Tissue sampling for bats

Standard Operating Procedure

Contents

I. Purpose

The purpose of this SOP is:

- To provide guidance to DOC staff or independent science providers commissioned by DOC who do not work for an institution that has an Animal Ethics Committee (AEC) and are planning to collect scientific tissue samples from native bats (New Zealand long-tailed bat *Chalinolobus tuberculatus*, and Lesser short-tailed bat *Mystacina tuberculata*) in the field.
- To provide a formal mechanism (Standard Operating Procedure) for ensuring that any impacts on manipulated animals are minimised during tissue sampling.
- To enable DOC staff to meet statutory species management requirements involving a significant amount of routine interaction with live animals without the requirement for DOC AEC approval, if the manipulation of animals:
    1. Constitutes routine management; or
    2. Forms part of a routine procedure as part of a conservation management research project.

Operators must seek separate AEC approval for any project, involving manipulation of animals, that does not constitute routine species management (See 1 & 2 above).

This SOP is not a replacement for appropriate training and practical experience.

Scope

This SOP fits within the scope of conservation management of wild and captive bat species.

- This SOP must be read in conjunction with the draft 'Bat Manual: handling, measuring, examining and releasing', at DOCDM-131580.
- Methods of catching individuals for data collection (including protocols for handling associated equipment) are beyond the scope of this SOP—refer to: 'Bat Manual: Catching Bats' at DOCDM-131554.
- Data analysis—an essential component of any scientific tissue samples operation—is also beyond the scope of this SOP.

For other SOPs, guidelines, information, advice and contacts relating to species management—refer to the home pages of species listed on the Recovery Group Index at DOCDM-377172.

II. Process

This SOP contains key information to assist project managers and *trained* operators to:

- Identify need for tissue sampling.
- Seek separate AEC approval where appropriate (refer Section III)*.
- Plan the project safely and appropriately.
- Ensure relevant experience is accredited to operator.
- Collect tissue samples from native bats with animal welfare being paramount.
- Store and transport samples safely.

*Permit requirements

Users of this SOP must note:

DOC staff: Capture and holding of protected species by DOC staff as part of their normal, routine work duties does not require a permit under the Wildlife Act.

Non-DOC staff: Other users of this document will need to ensure they obtain appropriate permits from DOC for the capture and holding of protected species and also obtain AEC approval for any research projects involving manipulations of these animals.

III. Requirements table

Tier 4 or higher managers are authorised to approve variation from SOP requirements and are accountable for those decisions. They are required to use their professional judgement and seek advice when in doubt. All decisions should be documented. It is expected that variations from requirements will be the exception rather than the norm, and that legal (i.e. legislation and judge made laws), and health and safety requirements are effectively compulsory. Common sense should prevail in the case of exceptional or emergency field situations.

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE	LINKS	COMPLETED / COMMENTS
Identify the need for tissue sampling: Ensure the purpose and benefit of sampling is sufficient to justify any adverse effects.	Project Manager	Legal requirement to avoid putting protected species, individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.	Section 1.1 DOC Code of Ethical Conduct—OLDDM-766783 (or Section IV for weblink)	
Obtain permission from local iwi for project.	Project Manager	Legal requirement in accordance with Conservation Act.	Section 1.1	

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE	LINKS	COMPLETED / COMMENTS
Obtain separate AEC approval for projects that: • Do not constitute routine species management. • Involve any other unusual sampling protocols not outlined in this manual.	Project Manager	Legal requirement to avoid putting protected species, individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.	Section 1.2 DOC AEC applications—Section IV for weblink DOC Code of Ethical Conduct—OLDDM-766783 (or Section IV for weblink)	
Plan project safely and appropriately: • Consult with veterinarian and/or biologists with relevant expertise to obtain assistance with selecting (and interpreting) the most appropriate tests/analyses. • Plan to minimise, reduce or eliminate any adverse effects resulting from the sampling process. • Identify potential impacts of capture and sampling to species/individuals at particular times of the year. • Contact relevant airline for	Project Manager	Legal requirement to avoid putting individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals. Legal requirement to comply with Health and Safety in Employment Act (1992) and Civil Aviation Authority regulations. Planning the project safely	Sections 1.1 to 1.6 Section 3.2 DOC Code of Ethical Conduct—OLDDM-766783 (or Section IV for weblink) DOC Health and Safety Management Systems Manual http://intranet/en/Procedures-and-Guides/Health-and-Safety-Manual/	

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE	LINKS	COMPLETED / COMMENTS
restrictions and regulations regarding the transport of dangerous goods, and comply with regulations. • Provide OSH briefs, including local risk management, for all hazardous procedures to ensure operator safety.		and appropriately helps to avoid wasting resources.		
Ensure relevant experience is accredited to operator: • Confirm operator has completed necessary training, and practice under supervision, prior to collecting any samples. • Ensure operator is aware of obligations under the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals (complies with all requirements of the Animal Welfare Act 1999).	Project Manager	Legal requirement to avoid putting protected species, individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.	Section 1.6 DOC Code of Ethical Conduct—OLDDM-766783 (or Section IV for weblink)	
Follow OSH precautions for all hazardous procedures to ensure operator health and safety.	Operator	Legal requirement to comply with Health and Safety in Employment Act (1992).	Section 1.6 DOC Health and Safety Management Systems Manual http://intranet/en/Procedures-and-Guides/Health-and-	

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE	LINKS	COMPLETED / COMMENTS
			Safety-Manual/	
Collect samples—animal welfare being paramount: • Avoid collecting tissue samples from animals in poor condition. • Employ at least one experienced handler to assist during the sampling process. • Maintain hygiene between individuals. • Minimise trauma by selecting the most appropriate tissue collection site. • Ensure protocols are in place for post-sampling recovery.	Operator	Legal requirement to avoid unnecessary suffering of individual animals, and to avoid compromising the recovery of threatened populations—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.	Sections 2.2 to 2.5 Section 4.2 DOC Code of Ethical Conduct—OLDDM-766783 (or Section IV for weblink)	
Handle, store and transport samples for effective analysis: • Avoid contaminating samples with other DNA sources. • Clearly label all samples.	Operator	Using best practice when handling, storing and transporting samples helps to avoid wasting resources.	Sections 3.1 and 3.2	

IV. About this document

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Approved for use

Deputy Director General, Operations

Signed
Date

Deputy Director General, Science and Technical

Signed K O'Connor

Date 5th June 2012

Amendments

AMENDMENT DATE	AMENDMENT DETAILS	DOCDM VERSION	AMENDED BY

Terminology and definitions

- Refer Appendix 4.1 for glossary of scientific terms.
- Operator—person collecting tissue sample.

- DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals as required by AWA 1999—http://intranet/en/Procedures-and-Guides/Manipulation-of-Live-Animals-Code-Process/
- Animal Ethics Committee (AEC)—DOC AEC application forms can be found at http://intranet/en/Conservation-Management/Science/Animal-Ethics/?mode=forms
- Scientific sampling—to obtain information for purposes other than health diagnosis.

1. Planning the tissue sampling operation

1.1 PROJECT CRITERIA

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Ensure the purpose and benefit of sampling is sufficient to justify any adverse effects.	Project Manager	Legal requirement to avoid putting protected species, individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.
Plan to minimise, reduce or eliminate any adverse effects resulting from the sampling process.	Project Manager	As above. Planning the project safely and appropriately helps to avoid wasting resources.
Obtain permission from local iwi for project.	Project Manager	Legal requirement in accordance with the Conservation Act.

A tissue sampling project can only proceed if:

- There is clear benefit to the conservation, health, or welfare of the species. This is particularly important with:
    1. Threatened and endangered species;
    2. Species inhabiting sites of significant conservation value.
- There are no other means of obtaining the same information (e.g. work undertaken elsewhere).
- There is no useable tissue from the same individual or species currently in storage.
- Any potential negative effects on the conservation of the species are avoided, remedied or mitigated.
- Relevant parties are consulted where appropriate (e.g. Bat Recovery Group, DOC Wildlife Health Coordinator, iwi/runanga).

The project must aim to sample the smallest number of individuals required for the appropriate analysis.

Applications

Tissue samples are taken for genetic analysis of individuals and populations. Results can help solve conservation problems and guide species management programmes by ascertaining:

- Genetic relationships within and between populations
- Genetic effects of population bottlenecks
- Taxonomic status and relationships, and evolutionary ecology
- Parentage
- Hybridisation
- Sex assignment of individuals, e.g. juveniles for translocation, adults lacking sexual dimorphism.
- Metapopulation dynamics

1.2 SCIENTIFIC TISSUE SAMPLING

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Obtain separate AEC approval for projects that: 1. Do not constitute routine species management. 2. Involve any other unusual sampling protocols not outlined in this manual.	Project Manager	Legal requirement to avoid putting individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.
Consult with veterinarian and/or biologists with relevant expertise to obtain assistance with selecting (and interpreting) the most appropriate	Project Manager	Legal requirement to avoid putting individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals. Planning the project safely and

tests/analyses.		appropriately helps to avoid wasting resources.

Good quality sampling is required in order to avoid wasting resources during analysis.

This SOP illustrates the routine procedure for taking 3mm wing biopsies from native bats. Research projects involving tissue sampling that are not generally considered to be routine species-management operations, and **require separate AEC approval**, include:

- Projects that require a level of manipulation exceeding that used in normal tissue sampling circumstances (e.g. taking wing biopsies larger than 3mm).
- Projects that involve unusual sampling protocols (e.g. blood samples).
- Projects that involve techniques not normally recommended by DOC.
- Any other procedures or methods not covered in this SOP.

1.3 WHEN TO TAKE TISSUE SAMPLES

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Identify potential impacts of capture and sampling to species/individuals at particular times of the year.	Project Manager	Legal requirement to avoid putting individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.

Time of year

Avoid handling bats at inappropriate times of the year where potentially negative impacts have been identified. Impacts of handling and sampling can include:

- Compromising condition of a bat during winter (e.g. bats may not be able to afford the time it takes to recover from tissue sampling due to torpor).
- Compromising the condition of heavily pregnant females.

With highly endangered species, such impacts can cause a major set back to recovery programmes.

Sampling bats during the breeding season

Due to torpor during winter, it is necessary to sample bats during the breeding season. Care should be taken to ensure bats are processed as quickly as possible so lactating females can resume parental care.

Laboratory operating times

Contact the laboratory analysing the samples to establish laboratory operating times and specific instructions on storage and transport.

1.4 SAMPLING CONDITIONS

Location

Points that need to be considered if working in a field location (as opposed to a captive environment) are:

- Remoteness (adequate storage facilities for duration of project and transport periods, factoring in potential delays).
- Scale of operation (number of assistants and amount of equipment required; adequate time available).
- Terrain and weather (sampling in exposed conditions, or under a forest canopy, or in a hut or shelter).
- Environmental temperature (sampling in extreme temperatures may effect ease of collection and sampling handling).

Weather

Bats should generally not be handled in wet weather (due to them becoming cold, going into torpor and not being able to be released immediately at the site of capture). If a sample has to be collected under damp conditions, it would be considered an exceptional circumstance and should only proceed under artificial cover from rain and wind (e.g. tent-fly, tarpaulin).

1.5 ANTICIPATING RESPONSE TO HANDLING

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE

Plan to minimize, reduce or eliminate an adverse affects that may occur due to the sampling process.	Operator	Legal requirement to avoid unnecessary suffering of individual animals, and to avoid compromising the recovery of threatened populations—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.

Handling time

For each species, it is important for operators to:

- Minimise individual handling time.
- Know how individuals are going to respond to prolonged handling and manipulation.

Multiple captures

Wherever possible, operators must ensure that multiple captures are housed appropriately while separate individuals are being sampled. Bats can be held in cloth holding bags, hung securely at a low height. To prevent overcrowding and aggression, the recommended maximum number of bats in a **'x' sized** bag is ten for long tailed bats and five for short tailed bats.

Time of night

If possible, attempt to sample bats shortly after dusk so they have adequate time to feed and recover following the procedure.

1.6 OPERATOR EXPERIENCE

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Confirm operator has completed necessary training, and practice under supervision, prior to collecting any samples.	Project Manager	Legal requirement to avoid putting individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.
Ensure operator is aware of obligations under the DOC Code of Ethical Conduct for the	Project Manager	As above

Care and Manipulation of Live Animals (complies with all requirements of the Animal Welfare Act 1999).		
Provide OSH briefs, including local risk management, for all hazardous procedures to ensure operator safety.	Project Manager	Legal requirement to comply with Health and Safety in Employment Act (1992).

Training

The Bat Recovery Group leader must approve all trainers. Refer to Bat Manual:

- Permitting and Training (DOCDM-131877)

Specialised training must be undertaken in order to minimise stress and avoid injury or death of bats during the sampling procedure. There is no prescription for attaining minimum standards: for example, a new bat handler will not be automatically approved to take tissue samples after they have taken samples on 10 occasions. New bat handlers should be able to demonstrate a minimum level of competency in the required technique to the trainer's satisfaction, and the amount of training required to reach this level will vary according to the skills and experience of individual trainees.

OSH requirements

All handlers must read and follow the Department of Conservation's Risk Management and Safety Planning Procedures. Handlers must also ensure they read Chcro-57112 Health and Safety for more details about the potential health risks of handling bats, particularly in relation to Lyssavirus.

2. Collecting tissue samples from bats

2.1 EQUIPMENT PREPARATION

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Maintain hygiene between individuals.	Operator	Legal requirement to avoid putting individual animals and/or threatened populations at unnecessary risk—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.

Before commencing sampling, ensure all equipment is laid out ready and close to hand.

- Prefill vials with 70% ethanol and keep several close to the sampling area in a secure polystyrene holder.
- Clearly designate and label a rubbish bag for swab, cotton bud and biopsy punch disposal.
- Make sure the hard surface that the sampling will take place on has been sterilized with 70% ethanol, and is relatively smooth and undented (e.g. an ice cream lid).
- Remove a brand new biopsy punch from its packet and position as close to the workspace as possible. One biopsy punch will last for an average of 20, and up to 30, punches before it becomes blunt. Once a biopsy punch has been used for 30 punches it **must** be changed for a new one.

Keep surplus cotton buds, biopsy punches and sterile tweezers somewhere with easy access.

2.2 PREPARATION OF THE BAT

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE

Avoid collecting tissue samples from animals in poor condition.	Operator	Legal requirement to avoid unnecessary suffering of individual animals, and to avoid compromising the recovery of threatened populations—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.

Prevent further captures

Closing or removing trapping devices (e.g. mist net, harp trap) after capture is essential for the following reasons:

- To prevent captures of excessive numbers of bats if not enough personnel are present to attend to them.
- Failure to do so could severely compromise the safety of any excess bats trapped, and of the bats being sampled under time pressure. This is particularly true for potentially large roost captures of short tailed bats, which require faster trap management than long tailed bats.

Identifying suitability of bats for tissue condition

Before commencing sampling:

- Identify bat (check band number or PIT tag) and check that the individual is required for sampling (e.g. they have not been sampled before; previous punches heal in a short period of time and are hard to recognise).
- Assess condition. Bats that are in poor condition (e.g. less than 85% of mean weight for species), mothers with young attached to the nipple, heavily pregnant females, and juveniles in their first four weeks of flight should not be tissue sampled.
- Perform any other necessary manipulations (e.g. Morphometrics).

2.3 PHYSICAL RESTRAINT

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Employ at least one experienced handler to assist during the sampling process.	Operator	Legal requirement to avoid unnecessary suffering of individual animals, and to avoid compromising the recovery of threatened populations—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for

		the Care and Manipulation of Live Animals.

Assistant handler(s)

At least one experienced handler must be employed, in most cases, to:

- Restrain the bat firmly and confidently to prevent any movement during tissue collection (Refer to Appendices 4.2, Figure 2).
- Stretch out the wing to its full capacity to provide a taut surface for the biopsy punch.

There are no circumstances when operators can work alone or without assistance (Refer Section 1.6) as it is not an approved or safe practice.

Minimising stress during restraint

Handlers can make restraint during tissue sampling easier and minimise stress to the bat in the following ways:

- Hold the bat steady with its back against the prepared hard surface.
- Inform the operator if the bat is about to struggle.
- Process the bat as quickly and efficiently as possible.
- For short tailed bats, the handler should wear a polypropylene glove on the non-dominant hand to prevent being bitten. If the bat does happen to bite the handler, the handler must ensure they do not withdraw their hand as this can cause injury to the bat's teeth. Blowing on the bat will encourage it to stop biting.

Lesser short-tailed bats appear to be more sensitive to prolonged and insensitive handling than long-tailed bats. Very occasionally lesser short-tailed bats will convulse during a lengthy handling period. If this happens, the handler **must** immediately cease examining or sampling the bat, place it somewhere quiet to recover (e.g. in a cloth holding bag by itself) and then release it as soon as possible.

2.4 TISSUE COLLECTION TECHNIQUE

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
• Maintain hygiene between	Operator	Legal requirement to avoid unnecessary suffering of individual animals, and to

individuals. • Minimise trauma by selecting the most appropriate tissue collection site.		avoid compromising the recovery of threatened populations—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.

Wing biopsy procedure

Handler: Hold the bat face up against the sterilised hard surface with non-dominant hand. The dominant hand stretches the wing out to its full capacity, parallel and as close as possible to the hard surface.

Operator: Remove protective cap from the biopsy punch and unscrew lid from a pre-prepared ethanol vial:

1. Press the biopsy punch firmly down on the main part of the wing, between the fifth finger and the body and avoiding major blood vessels. The wing should be completely flat, and the punch completely vertical.
2. Twist the punch gently 360 degrees both left and right, ensure the blade has completely punctured the wing membrane. If necessary, the handler can lift the bat's wing very slightly from the cutting board to check that the punch is all the way through the wing membrane.
3. Carefully remove the biopsy punch from the wing. The sample will either be lodged in the punch or stuck on the cutting board. If it is the latter, the handler must be very careful to avoid moving the sample as they remove the bat from the sampling area.

If sample remains in biopsy punch

Place the punch in one of the pre-prepared ethanol vials and shake the punch gently to dislodge the tissue. If the tissue is wedged then a pipette can be used to flush 70% ethanol through the punch, dislodging the sample. Once the sample is in the vial, sterilise the punch by shaking it again in the ethanol vial.

If sample remains on cutting board

Remove the sample with sterile tweezers and place it in a ethanol vial. Sterilise the tweezers by either shaking them in the ethanol vial or wiping them down with a cotton bud moistened with 70% ethanol.

Sample each wing

It is recommended that operators take a sample from each wing and label the separate vials appropriately (e.g. Left and Right). This provides a back up should one sample be misplaced. Some operators may also choose to swab the wing membrane with 70% ethanol prior to taking the sample, although this is not a necessity.

Hygiene

Basic hygiene measures to prevent the spread of infectious diseases and parasites between individuals and populations include:

- Washing hands, or using medical hand wipes (if no water available), between bats handled/sampled.
- Discarding and replacing holding bags as soon as soiled (e.g. faeces, blood) during the sampling operation.

The cutting board **must** be thoroughly swabbed down with 70% ethanol between bats, and the tweezers and biopsy punch sterilised also.

2.5 POST-SAMPLING RECOVERY AND RELEASE

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Ensure protocols are in place for post-sampling recovery.	Operator	Legal requirement to avoid unnecessary suffering of individual animals, and to avoid compromising the recovery of threatened populations—Wildlife Act (1953); Animal Welfare Act (1999) via the DOC Code of Ethical Conduct for the Care and Manipulation of Live Animals.

After sampling, bats are occasionally too cold or stressed to be released immediately. Operators should consider steps they will take in these situations, such as:

- Placing cold or torpid bats in a cloth handling bag and keeping somewhere warm (e.g. inside the handler's jacket) until they have sufficiently recovered.
- Stroking the tail of reluctant bats to encourage them to fly.
- Keeping a spotlight trained on all releases or a bat detector switched on to ensure they fly correctly and do not fall to the ground.

Bats should preferably be released from the capture site, while being held up high in an area with few obstructions.

Healing times

Wing holes are typically fully healed within three to four weeks, without impairment to flight or reproductive success; and can only be identified by a small pale coloured patch on the wing. Juvenile bats heal particularly quickly and may even heal without any discolouration.

3. Storage and transport of samples

3.1 LABELLING AND STORING SAMPLES

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Clearly label all samples.	Operator	Using best practice when handling, storing and transporting samples helps to avoid wasting resources.

Labelling samples

It is vital that all tissue samples are labelled with the following information:

- Individual ID (e.g. PIT tag, band number)
- Date of collection

This is to ensure the label contains information that relates back to the electronic database. However, other helpful labels can include:

- Colony Group
- Left or Right wing
- Location

Vials should be labelled with sticky labels that wrap around the entire vial, to ensure they do not fall off. A fine tipped indelible marker or sharp pencil can be used to write on the label. Note that some marker pens can run and become illegible in contact with alcohol.

Storage of Samples

Samples should be kept in 70% ethanol and refrigerated.

3.2 TRANSPORTING SAMPLES

REQUIREMENTS	WHO IS ACCOUNTABLE FOR CARRYING OUT THE REQUIREMENT	WHY?/CONSEQUENCE
Handle, store and transport samples for effective analysis	Operator	Using best practice when handling, storing and transporting samples helps to avoid wasting resources.
Contact relevant airline for restrictions and regulations regarding the transport of dangerous goods, and comply with regulations.	Project manager	Legal requirement to comply with Health and Safety in Employment Act (1992) and Civil Aviation Authority regulations.

The International Air Transport Association provides guidelines for shipping dangerous substances, including alcohol (classified as a Class 3 flammable liquid). General requirements dictate that samples are triple packaged, with one layer containing enough absorbent material to absorb the total quantity of ethanol.

A customs declaration is also required, containing the following information:

- Species
- Number of samples
- Quantity and strength of ethanol
- Commercial value of samples

A Wildlife Act Permit for shipping overseas may also be necessary.

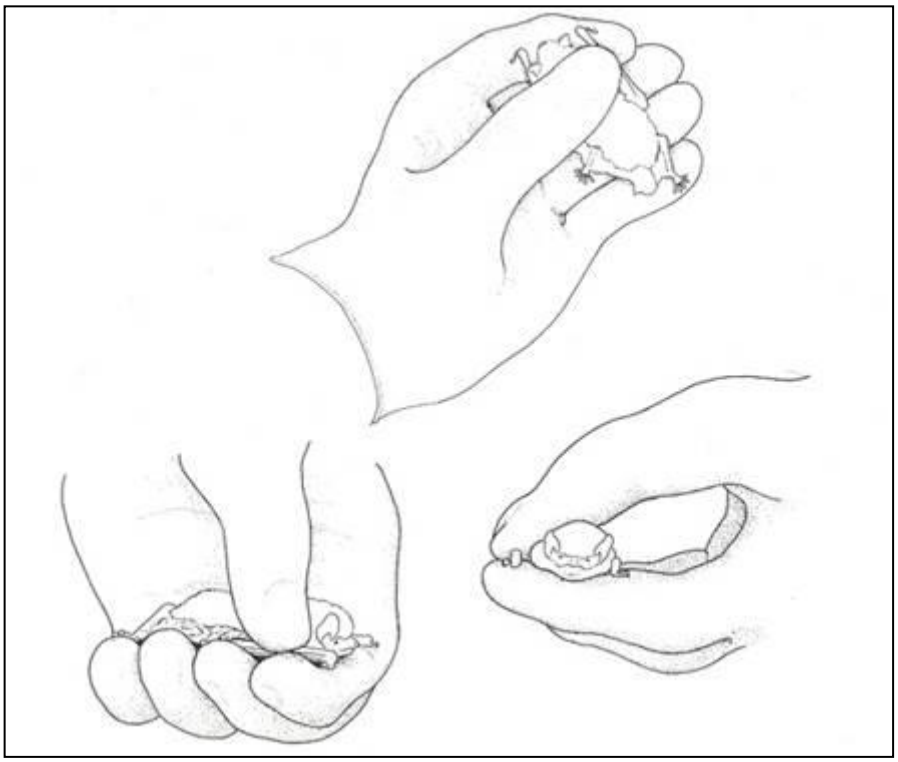
4. Collecting tissue samples from bats

4.1. GLOSSARY OF TERMS

Bat detector	Electronic device that detects certain kilohertz levels and makes them audible to the human ear.
PIT tag	Passive Integrated Transponder: A microchip that is inserted under the bat's skin and transmits a unique serial number.
Band	A metallic band containing a unique number/letter identification combination, which is fixed to the bat's forearm.
Morphometrics	Measurements concerning morphology (e.g. forearm, weight).

4.2. HOLDING TECHNIQUES

Figure 1: Palm grip for general holding and manipulations (not for tissue sampling)



T.P. McOwat, reproduced with permission, Bat Workers Manual, © JNCC 2004.

Figure 2: Holding technique for taking wing biopsies

Photo taken from O' Donnell

4.3. EQUIPMENT AND SUPPLIERS

Equipment

Biopsy punches	Sharp pencil
Cotton swabs/balls	Permanent fine-tipped black marker
Polystyrene vial holder	Plastic snap lock bags (plenty)
Bottle of 70% ethanol	Tweezers
Hard plastic surface (e.g. ice cream lid)	Designated general rubbish bag
Plastic vials	Plastic sheet or similar to provide clean surface to work on
Hand sanitizer	LED head torch (for night work)
Pipette	Cloth holding bags
Adhesive labels	

Suppliers

Most equipment can be sourced easily from supermarkets. However, scientific suppliers include:

- Global Science (for vials/axygen tubes)
  www.globalscience.co.nz

- MidMeds Ltd. (for Steifel biopsy punches)
  Unit 71
  Hill Grove Business Park
  Nazing Road
  Nazing
  En9 2HB

Companies that package and manage overseas transport of samples include:

- Dangerous Goods Management Ltd.
  850 Wairakei Road
  Christchurch

- Cedra
  www.cedra.co.nz

4.4. ACKNOWLEDGEMENTS

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