Smithsonian Institution

Pan-Institutional Collections Emergency Kit Survey

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Survey Planning and Design: Preparedness and Response in Collection Emergencies (PRICE) Logistics Action Team and Policies and Procedures Action Team

MITIGATE PREPARE

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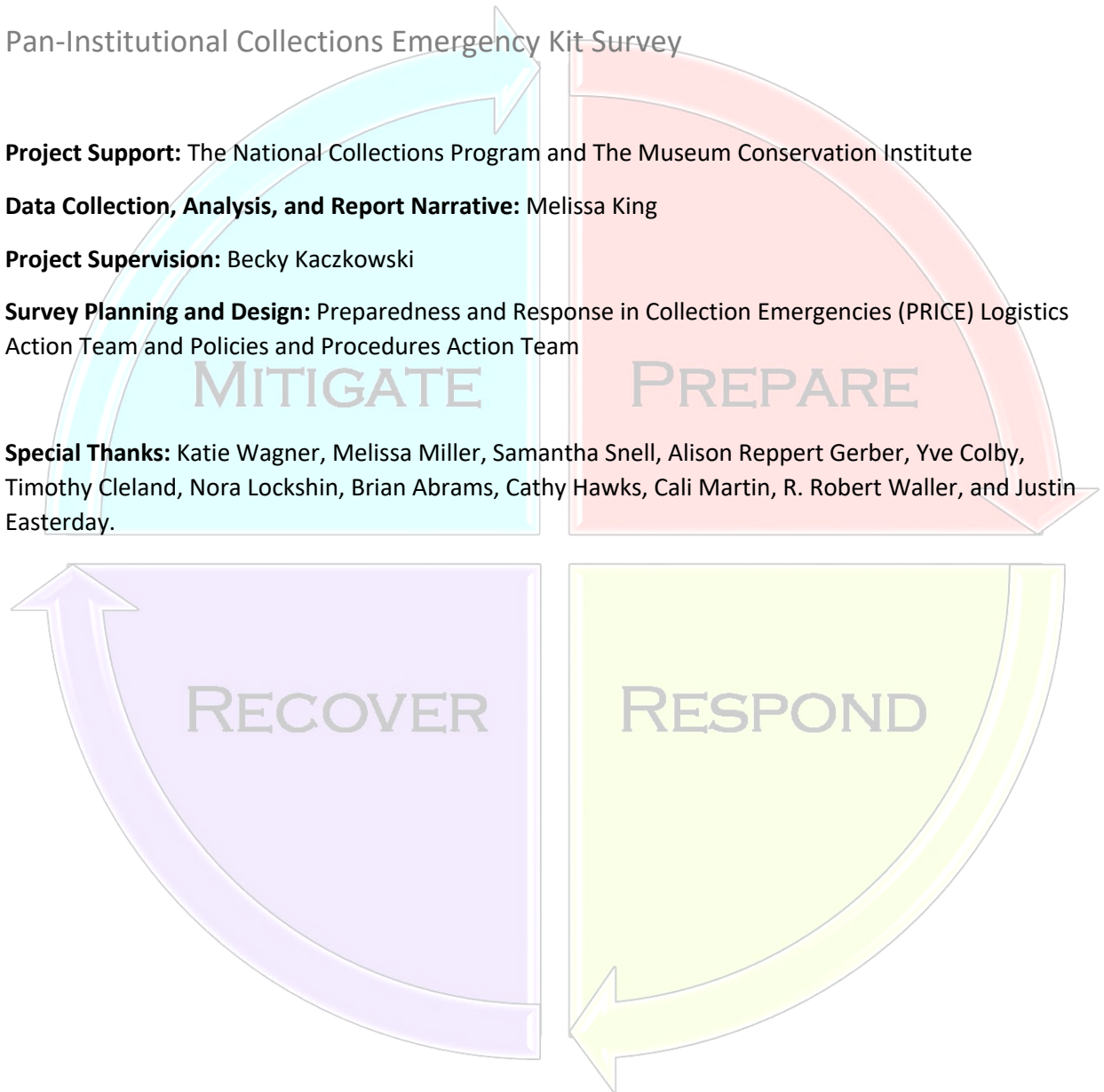
RECOVER RESPOND

Table of Contents

1. Executive Summary

From February to April 2020, Melissa King conducted 34 interviews with 22 different Smithsonian collecting units. The project was devised by members of the Preparedness and Response in Collections Emergencies (PRICE) Logistics Action Team within the Smithsonian's National Collections Program (NCP). This project provides an excellent foundation towards the start of a unified initiative to support the creation and maintenance of emergency kits across Smithsonian collections.

The survey was designed to understand the current status of collection emergency kit management across the Institution, while also creating a snapshot of the variety of supplies contained within them. This document will serve as an educational tool to inform decisions about emergency kits for those involved in collection emergency preparedness (CEP) within their respective unit. Additionally, the results of this research will be valuable to the PRICE team as they make decisions towards potential bulk ordering of supplies as a cost-saving measure, assessing the need for kits within certain facilities, and the future development of a searchable database that could be accessed in emergencies.

The survey included representatives from nearly all of the Smithsonian SD-600 Type 1 and 2 collecting units:

Survey Participants:

- Archives of American Art (AAA)
- Anacostia Community Museum (ACM)
- Center for Folklife and Cultural Heritage (CFCH)
- Cooper Hewitt, Smithsonian Design Museum (CHSDM)
- Hirshhorn Museum and Sculpture Garden (HMSG)
- National Museum of Asian Art (FS)
- National Air and Space Museum (NASM)

- National Museum of African American History and Culture (NMAAHC)
- National Museum of African Art (NMAfA)
- National Museum of American History (NMAH)
- National Museum of the American Indian (NMAI)
- National Museum of Natural History (NMNH)
- National Portrait Gallery (NPG)
- National Postal Museum (NPM)

- Museum Conservation Institute (MCI)
- Smithsonian Astrophysical Observatory (SAO)
- Smithsonian American Art Museum (SAAM)
- Smithsonian Gardens (SG)
- Smithsonian Exhibits SIE(xhibits)
- Smithsonian Institution Archives (SIA)
- Smithsonian Libraries (SIL)
- Smithsonian Institution Traveling Exhibition Service (SITES)

The majority of participants were collecting units with a large focus in non-living collections, and the focus of this report addresses their specific needs. However, there are certainly supplies and management strategies that can be interpreted and adapted for living collections. An ancillary outcome from the survey was a call-to-attention of emergency kit preparedness, and hopefully some inspiration to invest more time into this effort.

Outcomes and Recommendations

There are many things to be learned from this survey and this research; however, here are some of the **opportunities for improvement** revealed during the survey:

- Certain facilities house a large number of collection items but have a relatively small amount of dedicated emergency supply materials on hand (Museum Support Center, Udvar Hazy, Garber, and Pennsy)
- In some units there is a need to identify clear leadership roles to manage the kits
- The expiration of certain supplies within the kits (such as batteries and tape) should be considered, but there are opportunities to factor this concern within scheduled inventories.
- Consider storage methods within the kits as a means to find items during an emergency. For example, batteries should never be stored long-term inside flashlights, but keeping them within close proximity of the flashlight (i.e. storing them together in a plastic bag or container) ensures quick functionality in the case of an emergency.

Overall, however, it is clear there is a strong foundation in CEP for all of the survey participants and a clear desire to continue to improve. With the support of the National Collections Program, there is a real opportunity for SI collecting units to work together.

2. Introduction

2.1 Overview

This research was conducted by the Museum Conservation Institute's (MCI) Graduate Fellow in Preventive Conservation, Melissa King, on behalf of the National Collections Program's (NCP) Preparedness and Response in Collections Emergencies (PRICE) Logistics Action Team. The purpose of the study was to pull together information about the contents and management of emergency kits at the Type 1 and 2 collecting units listed within *Smithsonian Directive 600: Collections Management (SD 600[1]).* Emergency kits are a container of response and salvage materials designed to be accessible when collection items are threatened. The data for this survey were collected in two ways: an inventory Excel sheet and an oral survey that was completed in-person or in video conference over Microsoft Teams.

The goal for this research was to create a comprehensive list of materials found in emergency kits at the Smithsonian in order to facilitate the following:

- Developing a basis for bulk ordering supplies across units,
- Cross-training for units on supplies and intended uses, and
- Coordination of lending and borrowing of Smithsonian-held resources across units in an efficient manner, as needed.

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[1] 2011 version

Ultimately, the results from this survey will enable the Smithsonian to lower overall risk to collections affected by emergencies--ranging from minor to catastrophic—by providing a means by which to develop a communication and collaboration tool.

The information is primarily being collected for internal use; however, Melissa is performing the research as one of her primary projects as a Graduate Fellow at MCI. Because of this, some of the results of this survey will be shared in a final oral presentation in partial fulfillment of graduation requirements for the Winterthur/University of Delaware Program in Art Conservation.

2.2 Project Background

In Fall 2016, the Smithsonian's National Collections Program (NCP) launched Preparedness and Response in Collections Emergencies (PRICE), a pan-institutional initiative geared toward developing and strengthening a culture of emergency management for collections. This Emergency Kit survey is a project spearheaded by the Logistics Action Team of PRICE as a means for establishing an understanding of what the various Smithsonian collecting units presently manage as collections emergency resources.

Additionally, the development, implementation, and analysis of this research provided MCI's Graduate Fellow in Preventive Conservation, Melissa King, a fantastic learning opportunity to develop her knowledge in preventive conservation strategies—particularly in emergency preparedness and response. Going to the sites, meeting different preservation professionals, and learning about their management strategies for emergency kits served as an excellent learning opportunity, and will serve her well when consulting other small museums and cultural heritage institutions throughout her career as a preventive conservator.

Melissa King is a National Endowment for the Humanities Graduate Fellow in Preventive Conservation at the Winterthur/University of Delaware Graduate Program in Art Conservation (WUDPAC) Class of 2020. For her third year at WUDPAC, Melissa has a joint appointment with the Museum Conservation Institute (MCI) and The Freer Gallery of Art and Arthur M Sackler Gallery, Smithsonian's National Museum of Asian Art (FG). This survey was completed as part of her Fellowship.

2.3 What is an Emergency Kit?

An emergency kit is a compiled group of supplies set aside specifically for emergencies. The emergency kits referred to in this document are specifically created to respond to collection emergencies such as floods, leaks, fires, earthquakes, accidental physical contact, and vandalism. Sometimes emergency kits are called, "emergency carts;" however, this term is not inclusive of groupings of supplies set aside on a shelf (or shelves) or a non-mobile location.

Figures 1-3. Different examples of emergency kits at SI. Figure 1 shows a cabinet at MSC for HMSG, figure 2 is a mobile wooden kit at NMAH, and figure 3 is a metro shelving unit at FSG.

3.1 Primary Deliverables of the Survey

- **This Final Report** – A comprehensive document that outlines the project background, research methodologies, results of the survey, and recommendations. Access to this document will be limited to in-house, SI purposes.
- **Quick Reference Sheet** – A single-page document with key takeaways and relevant information that will be made available outside of SI.
- **Inventory List** – An Excel spreadsheet of compiled inventory lists from SD-600 units, which will be accessible to collections staff through PRICE. It is hoped that this data can be refigured into a more accessible database format with possible integration into GIS mapping software as part of future projects.

3.2 Timeline and Schedule

- September-December 2019
  - Preliminary research and survey design
- January-February 2020
  - Institutional Review Board Training and Review (Section 4.1)
- February 21st-March 12th 2020
  - In-person interviews and data collection
- April 13th-22nd 2020
  - Microsoft Teams video conference interviews and data collection (post COVID-19 stay-at-home order and Smithsonian enhanced telework)
- April 23rd- June 22nd 2020
  - Data Interpretation and Final Report

4. Project Methodologies

4.1 Institutional Review Board Approval

As per Smithsonian Directive 606, research involving human participants must comply with applicable federal laws, regulations, and ethical principles. An application was submitted for a formal Institutional Review Board (IRB) approval to ensure the protection and respect of the interviewees. After initial review, it was determined that the survey questions did not qualify it as human-based research; however, measures were taken in the design of the survey to protect the release of personally identifiable information (PII) through distinct data storage locations.

The interviewees were identified by SD-600 Collection Emergency Points-of-Contact as staff members best suited to speak about emergency kit management at their respective unit. The initial correspondence with the interviewees described the background and goals of the survey and shared important information regarding the collection, storage, and distribution of results.

4.2 Project Workflow

Interviewees were contacted via email and asked to set up a meeting with Melissa at different facilities that house collections. Inventory lists (if available) were sent directly to Melissa to compile prior to the interview. This allowed time for Melissa to review the contents and ask questions about specific items during the in-person or Teams interview.

4.3 Interview (verbal survey)

The verbal interview largely consisted of questions regarding the maintenance and use of emergency kits. Melissa typed the responses directly into a Survey Monkey application on her iPad. The questions were designed to get a better understanding of the way the inventory is managed, accessibility of the kits to various staff members, and methods for sharing the location of the kits in the case of an emergency. The survey was also designed to collect information about possible trainings that units host to share how the kits are used. Finally, the survey included a question to identify novel kit contents and what they can be used for (see appendix 2 for the list of questions).

4.4 Item Inventory List

The master inventory list was compiled within an Excel spreadsheet. This file contains columns with categories such as item name, quantity of individual items per kit, and the ability to assign the use of the item in one of the following categories: "absorbent materials," "container," "documentation," "instructional documents," "PPE/personal safety," "salvage/recovery," "scene safety/clean-up," and "tools." Since the contents of emergency kits is helpful information for a wider collections staff, data from this sheet may be shared more widely without identifying information such as the collection unit and facility.

4.5 CE POC List

The final data collection format is a pre-existing spreadsheet that contains the names of SD-600 collecting units with their respective "Collections Emergency Point-of-Contact" (CE POC). Each SD-600 unit has a CE POC and a designated back-up. The people interviewed in this survey were identified as those in charge of collections emergency kits and may or may not be CE POC. The spreadsheet is stored within the NCP PRICE network and utilized for emergency-related events. The research team at PRICE deemed it useful to add the names of the interviewees from this survey since they are considered the contact person for emergency kits by their respective CE POC's. The spreadsheet may also be shared with SI's Office of Emergency Management (OEM). Since this document will be made available only within the Smithsonian, the name and email address of the emergency kit contact would not be considered PII.

5. Findings: Data and Observations (Verbal Survey)

5.1 Overview
Survey findings have been consolidated into the following sections (respondent departments, number of kits, kit location awareness, access, training, kit varieties, and inventory management). Each category has been summarized based on survey answers.

5.2 Respondent Departments
As you might expect, most every respondent managing one or more collections emergency kits worked within collections-related departments. This obviously depends on the organizational structure of the unit. Some units had multiple departments responsible for maintaining the kits. The departments represented included:
- Registration
- Collections Management
- Conservation
- Preservation
- Central Engineering (SAO)
- Exhibit Planning
- Living Collections (SG)
- Preservation Services
- Numismatics (NMAH)
- Collections Program
- Collections Education & Access

Some locations such as CHSDM broke down the responsibility of managing the kits by collection departments (i.e. works on paper, textiles, and decorative arts). The rationale for this was that each department oversees different collection materials with specific needs when it comes to salvage and response, and these departments have distinct collection storage areas. NASM has expressed interest in setting up a multi-department planning committee. The advantage of this could be more buy-in from different departments as well as a larger variety of input from people on what should be inside the kits.

5.3 Number of Kits

The response to this was highly variable. This is expected because of the varied size of the facilities and the collections stored inside them. See Appendix 1 for the number of kits per unit per facility.

5.4 Kit Location Awareness

About a quarter of the respondents had some type of map (Figure 4) that indicated the location of the kits. The question was derived from Melissa's previous experience getting to know collections emergency plans at the Winterthur Museum Garden & Library. This museum is maze-like with over 175 period rooms, and for this reason, preventive conservation staff have utilized stickers on emergency evacuation maps placed around the museum to indicate the locations of emergency kits.

Is there a map that shows the location of these carts?

Answered: 33   Skipped: 1
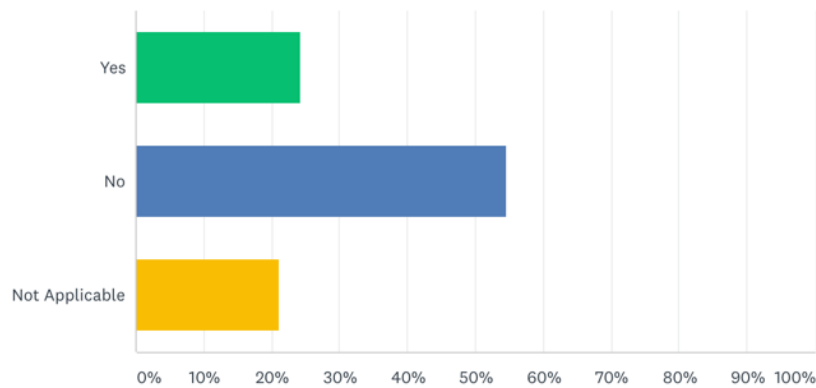
ANSWER CHOICES	RESPONSES	
Yes	24.24%	8
No	54.55%	18
Not Applicable	21.21%	7
TOTAL		33

Figure 4. Survey results for the use of maps to show kit locations.

NMAI-NY 2nd Floor Emergency Cart Locations
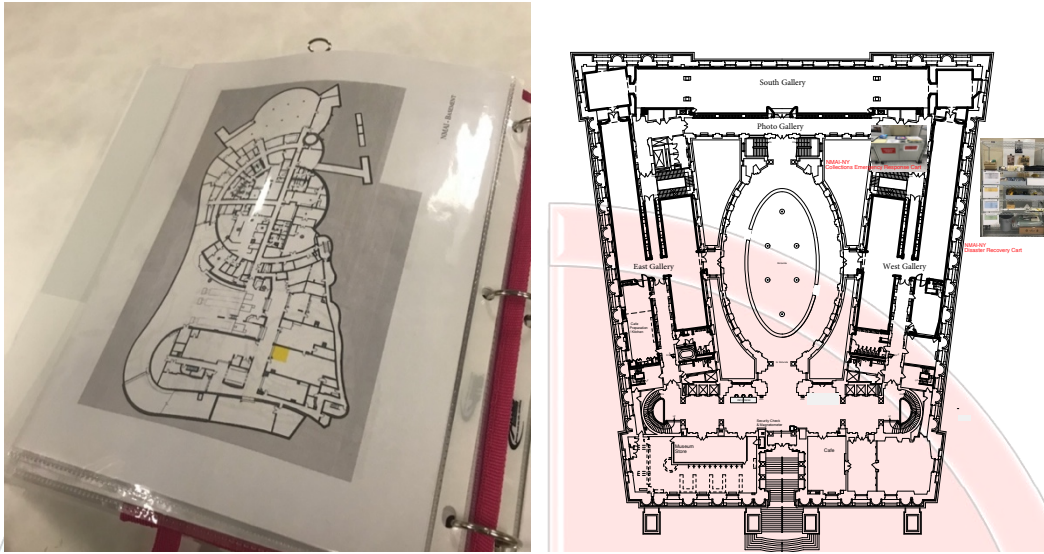
Figures 5-6. Floorplans that include emergency kit locations (NMAI-DC and NMAI-NYC). Both of these locations have these maps within the emergency kits and online in shared drives.

Those who have maps share them with staff in the following ways:

- Via the intranet or Microsoft Teams
- Some are considering sharing the map as part of the on-boarding process for all staff (NPM)
- Maps provided to the Office of Protection Services (OPS) as part of emergency information folders
- Through email circulation to collections staff

Those who didn't have maps gave the following reasons:
- The kits have a tendency to move around, so a map would be hard to update
- During annual May Day events staff are shown around to the kit locations. This was advertised to the entire staff, but it was hard to get everyone to attend.
- Rely on signage and bright colors on the kits to identify locations (see figure 7)
- Their locations are listed within the unit's emergency response plan
- Their locations are listed on the network internal share drive
- They rely on staff trainings to point out kit locations
- Their locations were announced at an all-staff meeting
- Have small numbers of collection staff and everyone is aware of their locations (and in some units, all collections staff participated in managing the kits).
- Due to the small number of kits (1-2), it doesn't seem necessary to map them
- Do not have a physical kit

Figure 7. Signs with large print and big lettering to make staff aware of emergency kit and its purpose at SIA.

5.5 Access

Access is a difficult parameter to balance when considering emergency kits. Of course, when there is an emergency, it is frightening to imagine an emergency kit filled with vital supplies locked away in a room and unavailable for use. However, there are incentives to limit access to the kits to prevent theft or borrowing of supplies. By design, emergency kits are filled with useful materials that could be tempting to staff members confronted with a task that necessitates a pair of scissors or nitrile gloves. The issue
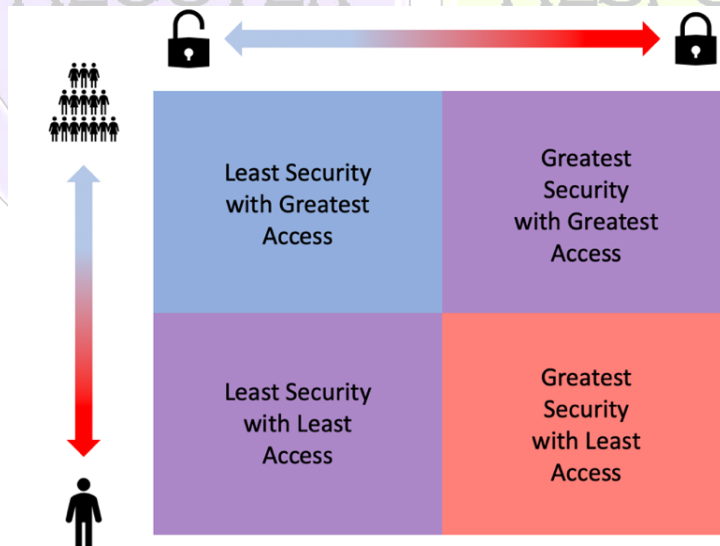

Figure 8. The vertical axis represents security based on physical location of the emergency kits, and the horizontal axis represents access based on locking mechanisms on the actual emergency kits.

with pilfering can be dire when those supplies are not available in an emergency situation. Supplies in emergency kits can be expensive, and removing them without accountability hinders accurate inventories and requires more time commitment of staff. Many of these concerns can be managed through controlling access in some form while also effectively communicating to staff the purpose of the kits and protocols for using materials within them.

5.5.1 Location

A kit's accessibility can be controlled by its physical location. Some kits were in publicly accessible areas near gallery spaces, while many others were in secured areas accessible by collections staff and OPS only. For units with publicly accessible kits, these were typically placed in staff-only areas tucked away from the main gallery areas but still physically accessible to the public. In some offsite storage locations, kits were accessible to anyone who can enter the building, which is restricted to staff and registered visitors. This was typically dependent on whether the kits were for collections on view in galleries or for collections in storage. Based on the organization of collections and access at the unit level, some facilities had multiple kits spread across different department storage locations. Security badge access for those spaces might vary depending on which staff members were assigned to work with specific collections (this was especially true at CHSDM and NMNH where collections are largely subdivided by departments).

Physical Access Based on Location

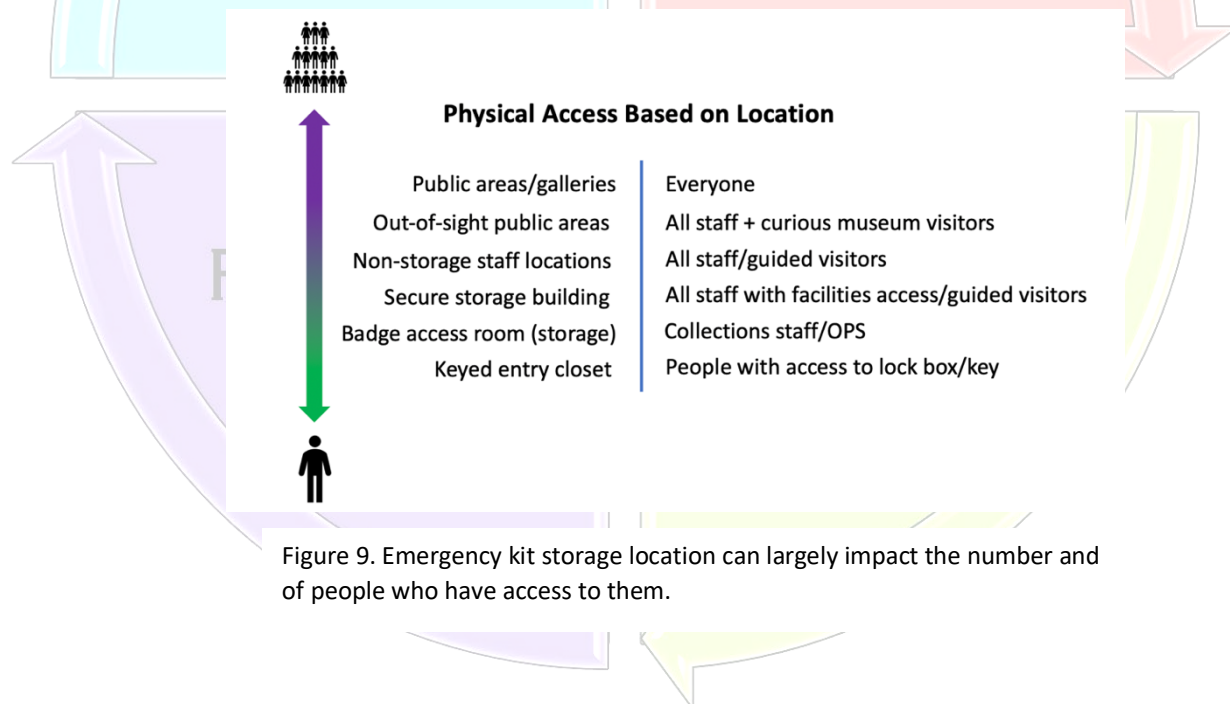| Public areas/galleries | Everyone |
Out-of-sight public areas	All staff + curious museum visitors
Non-storage staff locations	All staff/guided visitors
Secure storage building	All staff with facilities access/guided visitors
Badge access room (storage)	Collections staff/OPS
Keyed entry closet	People with access to lock box/key

Figure 9. Emergency kit storage location can largely impact the number and of people who have access to them.

5.5.2   Locking mechanisms

Some units implemented some form of security on their emergency kits as a means of deterring supply pilfering. This was more likely to be the case for emergency kits placed in more accessible locations (such as in galleries or areas with greater staff access). Those who did not use any form of locking mechanism rely on the trust of their colleagues within their department, which often meant a small number of people involved in some sort of collections work.

Some methods to deter people from physically entering the kits to borrow or take supplies were identified. These methods are listed in order of increasing security:

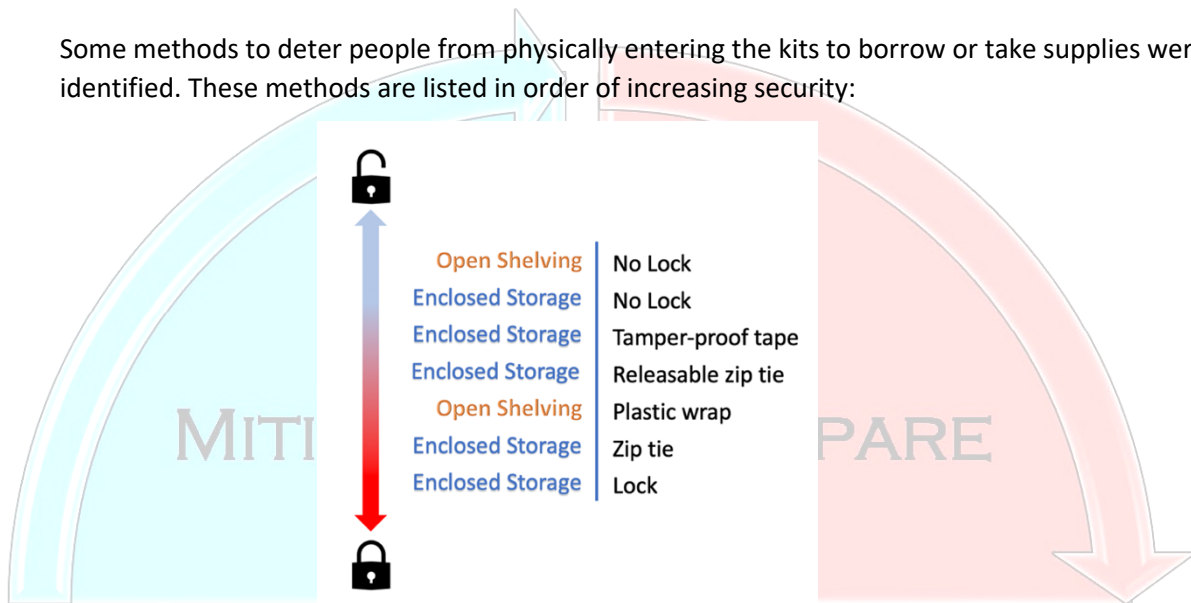|	
Open Shelving	No Lock
Enclosed Storage	No Lock
Enclosed Storage	Tamper-proof tape
Enclosed Storage	Releasable zip tie
Open Shelving	Plastic wrap
Enclosed Storage	Zip tie
Enclosed Storage	Lock

Figure 10. Access to emergency kits can be controlled by physical locking mechanisms.

Regular zip ties rely on users having access to sharp blades/scissors. Tamper-proof tape, perforated/unperforated zip ties, and shrink wrap all have the additional benefit of being a visual reminder to perform an inventory once the seal is broken. They also have a minimal barrier to discourage supply borrowing. One great potential of shrink-wrapped open shelving is that it is possible to see where certain supplies are located, and kit users can rip through the plastic to access needed item(s). The ripped plastic can serve as a visual reminder to inventory. If supply locations are well documented, it may help streamline the inventory process. In certain instances, kit access was highly restricted due to sensitive information inside the kits regarding instructions on how to unlock and access showcases.

5.6 Training

Educating staff about emergency kits is an important step in emergency preparedness. About one-third of the respondents hosted some type of training surrounding their emergency kits. Here is a summary of the responses related to the types of trainings completed:

- Many trainings involved showing the physical locations of the kits and a presentation on what the kit includes and how the different items may be used.
- Some offered training about the emergency kits alongside salvage and recovery practice and object handling courses.

- NPM is investigating the possibility of including emergency kit training into the on-boarding process.
- Staff being trained ranged from all staff members to collections professionals, volunteers, OFMR, and OPS.
- In some instances, training was as minimal as sending out an email to staff members to explain the location of the kits and what they are used for.
- Involving different staff members in the inventory process allows people to get more familiar with the kit contents.
- Training can involve discussing various emergency scenarios and querying the audience about what materials to use.

5.7 Variety of Emergency Kits

Some of the facilities had more than one type of emergency kit, whether they were simply in different containers or comprised of completely different materials. A question was asked to understand the rationale behind this decision.

Reasons for having a variety of kits within a singular facility:
- There are size limitations based on where different kits can be stored
- Some kits were older and kept as is while newer kits with different configurations were created
- Different kits are designed to address different collection types (example: paper salvage includes additional needs such as blotter paper and Hollytex®)
    - At NMNH, some departments customize their kits with additional materials to address specific collections needs.
    - At CHSDM, each department was responsible for creating their own kit(s) because varied materials within the collections.
- Some materials are large (ex. rolls of polyethylene, Tyvek, Hollytex®) and expensive. For this reason, some units have opted to buy a limited supply of these materials to store in one larger kit and have other smaller/mobile kits dispersed elsewhere.

5.8 Inventory Management

It can seem like a daunting task to maintain kits with a large number of supplies, especially when certain materials expire and people may be tempted to borrow materials from the kits.

Inventory strategies discussed:
- Content lists are printed and placed inside/outside the kits as an easy reference during inventory checks
    - NMAI-NY uses magnets to hold the inventory list onto the kit's metal container .
- Content lists are available on shared drives for reference during inventory checks.
- At NMAI-NY, kits contain tools needed to open the showcases. This ensures regular checks inside the emergency kits, since PEM2 sensors/dataloggers inside the cases need to be physically downloaded monthly.
- There are units that have such a small collections staff that any use of the kit in an emergency would be known and supplies can be replenished soon after.
- Some have regular inventory checks scheduled:

- o Some use MayDay[2] as an instigator to implement inventory checks and consider new items to include.
  - ▪ SIL contacts all of the libraries on May 1st for MayDay and gives each branch the month of May to make sure emergency kits are inventoried and any necessary replacement supplies are ordered.
- For museums with larger collections staff, there have been some efforts to make staff know who to contact if supplies are taken from the kits for emergencies. Ideally, staff would provide a precise list of what was used, but inventorying may be necessary (See section 5.5: Training).
- Locking mechanisms (section 5.4.2) can sometimes serve as a visual reminder to undertake an inventory.

Frequency of inventories:

Most respondents completed an inventory on an "as needed" basis (listed as "Other" in figure 11), following the use of a kit in an emergency. Some units had a defined schedule in order to keep track of items with expiration dates (batteries, tape, gloves, etc.). Some units timed their inventories in May to serve as a MayDay exercise or near the end of the fiscal year to order replacement items .

5.9 Leadership for Maintaining Kits

One of the survey questions addressed leadership and responsibility for the emergency kits. The answers were quite varied. Having some leadership structure can ensure there is no lapse in responsibility for maintaining an up-to-date inventory. Here is a summary of the answers:

- In some instances, different departments put the kits together than those who now maintain them.
- NPM is interested in putting the responsibility for maintaining emergency kits into a job description for a new hire.
- NMAI has unit-specific leadership but also has a unit-wide Collections Emergency Response Team that can provide support and guidance.
- Some units have specified leadership based on a staff member's previous involvement in PRICE training and initiatives.

How often do you do inventory?
Answered: 33   Skipped: 1

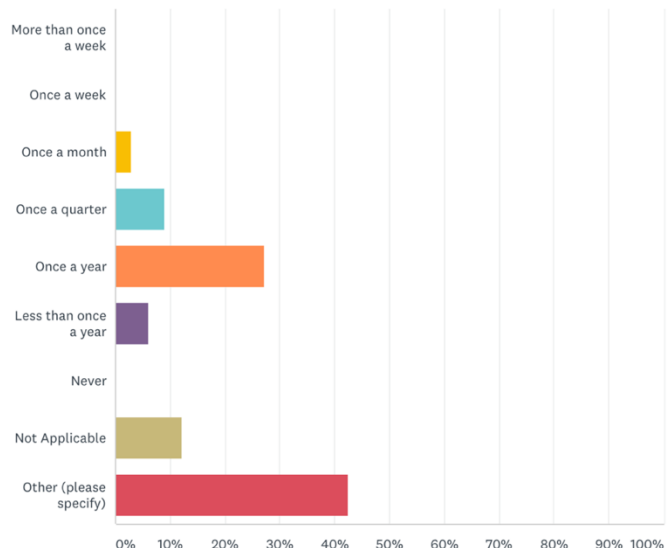Figure 11. The frequency of inventory by survey respondents. Those who chose "other" completed inventories as needed following the kit's use.

[2] On May 1st of every year, MayDay was established by the Society of American Archivists and Heritage Preservation and the Foundation for Advancement in Conservation to encourage cultural heritage professionals to take steps for emergency preparedness.

- Some units have shared the responsibility amongst their entire department.
- SIL emergency kits are overseen by staff working at Pennsy. Each library branch has the same kit, and is responsible for managing its kit and letting staff at Pennsy know when new supplies are needed (many items are purchased in bulk and stored at the SIL Pennsy site).
- The leadership at many units is on a volunteer basis, and there are instances where these positions have been on a temporary term basis with new leaders rotating in.
- At NMAH two volunteer leaders include this within their performance plans but were not hired specifically to manage the kits. This management team tries to meet bi-weekly.
- NMAI-DC implements an accountability sheet to mark off certain tasks that are completed during the week. There is a hope that kit maintenance/inventory can be included in that.
- CHSDM had one person coordinate different departments to put together kit supply wish lists. Ultimately, each departments will be responsible for maintaining its respective kit(s).

5.10 Creative Solutions

In an attempt to come up with a list of useful and novel kit items, the following question was asked: "What things have been added to the kits that are unexpectedly useful?" Here is a list of some of the favorite items:

| Item Name	Possible uses
Absorbent pads/snakes	Incredibly useful for any water emergency. Most of these items are also oil absorbent. Higher quantities of smaller absorbent pads/snakes are more economical than one larger one.
Laser-distance meters	This could be helpful if there is an item blocking a path or you have restricted access and need to make some preparations before entering a space.
Buckets	These are great for mopping, but they can also help to remove flood water, hold smaller items, fill with clean water for salvage, and more.
Stoplight system for priority (see Fig. 12)	Having these printed and ready for triage speed up the process during an emergency.
Maps	These can be great to have on hand for elevations and overall plans.
Battery chargers	Many items in kits require batteries. Additionally,
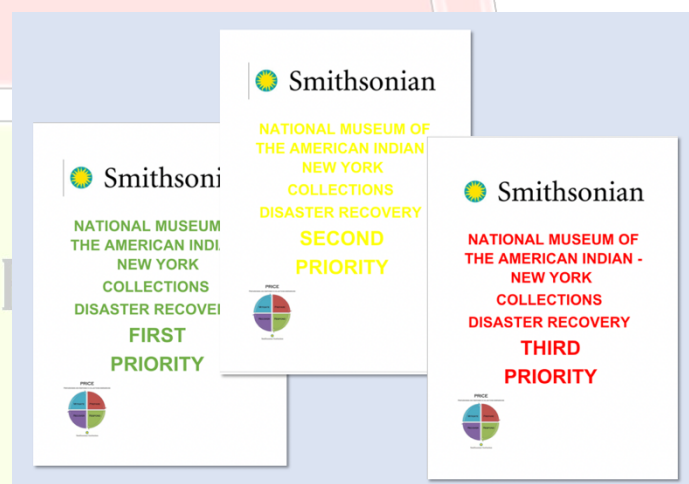
Figure 12. Stoplight system for prioritization. These are printed sheets of paper kept within emergency kits at NMAI-NY. These can be used during triage for salvage/recovery. The words are written out for color-blind accessibility.

	batteries have expiration dates.
Collapsible light-up safety cones (see Fig. 13)	Because they're collapsible, it is much easier to fit within packed kits and can be used for scene safety.
Pipe insulators/pool noodles	These can be used for support during salvage. They also are particularly helpful for wet textiles to support folds and for rolling/transportation.
Shoe cover "booties"	These are useful to cover your feet to prevent tracking a mess and also to protect your own feet from water and debris.
Bread trays (see Fig. 14)	These are useful as a drying apparatus for objects during salvage.
Collapsible kitty litter box (CHSDM)	These are water-tight and completely flatten, making them very portable. These can be used to fill with clean water for wet salvage.
Air rocket	This is an especially useful tool for recovery when you have a fine particulate such as soot or dust on the surface of a porous material.
Collapsible lanterns	These do not take up a lot of space and diffuse light in a way that is conducive for hands-free work.
Hairdryer/heatgun	These can help to speed up the drying process.
Vacme press (SIA)	This is designed to remove moisture from documents.
Desiccated silica gel	Can be used as a sorbent for drying.
Blank newsprint	This is used for absorbing water and creating a clean surface for placing items on.
Salvage and Recovery Wheels	These are quick reference for salvage/recovery techniques based on material-type.
Various colored reflective tape	Reflective tape can be used to mark high-prioritization items

Figure 13. Collapsible light-up safety cones. (image: amazon.com)

Figure 14. Bread trays that can be used as drying racks (image: Buckhorn, inc.)

Figure 15. Collapsible kitty litter trays are water-tight and can be useful when filled with clean water for salvage(Image: Amazon.com)

	in storage, and is visible with a flashlight in the dark.
Gaffers tape	This might come in handy for designating work zones and levels of triage.
Drip diverters	These can be suspended under a leak.
Waterproof notepad (see Fig. 16)	This is useful for documentation during a disaster—especially if there is water involved.
Paint roller with dry brush (see Fig. 17)	You can use this tool to sop up water from collection items, such as flat documents.
Paper, pens, pencils, and pencil sharpeners	These are always useful to have around!
Plastic sheeting	This is especially useful to divert water, cover objects, and for use as a floor covering.
Headlamps	These are perfect for illuminating areas if you need your hands free.
Squeegee	This can help redirect puddles nearing collection items.
Glow sticks	These can be used to illuminate areas if electricity is not available.

Table 1. Creative emergency kit inventory items

Figure 17. Paint roller with dry brush (Image: Amazon.com)

Figure 16. Waterproof notepad (Image: Amazon.com)

6   Findings: Data and Observations (Emergency Kit Inventory)

6.1 Overview

As part of the survey, Melissa collected inventory lists of emergency kits from the different collecting units. In order to interpret the data in a useful way, item names were standardized and sub-categories of materials were established for better data visualization potential.

6.2 Methodology

When interviewees set up appointments with Melissa for the verbal interview, they were asked to send any digital inventory lists they had of their emergency kits. Melissa then input the list into a single Excel spreadsheet, while splitting the information into as many columns as possible to increase data resolution and allow for more analysis and database search functions later on (See Table 2). In order to better understand common items included in the kits, Melissa imported the data into OpenRefine[3]

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[3] A free, open source, power tool for working with messy data

where she used the text facet and cluster tools to refine the data by creating standardized names for supply types. Any information lost from this name change was added into the additional "Size" and "Notes" columns. The data is almost 100% complete, however, there is still a need to collect the following data:

- Full Inventory lists for:
  - NMAAHC
  - NPG – Victor Building
  - Collections work room – CRC – NMAI

Column Name	Description/Rationale
SI Unit Name	
Facility	It is useful to categorize kits by facility in order to determine if additional supplies within a facility may be accessible/borrowed in the case of an emergency.
Kit type (name/location)	This was necessary since many units have more than one type of emergency kit within a facility.
Address	This column was included for specificity in case facilities are moved.
Supply Type	This refers to the name of the item. These names were standardized to evaluate the data. If changed during the data cleaning process, the original wording was placed into the "notes" column.
Supply # (per kit)	Total number of items included in kits.
Supply unit	It was necessary to include the unit because of the great variation in inventory lists provided (pairs, boxes, individual units, roll, etc.)
Size	Many times items of different sizes were included in the same kit (i.e. gloves, Ziploc bags, trash bags, etc.). By including this column, we can still manage this data separately but limit the total number of supply types listed.
Notes	This column was added to place ancillary information about supply types that were not included in the standardized supply type column. It was also used for any additional commentary about what the object is if it was not initially clear to Melissa during the survey.
Category	In order to visualize the emergency kit content breakdown, larger categories of materials were defined: Absorbent materials, Container, Documentation, Instructional documents, PPE/Personal safety, Salvage/Recovery, Scene safety/clean-up, and Tools. These categories are defined in section 6.3.

Table 2. Excel inventory list column descriptions.

6.3   Supply Categories

Broader categories were defined and created as an additional column in the Excel spreadsheet of inventory items using the OpenRefine software. These categories are defined below and allowed for a better understanding of emergency kit components for the survey. In creating these categories, Melissa recognized that many items can serve multiple purposes and may fit within multiple categories.

6.3.1   Absorbent materials

Water emergencies were described by many as one of the most frequent uses for emergency kits. There are many items manufactured for this specific purpose and included in most of the kits. Here are some of the supply types listed in this category:

Examples Absorbent Materials Supply Types:

- Absorbent pads
- Absorbent paper
- Absorbent socks
- All-purpose wipers
- Bath towels
- Bedsheets
- Blotter paper
- Cheesecloth
- Cloth diapers
- Muslin
- Newsprint
- Paint roller frame with dry cover
- PVA towels
- Paper towels
- Rags
- Sponges
- Techwipes

6.3.2   Container

The "container" category was created to describe the physical item used to hold emergency supply items and the accessories allow for further organization. These containers also have the benefit of being used to transport items in an emergency if needed.

Examples of Container Supply Types:

- Cabinets with doors/wheels
- Metro shelving units on wheels
- Lewis bins
- Milk crate
- Mobile trash can
- Plastic storage bins
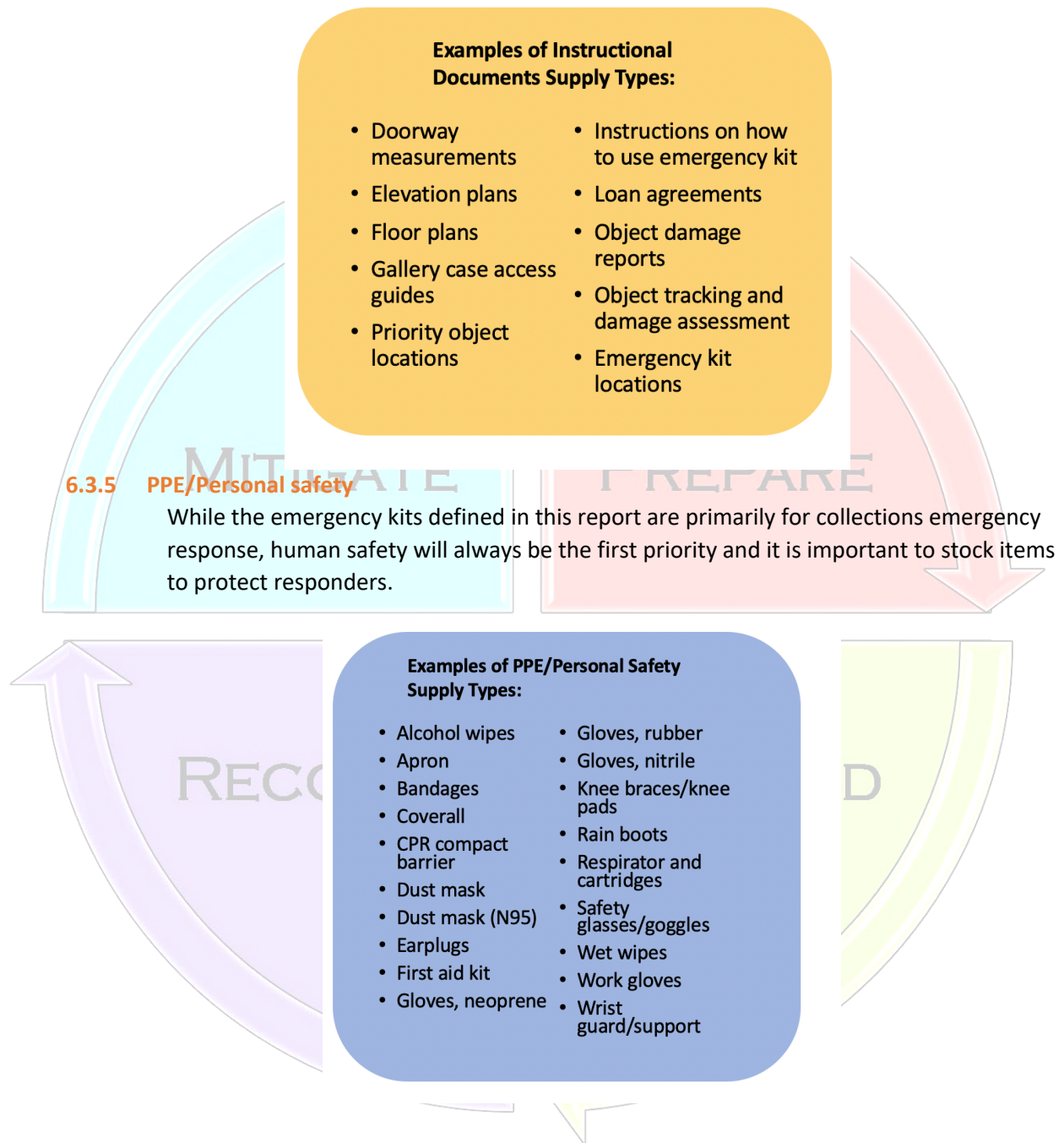- Plastic storage cates (PSC)
- Push carts
- Roadie box
- Tall wardrobe/utility cart on wheels
- Cart accessories (shelves, wheels, hooks)

6.3.3   Documentation

When responding to an emergency, it is crucial to document where items were found, and in what state they are in. This will be important for registration needs, preventing the risk of dissociation, and for insurance purposes.

Examples of Documentation Supply Types:

- Acid-free strips
- Adhesive labels
- Barcode labels
- Binder clips
- Binder/clipboard
- Calculator
- China marker
- Disposable camera
- Notecards
- Notepad/notebook
- Object tag
- Pencils
- Pencil replacement lead
- Pencil sharpeners
- Pens
- Permanent markers
- Red object tags
- Waterproof notebooks

6.3.4   Instructional documents

Some emergency kits included documents that were placed specifically to support and inform the responder accessing a kit.

Examples of Instructional Documents Supply Types:

- Doorway measurements
- Elevation plans
- Floor plans
- Gallery case access guides
- Priority object locations
- Instructions on how to use emergency kit
- Loan agreements
- Object damage reports
- Object tracking and damage assessment
- Emergency kit locations

6.3.5   PPE/Personal safety

While the emergency kits defined in this report are primarily for collections emergency response, human safety will always be the first priority and it is important to stock items to protect responders.

Examples of PPE/Personal Safety Supply Types:

- Alcohol wipes
- Apron
- Bandages
- Coverall
- CPR compact barrier
- Dust mask
- Dust mask (N95)
- Earplugs
- First aid kit
- Gloves, neoprene
- Gloves, rubber
- Gloves, nitrile
- Knee braces/knee pads
- Rain boots
- Respirator and cartridges
- Safety glasses/goggles
- Wet wipes
- Work gloves
- Wrist guard/support

6.3.6   Salvage/Recovery

These items are probably the most unique to collection emergency response kits, and many are quite creative. We will never know exactly what will be needed to respond to an emergency, but it is important to have items on hand that will support the physical salvage and recovery efforts, from wash basins with clean water for wet-salvage recovery, to conservation supplies for aid in the recovery effort, to materials that can support objects as they dry and/or when they are transported to another location outside of the disaster.

Examples of Salvage/Recovery Supply Types:

- Cotton swabs
- Dartek
- Developing tray
- Distilled water
- Eraser
- Ethafoam
- Fine dusting brush
- Foam pipe insulation
- Folding tables
- Freezer paper
- Glassine envelopes
- Gusseted Polyethylene bags
- Hairdryer/heatgun
- Hollytex
- Humidifier
- Indicating silica gel
- Magnifying lenses
- Microfiber cloth
- Mylar
- Nylon net
- Paintbrush
- pH strips
- Plastic bags
- Plastic cling wrap
- Plastic trays
- Polybags
- Polyester sheeting
- Reemay spunbounded polyester
- Teflon (relic wrap)
- RH Indicator strips
- Screen (for vacuuming)
- Screen drying racks
- Silicone release Mylar
- Small fans
- Snake weights
- Soot sponge
- Spray bottle
- Spun Tyvek paper
- Sweater drying rack
- Tweezers
- Twill tape
- Tyvek
- Unbuffered tissue
- Vinyl erasers
- Volara
- Wax paper
- Weights
- White cotton gloves
- Wood blocks
- Ziploc bag

6.3.7 Scene safety/clean-up

When one arrives at the scene of a disaster, there may be a need to block the area off for safety reasons and to protect collection items. There may also be a need to clean and secure surrounding areas to prevent further damage to other areas in the building.

Examples of Scene Safety/Clean-up Supply Types:

- Brooms
- Buckets
- Caution sign/tape
- Collapsible traffic cone
- Dehumidifier
- Door stop
- Drip diverter
- Dust broom
- Dustpan
- Flagging ribbon (orange)
- Gaffers tape
- Glow sticks
- Industrial fan
- Ladder
- Disinfectant
- Mop
- Squeegee
- Polyethylene disposable bags
- Polyethylene sheeting
- Portable fan
- Red barrier tape
- Reflective tape
- Safety cones
- Sandless sandbags
- Scrub brushes
- Scrubbing sponges
- Sponge mop
- Tarp
- Trash bag
- UV-C fan
- Vacuum
- Vacuum replacement bags
- Water pump
- White barrier tape
- Zip ties

6.3.8   Tools

Tools can have man purposes depending on the emergency. Lights and extension cords may be necessary to illuminate a dark room. Ropes and tape can help to support materials used to divert flood water.

Examples of Tools Supply Types:

- Batteries
- Battery charger
- Blade disposal containers
- Polyester twine
- Bungee cord
- Clear roll tape
- Clothesline rope
- Collapsible lantern
- Cotton cable cord rope
- Cotton twine
- Cotton yarn
- Crowbar
- Drill
- Duct tape
- Extension cord
- Flashlight
- Flood light
- Hammer
- Hatchet
- Headlamp
- Jute rope
- LED lightbulb
- Masking tape
- Measuring tape
- Nails
- Nylon rope
- Packing tape
- Painters tape
- Plastic emergency lights
- Pliers
- Polyester thread
- Pry bar
- Replacement blades (utility knife)
- Rubber mallet
- Scissors
- Screwdriver
- Self-healing cutting mat
- Socket
- Socket set
- Suction cup
- Surge protector
- Tape and dispenser
- Tape measurer
- Temperature/ humidity monitor
- Tongs
- Tool kit
- Twine
- Twisted Polyester Rope
- Tool set
- Utility knife
- Vinyl tape
- Waterproof tape
- Wire cutter
- Wire gripping and cutting pliers
- Work light
- Wrench

6.4 Data visualizations

Once the inventory list items were categorized, Excel was used to visualize the data as pie graphs based on the frequency of occurrence of categorized supply types. It should be noted that certain supplies were included more than once in an emergency kit if they came in different sizes (nitrile gloves, Ziploc bags, absorbent pads, etc.).

Top 30 Most Frequent Emergency Kit Supplies:

1. Nitrile gloves
2. Ziploc bags
3. Absorbent socks
4. Flashlights
5. Trash bags
6. Polyethylene sheeting
7. Sponge
8. Coverall
9. Scissors
10. Absorbent pads
11. Permanent markers
12. Notepad/notebook
13. Pencils
14. Batteries
15. Caution tape
16. Utility knife
17. Work gloves
18. Safety glasses/goggles
19. Door stop
20. Headlamp
21. Object tag
22. Duct tape
23. Paper towels
24. Tarp
25. Apron
26. Dust mask
27. Blotter paper
28. Bucket
29. Clipboard
30. Towels

Figure 18. A list of the highest frequency supply types from the survey. Certain items such as nitrile gloves, Ziploc bags, and absorbent socks may have extra high frequency because of the inclusion of a variety of sizes in each kit

By examining the defined categories and frequency of occurrence, Melissa was able to create a pie graph with the breakdown of materials for most of the Smithsonian collecting units (see Figure 19). This visualization shows the average makeup of an emergency kit at the Smithsonian based on material category.
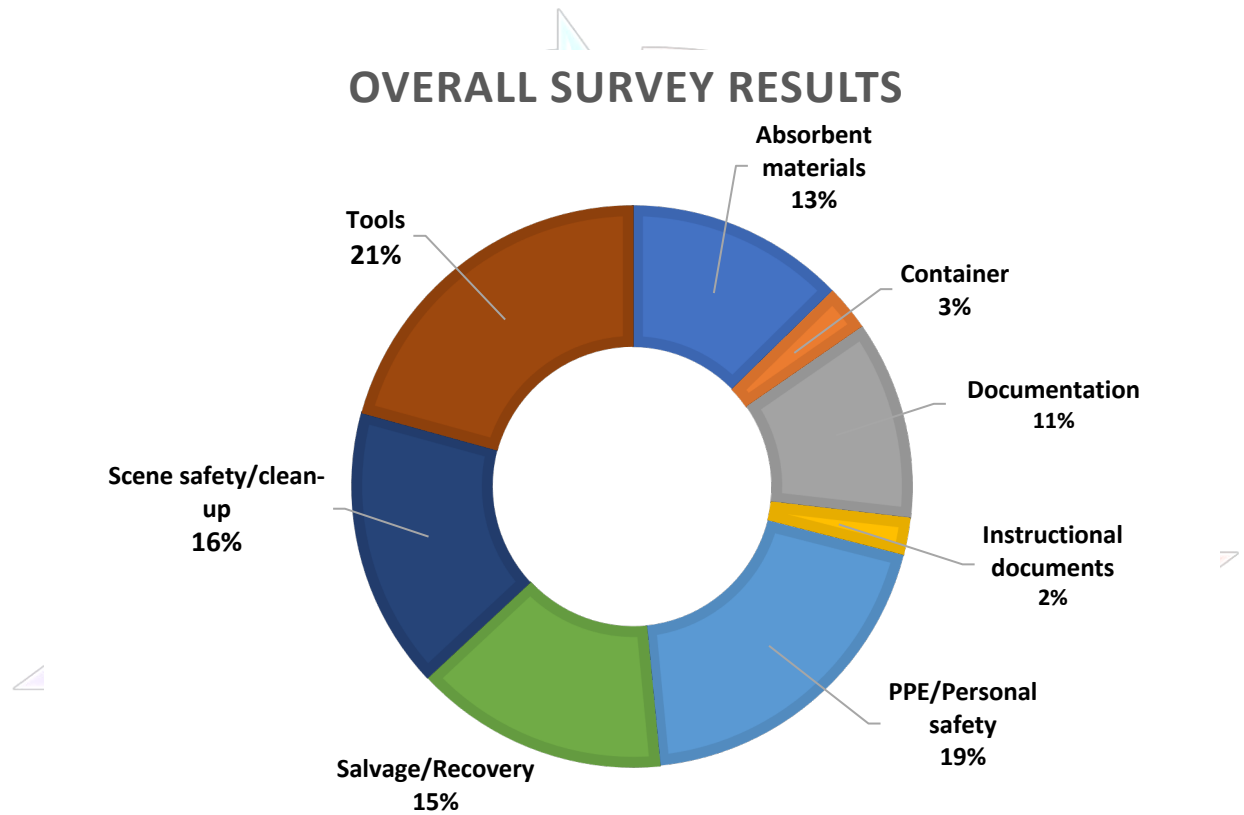
OVERALL SURVEY RESULTS

Figure 19. Breakdown of collection-types by frequency of occurrence for entire survey.

7   Recommendations

After reviewing the results from the survey, Melissa has determined the following recommendations for collections emergency kit management at the Smithsonian Institution:

- **Map the location of emergency kits within your entire facility and determine if more are needed**
  There were some facilities that were lacking in total number of reserved emergency supplies. An advantage to having collections in a shared facility is that you may be able to call upon your neighbors for additional supplies if needed, but start by making sure there are enough supplies for your own unit for at least small-scale emergencies. Maps showing kit locations can be an excellent tool in the case of emergencies as well—especially in large, complicated buildings.

- **Get to know others involved in CEP within your facility**
  Reach out to exchange information about emergency kits with different Smithsonian departments, and possibly set up a tour to see them. This would be especially helpful with other units that share collection storage within the same facility or a nearby one. Consider working together on training modules that involve tours of emergency kit locations.
- **Consider access to the kits alongside training**
  It is helpful to have many staff members trained to prepare for collections emergencies and utilize the contents of the kits. This means storing kits in areas with greater staff access. With greater accessibility, further training is needed to make sure staff are aware of the kit's purpose, what materials are inside, how to use them, and how to report their use . Training can be completed as part of the onboarding process and/or through a Moodle certification with refresher courses over time. To avoid borrowing of emergency kit supplies, consider locking mechanisms. Some of these include tamper-proof tape and quick-release zip ties that do not prohibit access, discourage pilfering, and serve as a visual cue to perform a kit inventory.
- **Remember supply expiration and factor this into inventory checks and sustainability considerations**
  This is true for batteries, nitrile gloves, and other PPE such as N95 masks. Rubber-based adhesive tapes will harden and become brittle, and acrylic-based adhesive in many clear packing tapes have a low glass transition temperature and can ooze at or above room temperature. Many kits will go years without needing to be accessed and often these materials will be inventoried without actually considering how long the items have been in storage. This can become a big problem when these supplies are actually needed, and allowing materials to expire is wasteful and unsustainable. Factoring expiration dates into emergency kit examinations is an excellent way to encourage more regular inventories. It is helpful to create a schedule and checklist to make sure these supplies are monitored, and assigning this task specified people.
- **It is useful to maintain an inventory list online and with emergency kits**
  Utilizing an online drive location for inventory lists allows accessibility to up-to-date lists. It also allows for ease in sharing inventory management documents amongst different staff members. Physical lists inside the emergency kits can be useful for identifying item locations (if the list designates certain shelves and boxes for supplies). These physical lists can also be marked for missing/used items after the kits have been used.
- **Identify clear leadership roles when it comes to maintaining emergency kits**
  It is important to designate at least one person as the leader for the kits to ensure that inventory is completed and staff are aware of the kits, their location, and their purpose. This role can be included within an actual job description. Alternatively, there can be term limits to the responsibility which will ultimately increase staff awareness of the kits.
- **Kit variety can be helpful but can also complicate inventory management**
  Different materials have different needs when it comes to salvage and recovery (i.e. paper and textiles vs. metal objects). If collection items are stored by material type, it may be worth considering unique collections-specific emergency kit contents. However, consistency of kit supply materials certainly makes things easier when it comes to resupply and inventory management.

- **Mobility is an incredibly important kit feature**
  You will appreciate having a kit on wheels when an emergency happens on the other side of the building. In certain emergencies you may not have access to elevators, so having at least one kit on every floor is ideal.
- **Be creative when considering supplies to include**
  There are many objects out there designed for something completely unrelated that can become the most useful tool within your kits. You may also be able to save money by considering these supplies over ones designed specifically for emergency response purposes.
- **Be active in the PRICE community**
  There is an incredible wealth of knowledge and experience at SI when it comes to emergency response and preparedness. Take advantage of this through the many networking opportunities organized by the National Collections Program.
- **Be prepared, but do not be overwhelmed**
  This is a long document filled with information about time-intensive management of inventory that can be costly to prepare. Schedule time to devote to this work and try not to critique your unit's preparedness by comparing it against other units. There is no defined moment when emergency preparedness is complete, and every small action is valuable.

8 Future Work

This work lays the foundation for some much larger fruitful initiatives. Here are some project ideas for the future:

- **Create an online database for emergency kit supplies** that can be used for inventory management by individual units. This would provide a single database with updated information about supplies and their locations across the Smithsonian. This may be accomplished through Microsoft Access or SQL, which can create a front-end interface that allows for easy data entry and prevents full access to raw data files.
- **Incorporate this data and geo-spatial information into SI Explorer 5.** This new web-based software has real potential for visualizing emergency kit supplies on floor plans and maps of the greater D.C. area and beyond. As more data is stored on SI Explorer such as incident reports, it could inform optimized kit placement within a building.
- **Enter more data associated with supply types into the inventory list.** This could include vendor information, price, expiration date, physical volume of individual supplies, collection-type for response, and consistent supply units (i.e. boxes of gloves vs. pairs of gloves).
- **Consider square footage/collection size and the capacity for response for certain facilities.** It could be helpful to understand the quantity of kits needed based on physical space and collection needs. In terms of capacity for response, kits are typically stocked for small emergencies as a stopgap measure until more supplies can be acquired. Are these kits designed to handle an emergency that impacts 1% or 25% of a collections area? If it is a large emergency, how long will the supplies be adequate until further materials arrive?

APPENDIX 1: Verbal Survey Questions

1. What is the name of your facility (for this singular survey)?
2. What is the name of your unit?
3. What is the name of your department?
4. How many kits do you have in this facility?
5. Is access to the kit(s) limited?[4]
6. Is there a map that shows the location of these kits?
7. If there is a map, how can these maps be found?
8. If there isn't a map, how are staff made aware of the kit locations?
9. How many variations of emergency kits are in this facility?
10. If you have more than one variation of emergency kits in a single facility, please explain why…
11. What strategy do you have for keeping up with stocking the kits/doing inventory?
12. How often do you do inventory?
13. What things have been added to the kits that are unexpectedly useful? Please explain.
14. Do you host any type of training for using the kits in an emergency?
15. Please describe how leadership works for maintaining the kits.
16. Additional comments

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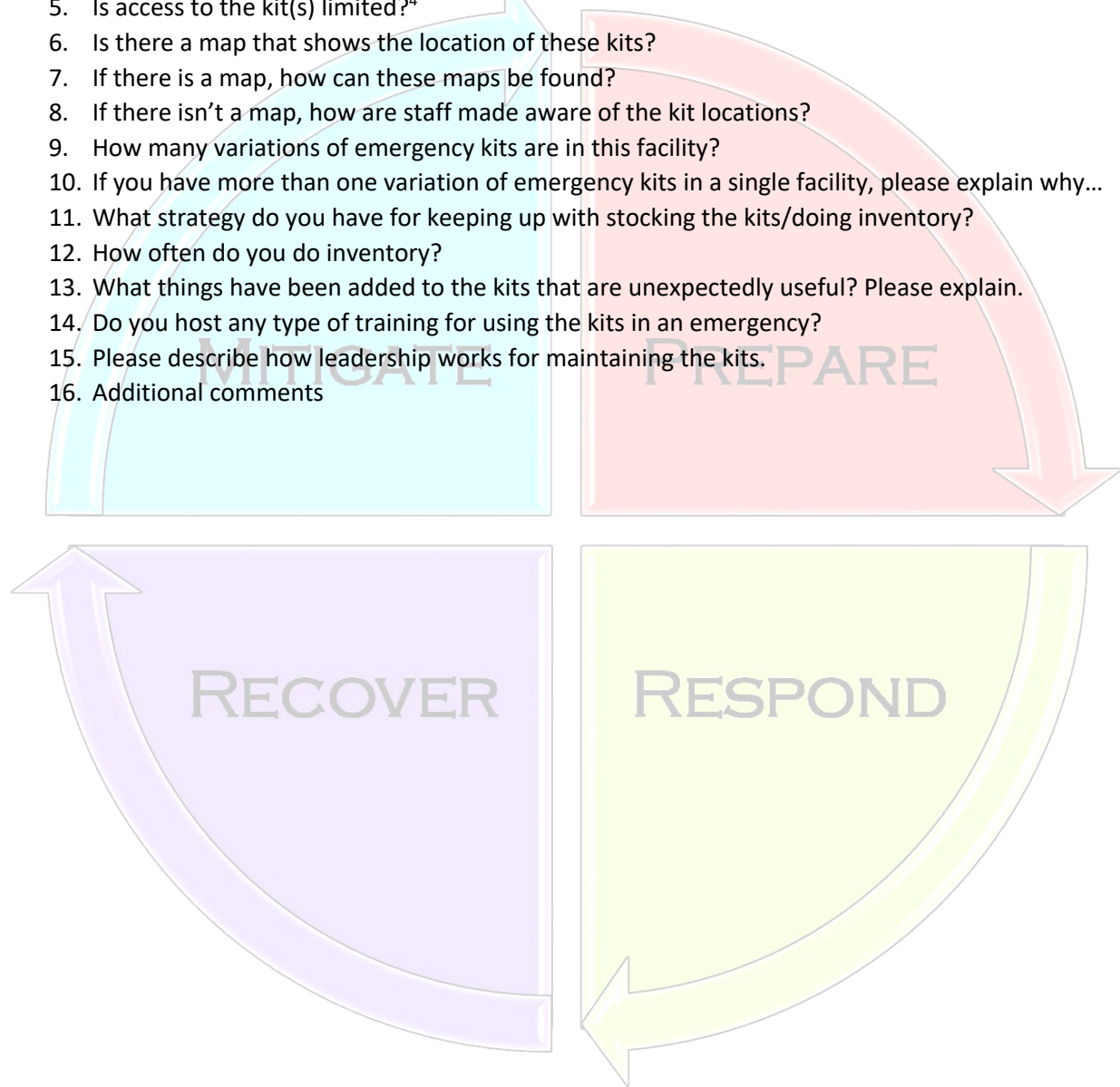
[4] Melissa determined that this question was too open-ended, and during the interview adjusted the question to, "Can you please describe the accessibility of the emergency kits."