

## Molecular Collections Disaster Planning Checklist

This checklist is intended as an addition to standard checklists for disaster planning in natural history collections; many of the basic requirements of a disaster plan are covered there. This list refers specifically to “Molecular Collections”.

In this context these collections are defined as specimens/samples held in freezers, fridges and liquid nitrogen. Whilst these collections are mainly DNA extractions, PCR products and sequencing reactions they may be stored for other purposes such as environmental contaminants. The list does not include liquid prepared samples held at ambient temperature in standard collections stores or leaves stored in with gels at ambient temperature in standard collections.

It does include:

- Silica dried material
- DNA in buffers
- Liquid (e.g., alcohol) preserved (for molecular use)
- Frozen Tissues (In Nitrogen)
- Frozen Tissues (In Freezers)
- EST libraries
- Freeze dried material

The list is intended to assist institutions holding these collections to identify any weaknesses in their disaster planning process. This a developing document and the compliers would appreciate suggestion for additions.

Some of the requirements in this list may be impractical or unnecessary in small scale collections. However to gain maximum value from the exercise the person responsible for completing the list should record why a particular requirement is not met rather than leave it blank.

It is divided into 4 sections

1. Prevention – standard practices and actions that should be taken to reduce the risk of a disaster
2. Preparation – risk assessments and training of staff in disaster procedures, provision of back up equipment and temporary storage facilities.
3. Response – activation of disaster procedures, contingency plans etc.
4. Recovery – actions to be taken to restore the collection to as close to its original condition as possible and re-establish previous stable storage conditions. Evaluation and updating of disaster procedures.

Section	Item	Description/Help	Yes?
Molecular Collections- Annexe			
<b>1. Prevention</b>			
	Locations – where are molecular collections located?	Clear written lists and map to show locations e.g. located in central area or scattered. Does plan apply to all?	
Risk Management	Recording major risks?	Have major risks been recorded: e.g. Power failure, Equipment failure Contamination?	
	Recording Equipment failures	Is there a log of time, duration, nature of failure of equipment e.g. an equipment log (electronic) sheet).	
	Staff responsibilities	Are those responsible for collections aware of the risks?	
		Have they been trained regularly?	
		Are the responsible staff contact lists up to date?	
	Mitigation	What measures have been taken to mitigate against risks?	
		Are these recorded in a document available to all relevant staff? <b>Note</b> There may be security reasons for limited circulation.	
	Routine monitoring	Is appropriate monitoring in place e.g. fire detectors, intruder alarms, low O2 sensors, humidity, temperature alarms.	
		Can remote monitoring access systems data be identified and assessed first before entering disaster site?	
		Are monitoring systems connected to central control, room, security points and security staff trained to react accordingly?	
		Do staff/security check collections storage areas on a regular basis including overnight?	
		If not are appropriate cover systems in place, e.g. automatic cell phone call out for equipment failure?	
Priority Collections	Identification of Priority collections	Have collections of higher priority been identified e.g. Types, priority collections, single samples, types, rare species, and bio-hazardous collections identified for priority removal? <b>Note:</b> these may be specific to an institution	
Backup	On site backup	Are “duplicate” samples of priority collections kept in alternative storage e.g. Liquid Nitrogen?	

	Mirror Collections	Are mirror collections (duplicates of priority collections) stored off site – e.g., properly managed in partner institutions?	
Predicting problems		Is there an appropriate response plan in place for the early stages of a disaster e.g. when equipment is starting to show signs of failure (e.g. increasing freezer temperature)??	
		Are environmental conditions (temp, humidity, O2 levels) measured continuously, and intervention procedures activated at specified levels, before the disaster occurs	
<b>2. Preparation</b>			
Priority collections	Identification of priority for salvage	Are priority collections (see above) and their locations clearly labelled for priority removal?	
People – Emergency Team	Who?	Are appropriate staff identified to deal with emergencies, recovery (Collections managers, Researchers, Night Security staff)? Are the staff lists up to date?	
	Training	Do staff have appropriate up dated, regular training?	
	Test emergency procedures systems	Have realistic exercises been carried out to test preparedness (regular drills)?	
	Out of hours staff	Do “Out of hours” staff have the appropriate level of training to respond to real emergencies and recognise when temperature drops are critical and emergency procedure needs to be activated. Decision trees when actions are required at specified environmental levels may be different for different emergency personnel (e.g., Collections managers and Security)?	
Documentation		Are all emergency procedures specific to molecular collections to written down in easily accessible documents readily available to all relevant staff?	
		Are all essentials details such as contact numbers etc. up to date? How often should these critical lists be reviewed (as soon as a responsible staff member leaves)?	
	Access to documentation	Do all staff likely to be involved in recovery have access to the same up to date information? As above, the information may well be graded differently for each group to maximise efficiency, but all responses should dove-tail to achieve a co-ordinated disaster plan.	

		Is there an overall co-ordinator ensuring that this will happen (will it work)?	
Health and Safety	Biohazards in the molecular collections	Have all collections potentially or likely to contain zoonoses or other pathogens etc been identified?	
		Is there appropriate containment equipment present nearby to quarantine samples if necessary (e.g. cat II hood)?	
		Is there protective gear etc available for handling contaminated material?	
	Procedures for nitrogen spillage	Are there detectors in place? Are these monitors properly maintained and serviced?	
	Training	Are staff trained to deal with nitrogen spills/low oxygen?	
	Backup freezers	Are there standby freezers/ liquid nitrogen vats available with sufficient capacity space?	
		What is considered reasonable back-up capacity?	
		Have other options such as arrangements with other institutions or hiring offsite warehouse space for temporary storage been investigated?	
		Are standby freezers exclusively used for back-up. <b>Note:</b> Other users cannot store material in them without permission, except for exceptional circumstances, where only a small fraction of the back up volume should be utilised for the shortest possible timeframe.	
	Containers	Is there easy access to boxes/racking etc to store removed material?	
	Supplies	Is there a well labelled and known store of emergency equipment available? Is this store locked and if so is the key easily obtainable in an emergency?	
	Boxes /racks	Are samples held in easily removable racks?	
	Labelling	Are racks clearly labelled to facilitate identification of material?	
	Transport/storage	Is there an arrangement with a company to supply freezer lorries for temporary storage and/or transport of material to temporary storage site (see above)? Does this match the size of the collection?	
		Log of time, duration, nature of failure, temperature, humidity (equipment log (electronic) sheet).	

<b>3. Response</b>			
Removal	Evaluation	Was situation evaluated before action taken? i.e. What was the extent of the disaster, its location and level? <b>Note</b> e.g. Total freezer and alarm failure in Room B12 of 2 days, hundreds of 1000's of samples at risk	
	Handling space	Were the necessary workspaces left clear to handle the material?	
	Locations of evacuated material	Were the locations of evacuated material carefully recorded and the new area labelled?	
	Damage limitation	Were the relevant agencies on site, e.g. Estates Management staff, equipment repair engineers notified and did they respond quickly to prevent further disaster damage and loss to collections?	
<b>4. Recovery</b>			
	Prioritised salvage - Triage	Is there a triage system in place to determine which material should be recovered first?	
		Does this relate to importance of specimens e.g. types, specimens with health safety?	
		Is this system easily accessible to the recovery teams from the start to prevent confusion?	
	Evaluating damage	Is there a system for assessing degradation of samples? E.g. take samples and run PCR on randomly selected specimens?	
		Is this extra evaluation work after a disaster accounted for on recovery team staffs' job remits?	
	Outside help	Do these staff also have responsibilities to join recovery teams at other institutions if necessary?	
		Is there a list of disaster team support staff from outside the institution which can be called upon to travel and help out at critical times?	
	Restoring equipment to normal working	Is there a system in place to ensure that relevant estates management, facilities departments, engineers etc are on hand to repair damaged equipment and restore rooms to full working order etc?	
	Review	After the disaster, was a review carried out to record strengths and weaknesses of the plan?	

