PLANNING FOR NATURAL DISASTER DAMAGE IN BOTANICAL COLLECTIONS

Connecting to Collections Care

Jackie Bergquist Salas

03-12-2019
Jackie Bergquist Salas, Oakland CA

Graduated with a B.S. in Environmental Horticulture and Urban Forestry from UC Davis, worked in floriculture labs and volunteered/interned at the arboretum and conservatory on campus.

Obtained a M.S. in Public Horticulture from the University of Delaware’s Longwood Graduate Program, where she studied public garden management, and wrote her thesis on disaster planning for botanical collections.

In 2011, Jackie joined Children’s Fairyland, America’s first storybook themed amusement park for children, as Landscape Supervisor and Horticulturist.

Obtained Arboricultural License WE-10485A and Tree Risk Assessment Qualification through the International Society of Arboriculture.
Currently employed with Children’s Fairyland, Oakland, CA

- Main areas of focus:
  - Grounds Maintenance
  - Habitat stewardship
  - Kids’ education
CURRENT DISASTERS

Biological

Man-made
“Plant collections are the life blood of public gardens; without plants there would be no gardens. Simply put, the process of disaster planning helps to ensure the safety of plant collections, and the true relevancy of a botanical institution.”
LONGUE VUE HOUSE AND GARDENS after Hurricane Katrina

Tree Damage

Flood Damage
Why disaster planning?

- Safe guard your cultural institutions relevancy, or appeal to the community
- Emergency/Disaster Preparedness plans are required by the American Association of Museums for museum accreditation (AAM, 2007)
- Preparedness planning required for Plant Collections Network accreditation (APGA, 2019)

You might HAVE to put together a plan for accreditation- that’s where this talk can help
Topics to be covered:

- Finding general resources for disaster planning help.
- Surveys, case studies, interviews made during thesis research.
- Discussion of a disaster planning template that was created as a result of aforementioned research.
- How the template can be best put to practice in a cultural institution’s setting, using Children’s Fairyland as the model.
General collections-based disaster planning resources are provided by many museum related professional development associations:

- Foundation for Advancement in Conservation
- Heritage Emergency National Task Force
- The American Association of Museums
- The Getty Institute
- D.plan.org by North East Document Conservation Center
- National Center for Preservation Technology and Training
Topics to be covered:

- Finding general resources for disaster planning help.
- *Surveys, case studies, interviews made during thesis research.*
- Discussion of a disaster planning template that was created as a result of aforementioned research.
- How the template can be best put to practice in a cultural institution’s setting, using *Children’s Fairyland* as the model.
RESEARCH DURING THESIS STUDIES

- Mixed Methods Approach where quantitative research (surveys) were “concurrently embedded” in qualitative research (case studies, and interviews)

- Specific data collection methods:
  - Two American Public Gardens Association (APGA) National surveys, three site-specific disaster planning case studies, nine on-site disaster damage interviews.

- Attendance at two national disaster planning conferences for museum professionals

- Two disaster specific courses at the University of Delaware:
  - Politics of Disaster (Sylves), Disaster and Society (Wachendorf)

- Participation as an observational member of the Longwood Gardens Horticulture Department Disaster Planning Team

- Participation in the Philadelphia Alliance for Response
C2C Care Webinar Poll, Question #1

- How many participating institutions do we have here today? Let's find out by responding to the following question:
  - Do you have a general emergency or disaster plan at your organization? Yes/No?
- While we wait for responses, let's move on to the results from a national survey taken in December 2008 asking the same question to public gardens....
December 2008 survey:

Gardens with natural disaster plans

Total Responses: 140

50.71% - yes
49.29% - no
Do you have a general emergency or disaster plan at your organization? Yes/No?

.........how many responses

.........how many yes?

.........how many no?
Of the organizations represented that do have a general emergency preparedness or disaster plan, are your collections (living or not) specifically discussed in terms of mitigation or salvage in the plan?

While we answer this question lets move on to the results of this question when asked in 2008 to public garden members....
DECEMBER 2008 SURVEY:

Gardens with specific plant protection/salvage information:

Total Responses: 66

18.18% - yes
81.82% - no
GARDENS WITH DISASTER PLANS

- 1\textsuperscript{st} survey $27/148 = 0.182$ or 18%
- 2\textsuperscript{nd} survey directly stated, 18.16%
- Museums: Heritage Health Index Reported 20% of museum collections were protected in 2004

Only 1 in 5 collections are protected!!!
Of the organizations represented that do have a general emergency preparedness or disaster plan, are your collections (living or not) discussed in terms of mitigation or salvage in the plan?

- .....Yes?
- .....No?

Similar to 2008 public garden or Heritage Health Index survey?
Let’s look at a plan!

- Adapted FEMA 386-6 Document, Integrating Historical Property and Cultural Resource considerations into Hazard Mitigation Planning.
- Professionally produced starting point.
- Chosen based on its 4 phases of planning.
  - Organizing resources
  - Assessing risks
  - Developing a plan
  - Implementing/monitoring the plan
Disaster Planning strategy adapted from FEMA 386-6 for use in Plant Collections

1. Organize Resources
   - Get support for project
   - Build team to work with
   - Engage employees

2. Assess Risks
   - Identify Hazards
     - Floods, High Winds, Ice Storms, Hurricanes, Fires, Earthquakes etc.
     - Look into Historical societies in the area
   - Inventory Collections
     - Speak with section gardeners about their most valued plants
     - Speak with curators about specially designated plants
     - Speak with volunteers and other stakeholders about plants that they value in the collections
   - Prioritize Salvage
     - Assess monetary replacement value for plants:
     - Assess historical/organizational significance of plants:

3. Develop a Mitigation Plan
   - Decide what plants to focus on
     - What designates plants priority level and how are different priority levels dealt with during disasters?
   - What will it take to keep highest priority plants safe?
     - Site-specific: will you need to use sandbags, berms, shelters, or move, take cuttings, pot up?
   - Assign Responsibilities
     - Who initiates disaster preparation before an imminent disaster?
     - Who will be responsible for safeguarding certain plants?
     - Will the responsibilities be different for different scenarios?
   - Test the Plan

4. Implement the Plan and Monitor its Progress
   - Write the plan
     - Keep it in a safe place for security reasons
   - Interagency Coordination
     - Agreements with local organizations, businesses that could help the garden prepare if necessary
   - Annual Updates
How much time does your organization have to spend on putting a plan together

- A. 5-8 hours (less than one work day)
- B. 9-24 hours (1-3 work days)
- C. 25+ hours (more than 3 work days)

While we answer this question lets move on and we will discuss results after a case study discussion....
How does the adapted FEMA plan work for botanical collections?

Let's find out through case studies:

- April 2008 - Naturalistic Garden
- May 2008 - Display Garden
- July 2008 - Historic Landscape
Adkins Arboretum
Naturalistic garden- educational interpretation of damage/natural succession was important.

There were some rare specimens which Adkins wanted to try to mitigate/salvage.
Brookside Gardens
Display garden- wanted to be able to reopen quickly for visitors to use after a disaster

Local audience uses garden recreationally as a walking venue, and for enjoying seasonal horticultural displays

Needed a replacement strategy for sourcing seasonal display and bedding plants (to be able to immediately replant after a disaster)
LONGUE VUE
HOUSE AND GARDENS
Very vulnerable:
HISTORICAL DESIGNS
Longue Vue Results

- Have an organizational disaster plan and a Restoration Plan (Longue Vue is a Garden Conservancy Preservation Project)
- Historical garden - must replant to the original specifications of the design
- Should focus on tree mitigation, as trees are the backbone of the garden and design
CASE STUDY CONCLUSIONS

- Mission dependent planning focus

- Gardens would rather replace most plants after disaster than try to mitigate damages beforehand

- Public garden plant exchanges could be utilized to promote individual plant safety at alternative sites
C2C Care Webinar Poll, Results to Question #3

How much time does your organization have to spend on putting a plan together

- A. 5-8 hours (less than one work day)
- B. 9-24 hours (1-3 work days)
- C. 25+ hours (more than 3 work days)
Does your institution have a living collection, or a garden/plant that would benefit from a disaster mitigation strategy?

- Yes?
- No?

While we get the answers to this question, let’s move on and we’ll come back for the results.
So we’ve looked at the FEMA 386-6 Plan in Case Study

- Adapted FEMA 386-6 Document, Integrating Historical Property and Cultural Resource considerations into Hazard Mitigation Planning.
- Professionally produced starting point.
- Chosen based on its 4 phases of planning (let’s be real we need to keep it simple at small organizations).
  - Organizing resources
  - Assessing risks
  - Developing a plan
  - Implementing/monitoring the plan
How does this plan work for botanical collections?

Let’s find out through interviews....

Nine interview sites:

- LSU Burden Center
- New Orleans Botanical Garden
- City of New Orleans Department of Parks and Parkways
- Montgomery Botanical Center
- Naples Botanical Garden
- Fairchild Tropical Botanic Garden
- Gifford Arboretum
- National Tropical Botanical Garden: Kampong
- Vizcaya Museum and Gardens
Apply proper identification to research plants with extra labels

Identify locations of plants through a mapping system before a disaster event
New Orleans Botanical Garden:

- After Katrina, a Christmas event lit the dark neighborhood and provided the operating budget for four following months.
- Test soils after an event.
- Plant alluvial/riparian trees and large shrubs to withstand floods.
City of New Orleans Parks and Parkways, Department of Landscape Architecture:

- In FEMA clean-up contracts, include re-planting plus one year of maintenance
- More successful to replant area by area instead of across the entire city at once
Posts-disaster impact assessment by horticulturalists and/or curators identifies which trees should be triaged or removed before general clean-up begins.

Leaving felled trees gives them a chance to come back, creates future wind blocks, and mitigates the “edge effect”.
INTERVIEWS

Naples Botanical Garden:

- Look into disaster preparation/mitigation material produced by local Universities or Municipal governments
- GIS can be used to assess damage with a hand-held unit, if pre-charged
Interviews

Fairchild Tropical Botanic Garden:

- Possible to obtain FEMA money to recollect seeds (for damaged collections)
- For research collections write accession number on the side of the pots or push tags deep into the pot so identification is not lost
Gifford Arboretum:

- Planting small specimens, and in enough space ensures proper growth.
- Clean-up procedures must be monitored to make sure that appropriate measures are taking place.
[Interviews]

- Build soil layers to promote healthy root systems
- Canopy sprinkler systems may mitigate root damage
Viscaya Museum and Gardens:

- Replanting with salt tolerant plants to avoid flooding damages
- Mangroves act as a barrier from some storm surge (reducing the “edge effect” on a larger scale)
- County services may be of great help to an organization
## Interview Themes Surrounding Disaster Recovery:

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Does your institution have a living collection, or a garden/plant that would benefit from a disaster mitigation strategy?

- Yes?
- No?

If we have time at the end of the talk let’s discuss the “yes” answers specifically!
WHERE ARE WE NOW?

TOPICS TO BE COVERED:

- Finding general resources for disaster planning help.
- Surveys, case studies, interviews made during thesis research.
- Discussion of a disaster planning template that was created as a result of aforementioned research.
- How the template can be best put to practice in a cultural institution’s setting, using *Children’s Fairyland* as the model.
Revisiting FEMA 386-6
Inspired Planning Strategy

Additions

- Revolved around organizing resources
  - Staff/Volunteer contact lists
  - Equipment lists
  - Replanting strategies

Creating “help networks” beforehand
- Local responders
- Regional gardens and non-profits that may help one another during recovery
Revised disaster planning strategy, highlighted to show source of change

- Case Studies
- Interviews
- Feedback
- Conferences

Phase 1: Organize Resources

- Get support for the project; build a team to work with, and engage employees.
- Create a staff phone tree to verify safety and location after a disaster.
- Create a “clean-up effort” resource list of contractors/vendors to utilize after a disaster.
- List local emergency responders and horticultural contacts to call for help/sid.

Phase 2: Assess Risks

- Identify Hazards
  - Flooding, High Winds, Ice Storms, Hurricanes, Fires, Drought, etc.
  - Look into Historical Society records of past damage in the area, if necessary.
- Inventory Collections
  - Speak with section gardeners about their most valued plants
  - Speak with curators about specially designated plants (e.g., rare plants or champion trees)
  - Speak with volunteers and other stakeholders about plants that they value in the collections
- Prioritize Salvage
  - Is the plant or collection important to the organizational mission?
  - Assess monetary replacement value for plants.
  - Assess historical/social significance of plants.

Phase 3: Develop a Mitigation Plan

- Decide what plants to focus on
  - What designates a plant’s priority level in your collection, and how are different priority levels dealt with during disasters?
- What will it take to keep highest priority plants safe
  - Site specific: will you need to use sandbags, berms, shelters, move plants indoors, take cuttings to alternate sites, pot up or ball and burlap to move?
  - Organize safety/salvage supplies and place them in an area or kit that staff will keep on hand and easily accessible.
Revisions to Original FEMA Document

- Assign responsibilities
  - Who initiates disaster preparation before an imminent disaster?
  - Who will be responsible for safeguarding certain plants?
  - Will the responsibilities be different for different scenarios?
  - Who will be the first person back on scene; designate an initial recovery person/group who will immediately document damage and assess safety of the damaged area before others are let back in
- Test the plan and adjust accordingly

Phase 4. Implement the Plan and Monitor its Progress

- Write the plan up
  - Keep it in a safe place (for security reasons; you don’t want everyone to know the most valuable plants in your collection).
- Interagency coordination
  - Agreements with local organizations, businesses that could help the garden prepare/recover if necessary.
  - Contact local university extension offices, and county agencies to find regional disaster research and planning materials for horticulture/arboriculture.
- Annual Updates
  - Review staff contact lists and responsibility designations.
  - Account for priority plants that were acquired or died.
  - Have annual review during the same week every year so that it becomes routine.
    - Do a “walk through” with local emergency responders, and or horticultural contacts to build relationships during this week.
Topics to be covered:

- Finding general resources for disaster planning help.
- Surveys, case studies, interviews made during thesis research.
- Discussion of a disaster planning template that was created as a result of aforementioned research.
- *How the template can be best put to practice in a cultural institution’s setting, using Children’s Fairyland as the model.*
Developing a Plan,  
1. Organizing Resources

- Get support for the project: build a team to work with, and engage employees.
- Create and distribute a staff contact list to verify safety and location after a disaster.
- Create a “clean-up effort” resource list of contractors/vendors to utilize after a disaster.
- List local emergency responders and horticultural contacts (both in and outside of the region) to call for help/aid after an event.
1. Organizing Resources at Children’s Fairyland

- Get support for the project: build a team to work with, and engage employees.
  - Management team should include one representative from each department.
    - Facilities (including grounds and animals), Rides, Operations, and Administration critical.
  - Meetings should be regular and efficient, so as not to misuse limited resources.

- Create and distribute a staff contact list to verify safety and location after a disaster.
  - List should be kept on paper and electronically with multiple people.

- Create a “clean-up effort” resource list of contractors/vendors to utilize after a disaster.
  - City of Oakland Public Works Department.
  - Subtronics LLC. utilities locators.
  - Local contractors that have previously donated services.

- List local emergency responders and horticultural contacts (both in and outside of the region) to call for help/aid after an event.
  - City Public Works Department, Police officers, and Fire Department.
  - Bay Area Gardens Network colleagues, Amusement Park Association colleagues.
  - Board Members contacts with specific aid related skills.
Identify Hazards
- Floods, High Winds, Ice Storms, Hurricanes, Fires, Drought, etc.
- Look into local historical and climatological records of past damage.

Evaluate collections and/or plants of high value or worth
- Speak with section gardeners about their most valued plants.
- Speak with curators about specially designated plants (ex. rare plants or champion trees).
- Speak with volunteers and other stakeholders about plants that they value in the collection.

Prioritize Salvage
- Is the plant or collection important to the organizational mission?
- Assess monetary replacement value for plants.
- Assess historical/social significance of plants.
2. Assessing risks at Children’s Fairyland

- **Identify Hazards**
  - *Earthquakes, High Winds, Fires, Drought, Urban disturbance are our biggest risks.*
  - Look into local historical and climatological records of past damage.
    - Discuss with our long time puppeteer and historian.

- **Evaluate collections and/or plants of high value or worth**
  - *Core to our mission are our four rides, animals, grounds and building infrastructure.*
  - Speak with curators - N/A.
  - Speak with volunteers, board members and other stakeholders about plants (or items) that they value in the collection.
    - Survey could be done on what is of most value to these stakeholders.

- **Prioritize Salvage**
  - Is the plant or collection important to the organizational mission?
    - Rides and infrastructure highest priority, animals and grounds second, education and outreach can happen once park is back up and running.
  - Assess monetary replacement value for plants (or collections).
    - Call insurance company and discuss with City of Oakland (our landlords), so discussion is started and documented proactively.
  - Assess historical/social significance of plants (or collections).
    - Include rides, animals and programming in discussion about significance.
DEVELOPING A PLAN, 3. ACTUAL MITIGATION PLANNING

- **Decide what plants to focus on**
  - What designates a plant’s priority level in your collection, and how are different priority levels dealt with during disasters?

- **What will it take to keep highest priority plants safe**
  - Site specific: will you need to use sandbags, berms, shelters, move plants indoors, take cuttings to alternate sites, pot up or ball and burlap to move?
  - Organize safety/salvage supplies and place them in a kit or area that staff will keep on hand and easily accessible.

- **Assign team-based responsibilities**
  - Who initiates disaster preparation before an imminent disaster?
  - Who will be responsible for safeguarding the highest priorities?
  - Will the responsibilities be different for different scenarios?
  - Who will be the first person back on scene; designate an initial recovery person or group that will immediately document damage and assess safety of the damaged area before others (especially volunteers) are let back in.
  - Who will contact the emergency response and security or police forces?
Decide what plants (or items/features) to focus on

What designates a specific plant or collection item’s priority level, and how are different priority levels dealt with during disasters?

- Highest priorities given to essential park features that would negate experience of being at Fairyland if they were missed— for the purpose of this exercise rides, and puppet theatre.
- Revenue generating features like the café and gift shop would be next in line to salvage as they would help bring in money for the rebuilding process.
- Animals, ornamental gardens, and programming could all come back to the park after the core features were rebuilt.

What will it take to keep highest priority plants (or items/features) safe

- Rides: weather proof garage, back-up equipment at the ready, trained staff to fix
- Puppet theatre: alarm system, sprinkler system, fire extinguishers, archives
- Organize safety/salvage supplies and place them in a safe place
- Train multiple people on how to operate and fix rides and puppet theatre/puppets so that in an emergency or rebuilding situation the knowledge of one person who may or may not be present will not hinder mitigation.
Assign team-based responsibilities

- Who initiates disaster preparation before an imminent disaster?
  - Highest Manager available; Executive Director, Operations or Facilities Manager.

- Who will be responsible for safeguarding the highest priorities?
  - Highest Manager available; Executive Director, Operations or Facilities Manager.

- Will the responsibilities be different for different scenarios?
  - Yes, fire will be treated differently than urban disturbance, but all actions should be guided by the Executive Director, and staff should work to accomplish what is deemed necessary to mitigate the specific circumstances.

- Who will be the first person back on scene; designate an initial recovery person or group that will immediately document damage and assess safety of the damaged area before others (especially volunteers) are let back in.
  - Team consisting of the Executive Director, Operations Manager and Facilities Manager.

- Who will contact the emergency response and security or police forces?
  - Highest Manager available; Executive Director, Operations or Facilities Manager.
**DEVELOPING A PLAN, 4. IMPLEMENT THE PLAN AND MONITOR ITS PROGRESS**

- **Write the plan**
  - Keep it in a safe place (balance accessibility with security).

- **Interagency coordination**
  - Agreements with local, regional and out-of-region organizations and businesses that could help the garden prepare or recover if necessary.
  - Contact local university extension offices, and county agencies to find regional disaster research and planning materials for horticulture/arboriculture.

- **Updates (performed annually at minimum)**
  - Review staff contact lists and responsibility designations.
  - Account for priority plants that were acquired or died.
  - Have annual review during the same week every year so that it becomes routine.

- **Do a “walk through” with local emergency responders, and or horticultural contacts to build relationships during this week.**
  - Test the plan and adjust accordingly.
  - Evaluate the effectiveness of the plan after a disaster event.
  - Communicate the disaster plan to new staff members.
4. Implement the plan and monitor its progress for Children’s Fairyland

- **Write the plan**
  - Keep it in a safe place:
    - Place on our organization’s server, making sure appropriate people have offsite access to the server. Duplicate a copy with City of Oakland Department responsible for maintaining relationship/contractual agreements with Fairyland.

- **Interagency coordination**
  - Agreements with local, regional and out-of-region organizations and businesses that could help the garden prepare or recover if necessary.
    - Have everything documented or in a contract signed and stored by all parties involved.
    - Specifically, relationships with City of Oakland Public Works Department, Subtronics LLC. utilities locators, and local contractors that have previously donated services (as mentioned in phase 1. of planning).
  - Contact local university extension offices, and county agencies to find regional disaster research and planning materials for horticulture/arboriculture (priorities).
    - Alameda County Emergency Preparedness; acgov.org/ready
    - International Association of Amusement Parks Association Crisis Communications Plan
    - Bay Area Urban Area Security Institute
    - Many California state wide references to choose from
4. Implement the plan and monitor its progress for Children’s Fairyland

- **Updates (performed annually at minimum)**
  - Review staff contact lists and responsibility designations.
    - Have Park Operations Assistant or Administrative Assistant maintain list once a month to maintain accuracy.
  - Account for priority plants (features or items) that were acquired or died.
    - Facilities Manager would have best knowledge of these happenings at Fairyland.
  - Have annual review during the same week every year so that it becomes routine.
    - Make this drill and review process stand alone so staff can give it full attention.

- Do a “walk through” with local emergency responders, and or horticultural contacts to build relationships during this week
  - Test/review the plan and adjust accordingly.
    - Revise contacts as things change throughout the year.
  - Evaluate the effectiveness of the plan after a disaster event.
    - Once it is safe to resume business as usual, have a post event meeting to discuss what worked, and what didn’t.
  - Communicate the disaster plan to new staff members.
    - During new hire training, the plan should be discussed as appropriate for the position.
Topics to be covered:

- Finding general resources for disaster planning help.
- Surveys, case studies, interviews made during thesis research.
- Discussion of a disaster planning template that was created as a result of aforementioned research.
- How the template can be best put to practice in a cultural institution’s setting, using Children’s Fairyland as the model.
Different types of natural disaster or emergency planning templates, worksheets, and networks can be found on the following organizations websites (links can be found in the handouts for this webinar):

- Foundation for Advancement in Conservation: [https://www.culturalheritage.org/resources/emergencies/disaster-response-recovery](https://www.culturalheritage.org/resources/emergencies/disaster-response-recovery)
- Heritage Emergency National Task Force: [https://culturalrescue.si.edu/hentf/](https://culturalrescue.si.edu/hentf/)
- National Center for Preservation Technology and Training: [https://www.ncptt.nps.gov/articles/disasters/](https://www.ncptt.nps.gov/articles/disasters/)
APGA's Library and Media center - type "disaster" in search box:
https://www.publicgardens.org/resources

Compass for Progress: Standards of Excellence for Plant Collections Management:

Garden2Garden Disaster Response Center with a Mobile Cause fundraising component:
https://www.publicgardens.org/disaster-response-center
Thriving in Disaster

Our gardens, whether we like it or not, are subject to the whims of nature, yet, a timely and effective response cannot be created on a whim. Preparation requires intense and thoughtful planning well ahead of time. To create preparative and responsive disaster plans that include all garden operations can be daunting, and requires shining a bright light on all an institution’s vulnerabilities. In this session, learn how gardens prepare for and respond to natural disasters, learn how you can be properly insured and financially prepared, and see how each garden used these occurrences to better ensure their gardens are ready when disaster strikes.

Media Types

Files & Links

Download thriving-disaster-complete.pdf
(19.63 MB)
TIME FOR QUESTIONS?
THANK YOU

Jacqueline B. Salas

jackie.b.salas@gmail.com