**Guide for developing policies and guidelines for destructive sampling of specimens.**

Version 1.0

# Purpose of this document

To provide a checklist of considerations and example wording for the benefit of CHAH herbaria wishing to develop policy and operating protocols with respect to destructive sampling of specimens.

# Background

The collections held by Australasian herbaria are maintained with the goal of balancing the preservation of herbarium specimens with the need to use them for research. The Australasian herbarium community acknowledges the changing needs of the scientific community, and endeavours to support a wide range of botanical research.

For the purposes of this document, destructive sampling is defined as the removal of material from a specimen for research purposes. For example, removal of leaf material for extraction of DNA or for phytochemical, isotope, morphometric or other studies is regarded as destructive sampling. Routine taxonomic examination and dissection or removal of parts of a specimen for microscopic inspection (e.g. bryophytes) is not normally considered to be destructive sampling as long as the parts are returned to the specimen.

# Principles adopted by CHAH members

* Requests for destructive sampling of specimens are considered on a case-by-case basis and according to the merits of the request.
* Every effort will be made to accommodate the needs of researchers where requests are in accordance with institutional policy or accepted guidelines.
* Researchers are expected to make every effort to source fresh material and request destructive sampling from herbarium specimens when there is no other option.
* Provision of a loan or physical access to specimens *does not* imply permission to destructively sample material.
* Explicit permission is required to undertake destructive sampling.
* Each herbarium will maintain and make available their Destructive Sampling Policy/Guidelines, and endeavour to maintain as much commonality with the relevant policies, procedures or guidelines of other CHAH members as is applicable/appropriate for their institution.

# Legislative requirements

The movement of specimens and parts of specimens of some taxa is governed, and in some instances restricted, by legislative requirements*.*

In Australia this is covered by:

* *Convention on International Trade in Endangered Species of Wild Fauna and Flora*
* *Environment Protection & Biodiversity Conservation Act 1999*
* In New Zealand this is covered by:
* *Trade In Endangered Species Act 1989*
* *Protected Objects Act 1975*
* *Biosecurity Act 1993*

*Hazardous Substances and New Organisms Act 1996 (HSNO Act)*

# Checklist for institutional policy development

The following section provides a checklist of topics that should be considered by each institution when developing their institutional policy or guidelines for destructive sampling. Example clauses are provided. Collection Managers should review their institutional policy on a regular basis.

## General considerations

* Who in your organisation has responsibility for sign-off of policy documents?
* Are there any institutional operating protocols that need to be followed or referenced?
* Does the policy or guidelines need to be cross-referenced in other herbarium institutional policies, procedures or guidelines?

## Request and approval for destructive sampling:

Herbaria need to ensure that requests for destructive sampling are made by legitimate researchers and are approved by the appropriate people within their herbaria. As a minimum the policy or guidelines should clearly state responsibilities and include:

* Who is able to request material for destructive sampling?
* In what form should the request be made? For students, do they need to be sent by supervisors?
* Who approves destructive sampling? Is this approval required in writing?
* Are there restrictions, or guidelines about when requests should be made?
* Who approves or declines the destructive sampling request? Has this been clearly set in herbarium policy or guidelines and have appropriate delegations been recorded?
* Are there types of activities for which destructive sampling will not be approved?
* Are there ethical or cultural considerations that may restrict destructive sampling?
* Are there legislative restrictions? What international, national and regional legislation may restrict destructive sampling?
* Are there permit or privacy restrictions? (e.g. some material may have been collected under a permit that prevents some types of analysis)

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| **Example clauses:**   1. Requests to destructively sample specimens are to be made in writing to the Collections Manager. 2. Where possible, requests to destructively sample specimens on loan should be made at the time the loan is requested. 3. For large or complicated requests, researchers are encouraged to visit the herbarium to select specimens for sampling. 4. Destructive sampling for bioprospecting is normally not allowed and will only be approved if documentation is provided demonstrating the prior informed consent of a majority of iwi, hapu or whanau exercising manawhenua over the collecting locality. 5. Approval to use herbarium samples as sources of DNA for experiments involving genetic modification as interpreted by Environmental Risk Management Authority, New Zealand (ERMA NZ) under the HSNO Act will not be given unless documentation is provided demonstrating the prior informed consent of a majority of iwi, hapu or whanau exercising manawhenua over the collecting locality. |

## Material available for sampling

Not all material within a collection may be available for destructive sampling. The policy should clearly identify material that may be excluded.

* Is there material that may not be sampled under any, or exceptional, circumstances? Will sampling be allowed of Types and significant historic specimens? If so, under what circumstances?
* Is the material expendable, replaceable and/or of sufficient quantity that the scientific value of the specimen is not jeopardised?
* Is the material of sufficient quality and with an appropriate curatorial history (e.g. chemical or other treatments)?
* Are there sufficient specimens of that taxon in the herbarium to allow sampling?
* Are there additional conditions that apply when sampling is permitted of otherwise restricted material?
* Will repeated sampling from the same specimen be allowed for the same purpose? Or for different purposes?
* What material may be removed from a specimen?
* Is destructive sampling restricted to particular “organs”? Or may all be sampled?

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| **Example clauses:**   1. Material may not be removed from Type material, historical specimens, or taxa represented in the herbaria by less than 3 collections. 2. Material may be destructively sampled from a specimen only if there is adequate material such that the scientific integrity of the specimen is not compromised by its removal. 3. In general, material should not be removed from a specimen for a second time if the nature of the study is the same. 4. Only the agreed or specified amount of material may be removed. 5. Where possible, samples should be taken from the material in fragment packets and/or from obscured portions of the specimen. Specimens with the most abundant leaf, fruit or flower material should be sampled first. Care must be taken not to damage the scientific value of the specimen. |

## Responsibilities for sampling

Institutions should indicate who is allowed to remove material from specimens to ensure that appropriate material is removed – this may be restricted to herbarium staff; experienced taxonomists or appropriately supervised students.

* Who specifies what material may be removed? Are appropriate delegations maintained in the herbarium’s policy or guidelines?
* Who will be allowed to remove material from a specimen when the specimen is at the custodial institute?
* If the material is on loan are there any restrictions as to the person or role that can be approved to sample the specimen?
* Are researchers expected to visit the herbarium to assist with selecting material for destructive sampling?

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| **Example clauses:**   1. Removal of material for destructive sampling must be done under the guidance of an experienced taxonomist; students in particular must be trained in good herbarium practice before being allowed to destructively sample from specimens. 2. Sampling of Type, historic, or other restricted specimens may only be carried out by an appropriate staff member. 3. For large or complicated requests, researchers are encouraged to visit the herbarium to select specimens for sampling. |

## Residual material, resulting artefacts and data

A destructive sampling policy or guidelines should clearly indicate expectations for any excess material that is removed from the specimen, as well as what should happen to any resulting samples, products and results.

* What should happen to excess material? Is it to be returned to the specimen? If so how? Does it need to be maintained in a separate packet?
* If the sample will be used to prepare derivative products (e.g. aliquots), what should happen to these products? Do they need to be discarded or returned with the specimen? Are these derivatives allowed to be passed to third parties?
* What should happen to any data that are generated from these analyses?
* Should researchers provide copies of resulting publications, data, or images to the herbarium?
* Are there any copyright issues that need to be considered (e.g. copyright of images)?

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| **Example clauses:**   1. Material removed for destructive sampling and not used must be returned to a fragment packet on the specimen, or placed in the specimen packet, box or spirit container. 2. Sampled material or derivatives (including aliquots, extracts, and images) must not be made available to any third parties without written permission from the Collections Manager. 3. DNA sequence data must be lodged in a publicly accessible database (e.g. GenBank and/or BOL). The specimen accession number must be included in the specimen voucher field. 4. Where possible, unused derived material should be returned as dried aliquots with accurate quantification indicated on the label. 5. Depending on the nature of the study and the specific requirements of the institution involved, physical records derived from specimens (e.g. permanent slides, SEM stubs and/or photographs) should be returned with the loan. This material will be cross-referenced to the associated specimen and made available to other researchers upon request. 6. Copies of publications resulting from the destructive sampling are to be sent to [herbarium’s name]. 7. To ensure public access to the collection and images of specimens, [herbarium’s name] shall own the copyright for all photographs and other images of specimens, irrespective of whether the person who took the photograph is a [Herbarium name] employee. However, [herbarium’s name] will agree with the photographer on a suitable licence to allow their use of the image. |

## Records and annotation

The destructive sampling policy or guidelines should cover the requirements for documenting the destructive sampling event and subsequent labelling of the specimen. Specifications for the labelling procedure may be covered, but this may also be covered by separate document. If covered in detail then example labels could be included.

* How do you want researchers to annotate the specimens?
* What labels should be put on fragment packets or derivate products to ensure they are linked to the specimen?
* Do you have a policy or procedure that specifies how specimens are to be annotated that can be provided separately, or from which content can be borrowed?

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| **Example clauses:**   1. When destructive sampling occurs, the specimen is to be annotated indicating the type of material taken, date, by whom and their institutional affiliation. 2. Sampled specimens should be cited by the specimen accession number in any resulting publication(s) and a copy of the publication(s) sent to the lending institution. The lending institution must be acknowledged in any resulting publication(s). 3. GenBank and other accession numbers must be included on the annotation slip (see below for example). If retained extracts are used to sequence additional regions, the additional GenBank numbers must be supplied to the lending institution. |

## Other considerations

It may be desirable to add additional statements such as disclaimers.

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| **Example disclaimer:**  Specimens in collections may have been treated in various ways at times (e.g. with preservatives, sterilants, insecticides, freezing, gamma irradiation). Records on the history of treatment of specimens may not be available. Material from specimens is supplied with no warranty of any kind, and the lending institution is not liable for misinterpretations or false results obtained as a result of these treatments. |