# MuseumPests.net

Integrated Pest Management for Cultural Heritage

## 2019 SURVEY DATA RE-EVALUATED

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Since our first meeting in 2002 the MuseumPests Working Group's priorities have been guided by the results of occasional surveys of the field.
In 2019, we conducted a worldwide survey to capture recent trends

## Research questions


I will start by saying that we learned as much from the process as we did from the results!

Our survey team included curators, conservators, collection managers, conservation scientists and pest management professionals. None of us are data scientists. The data we received is complex and we weren't able to answer all of our research questions. But what we learned from this experience will inform the design of future surveys.

I will present a few of conclusions that provide some insight into the state of pest management in cultural heritage today.
We will be giving a longer and more detailed explanation of the data at the upcoming joint American Institute for Conservation and Society for the Preservation of Natural History virtual conference this June and hopefully at the Pest Odyssey meeting in the Fall.

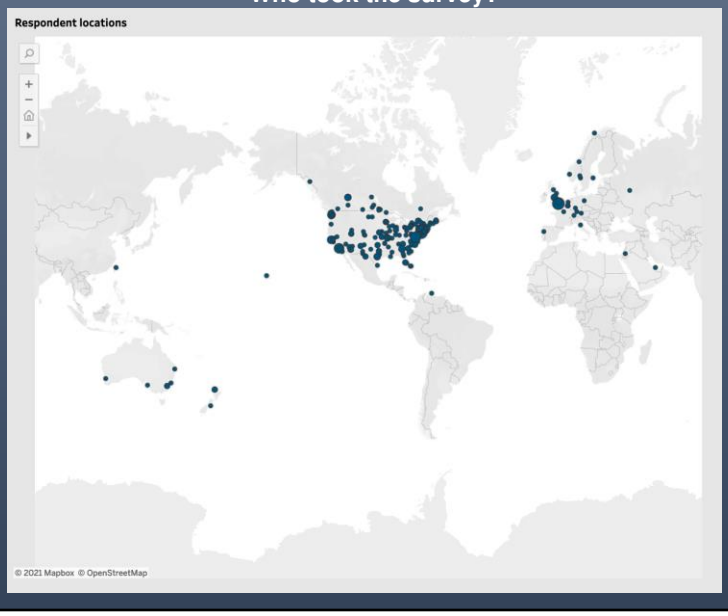
## Research questions

1. Who is doing IPM (Integrated Pest Management)?
2. What resources have been put towards IPM?
3. Are pest populations increasing or decreasing? Are decreases related to greater resources or awareness?
4. What methods are being used to treat pest issues?
5. How are resources such as MuseumPests.net being used?

We were hoping to learn how the field of cultural heritage IPM has developed over the past 20 years since our group started.

1. Who is doing IPM? Can we see trends in the types of institutions?
2. What resources have been put towards IPM and have they changed over time?
3. Our group believed that there are increased resources for and awareness of IPM, but have these had an impact?
4. Can we see trends in how institutions are responding to the introduction of pest management programs?
5. Can we see if MuseumPests.net is meeting the need of our community?

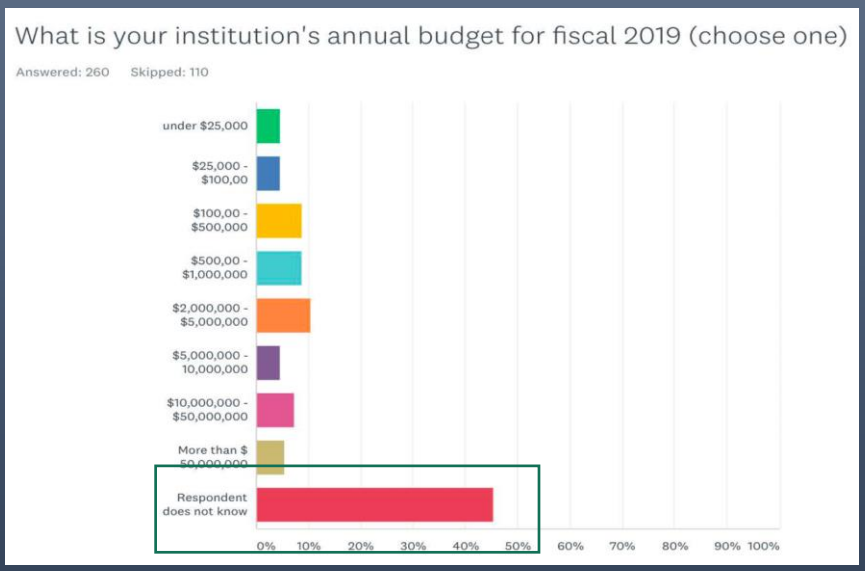
## Who took the survey?




We received responses from 377 institutions worldwide, as distributed through various listservs.

Our survey was in English, so the geographic distribution seen here is unsurprising. We received the most responses from general and natural history museums and the fewest from science and technology museums.

# PM Resource Allocation




We wanted to know if there was a correlation between the type of institution, general annual budgets, and percentage of funding expended on pest management.

But the results were difficult to interpret as it was clear that the majority of respondents could not or did not report about their institutional or departmental budgets.

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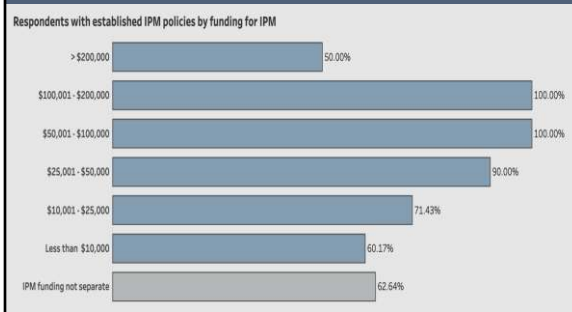
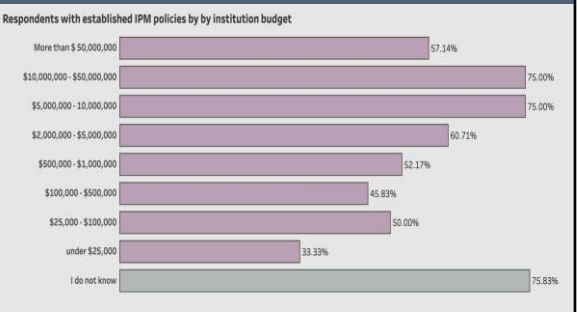
# FUNDING

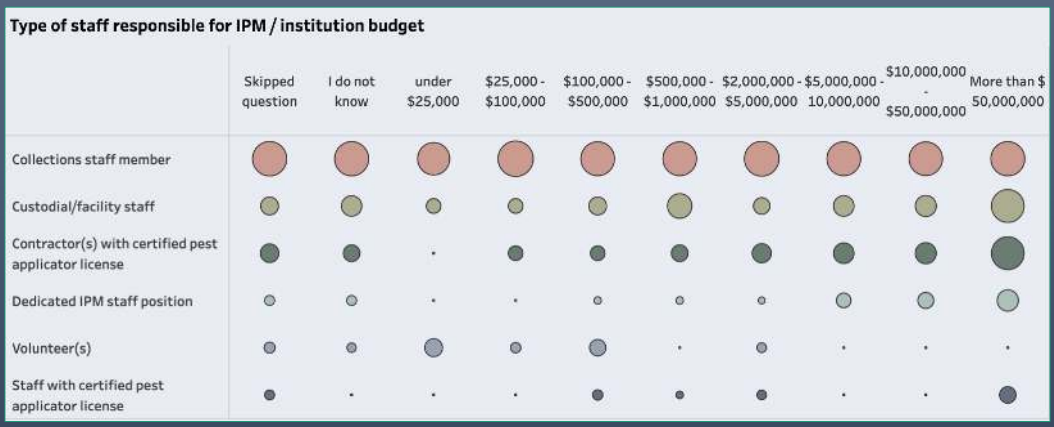
More money = More pest management?




Where budget information is available, funding for pest management activities still appears to be low. Less well funded institutions have the lowest funding resources for IPM.

# STAFF RESOURCES BY BUDGET




Bubble size is a visualization of percentage

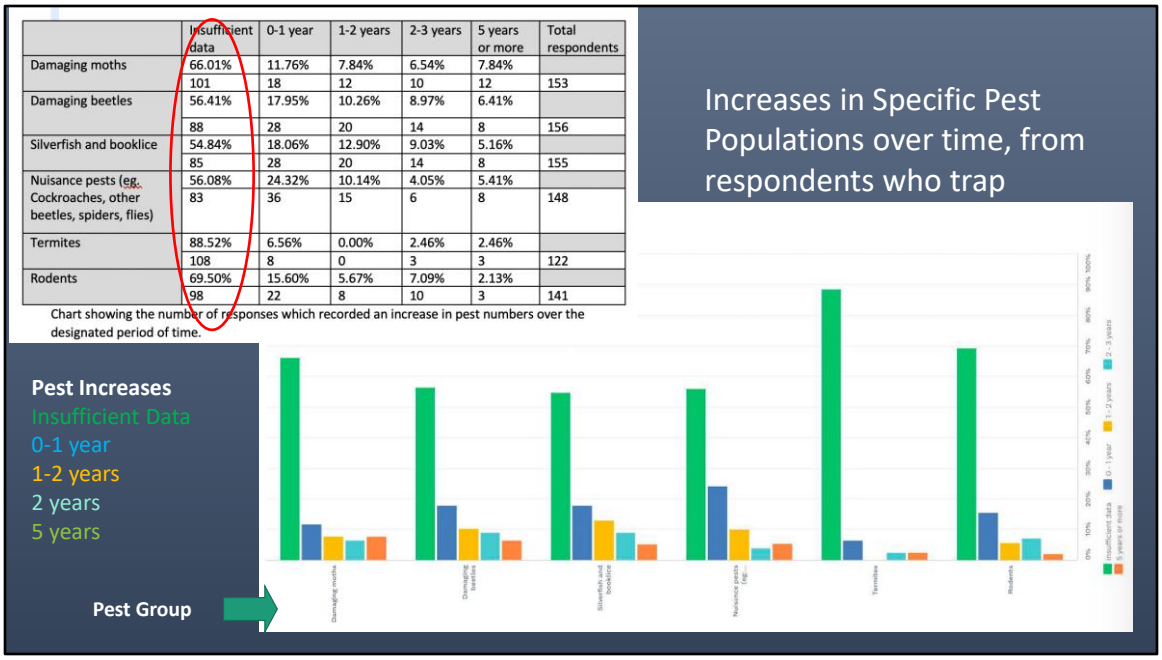
Unsurprisingly, collections staff are generally responsible for pest management.

Correlating budget with IPM responsibility shows that institutions with the highest budget size also are more likely to use contractors with certified pest licenses. Institutions with a dedicated IPM position are rare and seem to be concentrated among large institutions that have large IPM budgets.

| | Insufficient data | 0-1 year | 1-2 years | 2-3 years | 5 years or more | Total respondents |
|---|---|---|---|---|---|---|
| Damaging moths | 66.01% | 11.76% | 7.84% | 6.54% | 7.84% | |
| | 101 | 18 | 12 | 10 | 12 | 153 |
| Damaging beetles | 56.41% | 17.95% | 10.26% | 8.97% | 6.41% | |
| | 88 | 28 | 20 | 14 | 8 | 156 |
| Silverfish and booklice | 54.84% | 18.06% | 12.90% | 9.03% | 5.16% | |
| | 85 | 28 | 20 | 14 | 8 | 155 |
| Nuisance pests (eg. Cockroaches, other beetles, spiders, flies) | 56.08% | 24.32% | 10.14% | 4.05% | 5.41% | |
| | 83 | 36 | 15 | 6 | 8 | 148 |
| Termites | 88.52% | 6.56% | 0.00% | 2.46% | 2.46% | |
| | 108 | 8 | 0 | 3 | 3 | 122 |
| Rodents | 69.50% | 15.60% | 5.67% | 7.09% | 2.13% | |
| | 98 | 22 | 8 | 10 | 3 | 141 |

Chart showing the number of responses which recorded an increase in pest numbers over the designated period of time.

Increases in Specific Pest Populations over time, from respondents who trap




We were interested to see if there were noticeable trends in pest populations.

For simplicity, we categorized pests into six large groups: for instance, moths, damaging beetles, silverfish and booklice, etc.

Clearly, one take away seen from the size of the green bars is that most people said they had insufficient data to answer this question and this is from respondents who indicated that they were trapping and recording.

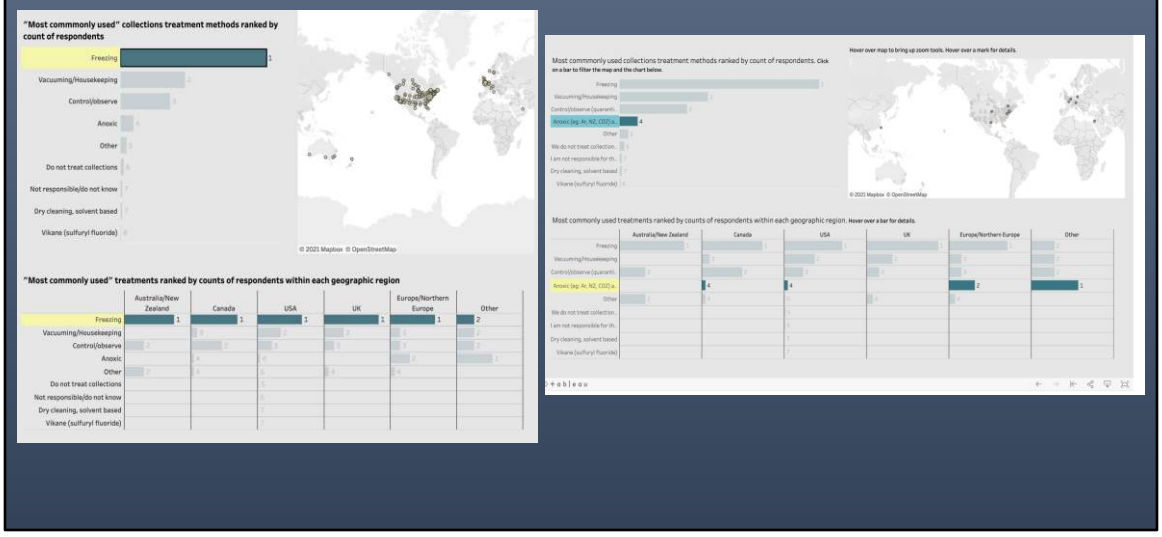
It is unclear whether respondents didn't mine their own data accurately and fully respond to the survey questions, or whether we could have asked the questions in a different way.
While slight, there does seem to be an increase of pest captures for each pest category, with perhaps a larger increase for nuisance pests. Whether this is an artifact of increased vigilance or better memory for most recent pest evidence cannot be ascertained.


When we correlated temporal data with geographical locations some interesting results emerged:

- Damaging moths were noted with temporal increase in northern Europe and in the north American continent, and we see incidences reported largely in coastal areas.

- In contrast, damaging beetles, and silverfish and book lice showed much wider geographical spreads and we could not see patterns as clearly.

# TREATMENT



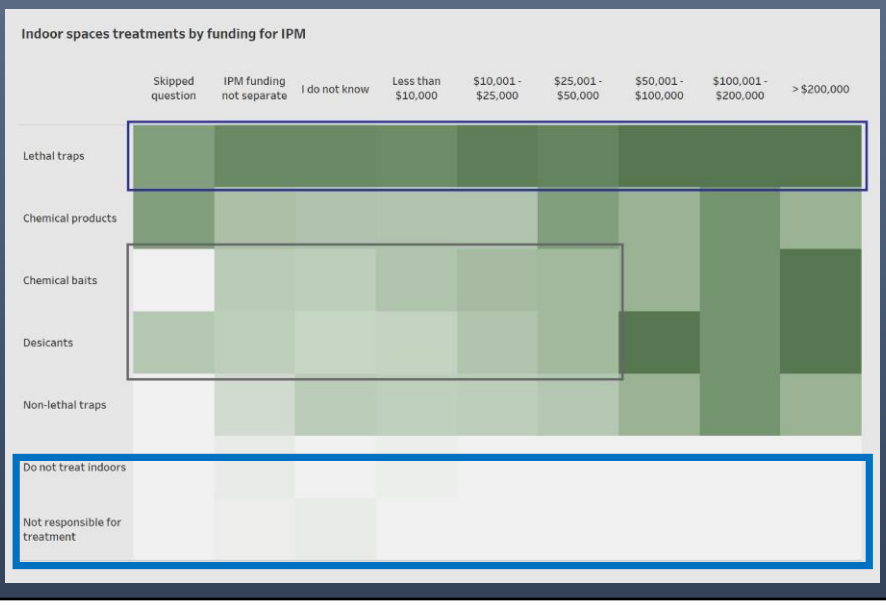

We also collected data about treatments used on collections, within buildings, and exterior spaces. For treatment of collection items:

- Low temperature (or freezing) was the most commonly used treatment, both by count and geographic distribution.
- The number of respondents using anoxia was very low and plotting it geographically resulted in significant differences.
- The highest percentage is seen in Canada and the U.S. No one in Australia or the UK is using these gaseous treatments.

## Treatments for Collections vs Budget

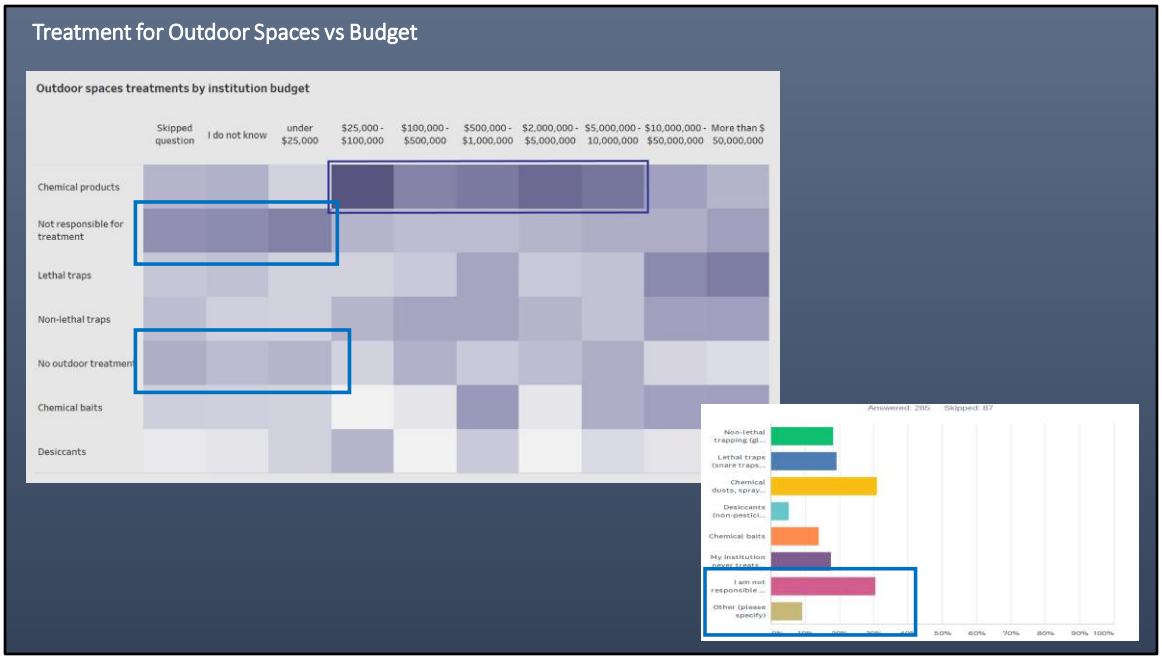

A heat map correlating treatments used with budget discloses that institutions with higher budgetary frameworks are more apt to use anoxia, suggesting that there is a financial barrier to performing these treatments.

## Treatment for Indoor Spaces vs Budget




For indoor spaces, our initial data showed that trapping and the use of chemical products were the most common indoor treatments used, with lethal traps leading at approximately 82%.

When the type of treatment was correlated with budget, the trends indicated that lower funded institutions did not report the use of chemical baits and desiccants as frequently as higher funded institutions.
Note that across the board, “do not treat indoors” and “not responsible for treatment” is very weakly reported across all funding categories.

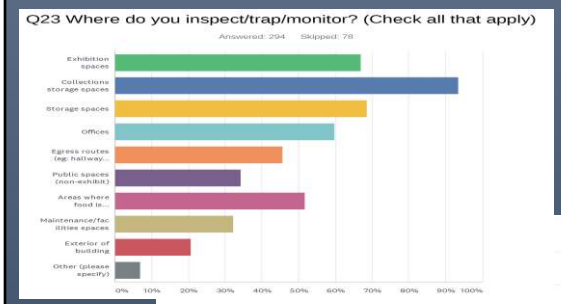


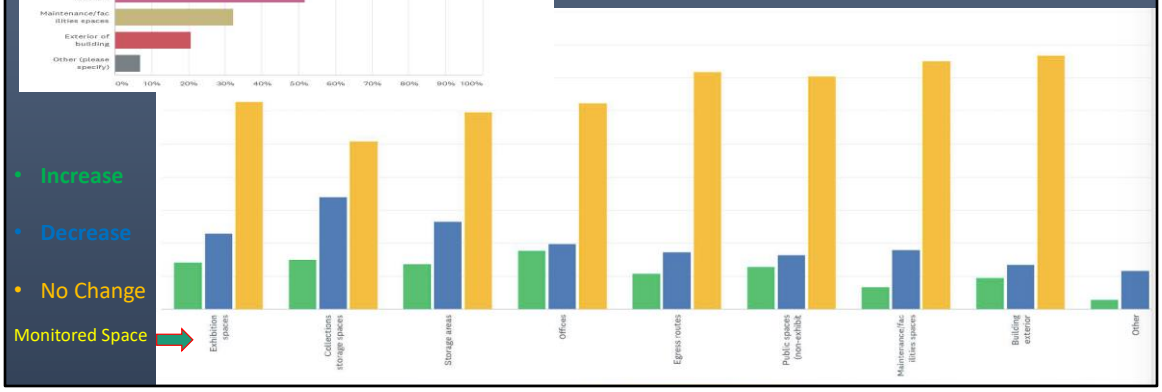

For outdoor spaces, we uncovered a few trends:

- The blue boxes highlight responses showing that a significant percentage indicated that their institution never treats these areas, or that they are not responsible for treating them.
- The darker purple box indicates that institutions in the budgetary middle range were more likely to use chemical products, suggesting use of licensed contractors.

We think this data indicates the need for more engagement between collections care professionals and contracted pest applicators.
And perhaps this is an opportunity to educate our community about the efficacy and necessity of exclusion strategies and promote them on MuseumPests.net.

# Monitoring and Pest Populations

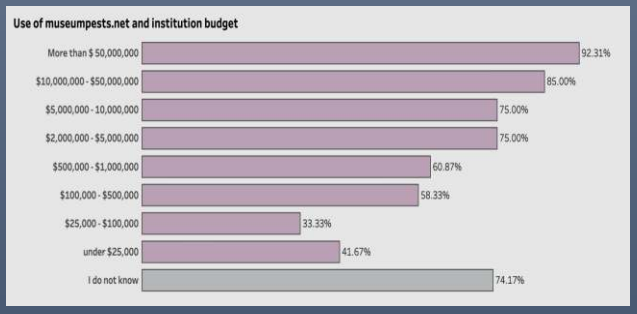


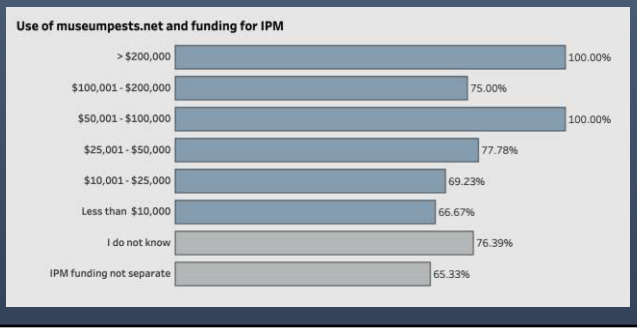




We asked where monitoring takes place. It seems we are most focused on collection, storage and exhibition spaces and least on egress routes, public spaces, maintenance spaces, and exteriors.

Data collected on change in location of pest populations demonstrates that in monitored spaces, pest populations generally stayed the same, but for those that reported a change in pest populations, more reported a decrease.
However, if you look at the size of decrease, you will notice that spaces of more concern to collections professionals such as storage spaces reported higher decreases than spaces like building exteriors.

# Education


We also looked at what is needed to advance the efficient use of IPM in cultural heritage institutions.

The orange bar shows that online resources and relevant literature were seen as the most needed and most used.
When we correlated use of the MuseumPests.net site with institutional budget, we saw a clear relationship between budget size and awareness, with use of the site decreasing with decreasing budget range.

This suggests we need to make more effort to reach smaller, lower funded institutions.

## Conclusions:

- We are using IPM!
- Budgets are still limited for pest management activities.
- Build alliances with pest management professionals.
- Think strategically about how we present information on treatments.
- Spread the word about MuseumPests.net and other trusted resources.
- The relationship between the reported pest data and whether IPM is making inroads in helping to control pest populations is unclear or too complex to parse from this survey.
- We probably need to do another survey!

We've spent a lot of time trying to map and understand our complex data. We think we see the following trends:

We ARE using IPM in our approach to control pest populations. Many institutions have invested time and effort in creating policies, procedures, and guidelines to limit pest activity.

Funding for IPM activities still appears to be low. We lack museum professionals who are educated in pest management at an academic or licensed level.

IPM tasks are performed mainly by collections staff. However, we see many mid-sized institutions contracting pest management work, so this may be an area where we want to explore alliances with pest control professionals.

Knowing that low temperature is the predominant treatment choice for collections, and anoxia has geographic and fiscal limitations, we can tailor how we present information on the MuseumPests Solutions pages. We may need to indicate on our website what solutions are available or legal in different areas of the world.

The cultural heritage community relies on online resources for pest management information. We need to ensure that under resourced institutions know about our site.

We were unable to draw any irrefutable conclusions from our data about increases or decreases in pest activity or whether IPM is making inroads in helping to control pest populations in cultural heritage collections.

We realized that we could have constructed the survey with more clarity and specificity. For example, we chose to allow open text answers to many questions, and the results were difficult to quantify and include in our data sets. We also neglected to ask some basic questions that now seem obvious. We also wondered if there might be another way to collect data about pest increases and pest response.

We learned a lot using Tableau to visualize our data and we look forward to presenting some of our more nuanced analyses in future presentations. And in some future year we'll integrate what we learned in another survey….but that is for the future!

# MuseumPests.net

## Integrated Pest Management for Cultural Heritage

Thank you to all who took the time to respond to the survey!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