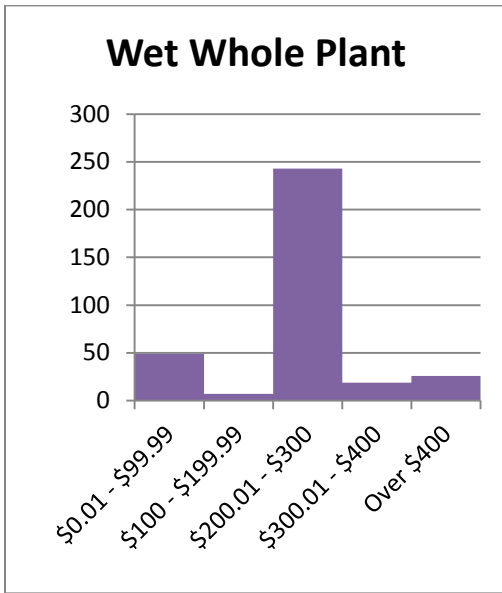
Wet Whole Plant

| Rate (\$/lb) | Frequency |
|------------------|-----------|
| \$0.01 - \$99.99 | 49 |
| \$100 - \$199.99 | 7 |
| \$200.01 - \$300 | 243 |
| \$300.01 - \$400 | 19 |
| Over \$400 | 26 |

Raw Frequencies

Seed

| Rate (\$/each) | Frequency |
|----------------|-----------|
| \$0.01 - \$1 | 70 |
| \$1.01 - \$4 | 48 |
| \$4.01 - \$8 | 121 |
| \$8.01 - \$15 | 8 |
| Over \$15 | 17 |



Next, each rate for each item in a product category was combined into an un-weighted arithmetic mean (each item counts as an observation in the weight). Additional summary statistics related to the distribution of these values, such as the maximum and minimum by transaction rates as well as the median and mode values by transaction rates, are shown in the tables below.

Summary Statistics (Including Outliers)

| | Flower Rate (\$/lb) | Trim Rate (\$/lb) | Immature Plant Rate (\$/EA) | Wet Whole Plant Rate (\$/LB) | Seed Rate (\$/Seed) |
|--------------------|------------------------|----------------------|-----------------------------------|------------------------------------|------------------------|
| Max Rate | \$22,223,586 | \$37,799 | \$150 | \$525 | \$49 |
| Min Rate | \$0 | \$0 | \$0 | \$0 | \$0 |
| Median Rate | \$1,293 | \$454 | \$5 | \$227 | \$4 |
| Mode Rate | \$5 | \$504 | \$10 | \$225 | \$5 |
| Standard Deviation | 115,419 | 927 | 5.91 | 116 | 9 |

The frequency tables show that the rates for both Flower and Trim have wide ranges. The frequency for Immature Plant rates tend to cluster between \$0 and \$14 dollars. There are few transactions reported for both Wet Whole Plant rates and Seed rates, although these tend to be the most clustered, with most observations clustered within \$200.01 to \$300 per Wet Whole Plant and \$4.01 to \$8 per Seed. The mean price for Flower and Trim both show substantial variation with a standard deviation of 115,419 and 927 respectively. The data for Immature Plants also shows variation. There are several data values that could be considered outliers due to possible data entry errors or taxpayer difficulty understanding the form.

It is ORA's recommendation that the Department should levy the excise tax using the AMR after removing the following outliers:

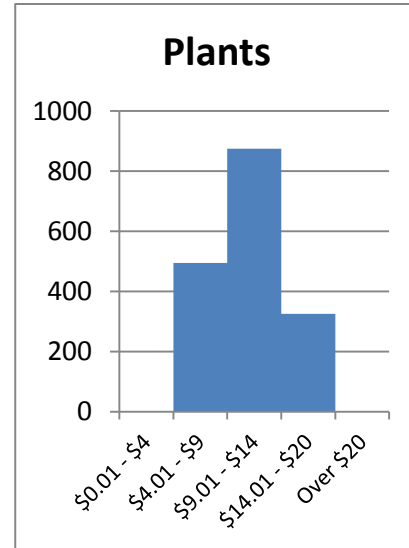
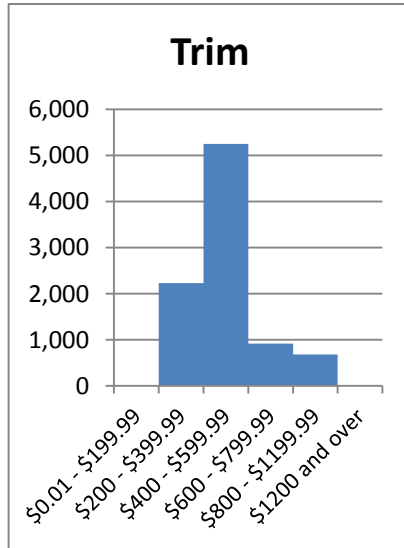
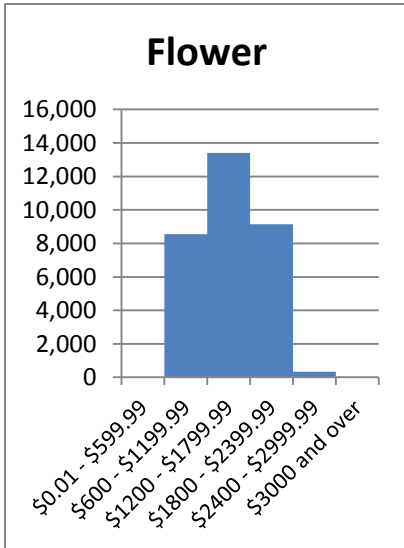
- Flower: observations in the "\$0.01-\$599.99" and "\$3000 and over" ranges;
- Trim: observations in the "\$0.01-\$199.99" and "\$1,200 and over" ranges; and
- Immature Plant: observations in the "\$0.01-\$4" and "over \$20" ranges.

No outliers were removed for Wet Whole Plant or Seeds because they had few transactions reported and tended to be the most clustered. After removing outliers from the data extraction on November 15, 2016, the frequency tables shown below reflect the normalized data of single category transfer manifests from May 1, 2016 through October 31, 2016. The calculations based on the normalized data would equate to an AMR of \$1,471 per pound for Flower, \$499 per pound for Trim, \$10 for each Immature Plant, \$223 per pound for Wet Whole Plant, and \$6 per seed for Seed. These average rates are consistent with the median and mode rate analysis in the below tables and are recommended to be used for January 1, 2017.

| Flower | |
|--------------------|-----------|
| Rate (\$/lb) | Frequency |
| \$0.01 - \$599.99 | 0 |
| \$600 - \$1199.99 | 8,547 |
| \$1200 - \$1799.99 | 13,398 |
| \$1800 - \$2399.99 | 9,141 |
| \$2400 - \$2999.99 | 334 |
| \$3000 and over | 0 |

| Trim/Shake | |
|-------------------|-----------|
| Rate (\$/lb) | Frequency |
| \$0.01 - \$199.99 | 0 |
| \$200 - \$399.99 | 2,230 |
| \$400 - \$599.99 | 5,252 |
| \$600 - \$799.99 | 916 |
| \$800 - \$1199.99 | 685 |
| \$1200 and over | 0 |

| Immature Plant | |
|----------------|-----------|
| Rate (\$/each) | Frequency |
| \$0.01 - \$4 | 0 |
| \$4.01 - \$9 | 495 |
| \$9.01 - \$14 | 875 |
| \$14.01 - \$20 | 326 |
| Over \$20 | 0 |

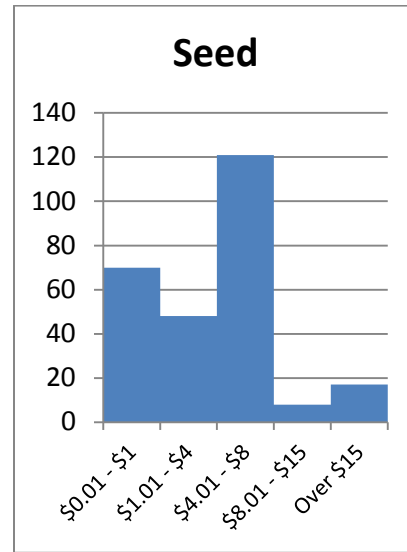
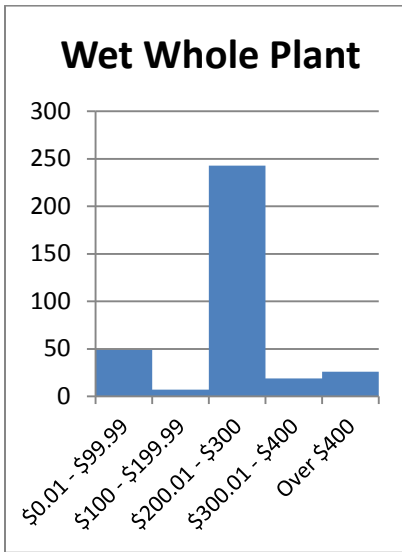


Wet Whole Plant

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Seed

| Rate (\$/each) | Frequency |
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| \$0.01 - \$1 | 70 |
| \$1.01 - \$4 | 48 |
| \$4.01 - \$8 | 121 |
| \$8.01 - \$15 | 8 |
| Over \$15 | 17 |



Summary Statistics (Excluding Outliers)

| | Flower Rate (\$/lb) | Trim Rate (\$/lb) | Immature Plant Rate (\$/EA) | Wet Whole Plant Rate (\$/LB) | Seed Rate (\$/Seed) |
|--------------------|------------------------|----------------------|-----------------------------------|------------------------------------|------------------------|
| Max Rate | \$2,997 | \$1,199 | \$20 | \$525 | \$49 |
| Min Rate | \$600 | \$200 | \$4 | \$0 | \$0 |
| Median Rate | \$1,455 | \$470 | \$10 | \$227 | \$4 |
| Mode Rate | \$1,519 | \$504 | \$10 | \$225 | \$5 |
| Standard Deviation | 382 | 169 | 4 | 116 | 9 |