



# DIRT Report for 2017

Supplemental Analysis

**Relating Call Before You Dig Awareness and Damages Due to No Notification to One Call Center**

April 2019

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# CGA DIRT Data & Call Before You Dig Awareness

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# CGA DIRT Data & Call Before You Dig Awareness

## Introduction

This report is a companion document to the 2017 DIRT Annual Report. It examines damages due to notifications not made in relation to awareness of call before you dig (CBYD) services at various geographical levels: first by U.S. Census Divisions, then for seven individual states and then by regions within those states. This analysis seeks to test the hypothesis that higher awareness of CBYD services corresponds with lower damages attributed to the root cause notification not made in the DIRT data. If the hypothesis is correct, higher levels of awareness would correspond with lower levels of damages due to the root cause notification not made (NNM),<sup>1</sup> and vice versa.

## Approach

Each year since 2008, CGA has conducted a national survey testing awareness of CBYD and 811 services. The survey targets the general population and thus would capture few, if any, professional excavators and other damage prevention industry stakeholders. The survey asks respondents the following questions<sup>2</sup>:

- Are you aware of a free national phone number that people can call to have underground utility lines on their property marked prior to starting any digging project?
- Do you recall what the number is? (Unaided recall)
- Does the phone number “811” sound familiar? (Aided recall)
- Have you ever called or gone online to request to have underground utility lines on your property marked prior to starting a digging project?
- In the future, how likely are you to contact 811 before starting a digging project?
- Have you seen or heard advertising that promotes the 811 service?
- If yes, where specifically did you see or hear 811 advertising? (TV, radio, bill inserts, billboards, etc.)

This survey is done at the U.S. Census Division level, but CGA also offers to conduct the same survey at a state/region level for states willing to cover the additional cost. The states that did so in 2018 were California (CA), Georgia (GA), Indiana (IN), Kentucky (KY), North Carolina (NC), Pennsylvania (PA) and Texas (TX).

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<sup>1</sup> AKA NOLOCATEREQ – notification of intent to excavate was not provided to the one call center.

<sup>2</sup> This is an incomplete list of the questions asked on the survey. CGA typically does a webinar on the results of these annual surveys. A recording of the most recent webinar at the time of this report can be accessed at: <https://commongroundalliance.com/webinars>, titled “Using Data to Measure Progress – August 14, 2018.”

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Figure 1 shows the states that make up the U.S. Census Divisions, and the corresponding levels of awareness of CBYD services (i.e. the percent answering YES to the first bulleted questions above).

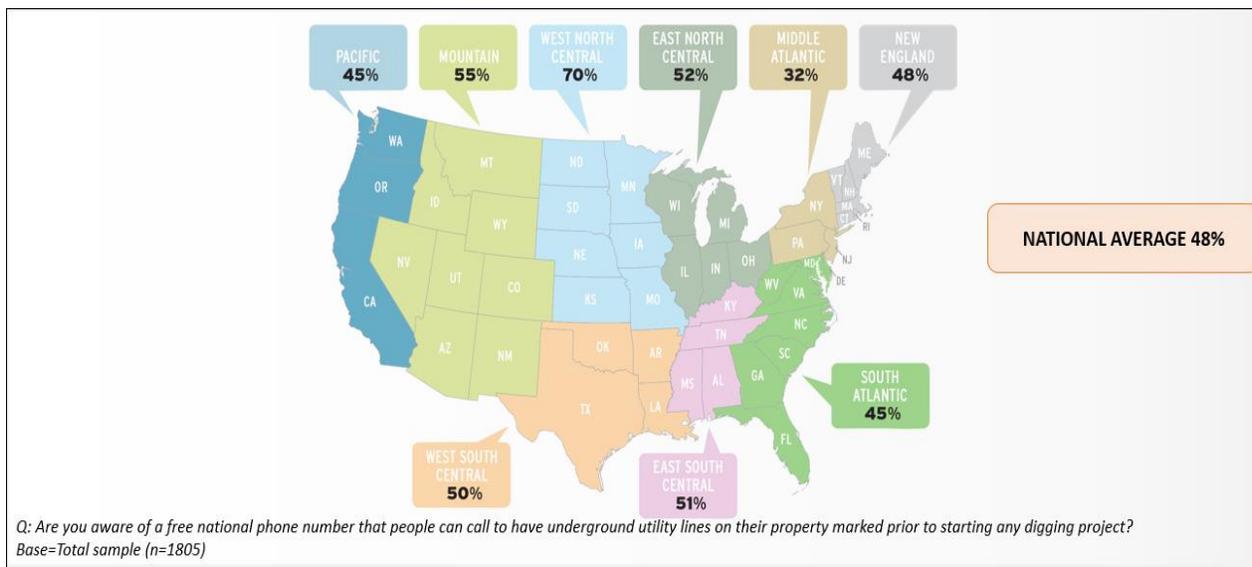


Figure 1. U.S. Census Regions used in Awareness Survey.

This analysis will start at the U.S. Census Division level, then zoom in to the state level for those that participated in the additional survey, and then to regions within those states. From the DIRT data, we use damages with root cause of NNM as a percentage of damages with a known root cause (meaning “data not collected” and “other” are filtered out). The hypothesis is that as CBYD awareness increases, the percentage of NNM damages will decrease. The analysis will also use the “type of excavator” field from DIRT data, first utilizing all excavator types, and then focusing on occupants.

This analysis uses the latest available data, but it should be noted that there is a slight mismatch in the timing of the awareness survey (June 2018) and the DIRT data (CY 2017). If interested in historical awareness data, DIRT reports since 2012 have included variations of this analysis at the U.S. Census Division level.

Also note that as we zoom in to smaller geographical areas, the awareness survey sample populations also become smaller and thus the margin of error<sup>3</sup> increases. In addition, filtering out unknown root causes reduces the size of the DIRT dataset available for this analysis. Furthermore, when we filter down to regions within states, and occupants as the type of excavator, in some cases the available data set becomes very small and therefore any observed relationships should be interpreted with caution.

<sup>3</sup> The margin of error at the U.S. Census Division Level was  $\pm 2.3$ . Margins of error for the individual states are provided in the Regional Results section of this report.

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## Results

Trends in damages in relation to CBYD awareness are presented at a national level by Census Division, at a state level, at a regional level across states and at a regional level within states.

### National Results

The following figures are sorted, high-to-low, by the percentage of damages due to NNM relative to all damages within the geographical unit with a known root cause (i.e. “other” and “data not collected” responses are filtered out).

Figure 2 demonstrates the trend in damages due to NNM in relation to awareness of CBYD services for all excavator types. In general, if we were to imagine a line of best fit for the percentage of awareness data points, the inverse relationship is observed except for the Middle Atlantic Region.

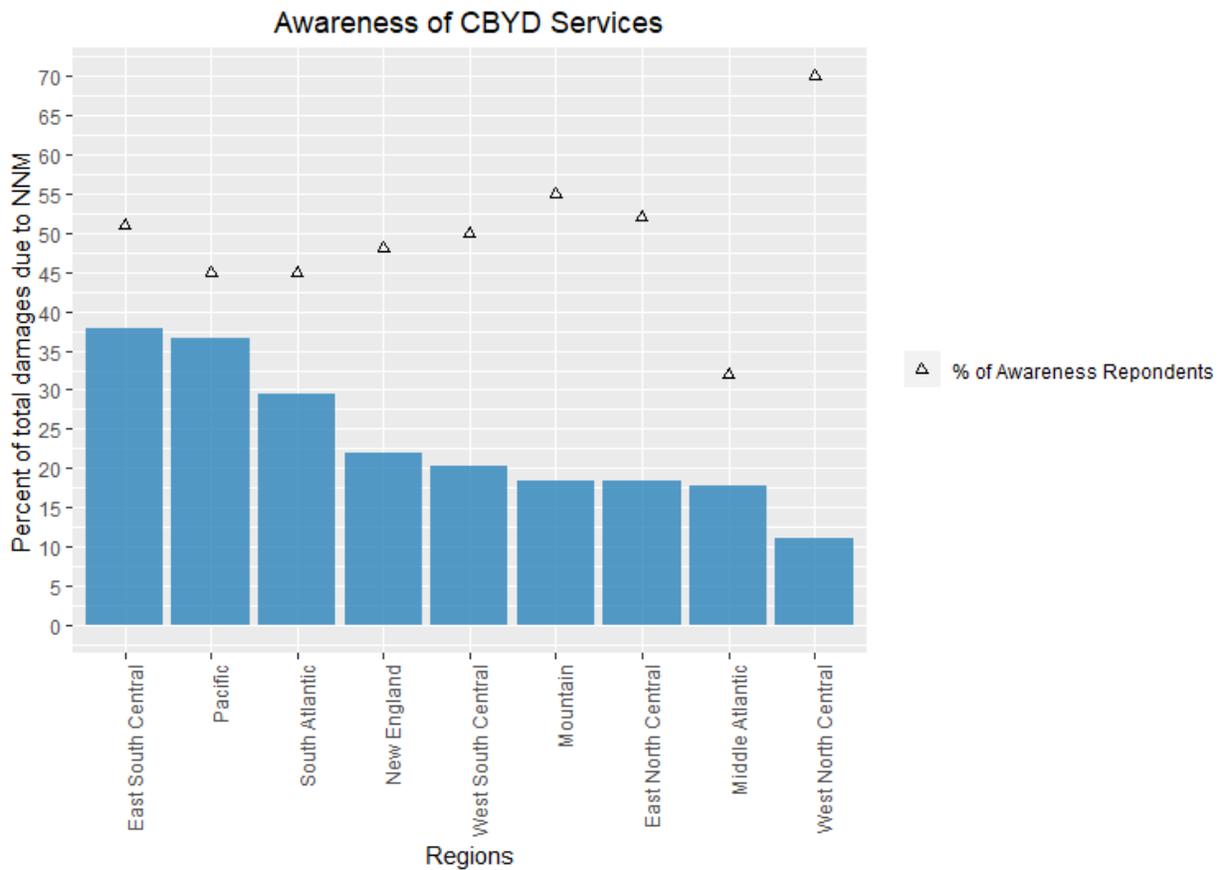


Figure 2. Awareness of CBYD services in relation to damages due to notification not made, U.S. Census Divisions.

Middle Atlantic has a large percentage of “unknown” responses in the root cause data. If that is masking a higher percentage of NNM than that in the known data, that would shift it to the left in Figure 2, making it less of an outlier.

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Figure 3 shows the same analysis as Figure 2, but the excavator type is limited to occupants, which would be most representative of the awareness survey population. Note how the percentages of NNM damages shifts upwards significantly when compared to Figure 2.

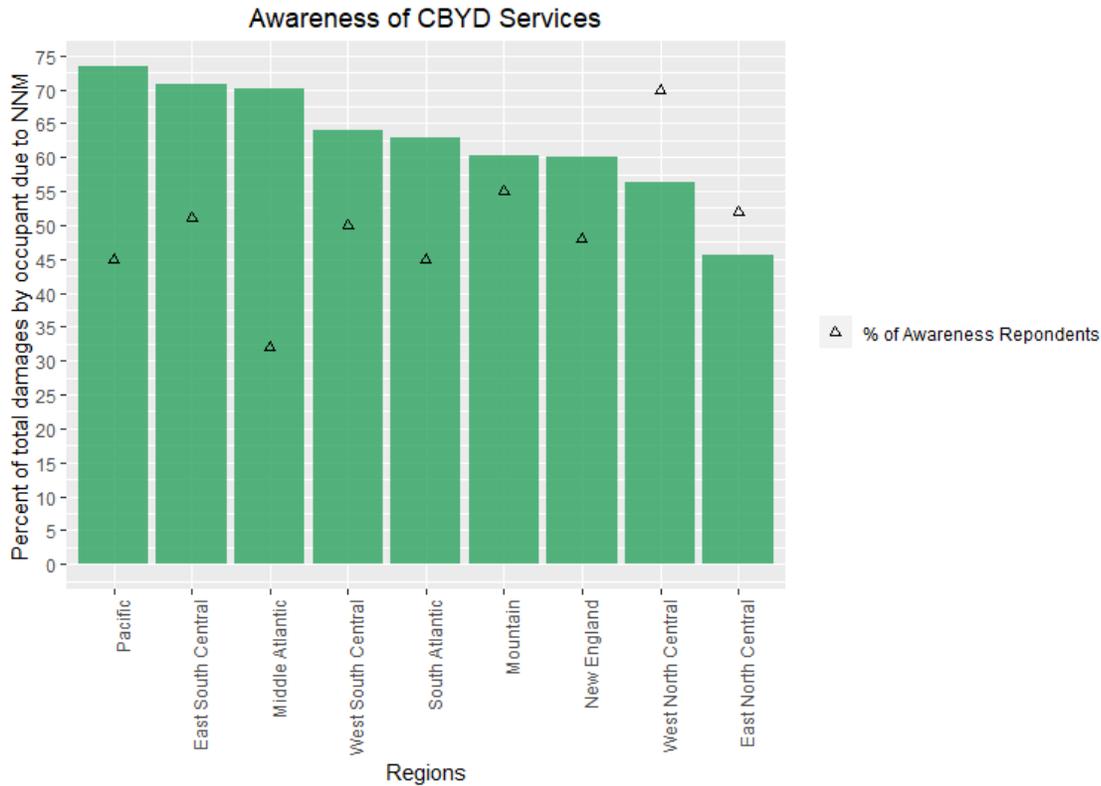


Figure 3. Awareness of CBYD services in relation to damages by occupants due to notification not made, U.S. Census Divisions.

Because we are sorting high-to-low by percent NNM, the order of the regions is shuffled. In general, the figure still demonstrates the inverse relationship, although not as well as in Figure 2. Regions with relatively high NNM damages (Pacific, East South Central and Middle Atlantic) have relatively low CBYD awareness. Regions with relatively low NNM damages (West North Central and East North Central) have relatively high CBYD awareness. As noted above, the “unknown” root cause data in the Middle Atlantic might be causing it to be further to the right than it should be.

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## State Results

This section of the report repeats the above analysis at the state level for those that participated in the additional awareness survey. The seven states come from six U.S. Census Divisions, with two (GA and NC) from South Atlantic.

Figure 4 corresponds to Figure 2 (all excavator types) and Figure 5 corresponds to Figure 3 (occupant excavators).

Due to the issues with “unknown” root cause data described above in the Middle Atlantic Region, PA perhaps should be further to the left in Figures 4 and 5.

In Figure 4, the hypothesis is demonstrated well in CA and IN. For the remaining states, there appears to be declining NNM damages along with decreasing awareness, although PA perhaps should have higher NNM and be further to the left.

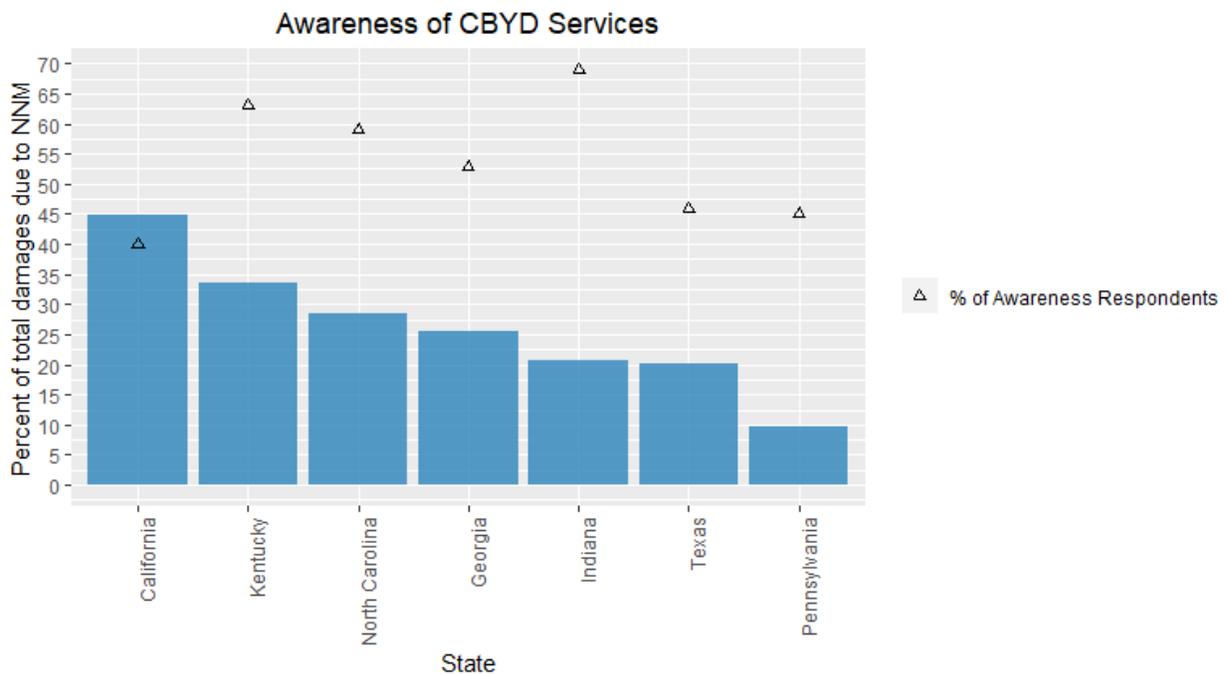


Figure 4. Awareness of CBYD services in relation to damages due to notification not made, all excavator types, 7 states.

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In Figure 5, IN and KY are characterized by relatively high occupant NNM damages and high awareness of CBYD services, contrary to our hypothesis. The hypothesis holds up well in CA. In general, the other states follow the pattern seen in CA where lower NNM damages are associated with higher CBYD awareness, and vice versa.

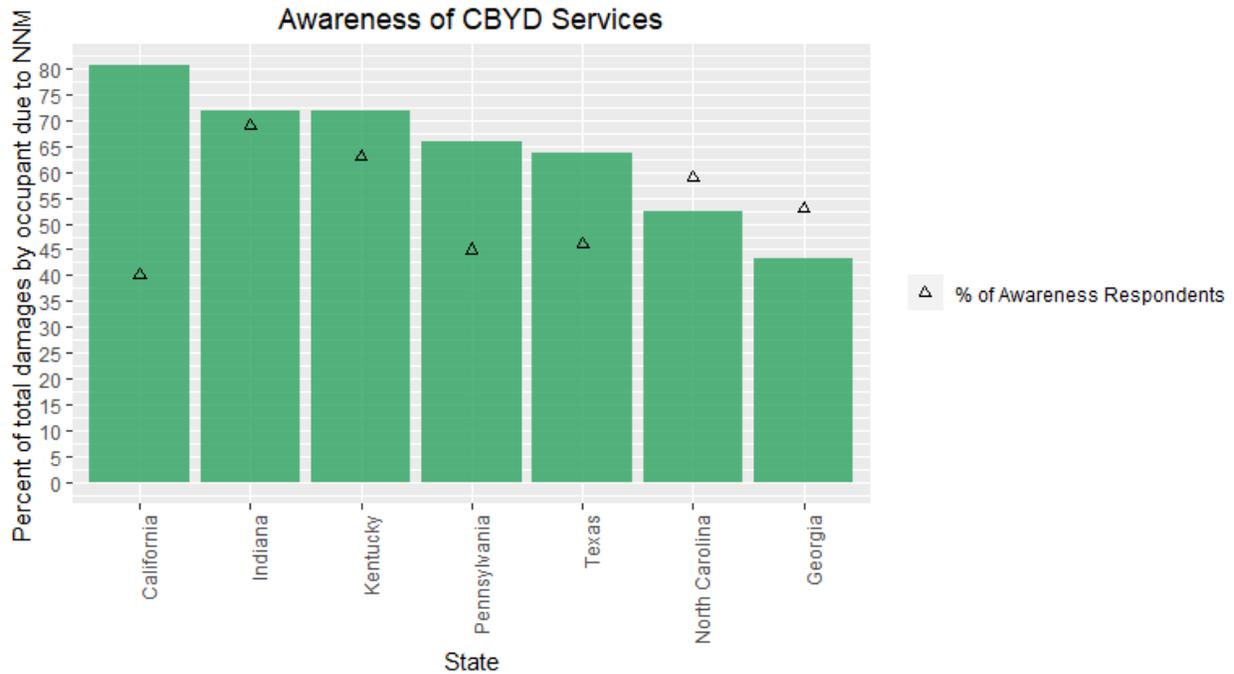


Figure 5. Awareness of CBYD services in relation to damages due to notification not made, occupant excavators, 7 states

For comparison, the CBYD awareness level for the entire U.S. is 48%.

The percent NNM damages (known data) is 23% for all excavator types, and 61% for occupants.

In the above Figures, these data points would place the U.S as a whole:

- Figure 2: About even with New England
- Figure 3: About even with Mountain and New England
- Figure 4: Between GA and IN
- Figure 5: Between TX and NC

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## Regional Results

This section of the report repeats the above analysis at the regional level within these seven states. Note again that by zooming in on a smaller geographical area, the number of awareness respondents and DIRT reports becomes smaller. Figures 6 and 7 repeat the analyses performed above for the seven individual states. Figure 6 is all excavator types, and Figure 7 is occupant excavators. Appendix 1 contains the data on which Exhibits 6 through 9 are based.

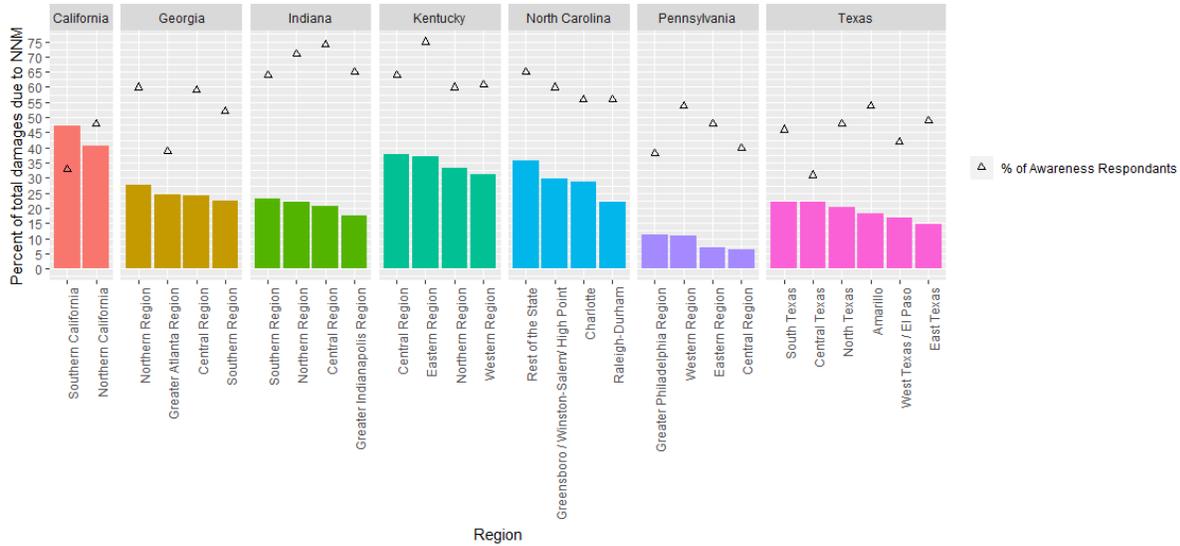


Figure 6. Regional results across states showing %NNM damages for all excavator types.

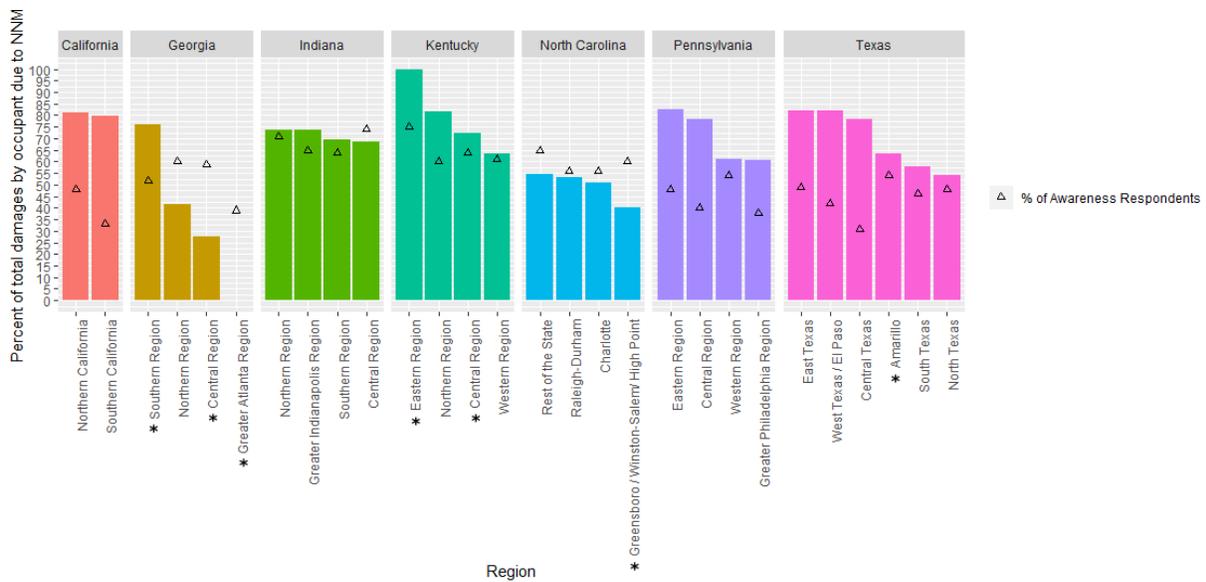


Figure 7 Awareness of CBYD services in relation to occupant damages due to NNM, regions within states. \* indicates where the sample size is less than 10 therefore any observed relationships should be interpreted with caution.

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### California

- Overall CBYD awareness: 40%
- Margin of error:  $\pm 3.6$
- Unaided 811 awareness: 14%
- Aided 811 awareness: 36%
- $\Delta$  from Pacific U.S. Census Division: -5%
- Inverse relationship: Apparent for all excavator types (Figure 6), but not so much when limited to occupant excavators (Figure 7).

### Georgia:

- Overall CBYD awareness: 53%
- Margin of error:  $\pm 4.4$
- Unaided 811 awareness: 23%
- Aided 811 awareness: 48%
- $\Delta$  from South Atlantic U.S. Census Division: +8%
- Inverse relationship: Not apparent in either Figure.

### Indiana:

- Overall CBYD awareness: 69%
- Margin of error:  $\pm 4.4$
- Unaided 811 awareness: 35%
- Aided 811 awareness: 65%
- $\Delta$  from East North Central U.S. Census Division: +17%
- Inverse relationship: Somewhat apparent for all excavator types (Figure 6) if “rest of state” is excluded. Not apparent for occupant excavators (Figure 7).

### Kentucky:

- Overall CBYD awareness: 63%
- Margin of error:  $\pm 4.4$
- Unaided 811 awareness: 34%
- Aided 811 awareness: 57%
- $\Delta$  from East South Central U.S. Census Division: +12%
- Inverse relationship: Not apparent in either Figure.

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### North Carolina:

- Overall CBYD awareness: 59%
- Margin of error:  $\pm 4.4$
- Unaided 811 awareness: 32%
- Aided 811 awareness: 56%
- $\Delta$  from South Atlantic U.S. Census Division: +14%
- Inverse relationship: Not apparent in either Figure.

### Pennsylvania:

- Overall CBYD awareness: 45%
- Margin of error:  $\pm 4.4$
- Unaided 811 awareness: 21%
- Aided 811 awareness: 42%
- $\Delta$  from Middle Atlantic U.S. Census Division: +13%
- Inverse relationship: Not apparent in either Figure.

### Texas:

- Overall CBYD awareness: 46%
- Margin of error:  $\pm 3.6$
- Unaided 811 awareness: 21%
- Aided 811 awareness: 43%
- $\Delta$  from West South Central U.S. Census Division: -4%
- Inverse relationship: Not apparent in either Figure.

Figures 8 and 9 intermingle the regions of the seven states, still sorting high-to-low by % NNM. Figure 8 is all excavator types and Figure 9 is occupant excavators. In Figure 9, regions with less than 10 NNM occupant damages are omitted because with such small sample sizes, small shifts in numbers can cause dramatic shifts in percentages.

In Figure 8, the awareness levels are very scattered, although there are a few instances of high CBYD awareness with low NNM damages (IN Northern, Central and Greater Indianapolis). Southern CA has relatively low awareness and high NNM damages. Overall however, the inverse relationship is not apparent, and in fact a best fit line of awareness levels trends slightly downward.

In Figure 9, the order of the regions left-to-right is reshuffled relative to Figure 8. We still have the individual examples mentioned that support the hypothesis, but overall the awareness levels remain quite scattered, although a best fit line for the awareness data points does trend slightly upward.

# CGA DIRT Data & Call Before You Dig Awareness

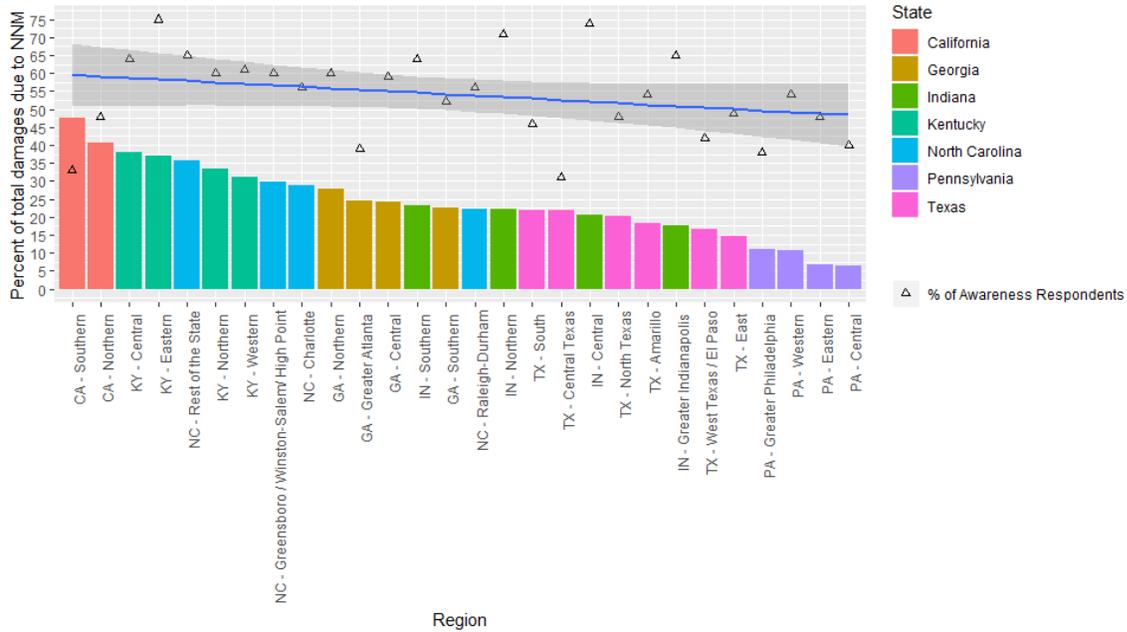


Figure 8. Regional results across states showing damages for all excavator types.

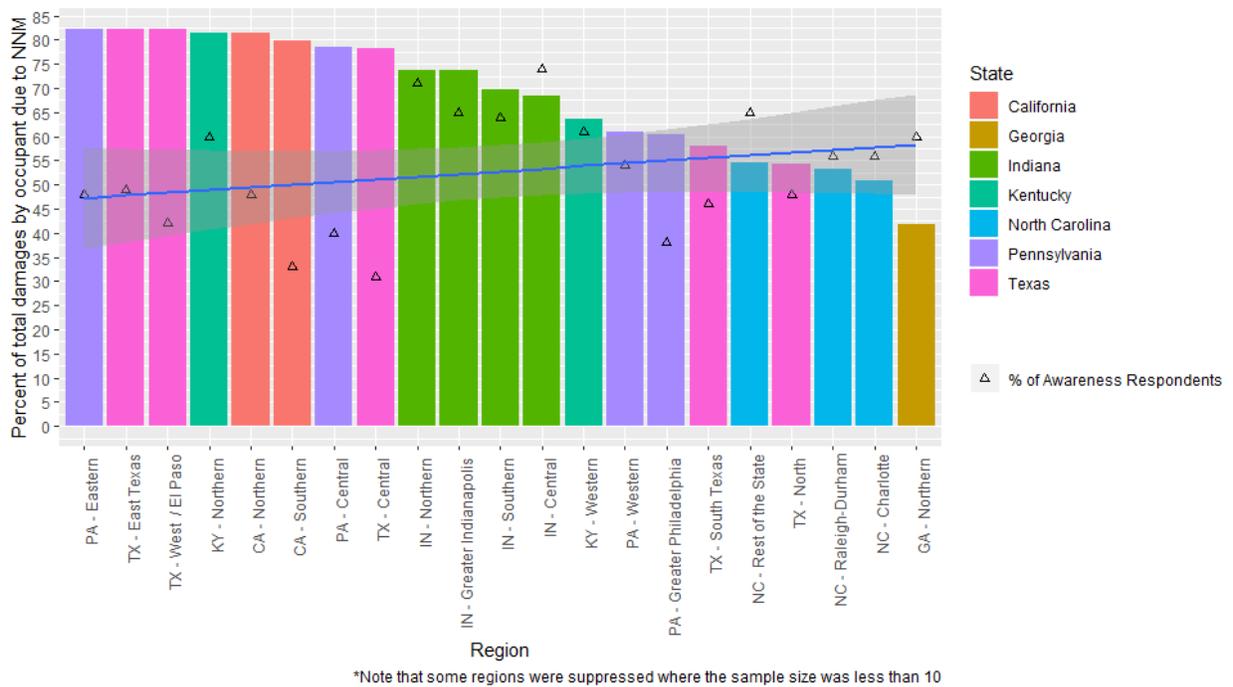


Figure 9. Awareness of CBYD services in relation to damages by occupants due to notification not made, regions across states.

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## Big Picture Observations

In this section of the report, we use the DIRT Report and online Interactive Dashboard<sup>4</sup> to provide some context for the above analysis. We will use the U.S. estimate of total damages to extrapolate from the DIRT data to the entire U.S.<sup>5</sup> Occupants and farmers are a combined excavator group on the dashboard, with occupants constituting 97% of the 4,788 reports for that group with a root cause of “notification not made.”

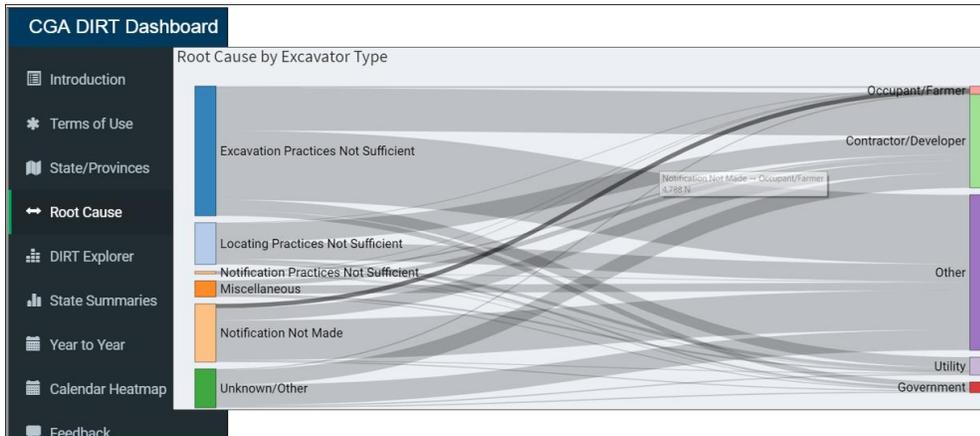


Figure 10. Screenshot of DIRT Interactive Dashboard, Root Cause page.

The Farmer/Occupant group constitutes 6.22% of “known” excavator types (see Figure 11).

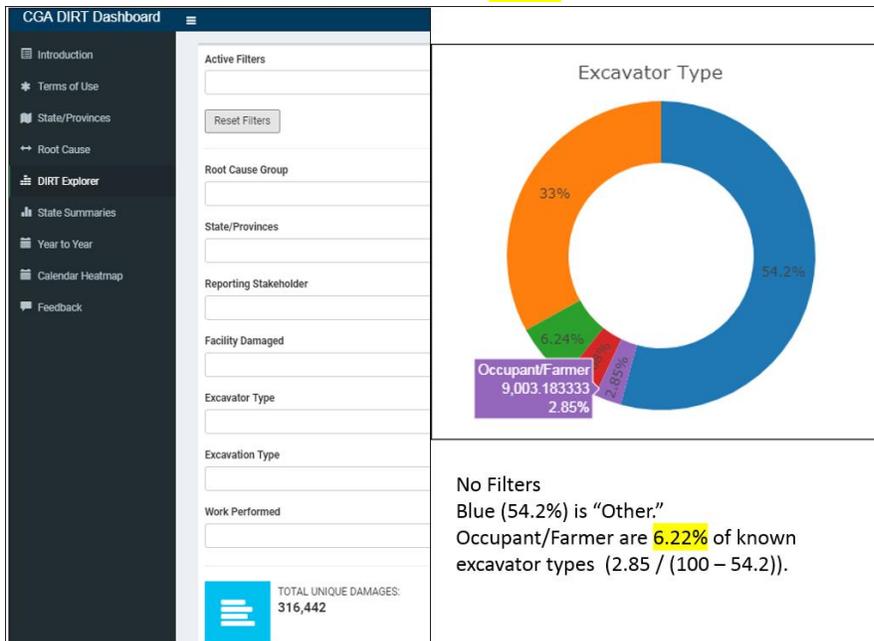


Figure 11. Screenshot of DIRT Interactive Dashboard, DIRT Explore page, no active filters.

<sup>4</sup> <https://commongroundalliance.com/media-reports/dirt-reports>

<sup>5</sup> The Dashboard includes data for Canada and the U.S. The U.S. constitutes 96.6% of the 316,422 total unique damages.

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For the Occupant/Farmer excavator group, Notification Not Made makes up 61.6% of known root causes (See Figure 12).

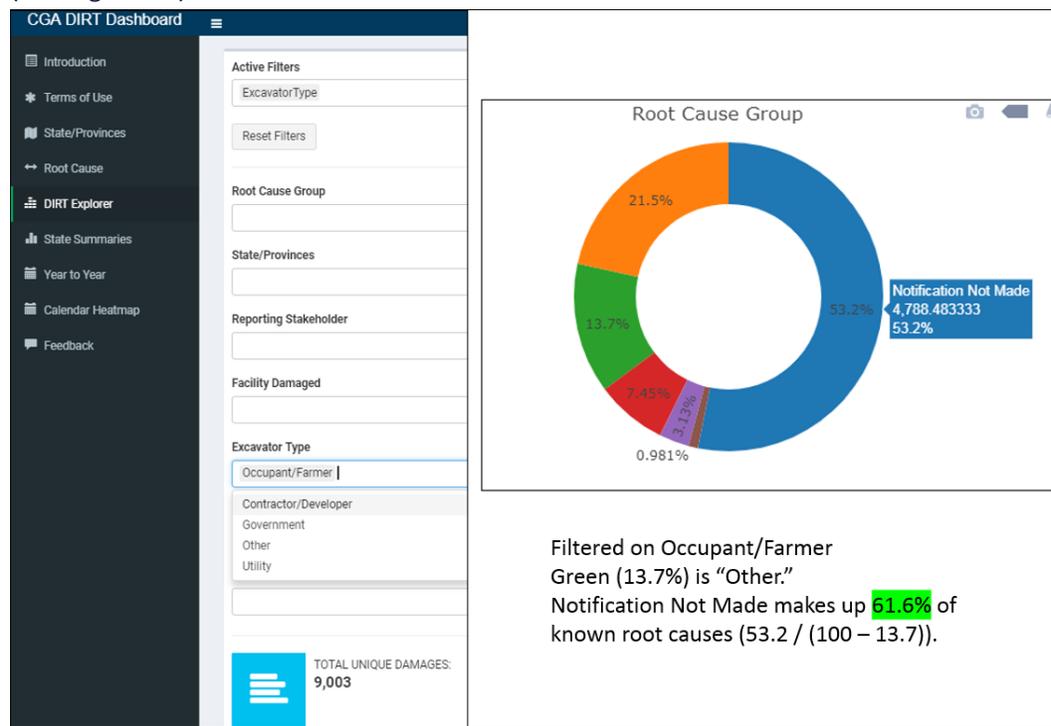


Figure 12. Screenshot of DIRT Interactive Dashboard, DIRT Explore page, excavator type filtered on "Occupant Farmer."

The estimate of total U.S. damages from the 2017 DIRT report is 439,000. Using these color-coded variables to extrapolate from DIRT data to the entire U.S. yields an estimate of approximately 16,315 damages by occupants due to Notification Not Made in 2017. ( $439,000 \times 0.97 \times 0.0622 \times 0.616$ )

These are the damages that could potentially be avoided by occupant usage of CBYD services. Awareness is a first step towards usage. A variety of factors other than awareness may affect usage of CBYD services, such as enforcement, damage claim collection policies, notification exemptions, etc.

The seven states used in this analysis have a variety of combinations of homeowner and hand tool exemptions. Approximately 60% of NNM damages by occupants involve hand tools.<sup>6</sup> In many cases involving occupants, one or both exemptions may apply. However, if awareness of CBYD services is lacking, awareness of the nuances of exemptions is probably also lacking.

Other factors beyond CBYD awareness affect damage rates, such as construction activity, population growth, weather, etc.

<sup>6</sup> Using the Dashboard, filter on Root Cause Group = Notification Not Made and Excavator Type = Occupant/Farmer. Scroll down to the "Excavation Type" ring chart. Calculate "known" percentage as in the above examples.

## CGA DIRT Data & Call Before You Dig Awareness

### Summary

This report tests the hypothesis that higher levels of awareness of CBYD services correspond with lower percentages of damages due to notification not made. The hypothesis was examined in progressively smaller geographical areas: U.S. Census Divisions, then seven individual states, and finally regions within those states. It is notable that some state-level awareness levels differ significantly from their home Census Division<sup>7</sup>, and in some states the internal regional awareness levels vary significantly.

At each geographic level, the analysis contrasted NNM damages by all types of excavators versus occupant excavators. It seems logical that where CBYD awareness is high among the general population it should also be high among professional excavators. Where CBYD awareness is low among the general population, it may be higher among professional excavators if they are targeted as a specific audience. It would be odd for professional excavator CBYD awareness to be lower than the general populations.

In general, the hypothesis seems to hold true at the U.S. Census Division level, both for all excavator types and for occupant excavators. As the focus zooms in on states and then regions within states, the results become more mixed, with some individual states and Census Divisions supporting the hypothesis, some inconclusive, and a few going against it. This may be an example of the *laws of large numbers and small numbers*. Suppressing CBYD awareness is obviously not recommended as a way to reduce NNM damages. High-profile incidents could raise awareness, but that is also obviously not recommended.<sup>8</sup>

The results presented in this study should be considered cautiously as observable trends may reflect limitations in the dataset such as small sample sizes and other potential economic and demographic influences. For the DIRT data used for this analysis, among the geographical areas there are varying levels of data quality (known root causes and types of excavator) and completeness of DIRT reporting relative to damages that occur.<sup>9</sup>

Going forward, improved DIRT data quality, and quantity from under-reporting areas, would benefit this type of analysis. If different combinations of states participate in future awareness surveys it would be interesting to repeat this analysis.

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<sup>7</sup> If Indiana is 17% above the East North Central Region's CBYD awareness level, then one or more other states in the region must be well below it.

<sup>8</sup> Indiana had the highest CBYD awareness level (69%) among the seven states participating in the June 2018 awareness survey. There was a high-profile incident in Camby, IN (Greater Indianapolis Region) in November 2017. Indiana also participated in the June 2017 survey and had 64% CBYD awareness at that time, although the Greater Indianapolis Region remained level at 65%.

<sup>9</sup> Georgia, Pennsylvania and Texas were considered "substantial reporting states" for the 2017 DIRT Report estimate of total U.S. damages.

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## Appendix 1

This appendix presents the results of the CBYD survey in relation to total reported damages due to notification not made (NNM) and damages by occupants due to notification not made (NNM) by state and region.

Region	Total Reported Damages			Damages by Occupant			Survey Results		
	Total Reported Damages	Due to NNM	% Due to NNM	Damages by Occupant	NNM by Occupant	% Due to NNM by Occupant	Sample Size	% of Sample	Awareness of CBYD Services
<b>California</b>	9246	4145	45	1135	915	81	752	100	40
Northern California	3566	1452	41	520	423	81	376	50	48
Southern California	5681	2694	47	615	492	80	376	50	33
<b>Georgia</b>	19741	5026	25	55	24	43	501	100	53
Central Region	3750	909	24	9	3	28	120	24	59
Greater Atlanta Region	6996	1717	25	2	0	0	125	25	39
Northern Region	7296	2018	28	35	14	42	175	35	60
Southern Region	1698	382	23	9	7	76	80	16	52
<b>Indiana</b>	8921	1835	21	287	207	72	501	100	53
Central Region	2681	555	21	71	49	69	140	108	74
Greater Indianapolis Region	2627	462	18	16	12	74	130	100	65
Northern Region	1915	424	22	167	123	74	115	88	71
Southern Region	1698	394	23	33	23	70	105	81	64
<b>Kentucky</b>	3953	1328	34	82	59	72	501	100	63
Central Region	670	254	38	10	7	72	125	25	64
Eastern Region	124	46	37	3	3	100	60	12	75
Northern Region	2077	691	33	27	22	81	210	42	60
Western Region	1082	337	31	43	27	64	105	21	61
<b>North Carolina</b>	17267	4894	28	99	52	52	501	100	59
Charlotte	8795	2523	29	31	16	51	125	25	56
Greensboro / Winston-Salem/ High Point	2376	710	30	5	2	40	95	19	60
Raleigh-Durham	3850	857	22	28	15	53	140	28	56
Rest of the State	2246	803	36	35	19	55	125	25	65
<b>Pennsylvania</b>	4527	434	10	123	81	66	501	100	45
Central Region	572	36	6	14	11	79	80	16	40
Eastern Region	910	63	7	17	14	82	120	24	48
Greater Philadelphia Region	1731	192	11	45	27	60	160	32	38
Western Region	1312	143	11	48	29	61	140	28	54
<b>Texas</b>	42204	8466	20	392	250	64	750	904	46
Amarillo	1728	316	18	8	5	64	53	64	54
Central Texas	3478	764	22	56	44	78	83	100	31
East Texas	3628	536	15	53	43	82	180	217	49
North Texas	20095	4066	20	184	100	54	203	245	48
South Texas	10608	2337	22	71	41	58	135	163	46
West Texas / El Paso	2667	447	17	20	16	82	105	127	42