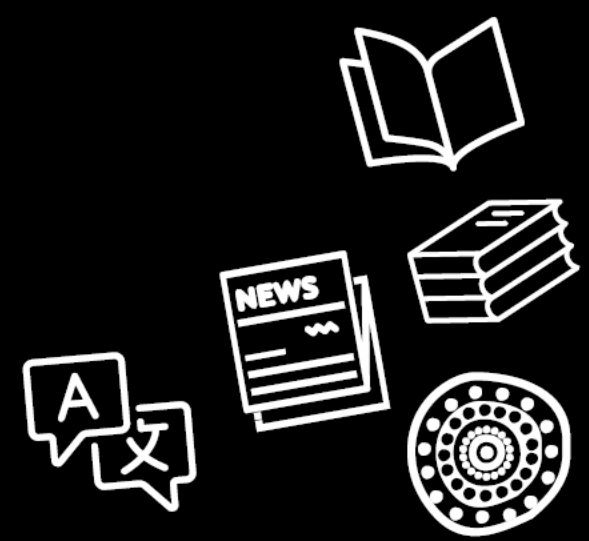


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Vinegar Syndrome

From Vinegar to Victory
A Case Study



Vinegar Syndrome

A Case Study

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From the lands on which we meet, Townsville City Council acknowledges the Wulgurukaba of Gurambilbarra and Yunbenun, Bindal, Gugu Badhun and Nywaigi as the Traditional Owners of this land.

We pay our respects to their cultures, their ancestors and their Elders, past, present
and all future emerging leaders.

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Agenda

- What is Vinegar Syndrome?
- Location Challenges - Vinegar Syndrome in tropical environments
- Expert advice, best practice and risks
- Overview of our microfilm collection affected
- Vinegar Syndrome survival kit
- Public messaging
- Timeline, future plans, phase 2, monitoring schedules
- Outcomes
- Links to information

Vinegar Syndrome

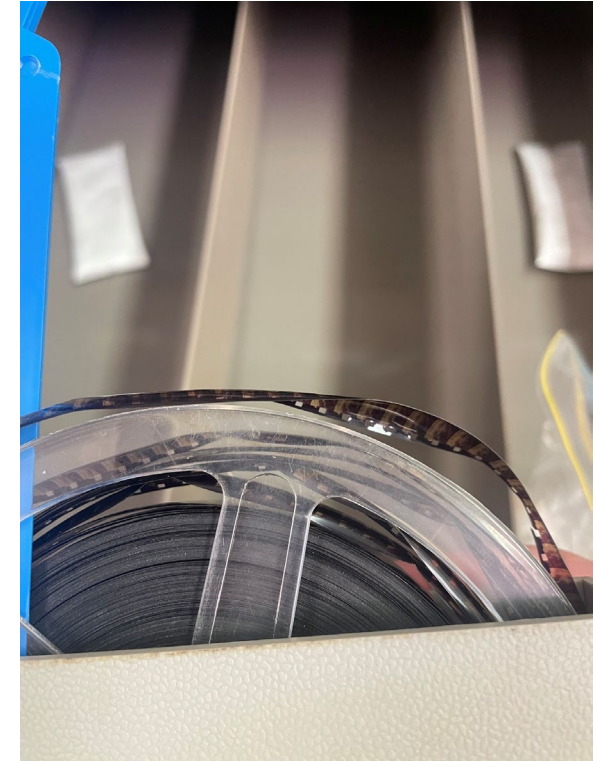
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What is Vinegar Syndrome?

- Chemical deterioration affecting acetate-based film stock.
- Chemical action called hydrolysis - a reaction with moisture.
- Produces acetic acid - vapour which can spread and affect other films or be absorbed by paper stock.
- Accelerates degradation of film causing shrinkage.
- Left unchecked film stock such as microfilm becomes unreadable.



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Source: [Queensland Globe](#)

Location Challenges:

- High humidity and temperature levels.
- Tropical cyclones during severe weather season (January - April).
- Storms and flooding.
- Preparation for severe weather season (Nov - April) starts in November each year.

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Expert Advice

- State Library of Queensland - Specialist Conservator (Audio-visual)
- Queensland State Archives - Senior Conservator

Best Practice

- Smithsonian Critical Moisture Indicator (CMI) method
 - Packaging for conventional freezers/fridges recently developed in the Smithsonian Institute labs

Risks

- Avoiding condensation when returning from cold storage to room temperature

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The Microfilm Collection

- Reaching end of life - 45 - 50 years
- Mixture of 35mm and 16mm
- Close to 800 microfilm reels affected.

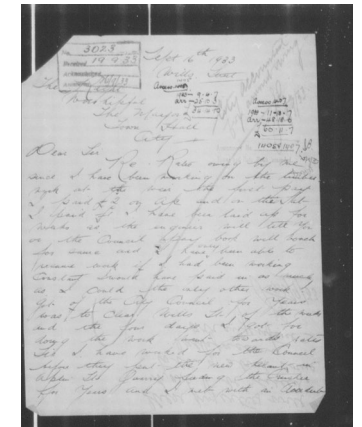
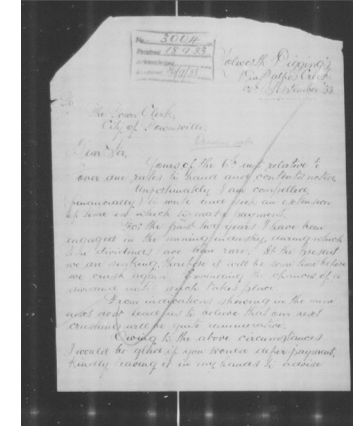
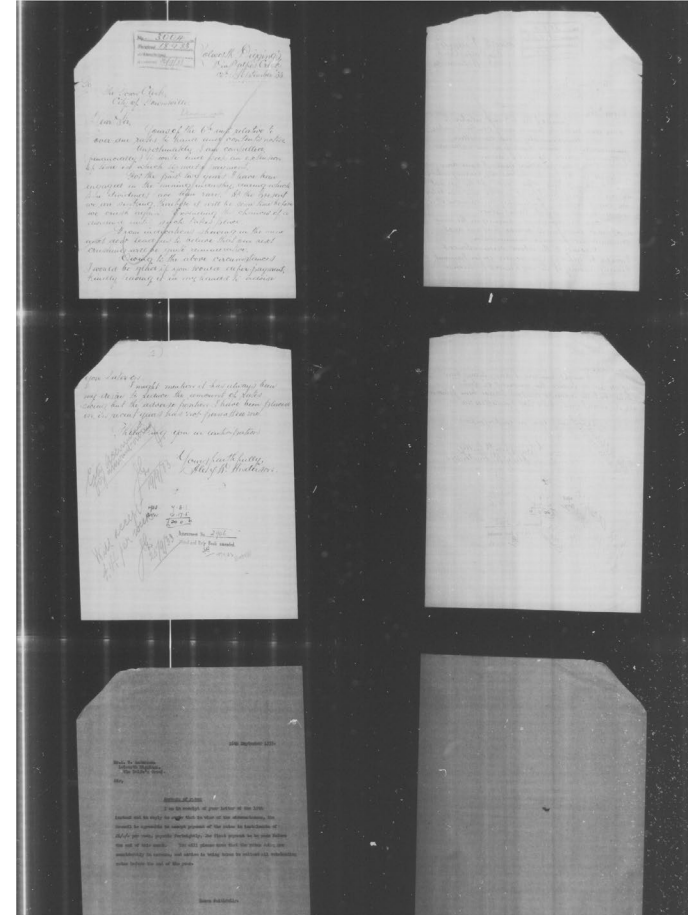


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The Microfilm Collection affected

- Townsville City's Town Clerk correspondence
- City architecture documents and architectural drawings
- City Engineering Department documents



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The Microfilm Collection

- Metal canisters
- Cardboard boxes
- Poly plastic



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The Microfilm Collection

- Removal of degraded elastic bands



Vinegar Syndrome

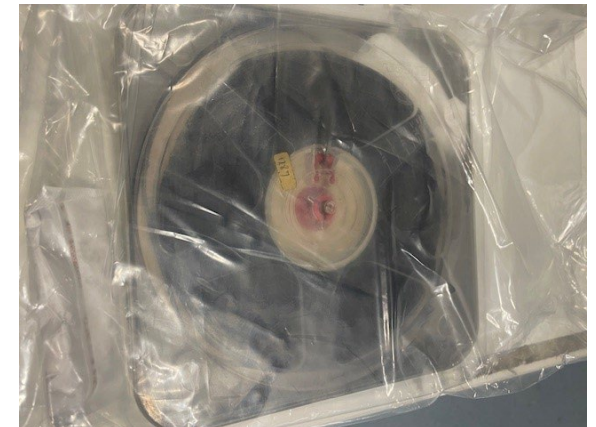
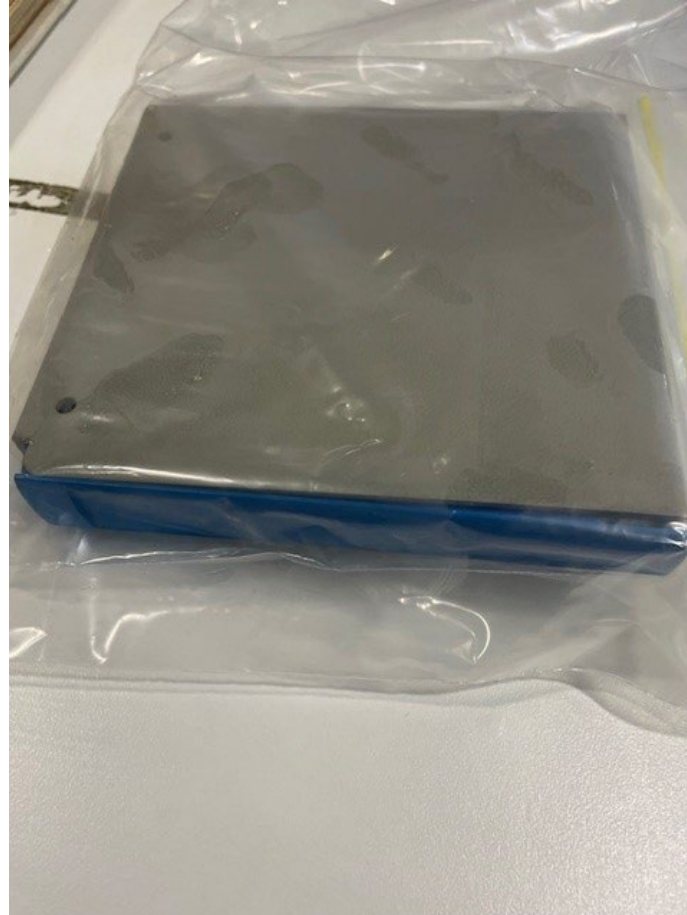
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The Philip Leong Collection

- 21 x Super8 8mm moving image film



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Vinegar Syndrome Survival Kit

- PPE - masks, gloves
- Space - ventilated
- Refrigeration
- Ziplock bags - enough to double bag
- Aluminium foil tape - metres and metres
- Scavenger - Kodak Molecular Sieve
- Permanent markers & scissors
- Laptop & barcode scanner
- A can-do attitude
- Regular breaks



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From Vinegar to Victory: Saving microfilm archives

A critical issue for archives and our History and Heritage.

The city's records are an important asset and worth preserving. One critical issue has been quietly threatening a portion of our microfilm collection – vinegar syndrome. This condition affects the chemical stability of microfilm which can lead to deterioration of valuable records, such as maps, drawings, documents, and photographs stored on film.

Vinegar syndrome is a form of chemical deterioration that affects acetate-based film stock and just as the name suggests, a pungent vinegar-like odour is released from the film as it begins to break down. The chemical action is called hydrolysis (a chemical reaction with moisture), which results in the release of acetic acid. As the acid accumulates, it accelerates the degradation process, causing the film to shrink, become brittle, and eventually deteriorate into a gooey, sticky mess. Over time, the microfilm becomes unreadable, and the valuable records it contains, may be lost forever.

This makes vinegar syndrome a particularly urgent concern for libraries and archives with microfilm collections, especially where moisture is an issue in high humidity regions such as the tropics. Age of the film can also be a factor as it is a natural ageing process of film. Many archives with microfilm collections that are 45 - 50 years old, are dealing with the ravages of vinegar syndrome.

The plan to maintain our collection

The History and Heritage team, after expert archival advice from the Queensland State Archives and the State Library of Queensland, are undertaking a cold storage process to ensure we slow down the advancement of the deterioration of our film stock. This project will take some weeks to complete as the Collection involves packaging and storing some 560 microfilm reels.

While it might look like our team is geared up for something serious, rest assured—our PPE is just a precaution. The library is perfectly safe. We're simply following best practices to save our collection and to keep everyone healthy and happy!

townsville.qld.gov.au/libraries

library@townsville.qld.gov.au

Citylibraries Townsville

[townsvillelib](#)

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From Vinegar to Victory: Saving microfilm archives

Public Messaging

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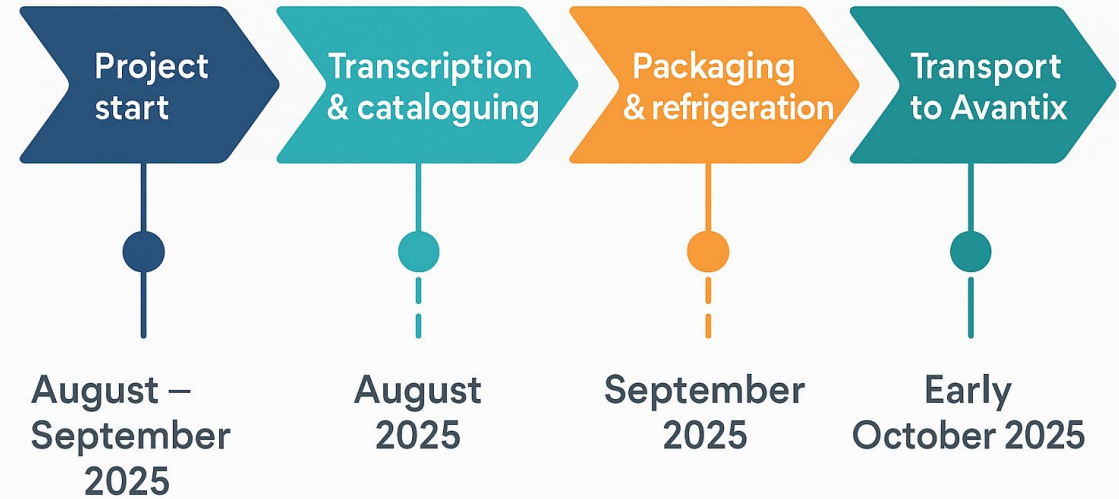
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PROJECT TIMELINE



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Future Plans - Phase 2

- Rehousing the rest of the Collection
 - Phasing out metal canisters for polypropylene microfilm boxes
 - Disposing of cardboard box housings

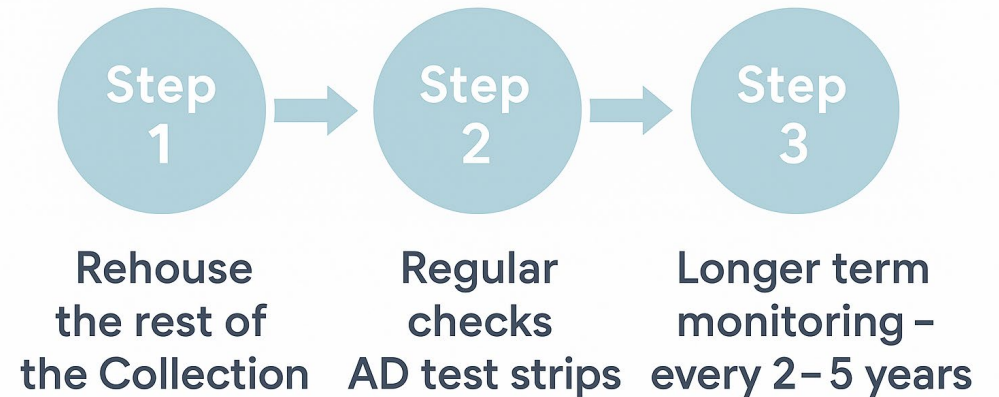
Recommended Monitoring Schedule

- Regular checks of the rest of the Microfilm Collection
 - Weekly reading of AD test strips until all Microfilm readings are stable
 - Maintenance schedule development

Longer Term Monitoring Schedule

- 21 degrees Celsius - every 2 years
- 5 - 10 degrees Celsius - every 5 to 10 years

PHASE 2



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When Your Film Starts to Smell: Preserving Microform Before It's Too Late

Case Study: Preserving Corporate Memory at Townsville Council

For Townsville Council, vinegar syndrome was a real and immediate threat to over 800 microfilm and microfiche items containing both historical records and corporate memory.

Discovery

Staff noticed a faint odour when accessing parts of the collection, signalling vinegar syndrome. Compounded by ageing facilities and climate challenges, deterioration was accelerating.

Response

Nicole and her team took urgent measures:



Segregated affected collections



Monitored deterioration with detection strips



Wrapped and refrigerated canisters



Ensured staff had PPE and safe handling procedures

Building the Business Case

Nicole framed digitisation as a solution addressing:

- Legal and financial risk: preventing loss of records for claims or audits
- Corporate memory: maintaining insight into past decision-making
- Community value: enabling public access to historical records

Digitisation was presented not just as preservation, but as a proactive solution ensuring long-term access and organisational resilience.

Vision for the Future

The council plans to make the digitised collection widely accessible through the Recollect platform, enabling 24/7 access without relying on fragile physical formats.



It's about maintaining the stories of your area and how your community got to be in the place it currently is. Digitisation preserves this for future generations.

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Links to information:

FilmCare.org

- Low Temperature Storage Implementation Basics: <https://filmcare.org/lowtempstorage>
- Storage Alternatives: Micro-environments vs Macro-environment: <https://filmcare.org/macromicro>

FilmPreservation.org

- Storage: IPI Recommendations for Film Materials: https://www.filmpreservation.org/userfiles/image/PDFs/fpg_6.pdf

National Film and Sound Archive of Australia

- Preservation Handbook: <https://www.nfsa.gov.au/preservation/guide/handbook/cold-storage>

Wilhelm Research

- On the Cold Storage of Photographic Materials in a Conventional Freezer Using the Critical Moisture Indicator (CMI)

Packaging Method: http://www.wilhelm-research.com/subzero/CMI_Paper_2003_07_31.pdf

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E: historyandheritage@townsville.qld.gov.au

W: stories.townsville.qld.gov.au