The gradual improvement in the Phoenix market that has been evident for several months ended with no appreciation in house prices from July 2009 to July 2010. Various segments of the housing market continued to show mixed results with foreclosure prices up slightly in July while non-foreclosure prices continued to decline. Based on index values from last year and current conditions in the housing market, it is likely that house prices throughout the metro area will remain essentially flat for the next twelve months. While the improvement seen over the past 18 months isn’t likely to continue, there also is no evidence that house prices will resume a downward trend, contrary to some published reports. The advantage of a repeat sales index is that the same houses are paired as they resell, holding house quality essentially constant. In contrast, other methods for measuring price changes involve a different mix of houses in terms of size or age, etc. each period making those calculations less reliable.

Lower priced houses had been seeing gains in recent months but the preliminary increase for July was 8 percent, lower than the 13 percent increase in May and 11 percent in June (Table 1). It appears that this segment of the housing market, which was hard hit during the downturn, will see price increases throughout the rest of 2010 but at gradually slower rates. Unless economic and housing market conditions change dramatically, prices are likely to be relatively stable going into 2011. For higher priced houses the May decline was 1 percent compared to 3 percent in April. The data indicate that the higher priced segment of the market is likely to show small declines on an annual basis through the rest of 2010 with prices flat for the first part of 2011.

### Table 1

<table>
<thead>
<tr>
<th></th>
<th>OVERALL</th>
<th>LOWER PRICED</th>
<th>HIGHER PRICED</th>
<th>TOWNHOUSE / CONDO</th>
<th>FORECLOSURES</th>
<th>NON-FORECLOSURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2009 – May 2010</td>
<td>2.6</td>
<td>12.7</td>
<td>-1.2</td>
<td>-20.6</td>
<td>3.0</td>
<td>-13.2</td>
</tr>
<tr>
<td>April 2010 – May 2010</td>
<td>0.8</td>
<td>1.6</td>
<td>1.0</td>
<td>-2.9</td>
<td>-1.1</td>
<td>2.0</td>
</tr>
<tr>
<td>1989–1992</td>
<td>-7.7</td>
<td>-3.9</td>
<td>-12.8</td>
<td>-3.9</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>2006– May 2010</td>
<td>-47.5</td>
<td>-57.1</td>
<td>-39.5</td>
<td>-56.2</td>
<td>-52.3</td>
<td>-43.4</td>
</tr>
<tr>
<td>Median Price - May 2010</td>
<td>$132,000</td>
<td>$105,600</td>
<td>$274,900</td>
<td>$80,000</td>
<td>$119,900</td>
<td>$164,950</td>
</tr>
</tbody>
</table>
The foreclosure and non-foreclosure indexes continue to move in opposite directions with foreclosure houses showing small increases in July (3 percent). Since March foreclosure prices have increased at an annual rate in the 3-5 percent range. In contrast the preliminary decline for non-foreclosure prices in July was unchanged from June at -11 percent. This pattern is likely to continue into 2011 for both segments of the market unless there is a dramatic change in housing market conditions. The townhouse/condo segment of the market appears to be leveling off but at an annual rate of decline just under 20 percent. Prices declined by 19 percent beginning with the March data and that rate has hardly changed, standing at -18 percent for the preliminary July data.

The overall median price for sales that were included in the May index was $132,000 and the preliminary figure for July is $129,900. Median prices have been fairly stable for the almost a year except for dips last January and February, typically slow times of the year for housing. The median price for foreclosed houses in May was $119,900 up substantially from a low of $97,000 last May. The preliminary median for July is essentially the same at $120,000. Prices since October 2009 have been in the range of $115,000 to $120,000 and may well remain in that general range for the foreseeable future unless there is a significant change in the number of houses going into foreclosure or a turnaround in the Phoenix economy. Median prices for the lower and higher priced houses in Table 1 were $98,000 and $275,000 respectively last July. For non-foreclosure houses the median price dropped to $157,000 in July compared to $165,000 in June while for foreclosures the July median was $120,000. The preliminary median price of townhouse / condo units in July increased slightly to $77,100 from $75,500 in June.

**Regions**

Prices in the Central, Northwest and Southwest regions have increased from May 2009 to May 2010 and in the case of the Central region the increase is 6.4 percent, up from 3.1 percent in the June data. The hardest hit regions in the downturn have now had increases for two straight months. In contrast the Northeast and Southeast regions show annual declines but at much slower rates than in June. Prices in both regions are likely to continue declining for the rest of the year. In terms of total declines from the 2006 peak, the Southwest is down the most, 58 percent, but even in the Northeast prices have dropped 36 percent. The three hardest hit regions still show total declines in excess of 50 percent.

**Cities**

This report introduces new indices for Goodyear, Avondale and Surprise, bringing the total number of cities for which indices are calculated to eleven. Limited historical data has prevented those cities from being included in the monthly reports but the methodology used to calculate each index has
been modified resulting in a large enough sample of sale pairs each month so that a reliable index can be calculated. The new methodology is explained in more detail in the methodology section at the end of this report. The only cities with appreciation from May 2009 to 2010 are those in the Northwest and Southwest regions, including the three new cities. Prices in the Southeast region are down across the board with the largest decline in Tempe at 9.3 percent, the same as in April. Based on index values for the past year, it is likely that Glendale, Peoria and Mesa will have relatively stable prices at least into early 2011. Slight price appreciation is likely to continue in Goodyear, Avondale and Surprise into next year with small price declines likely for the remaining cities.

### TABLE 2
CHANGE IN HOUSE PRICES BY REGION
(Percent)

<table>
<thead>
<tr>
<th></th>
<th>CENTRAL</th>
<th>NORTHEAST</th>
<th>SOUTHEAST</th>
<th>NORTHWEST</th>
<th>SOUTHWEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2009 – May 2010</td>
<td>6.4</td>
<td>-3.8</td>
<td>-2.5</td>
<td>2.9</td>
<td>3.9</td>
</tr>
<tr>
<td>April 2010 - May 2010</td>
<td>0.7</td>
<td>1.4</td>
<td>0.8</td>
<td>0.3</td>
<td>-0.3</td>
</tr>
<tr>
<td>2006 – May 2010</td>
<td>-53.2</td>
<td>-36.4</td>
<td>-46.8</td>
<td>-52.0</td>
<td>-58.1</td>
</tr>
</tbody>
</table>

### TABLE 3
CHANGE IN HOUSE PRICES BY CITY
(Percent)

<table>
<thead>
<tr>
<th></th>
<th>CHANDLER</th>
<th>GILBERT</th>
<th>GLENDALE</th>
<th>MESA</th>
<th>PEORIA</th>
<th>SCOTTSDALE/ PARADISE VALLEY</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2009 – May 2010</td>
<td>-2.8</td>
<td>-4.8</td>
<td>1.9</td>
<td>-1.1</td>
<td>-1.3</td>
<td>-3.8</td>
</tr>
<tr>
<td>April 2010 May 2010</td>
<td>1.9</td>
<td>0.2</td>
<td>0.6</td>
<td>0.5</td>
<td>0.3</td>
<td>1.0</td>
</tr>
<tr>
<td>2006 – May 2010</td>
<td>-43.6</td>
<td>-46.8</td>
<td>-55.5</td>
<td>-49.6</td>
<td>-52.4</td>
<td>-35.7</td>
</tr>
<tr>
<td></td>
<td>SUN CITY/</td>
<td>TEMPE</td>
<td>GOODYEAR</td>
<td>AVONDALE</td>
<td>SURPRISE</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-----------</td>
<td>-------</td>
<td>----------</td>
<td>----------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SUN CITY WEST</td>
<td>(Percent)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May 2009 - May 2010</td>
<td>-5.6</td>
<td>-9.3</td>
<td>13.3</td>
<td>5.0</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>April 2010 - May 2010</td>
<td>0.4</td>
<td>-1.7</td>
<td>2.9</td>
<td>3.2</td>
<td>-0.7</td>
<td></td>
</tr>
<tr>
<td>1989 – 1992</td>
<td>-10.5</td>
<td>-1.9</td>
<td>na</td>
<td>na</td>
<td>na</td>
<td></td>
</tr>
<tr>
<td>2006 – May 2010</td>
<td>-38.7</td>
<td>44.3</td>
<td>-58.0</td>
<td>-64.4</td>
<td>-55.1</td>
<td></td>
</tr>
</tbody>
</table>

**Methodology**

The use of repeat sales is the most reliable way to estimate price changes in the housing market because the repeat sales approach eliminates the need to deal with the many issues associated with the heterogeneous nature of housing. Repeat sales can be used to measure the price change of the same housing unit over time. A large number of repeat sales over many years can be analyzed to develop a repeat sales index. In contrast, indices developed using regression analysis provide estimates of price changes over time while simultaneously attempting to control for differences in house characteristics, location, demographics and market conditions, etc. within the model. Regression analysis can and does produce meaningful estimates of price changes but the results are not as reliable as those produced using repeat sales data. An even less rigorous approach would be to simply average sale prices by zip code or some other geographic area where the mix of housing sizes and ages, etc. would be different each month. The percent changes based on medians or averages would reflect not only price changes but also differences in the sizes, ages and other characteristics of the houses sold each month.

The W.P. Carey School of Business – Repeat Sales Index (RSI) tracks very closely to the S&P/Case - Shiller index for Phoenix since the same methodology is employed for calculating both indices. The S&P/ Case-Shiller index has been developed for 20 metropolitan areas and is being used as a basis for trading housing futures contracts in 10 of those markets. Any differences between the two indices are probably due to the way the data has been cleaned prior to the calculation process. The S&P/Case-Shiller index is proprietary so the cleaning procedure used in connection with that index
could not be completely duplicated. However, following S&P/Case-Shiller, the cleaning process used with the ASU - RSI excludes pairs where the first sale involved new construction and pairs where sales occurred within six months of each other. Sale pairs with extremely high or low annual rates of price change are excluded since at least one of the transactions may involve a data error. The same justification is used to drop sales with extremely high or low prices or prices per square foot prior to matching the sale pairs. A more detailed explanation of the data cleaning and calculation process is contained in the ASU-RSI Methodology Report.

The house price data used in the S&P/Case-Shiller index starts in January 1989. Beginning with January 1990, the percent change from the same month in the previous year is reported. The ASU – RSI also begins with January 1989 data so the same percent change calculation also begins in January 1990 and is reported for each month since then. There is seasonality in house price data so month to month changes may not accurately reflect changes in market conditions and would cover a very short time period. Calculating a percent change from the same month last year controls for whatever seasonality may be present in the data. Annual rates of change typically are thought of applying to a calendar year but in this report the annual rates that are reported would be measuring change over the preceding twelve months. To smooth the index, the rate of return calculated from each sale pair is included in calculations for a total of three months before it is published. Results using data for the two newest months are labeled as preliminary.

The S&P/Case-Shiller index is published only for the entire Phoenix metro area. One major advantage to the ASU-RSI is that in addition to the overall index, indices have been calculated for higher and lower priced houses, smaller geographic areas (regions and selected cities) and for the housing market segmented in various ways. Price changes for the attached portion of the housing market (townhouse / condominiums) are presented as a repeat sales index using the same methodology and indices are also estimated for higher and lower priced single-family detached houses and for foreclosure and non-foreclosure sales. The monthly data are divided into two groups based on the median price of all single-family houses sold. Sales are then paired within each of the two data sets and a repeat sales index is calculated for each. The foreclosure sale pairs are formed using two foreclosure sales or with a foreclosure sale paired with an earlier non-foreclosure sale of the house. The metro area has also been divided into five regions and an index has been calculated for each. All repeat sales used in the metro index are included in one of the five regional indices. Indices have also been calculated for eight individual cities where there are a sufficient number of repeat sales a reliable index to be estimated. A list of the cities included in each region is in Table 4.

The graphs contained in this report show the annual rate of change in house prices for the Phoenix metropolitan area on a monthly basis as well as median house prices. Figures 1 and 2 compare the change in the overall, lower and higher priced indices to the overall trend in the index,
where the trend was estimated using data from January 1989 through December 2003. Figure 3 makes the same type of comparison using the median price of single-family sales that were used to form sale pairs for the current month, not the median price of all sales that occurred during the month. Since each index is a moving three month average, preliminary estimates of the index and future median prices for the entire market are included for the next two months (June and July) in Figures 1-7. Figures 4 and 5 include the townhouse / condominium RSI compared to the single-family RSI presented earlier in Figures 1 and 2. The foreclosure and non-foreclosure RSIs are in Figure 6 while Figure 7 has median prices for foreclosure and non-foreclosure houses and townhouse / condo units. Figures 8-17 contain graphs for the regions and cities for two different time periods. Five of the graphs present the price changes from January 1990 through May 2010 while the other five graphs cover the current housing cycle beginning in January 2004. Due to data limitations, a reliable index for Gilbert could not be calculated until January 1999 so the annual changes for Gilbert in Figures 10 and 11 start in January 2000.

Limited historical data has prevented Goodyear, Avondale and Surprise from being included in the monthly reports. However, the methodology used to calculate the indices has been modified and applied to those cities, resulting in enough data to calculate a reliable index for each one. Very simply, if a sale in one of those cities cannot be paired with a prior sale of the same house, the sale is paired with the prior sale of a house that is the same model and in the same subdivision. While model pairing is not ideal, this technique allows these cities to be included in the report. When the model pairing methodology was applied to the existing cities in the report, the index values correlated almost perfectly with those calculated from the traditional sale pair methodology. However, even with the modified pairing technique, fewer pairs are available to calculate the monthly index so the indices for Goodyear, Avondale and Surprise are somewhat more volatile than those for the other eight cities.
<table>
<thead>
<tr>
<th>REGION</th>
<th>CITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORTHEAST</td>
<td>CAREFREE, CAVE CREEK, FOUNTAIN HILLS, PARADISE VALLEY, SCOTTSDALE</td>
</tr>
<tr>
<td>NORTHWEST</td>
<td>EL MIRAGE, GLENDALE, PEORIA, SUN CITY / SUN CITY WEST, SURPRISE, YOUNGTOWN</td>
</tr>
<tr>
<td>CENTRAL</td>
<td>PHOENIX</td>
</tr>
<tr>
<td>SOUTHEAST</td>
<td>APACHE JUNCTION, CHANDLER, GILBERT, HIGLEY, MESA, QUEEN CREEK, SUN LAKES, TEMPE</td>
</tr>
<tr>
<td>SOUTHWEST</td>
<td>AVONDALE, BUCKEYE, GOODYEAR, GOODYEAR, LITCHFIELD PARK</td>
</tr>
</tbody>
</table>
Figure 1
Phoenix Single-Family Repeat Sales Index (RSI)
Annual Change
January 1990 - July 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data

May: 1, Upper -1%  2, Lower 13%
Figure 2
Phoenix Single-Family Repeat Sales Index (RSI) Annual Change
January 2004 - July 2010

Metro Area
Upper Range¹
Lower Range²

June and July are Preliminary

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data

May: 1, Upper -1%  2, Lower 13%
Figure 3
Phoenix Median Single-Family House Prices
January 1989 - July 2010

Trend
Metro Area
Upper Range¹
Lower Range²

June and July are Preliminary

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data

May: 1, Upper $274,900  2, Lower $105,500
Figure 4
Phoenix Single-Family and Townhouse/Condominium Repeat Sales Index (RSI) Annual Change
January 1990 - July 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data

May: Single-Family 3%; TH/Condo -21%
Figure 5
Phoenix Single-Family & Townhouse/Condominium Repeat Sales Index (RSI)
Annual Change
January 2004 - July 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data

May: Single-Family 3%; TH/Condo -21%
Figure 6
Phoenix Single-Family Foreclosure Repeat Sales Index (RSI) Annual Change January 2001 - July 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice

Data Provided by Ion Data

May: 1, Foreclosure 3%; 2, Non-Foreclosure -13%
Figure 7
Phoenix Foreclosures, Non-Foreclosures and Townhouse/Condominium Median Prices
January 1989 - July 2010

June and July are Preliminary

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data

May:  1, TH/Condo $ 80,000   2, Foreclosures $119,900   3, Non-Foreclosures $164,950
Figure 8
Regional Single-Family Repeat Sales Index (RSI)
Annual Change
January 1990 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 9
Regional Single-Family Repeat Sales Index (RSI) Annual Change
January 2004 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 10
Chandler, Gilbert, Mesa, & Tempe Single-Family Repeat Sales Index (RSI)
Annual Change
January 1990 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 11
Chandler, Gilbert, Mesa & Tempe Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 12
Glendale, Peoria, Surprise & Sun City/Sun City Single-Family West Repeat Sales Index (RSI)
Annual Change
January 1990 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 13
Glendale, Peoria, Surprise & Sun City/Sun City West Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 14
Scottsdale/Paradise Valley & Phoenix Single-Family Repeat Sales Index (RSI)
Annual Change
January 1990 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 15
Scottsdale/Paradise Valley & Phoenix Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 16
Avondale and Goodyear Single Family Repeat Sales Index (RSI)
Annual Change
January 1990 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data
Figure 17
Avondale and Goodyear Single-Family Repeat Sales Index (RSI)
Annual Change
January 2004 - May 2010

Source: ASU W.P. Carey School of Business; Center for Real Estate Theory and Practice
Data Provided by Ion Data