



**Evaluation of the NFB's collection management**

**National Film Board of Canada**

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## Summary

### **The evaluation**

This report presents the evaluation of activities involved in managing the NFB collection, which currently contains over 13,000 audiovisual works. NFB collection management activities are necessary for carrying out the NFB's programs and are a core component of its program activity architecture. In addition to supporting *Audiovisual Production* activities, they are an integral part of the *Accessibility and Audience Engagement* program. Managing the collection entails several operations pertaining to the conservation and preservation of original works and their multiple migrations to more technologically advanced formats. While the conservation of a work requires creating optimal physical conditions that will maintain it in a state comparable to its original state at the time of its creation and that will slow its natural deterioration, preserving a work involves protecting it from external risks and ensuring its physical security, primarily to decrease the risk of loss due to floods, fires or other disasters. Preservation and conservation require adequate identification, management, archiving and restoration tools and systems.

In terms of governance, the NFB's Finance, Operations and Technology Division (FOT) is responsible for the operational management of conservation and preservation. The collection's conservation is a responsibility that is shared by three sectors of the FOT division: Information Management, Research and Development (R-D) and Technical Resources. The Information Management sector's Conservation and Laboratory team plays a central role in carrying out this activity.

The Canadian Conservation Institute (CCI) was mandated to carry out the performance evaluation and comparative analysis with standards and best practices in the industry between May and December 2012.

### **Main observations**

#### ***Relevance***

The NFB's collection of works is among the country's most priceless audiovisual heritages—a heritage in which Canadians have invested for more than 70 years and that is now inscribed in the country's collective memory. Canadians want to consult these documents, which hold a significant part of their identity. Increased access to works in the collection is ultimately dependant on the existence of the original works and their migration to various formats in the NFB's conservation rooms. Conservation and preservation activities, which make the distribution of works in different formats and technologies possible, address a tangible need that is expressed by the population's growing demand for accessibility.

Canadians express this desire for accessibility very concretely. Recent surveys show that they hold the NFB in high esteem and feel the institution is more relevant than ever in the digital age. A majority believes that the organization should increase its promotion of works in the collection and would like to be able to consult them more often. The education sector and Canadian film and television industry are among the user categories most interested in works from the collection. Through its educational works, the NFB is able to meet the changing needs of young Canadians and their teachers. Thanks to its extensive collection, the institution has been among the most trusted providers of Canadian content for the country's education system for generations. The Canadian film and television industry considers this collection to be a source of innovation and inspiration that contributes to the NFB's international reputation, especially in the documentary and animation sector.

The relevance of the *Conservation and Preservation* activity is also apparent in its compliance with federal government priorities and the NFB's strategic outcome. The success of the government's Digital Economy Strategy ultimately hinges on the preservation and accessibility of digital Canadian content. Furthermore, these activities support the federal government's efforts to enhance the value of Canadian heritage and history. Conserving and preserving the NFB's films enable the organization to fulfil its legislative mandate, which is to produce and distribute films designed to interpret Canada to Canadians and to citizens of other nations.

### ***Performance***

The CCI has concluded that the conservation conditions and handling procedures for works in the NFB's collection make it possible to produce and distribute audiovisual works that are on the cutting edge of existing technical standards. On the whole, they adequately contribute to the long-term conservation and preservation of these works. However, the collection of artefacts—all the “non-audiovisual” elements<sup>1</sup>—stored in the NFB's offices is not conserved in the same formal and systematic manner as the official collection, which is part of the organization's mandate. The conservation of these objects is carried out on an *ad hoc* basis and would benefit from an appropriate preservation strategy.

### **Recommendations**

In a spirit of continuous improvement, the CCI has provided a series of detailed recommendations and best practices related to storage conditions and to the various collection materials. The CCI's mandate involved identifying best practices from which the NFB could learn. Given the granularity of their detailed recommendations (a total of 64), the NFB has focused its management response on CCI's global recommendations regarding the following elements:

1. *Non-mandated collections*

That the NFB examine all non-mandated collections, determine who assumes responsibility for them and develop a strategy for their long-term preservation.

2. *Proper storage and handling during and post-production*

That the NFB encourage filmmakers to properly store and handle media during and post-production, for example by providing basic guidelines (and training) with respect to storage and handling procedures.

3. *Succession planning*

That the NFB incorporate succession planning in its strategic plan given that collection management and preservation expertise resides within a relatively small group of staff members and that their departure would potentially result in substantial workflow continuity issues.

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<sup>1</sup> Film production artifacts and graphic material, obsolete equipment of historic value, technical innovations, promotional materials and exhibition materials

## 1. Introduction and context

### The National Film Board

The NFB was created by an act of Parliament in 1939 and is a federal agency within the Canadian Heritage portfolio. The NFB's mandate is to produce and distribute original and innovative audiovisual works that add to the understanding of the issues facing Canadians and raise awareness of Canadian values and viewpoints across the country and around the world. Throughout the decades, the NFB has also played an important role in marking the major changes and events taking place in Canadian society and has become Canada's best-known cinematic brand.

As Canada's public producer and distributor of audiovisual works, the NFB creates interactive works, social-issue documentaries, auteur animation, and alternative dramas that provide the world with a unique Canadian perspective. The NFB is breaking new ground in form and content through interactive and mobile media, community filmmaking projects, programs for emerging filmmakers, stereoscopic film, and more. It works in collaboration with creative filmmakers, digital media creators, and co-producers in every region of Canada with Aboriginal and culturally diverse communities as well as partners around the world. Since the NFB's founding in 1939, it has created more than 13,000 productions and won over 5,000 awards, including 4 Webbys, 12 Oscars and more than 90 Genies. Its screening room features over 2,100 productions online, including high-definition and 3D films. The NFB also puts the experience of cinema into the hands of Canadians everywhere through its acclaimed mobile apps for the iPhone, iPad, and Android platforms as well as a pre-loaded app in the new BlackBerry PlayBook.

The NFB also has a mission to broaden the range of possibilities for the population and the Canadian industry by taking commercial and artistic risks that the private sector is reluctant to take on. By supporting emerging filmmakers, members of diverse cultural and linguistic communities, Aboriginal communities, and people with disabilities, the NFB ensures that its audiovisual works reflect the country's diversity and illustrates the changing cultural and social realities of Canada.

The NFB has a mission to provide all Canadians and the world with access to its collection. Ensuring accessibility to NFB programming by Canadians is pivotal to the NFB's success. For this reason, improving accessibility, developing new business models, and elaborating a specific strategy for the educational sector constitute key priority actions. In particular, the NFB has put forward a strategy for digital distribution and outreach activities that aim to engage and reach as many users as possible using new distribution methods and channels as well as traditional outreach models, such as a more effective web portal, e-cinema, and library partnerships.

### 1.1 Description of the *Collection Management* activity

This section describes the profile of the *Collection Management* activity, which has two main components: conservation and preservation. The description will be followed by a brief overview of the activity's principal stakeholders and beneficiaries, its governance structure and the financial, human and material resources allocated to it.

### 1.1.1 Activity profile

Since its founding in 1939, the NFB has been producing and distributing original and innovative audiovisual works that enable Canadians and the rest of the world to better understand Canada. Over the decades, its collection of audiovisual works has continued to grow and currently contains over 13,000 titles. Documentaries, animated and fiction films, stock shots, photos, audio material, interactive Web productions: the extensiveness of the NFB's collection is apparent in the diversity of topics covered as well as in the variety of media and formats used to contain and distribute the works. If the topics addressed in the works comprising the NFB's vast collection are a reflection of the country's history, the NFB's own history exemplifies the developments in audiovisual technology over the past 75 years—developments that are continuing today through efforts to digitize the collection and through an increased use of new Web 2.0 technology.

In March 2010, the database used to manage the conservation rooms indicated that, in addition to 13,000 audiovisual titles, the collection contained no fewer than 10,700 “sound” works, more than 50,000 stock shots, 19,000 sound effects, 5,754 music master tapes and a photo library with 460,000 items. According to the FORMAT database, the breakdown of the audiovisual works collection, which is the primary target of conservation and preservation efforts, is as follows: 73% documentaries, 14% animated films, 11% short and feature-length fiction, 2% “experimental” works and 0.8% interactive material.

The NFB's program activity architecture (PAA) consists of two main activities: *Audiovisual Production* and *Accessibility and Audience Engagement*. The collection's management is represented within the PAA by the *Conservation and Preservation* sub-activity, which is part of the *Accessibility and Audience Engagement* program activity. This activity to conserve and preserve NFB works is defined in the PAA as follows: “NFB productions, regardless of the work's original source, are preserved and digitized in order to ensure their permanence and their accessibility to Canadians, now and in future generations. This activity reduces the risks of technological obsolescence, minimizes the effects of time on the media on which works are recorded, and guarantees the physical security of works. Preservation and conservation require suitable tools and systems for identification, management, archiving and restoration.”<sup>2</sup>

The *Collection Management* activity, which is the subject of this evaluation, entails several operations pertaining to the conservation and preservation of original works and their multiple migrations to more technically advanced formats. While the conservation of a work requires creating optimal physical conditions that will maintain it in a state comparable to its original state at the time of its creation and that will slow its natural deterioration, preserving a work involves protecting it from external risks and ensuring its physical security, primarily to decrease the risk of loss due to floods, fires or other disasters.

Conservation and preservation operations are not carried out in isolation but rather are closely related to audiovisual production activities upstream and activities linked to works distribution downstream. More specifically, whether it involves implementing measures for adequately storing works, inspecting their degree of deterioration, restoring at-risk works, moving works to other sites that have optimal conditions, identifying safe handling procedures or managing information about the works via a centralized database,<sup>3</sup> the ultimate objective of the operations associated with managing the NFB's collection<sup>4</sup> is to preserve the NFB's audiovisual heritage in order to support institutional guidelines regarding accessibility.

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<sup>2</sup> National Film Board, *Program Activity Architecture Report*, sub-activity 1.2.1 (Conservation and preservation)

<sup>3</sup> Vault Management System (VMS)

<sup>4</sup> The term “collection” will be used in the singular in this document, although NFB stakeholders and managers sometimes refer to the existence of several collections: collection of works in French, collection of works in English, collection of works on a specific topic, collection of feature films, documentaries, interactive works, etc. In this context, we consider these various groups to be part of one and the same collection.

As Canadians' media consumption migrates to the Internet, it is imperative to make high-quality innovative Canadian content available to them. Without a concerted conservation and preservation activity, this cultural heritage is at risk. In 2010, the NFB unveiled a conservation plan for its works to ensure the institution's long-term access to and use of its audiovisual assets. In order to preserve the content of works and facilitate the population's access to them, the NFB also devised a plan to digitize and archive its collection. The plan's implementation began in 2010 and is ongoing. The plan's objectives are threefold:

- 1) foster current and future accessibility of NFB works in digital format
- 2) enable the preservation and conservation of NFB works in new formats
- 3) restore works in the collection that have been damaged.

Transposing or copying a work from an older original medium to newer media to preserve its content or facilitate its availability to users is an operation that NFB staff has needed to perform for decades. However, conserving and preserving media on which digitized versions of original works are stored are also part of the operations involved in managing the collection, and these operations will inevitably become increasingly important as the digitization plan continues to be carried out.

### **1.1.2 Stakeholders and beneficiaries**

The responsibilities of main stakeholders are outlined in the Governance Structure section below. The principal beneficiaries of collection management activities are:

- The NFB as a whole, particularly the French and English Programs, and the Accessibility and Digital Enterprises Division (distribution, marketing).
- The Canadian population:
  - as a whole: general public (consumer market);
  - educational institutions, teaching staff and students (institutional market).
- Partners of the NFB: creators, filmmakers, private production companies and co-producers of NFB films, content aggregators such as broadcasters, Web portals, the government, etc.
- Audiences the world over.

### **1.1.3 Governance structure**

Managing the collection is incumbent upon several NFB sectors. The ultimate responsibility for collection conservation activities lies with the Government Film Commissioner and Chairperson of the NFB, while the Finance, Operations and Technology Division is in charge of its operational management. The collection's conservation is a responsibility that is shared by three sectors of the Finance, Operations and Technology Division (FOT): Information Management, Research and Development (R-D) and Technical Resources. The FOT division is responsible for integrating and supporting the NFB's operations and priorities by assuming the leadership of major operational projects, supporting programming, accessibility and conservation activities as well as all strategic and operational activities via research and development.

More specifically, the **Information Management** sector’s **Conservation and Laboratory** team is responsible for circulating material (access to conservation rooms, monitoring, delivery), laboratory activities (inspection, cleaning, preparation and repair of material), maintaining conservation conditions and the Vault Management System (VMS). In general, the team implements identification, management, archiving and restoration tools and systems for the NFB’s audiovisual works.

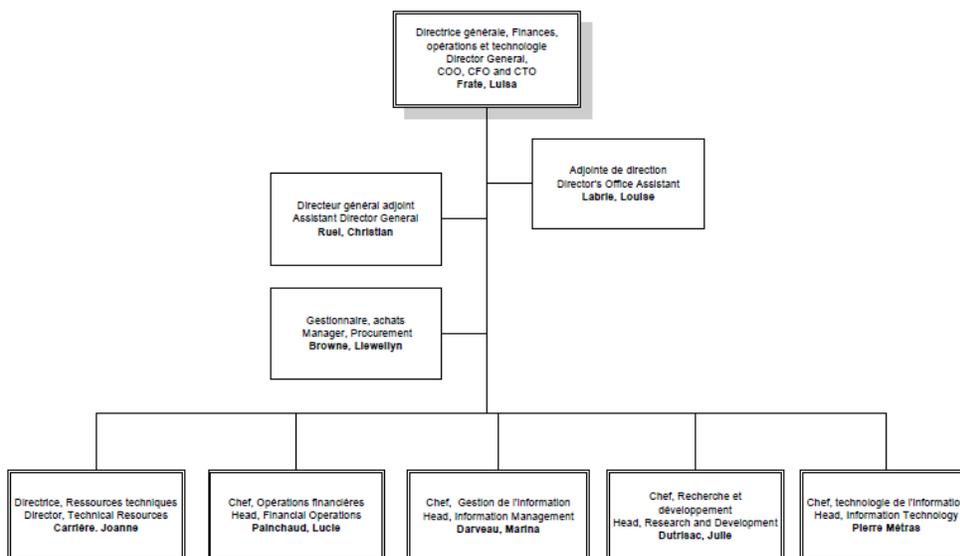
The **R-D** sector advises senior management on technology development. It performs strategic oversight activities to ensure that the NFB’s policies and technological choices are aligned with industry trends. The R-D sector’s responsibilities include devising the Digitization Plan.

The **Technical Resources** sector’s responsibilities include implementing the NFB’s Digitization Plan. This sector is in charge of creating new digital assets (encoding and digitizing image and sound files) and restoring damaged images (colour grading and digital calibration).

The Accessibility and Digital Enterprises Division (ADE) is responsible for activities linked to the collection’s *access and distribution* (outreach, audience development, sales, etc.). This evaluation was limited to the FOT division’s sectors since the evaluation deals specifically with the collection’s preservation.

### Finance, Operations and Technology organizational chart

FINANCES, OPÉRATIONS ET TECHNOLOGIE / FINANCE, OPERATIONS AND TECHNOLOGY



### 1.1.4 Resources

The table below provides a summary of annual costs associated with conservation and preservation activities for the NFB collection between 2007 and 2012. They are described in detail above in section 1.1.1 *Activity Profile*.

**Table 1 – Annual costs – Collection conservation and preservation (2007-2012)**

Expenditures (\$)	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Human resources	552,704	626,766	729,961	755,183	845,421
Operations	604,176	977,251	1,182,487	1,388,106	908,549
<b>Total expenditures</b>	<b>1,156,880</b>	<b>1,604,017</b>	<b>1,912,448</b>	<b>2,143,289</b>	<b>1,753,970</b>
<b>FTE</b>	<b>9.0</b>	<b>9.6</b>	<b>10.0</b>	<b>10.0</b>	<b>11.0</b>

Cost variations can be explained primarily by the start-up of the NFB's digital shift in 2008-2009. The digitization strategy required renting and purchasing specialized equipment such as the Arri scanner, Spirit Datacine and Da Vinci devices.<sup>5</sup> Another source of cost variation stems from the exercise of several options to purchase equipment in 2010-2011.

## 1.2 Evaluation context

In March 2011, the NFB published its five-year evaluation plan (2011-2012 to 2015-2016), in accordance with the requirements of the Treasury Board's *Policy on Evaluation* and accompanying *Directive* and *Standards*. The NFB made the commitment in its departmental plan to evaluate its collection management practices. In the interest of impartiality, the NFB's Assistant Commissioner led the evaluation of collection management activities since these activities are overseen by the evaluation head (Director General, FOT). The Canadian Conservation Institute (CCI) provided independent conservation expertise by carrying out the performance evaluation and comparative analysis with the industry's standards and best practices.

### 1.2.1 Evaluation objectives and scope

The overall objective of this evaluation is to provide NFB staff and senior management with conclusions and recommendations concerning the collection's conservation and preservation. The evaluation is intended to guide strategies and practices for preserving the collection and to support the execution of the NFB's mandate in the most efficient manner possible.

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<sup>5</sup> The Arri scanner is a device that digitizes film (16mm or 35mm) and creates image files in very high resolution (2K or 4K DPX or TIFF). The Spirit Datacine makes it possible to convert 16mm or 35mm film to an HD format video signal or very high resolution image files (2K or 4K DPX or TIFF). The Da Vinci is the Spirit Datacine's control panel. It allows for making sophisticated colour correction on material transferred by the Datacine as well as several other improvements such as image reframing or brightening areas of an image.

To achieve this objective, the evaluation consisted of gathering and analyzing relevant information to determine if:

- 1) policies and procedures in place ensure the collection's security (optimal preservation);
- 2) conservation conditions in the conservation rooms ("vaults") and handling methods used are effective;
- 3) the general state of the collections is assessed regularly;
- 4) NFB good preservation practices are applied.

This evaluation covers the period from 2008 to 2012 and therefore corresponds to the period covered by the NFB's *Strategic Plan 2008-2009 to 2012-2013*. Although this period corresponds to the digital shift undertaken by the NFB—as described in its *Digitization and Digital Archiving Plan*—the results of digitization efforts are not included in this evaluation. They will be evaluated at a later date. The current evaluation deals specifically with procedures and practices linked to the security of the physical assets in the NFB collection.

### 1.2.2 Clients and main stakeholders of the evaluation

As previously indicated, the evaluation of the *Collection Management* activity is intended primarily for NFB staff and managers. The evaluation contains analyses, advice and recommendations for improving their conservation and preservation practices. Additionally, conclusions concerning the activity's relevance and performance will provide useful insights for political decision-makers and Canadians regarding the purpose of managing the collection. They will see the vital role this activity plays in the preservation and accessibility of a major segment of their audiovisual cultural heritage both today and in the future. Furthermore, in reading this report, artists and other audiovisual industry stakeholders as well as cultural sector decision-makers will learn about practices in use at the NFB and draw inspiration from them.

## 1.3 Questions and methodology

### 1.3.1 Questions

The evaluation of the *Collection Management* activity focuses specifically on five questions that are divided into two components: relevance and performance. The five basic questions are taken from the *Directive* accompanying the Treasury Board's *Policy on Evaluation*. They provide a general framework for evaluations dealing with federal program expenditures and, in the context of this evaluation, have been adapted to cover the NFB's conservation and preservation activities. The evaluation questions appear in the detailed evaluation mandate in Annex II along with performance indicators and data sources used for the evaluation.

### 1.3.2 Methodology

The first component, which deals with the activity's relevance, was assigned to NFB staff and an independent external consultant. The consultant examined pertinent reference documents concerning governance, practices and resources associated with collection management as well as strategic and operational objectives.

#### *Examination of documentation*

List of principal documents consulted:

- NFB Strategic Plan 2008-2009 to 2012-2013

- NFB Reports on Plans and Priorities and Departmental Performance Reports from 2008-2009 to 2012-2013
- NFB Organizational Chart
- Conservation Plan for works in the NFB collection
- Strategy to preserve the NFB's productions and interactive websites, 2012
- NFB Digitization and Digital Archiving Plan, 2010
- Evaluation of the online Screening Room NFB.ca, 2012
- Canadian Heritage Reports on Plans and Priorities from 2010-2011 to 2012-2013
- Speech from the Throne, June 3, 2011
- Budget Speech, June 6, 2012
- *Improving Canada's Digital Advantage – Strategies for Sustainable Prosperity*. Consultation paper on Canada's digital strategy, 2010
- *From Script to Screen*, Policy on feature film
- *National Film Act*
- Harris-Decima surveys on Canadians' perceptions of the NFB, 2009 and 2010
- Consultation of the NFB's institutional website and NFB.ca.

***Interviews with key stakeholders***

Interviews with the following people supplemented the documents consulted:

- Richard Cournoyer, Supervisor, Conservation and Laboratory
- Albert Ohayon, Analyst, collection expert
- Marc Saint-Pierre, Analyst, collection expert
- Christian Ruel, Assistant Director General, Finance, Operations and Technology Division (FOT)

***In situ examination of conservation rooms***

The second component, which deals with the evaluation of the activity's performance, was assigned to specialists at the Canadian Conservation Institute (CCI) who visited the conservation rooms at the NFB's Head Office in Montreal from June 20 to 22, 2012. During the visits, they met with key stakeholders and obtained pertinent information for evaluating the collection management activity's performance. CCI representatives met with the following people:

- Joanne Carrière, Director, Technical Resources
- Julie Dutrisac, Head, Research and Development
- Claude Lord, Senior Technician, Photo Library
- Marina Darveau, Head, Information Management
- Christian Ruel, Assistant Director General, FOT
- Richard Cournoyer, Supervisor, Conservation and Laboratory
- André Gagnon, Head, Technical and Artistic Resources

In addition to individual interviews, the evaluators visited the conservation rooms and other storage areas. At that time, they examined a sampling of audiovisual material. A follow-up on November 22, 2012, allowed for a better evaluation of the state of archival and artifact collections and some obsolete technical equipment. An analysis of

atmospheric conditions (temperature, humidity) was performed during this *in situ* visit, which enabled the CCI specialists to evaluate the NFB's practices and policies regarding the handling of material.

### 1.3.3 Limitations

The NFB complies with conservation quality standards. Nonetheless, with respect to the evaluation's constraints, it should be noted that, for the 2011 target,<sup>6</sup> the *Conservation and Preservation* sub-activity's key targets and performance indicators dealt with the percentage of works that had been digitized and the number of works available online. For the 2018 target,<sup>7</sup> performance indicators include the number of works available on two formats and at separate locations; the number of works in the collection having a DSM (Digital Source Master) and a Mezzanine file. Essentially, the NFB's performance indicators for this activity focus on performance measurement of the institutional *Digitization Plan* and *Relocation Plan*.

Conducting a comparative analysis of the NFB and other organizations that have a conservation and preservation mandate for audiovisual collections (Library and Archives Canada, Cinémathèque québécoise, etc.) can be difficult and result in little in the way of truly useful information for decision making. This becomes apparent when one considers that the notion of efficiency is strongly influenced by the specific nature of the mandate, organizational environment, budget, and strategic and operational objectives of each organization, not to mention the variety of material conserved and the fact that each type of material conserved (media, format, etc.) is treated differently.

## 2. Main conclusions

### 2.1 Relevance

This section examines the relevance and necessity of NFB collection conservation and preservation activities. We will begin by determining whether these activities meet the needs of Canadians. We will then consider whether they are aligned with the current government's priorities and are consistent with the strategic priorities of the NFB and Department of Canadian Heritage. Lastly, we will demonstrate the extent of the federal government's role in carrying out the NFB collection conservation and preservation activities.

#### 2.1.1 To what extent do NFB collection conservation and preservation activities meet the needs of Canadians?

The NFB's collection of works is an invaluable asset for Canadians. Indeed, the NFB is the guardian of one of Canada's most priceless audiovisual heritages—a heritage in which Canadians have invested for more than 70 years and that is now part of the country's collective memory. The 13,000 works in the NFB's conservation rooms are like snapshots that make up a veritable family album of Canadian communities and Canadians want to be able to access these works at all times.

Whether documentaries, animated films, fiction or experimental works, the NFB collection bears witness to the transformations experienced by Canadian communities across the country over the past seven decades. Canadians want access to these documents that contain a significant part of their identity and that remind them of the challenges and obstacles they had to overcome or that celebrate the many facets of their culture. The collection's

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<sup>6</sup> NFB performance measurement framework, 2007-2008

<sup>7</sup> NFB performance measurement framework, 2011-2012

existence and maintenance through conservation and preservation activities ensures that future generations of Canadians as well as immigrants and future citizens have access to documents that are key to the country's history. The growing accessibility to the works that comprise this family album on various platforms, especially as a result of the digitization efforts deployed in recent years, ultimately hinges on the existence of the original works and their migrations to various formats in the NFB's conservation rooms.

Beyond the intrinsic heritage value of the content of works in the collection, the original formats have an underlying artistic and historic value that justifies the existence of a management system ensuring their sustainability. Moreover, the preservation of works through their transposition to media and formats based on newer technology, whether to make backup copies or facilitate wider distribution, frequently causes data loss when compared to the originals. Conserving original works in their entirety reduces the risk of irreparable content loss. In this regard, the multiplication of copies of a work in various formats, and even digital formats and their copies on secure servers, cannot justify cutting corners on conservation and preservation activities when it comes to original works. The existence of the family album requires that the works and formats in which they were created be protected and conserved under optimal conditions.

Canadians express their accessibility needs in a very tangible way. According to the most recent polls taken in 2009 and 2010,<sup>8</sup> Canadians hold the NFB in high esteem and believe that the institution is more relevant than ever in the digital age. In 2011, a majority (76%) believed that the organization should boost the promotion of the works in its collection and 66% said they would like easier access to it online or through more traditional distribution channels. They also said they were spending more and more time watching feature and short films and documentaries online. Increasing numbers of Canadians consider the NFB to be an important, if not unique, Canadian cultural institution that contributes to the cultural dialogue between citizens and Canadian communities. From 2008-2009 to 2010-2011, i.e., within less than three years, the number of views increased from 665 to 5,300,000. Between 2009-2010 and 2010-2011 alone, that number increased by 21%. Conservation and preservation activities that make it possible to distribute works in various formats and with different technologies fill a tangible need that is being expressed by the growing demand for accessibility on the part of Canadians.

While the demand by Canadians for accessibility to the audiovisual heritage stored in the NFB's rooms is increasing, various segments of the population want access to it for different reasons. The education sector is one of the segments most interested in the collection's works. For years, the NFB has been making its works available to the country's universities and colleges through various distribution channels. At the start of the *Strategic Plan 2008-2009 to 2012-2013* period, the NFB estimated that it had provided six million views of its works in Canadian schools. The number has grown significantly since NFB.ca and CAMPUS (the website for teachers and schools) went online. From elementary school to university, the needs of young Canadians and their educators for quality educational content and teaching materials is constantly evolving. The NFB is able to respond to those needs through its extensive collection, which has made the institution one of the most reliable providers of Canadian content to the country's education system for generations.

The Canadian film and television industry also benefits from the vast collection of works preserved in the NFB's conservation rooms and laboratories according to the rules of the art. "Since its earliest days, the NFB has been a wellspring of innovation for the Canadian industry, maintaining its technological edge and contributing to the industry's international reputation in the documentary and point-of-view animation sectors."<sup>9</sup> The NFB's reputation is such that its productions are represented at close to 250 major festivals around the world each year. The reputation of award-winning works reflects favourably on Canadian artists, filmmakers and producers as well as on their works in competition, giving them a competitive advantage.

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<sup>8</sup> Harris-Decima, *National Film Board, Streaming initiative – 2010 Tracking Study, Revised Report, April 16, 2010* and Harris-Decima, *National Film Board, Streaming initiative – 2011 Tracking Study, Draft Report, June 8, 2011*.

<sup>9</sup> National Film Board of Canada, *Departmental Report on Plans and Priorities 2008-2009*, p. 9.

Stakeholders in the education community and film industry are but two examples that illustrate ways that collection management activities can meet specific needs of Canadians. From members of First Nations to Canadians living in remote areas, from citizens belonging to linguistic minorities to those wishing to simply enjoy the creativity of their country's artists, all Canadians stand to benefit from a collection of works as extensive and diverse as the one found in the NFB's conservation rooms.

### 2.1.2 Alignment with federal government priorities and the NFB's strategic outcome

The purpose of this section is to determine whether the objectives of collection management activities are consistent with (i) current Canadian government priorities and (ii) the NFB's strategic outcome.

#### *Compliance with the government's current priorities*

Several sources confirm that NFB collection conservation and preservation activities are consistent with the government's current priorities. In many respects, these activities contribute directly to the achievement of government objectives for the current year and in the longer term as explicitly stated in official documents such as the 2011 *Speech from the Throne*, the federal government budget and the *Reports on Plans and Priorities* issued annually by the Department of Canadian Heritage.

#### Canada's Digital Economy Strategy

Firstly, NFB collection conservation and preservation activities tangibly contribute to the implementation of the federal government's Digital Economy Strategy, for which a vast countrywide consultation was conducted. Some of the strategy's objectives were clearly outlined in the consultation paper entitled *Improving Canada's Digital Advantage: Strategies for Sustainable Prosperity* and were reiterated in the June 6, 2011, and March 3, 2010, Speeches from the Throne. According to the consultation paper, the goal of the federal government is "for Canada [...] to have a world leading digital economy; to be a nation that creates, uses and supplies advanced digital technologies and content to improve productivity across all sectors."<sup>10</sup>

In preparing for the consultation on Canada's *Digital Economy Strategy*, the government stated its commitments and expectations regarding the NFB and other content-producing public institutions as follows: "They can play a leadership role in providing Canadians with access to leading edge digital content while not unfairly competing with the private sector. To that end, the Government of Canada expects the CBC/Radio-Canada and the NFB to maximize their presence on all digital platforms."<sup>11</sup> Furthermore, this digital content priority became a reality with the budget tabled on June 6, 2011, which provides \$100 million in permanent funding annually to the Canada Media Fund for investments in the creation of multiplatform digital content.<sup>12</sup>

The success of Canada's future digital strategy is therefore dependent on the existence and accessibility of extensive and diverse multiplatform content that is in digital format or in the process of being digitized. NFB collection conservation and preservation activities, in tandem with the deployment of the NFB digitization plan, ensure that efforts made by the industry and the federal government supporting it to develop and implement new

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<sup>10</sup> Government of Canada, *Improving Canada's Digital Advantage: Strategies for Sustainable Prosperity. Consultation Paper on a Digital Economy Strategy for Canada*, Ottawa, ON, 2010, p. 9.

([http://publications.gc.ca/collections/collection\\_2010/ic/Iu4-144-2010-eng.pdf](http://publications.gc.ca/collections/collection_2010/ic/Iu4-144-2010-eng.pdf))

<sup>11</sup> *ibid.*, p. 28.

<sup>12</sup> Government of Canada, Department of Finance, *The Budget Speech 2011*, June 6, 2011, p. 20 (<http://www.budget.gc.ca/2011/glance-apercu/brief-bref-eng.pdf>)

production, distribution and digital consultation technologies will be reinforced by content that is appealing to consumers. This is especially true given that NFB productions target market niches that are traditionally neglected by the private sector.

### Enhancing the value of Canadian history and identity

Secondly, if the 13,000 works currently in the NFB's conservation rooms contribute directly to the government's digital strategy priorities, they also directly support efforts by the federal government to enhance the value of Canada's heritage and the history of our country.

To begin with, the NFB makes a unique and original contribution to highlighting milestones in our history. Celebrating these milestones is an important government priority, as announced in the most recent Speech from the Throne: "Canadians [...] cherish our shared history. Anniversaries are an important part of how a society marks its collective progress and defines its goals for the future."<sup>13</sup> As an example, the depth of the topics covered in the films in its collection and the material quality of the works that have been preserved enabled the NFB to contribute to the celebrations marking the Diamond Jubilee of Queen Elizabeth II by providing a souvenir box set containing two renowned films from its collection: *Royal Journey* (1951) and *Canada at the Coronation* (1953). Similarly, the NFB underscored the bicentennial of the War of 1812 in its own way by broadcasting and featuring films and documentaries on its NFB.ca site that reconstituted some of the war's key events. Films such as *A Question of Identity: War of 1812* (1966), *The Battle of Chateauguay* (1977) and the four-part *War of 1812* series produced over the years enrich our understanding and knowledge of this period that the current government wished to spotlight. Additionally, these archives were useful for researching and developing the animated interactive narrative *The Loxleys and the War of 1812*, an application for tablets and mobile platforms launched especially for the war's bicentennial. Without trying to predict what the priorities of the federal government will be in the next few years, it is clear that, owing to its conservation and preservation activities, the NFB has a great ability to support the government in its efforts to highlight crucial moments in our history. Celebrations marking the 150th anniversary of the Confederation offer potential for a host of opportunities whereby the NFB can lend its support to the government by making its extensive collection available to Canadians.

Just as collection conservation and preservation activities make it possible to showcase the history of our country through quality audiovisual works, they also contribute to celebrating and promoting the values, symbols and cultural heritage that unite Canadians. More specifically, one of the government's current priorities is to "[...] join Canadians in celebrating our heritage, in promoting our values and in standing for what is right on the world stage,<sup>14</sup> particularly by supporting the Canadian Armed Forces." In 2010-2011, the NFB lent tangible support to that priority by producing *The Many Faces of Afghanistan* DVD box set and distributing it to 143 Canadian missions. The box set will continue to be used for diplomatic activities carried out by the Afghanistan Task Force of the Department of Foreign Affairs and International Trade. Many works from the NFB's collection deal with the participation of the Canadian Armed Forces in the war efforts of the major conflicts that marked the last century. The works constitute authentic historical archives that enable all Canadians to remember the sacrifices they have made. Through its extensive collection, the NFB is making a concrete contribution to this duty to remember.

In addition, the priority given to defending Canada's sovereignty in the Arctic and its presence in the Far North is supported by a wide array of fiction works and documentaries highlighting Inuit culture. Indeed, "since its founding, the NFB has worked with Inuit communities to tell their stories and share their traditions. As a result, we now have the world's largest collection of audiovisual works about northern peoples. [...] At a time when the

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<sup>13</sup> Government of Canada, *Speech from the Throne*, June 6, 2011, Ottawa, ON, p. 11.

<sup>14</sup> *ibid*, p. 9.

Arctic is attracting increasing international attention, dissemination of this cultural heritage is vital.”<sup>15</sup> Recently, on the occasion of the International Polar Year 2012 conference, the NFB’s collection of Inuit films made it possible to launch the *Unikkausivut: Sharing Our Stories* DVD box set. This was a collaborative effort with the Inuit Relations Secretariat of the Department of Aboriginal Affairs and Northern Development Canada, the Government of Nunavut and its Department of Education, with support from Inuit organizations.

The important role that an institution like the NFB plays in preserving the heritage and vitality of northern communities also applies to all Canadian communities, particularly in remote areas and official-language minority communities. The government’s current desire to “continue taking action to address the needs and aspirations of every region of the country”<sup>16</sup> is directly supported by initiatives such as the interactive game *Ta parole est en jeu*, the *Espace francophonie* film selection on ONF.ca and the e-cinema program, which reach Canada’s official-language minority communities. All are made possible as a result of collection management activities.

### ***Compliance with strategic outcomes***

NFB collection management activities are not only consistent with the government’s current priorities, but also directly contribute to achieving the strategic outcomes of the Department of Canadian Heritage as well as the strategic outcomes of the NFB that stem from them.

In his latest departmental *Report on Plans and Priorities* (2012-2013), the Minister of Canadian Heritage expressed one of the strategic outcomes in the following terms:

*Strategic outcome 1 – Canadian artistic expressions and cultural content are created and accessible at home and abroad.*

This strategic outcome reflects the importance the Canadian government places on the sustainability and public accessibility of Canadian cultural products, the artistic work of Canadian artists and Canada’s cultural heritage.<sup>17</sup>

As an agency within the Department of Canadian Heritage portfolio, the NFB also supports the Department’s strategic guidelines. The strategic outcome targeted by the NFB is as follows:

*Canadian stories and perspectives are reflected in audiovisual media and accessible to Canadians and the world.*

The accessibility of Canadian cultural content, especially audiovisual works, is therefore at the heart of the strategic priorities of the NFB and Department of Canadian Heritage. Moreover, as we have seen, activities involved in the collection’s conservation and preservation contribute directly to the achievement of this priority by ensuring that an ever-increasing portion of the 13,000 works in the collection are physically accessible to the Canadian public.

Beyond accessibility to heritage, collection management activities make the survival and even the very existence of the works possible. As we have seen, digitization efforts carried out in recent years are based on the assumption that a diversified and well-preserved collection of works exists, without which the heritage they represent is in danger of disappearing.

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<sup>15</sup> National Film Board, *Report on Plans and Priorities, 2012-2013*, p. 3

<sup>16</sup> *Speech from the Throne*, p. 13.

<sup>17</sup> Department of Canadian Heritage, *Report on Plans and Priorities 2012-2013*, Ottawa, ON, p. 4.

To conclude this section, it might be useful to draw a parallel between museums and other heritage institutions. According to the Department, they:

encourage the discovery of the rich diversity of Canada's history and culture and strengthen the bonds between our past, our present and our future in an increasingly pluralistic society. Museums and other heritage organizations have important roles in preserving the past and providing learning opportunities.<sup>18</sup>

The NFB shares the mandate with these key Canadian heritage players to enable Canadian citizens as well as people in other countries wishing to learn more about Canada to discover our history, values and communities.

### 2.1.3 Roles and responsibilities of the federal government

The federal government's involvement in the conservation and preservation of the NFB's collection is justified and consistent with federal legislation and policies in force. If the NFB's works were not preserved and made accessible, the NFB would be unable to fulfil its legislative mandate.

#### National Film Act

The [National Film Act](#) mandates the NFB to produce and distribute audiovisual works. Activities aimed at the conservation and preservation of the NFB's collection make it possible for the NFB to fulfil its mission as stipulated in the [National Film Act](#), section 9 (a):

#### Mission

**9.** The Board is established to initiate and promote the production and distribution of films in the national interest and, in particular:

**a)** to produce and distribute and to promote the production and distribution of films designed to interpret Canada to Canadians and to other nations.

#### The federal government's feature film policy

Although it does not deal specifically with *documentary* film production (the government has no documentary film policy per se), the *Canadian Feature Film Policy* outlines the government's overall objectives for Canada's feature film industry. The policy's goal as stated in the document entitled [From Script to Screen](#) is to increase the quality, diversity and accessibility of Canadian films. The objectives of activities aimed at the conservation and preservation of the NFB's collection are entirely consistent with one of the objectives of this policy, namely:

- preserve and disseminate our collection of Canadian feature films for audiences today and tomorrow.

The policy states that "film is a powerful means of providing snapshots of moments, places and faces in Canadian history. By preserving our film heritage, we value and strengthen the Canadian experience for generations to come. The federal government is therefore taking steps to ensure the continued protection and long-term accessibility of the growing wealth of Canadian feature films.

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<sup>18</sup> Department of Canadian Heritage, *Report on Plans and Priorities 2010-2011*, Ottawa, ON, p. 21.

“Partners in the private and public sectors play a role in the collective effort to preserve and disseminate our collection of feature films. Key players include our nation’s cinematheques, the National Film Board and the National Archives of Canada whose state-of-the-art storage facility in Gatineau, Quebec, safeguards many of Canada’s film treasures.”

#### *Treasury Board Policy on Management of Materiel*

NFB collection conservation and preservation activities are also consistent with the spirit and requirements of the TB’s *Policy on Management of Materiel*.

## 2.2 Performance

At the NFB’s request, the Canadian Conservation Institute (CCI) has reviewed the performance of the physical collection’s conditions and practices. **The detailed report of the CCI experts is provided in Annex I.** In the next section, we have reproduced the summary of the Institute’s recommendations and NFB management’s response.

The CCI is a special operating agency with expertise in the science of conservation, restoration and preventive conservation. The agency is part of the Department of Canadian Heritage portfolio and, among other things, provides expert services to Canadian heritage organizations.

## 3. Summary of the recommendations, management response and action plan

### CCI recommendations<sup>19</sup>

The collections of the National Film Board of Canada are an extraordinarily rich heritage resource of truly national significance. They comprise all aspects of the development of film projects as well as unique innovations in film technology. The richness and breadth of the collections combined tells, in large measure, the story of film in Canada. Currently, the NFB mandate extends to production and distribution of films. A by-product of this is the preservation of all film elements so that the distributed copy films can be produced to the highest possible technical standards. This has been largely addressed by the current storage vault and handling procedures. The conditions are, for the most part, appropriate for the long-term preservation of the material within. Many other collections are present in the Norman McLaren building that have not received the same attention as they are not officially considered “collection” material. With the exception of the archival and the still photographic collection, the collection and preservation of film production artifacts and artwork, historic and obsolete equipment, technical innovations, promotional materials, and exhibitions, do not fall within a protective corporate mandate for retention. As a consequence their preservation has been ad hoc.

It is strongly recommended that the NFB examine all currently non-mandated collections and first of all, determine the value of these collections, secondly determine who should assume responsibility for them, and thirdly, develop a strategy for their long-term preservation. A broader collection mandate and long-term preservation plan for all collections would facilitate a more systematic approach.

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<sup>19</sup> The detailed recommendations made by the CCI regarding conservation conditions and the many media that make up the collection are provided in Annex I.

The NFB should encourage filmmakers to properly store and handle media during and post production. A number of pieces of media were discovered with signs of improper handling such as fingerprints on optical media and poor labeling of materials. Improper storage and handling can lead to media that is compromised before even entering the NFB vaults and can pose significant and costly problems in the future for the NFB. Basic guidelines with respect to storage and handling procedures can be written and provided to filmmakers. Similar guidelines should be provided to NFB staff and they should be trained accordingly.

The collections expertise resides within a relatively small group of staff members. Those with a global awareness of the collections and their extent are few. The departure of these key staff members, whether through job transfer or retirement, would result in potentially substantial workflow continuity issues. Though hardly unique to NFB, succession planning must be incorporated into the strategic plan. Collection management and preservation expertise would be highly desirable.

### **Management response and action plan**

NFB management welcomes the CCI's recommendations since they represent the best conservation practices. The Conservation and Laboratory sector staff is working on some of these recommendations on an ongoing basis. However, the NFB is not in a position to follow up on each of the 67 recommendations in the medium term due to its limited financial capacity and organizational resources. Indeed, several of the recommendations involve substantial costs. Furthermore, at this time, it would not be advisable for the NFB to invest in its head office infrastructure, which is recognized as obsolete. In this regard, the head office relocation project provides an opportunity to prioritize the implementation of the CCI's recommendations, since the project will involve relocating the conservation rooms.

The NFB has devised an action plan for the following recommendations:

#### **Recommendation 1 – Non-mandated collections**

That the NFB examine all non-mandated collections, determine who assume responsibility for them and develop a strategy for their long-term preservation.

#### **Management response: Accepted**

This recommendation is highly relevant in the context of the NFB's relocation. Since the NFB has already formed a working group to plan the head office's relocation, the group will also be mandated to recommend to management the strategy and actions to be implemented, if necessary, to preserve artifact collections. The working group will oversee the implementation of measures selected by management, if applicable.

#### **Implementation date**

Working and strategy group recommendations: March 31, 2014

Implementation, if applicable: 2014 to 2016

**Responsibility:** Senior management, Finance, Operations and Technology – in partnership with French Program and English Program senior management.

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#### **Recommendation 2 – Proper storage and handling during and post-production**

That the NFB encourage filmmakers to properly store and handle media during and post-production, for example by providing basic guidelines and training with respect to storage and handling procedures.

#### **Management response: Accepted**

After updating its pruning policy, the NFB will develop and implement a policy and procedure for storing and handling audiovisual material (physical and digital). These guidelines will be published on the intranet and will be intended for creators as well as conservation room staff. The Conservation and Laboratory team will ensure their implementation by providing adequate and timely training.

**Implementation date:** Winter 2014

**Responsibility:** Senior management, Finance, Operations and Technology – in partnership with French Program and English Program senior management.

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**Recommendation 3 – Succession planning**

That the NFB incorporate succession planning in its strategic plan given that collection management and preservation expertise resides within a relatively small group of staff members and that their departure would potentially result in substantial workflow continuity issues.

**Management response: Accepted**

The loss or inadequate transfer of institutional knowledge is one of the risks that the NFB is closely monitoring as part of its integrated risk management. As such, the Human Resources Division is continuing to actively carry out its 2011-2014 three-year Strategic Plan. The development strategy for next generation and high-potential employees as well as the implementation of plans for the transfer of knowledge for vulnerable positions are already part of this strategic plan. This includes identifying vulnerable positions in the Conservation and Laboratory sector.

**Implementation date:** Ongoing.

**Responsibility:** Senior management, Human Resources

**Annex I – Canadian Conservation Institute Report**

# REPORT



## **COLLECTION ASSESSMENT AT THE NATIONAL FILM BOARD OF CANADA**

for

National Film Board of Canada  
Montréal, Quebec, Canada

Greg Hill

Treatment & Collections: Textiles, Archaeology, Objects, Paper

Joe Iraci

Conservation Science Division

January 30, 2013

CCI 124391

Collection Assessment at the National Film Board of Canada



Canadian  
Conservation Institute

Institut canadien  
de conservation

Canada



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# COLLECTION ASSESSMENT AT THE NATIONAL FILM BOARD OF CANADA

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## 1. INTRODUCTION

The National Film Board of Canada (NFB) approached the Canadian Conservation Institute (CCI) to perform a collection assessment as part of a formal evaluation of their collection management practices. Specifically, the CCI was asked to determine whether:

- NFB policies and procedures ensure the safety of their collection;
- the conservation conditions and handling methods at NFB are efficient;
- the global state of the NFB collection is regularly assessed;
- there are good practices (external or internal) from which the NFB could learn.

It is understood that the current mandate of the NFB is essentially twofold, film production and film distribution. Collection preservation is essentially a by-product of the latter. In order to ensure the distribution of all films produced by the NFB, both vintage and contemporary, all film elements, visual and audio, must be preserved in usable form. Further to this, housed within the NFB's head office, the Norman McLaren building located at 3155 Côte de Liesse Road, Montreal, are many related collections including archives, still photographs, film production artifacts, trophies and awards, and specialized production equipment, to name a few. Though not specifically mandated collections, they represent significant historic material. All of these diverse materials have been examined, assessed and included in this report, with emphasis on the moving image and sound collections.

## 2. COLLECTION ASSESSMENT METHODOLOGY

In order to examine the issues, Greg Hill, Senior Conservator, Archival and Photographic Materials and Joe Iraci, Senior Conservation Scientist from the CCI visited the NFB Head Office on June 20-22, 2012. The visit involved a preliminary meeting with key individuals that could provide information required for the collection assessment. This meeting was followed by a series of one hour interviews with NFB staff listed below:

- Joanne Carrière, Director, Technical Resources;
- Julie Dutrisac, Head, Research and Development;
- Claude Lord, Senior Technician, Photo Library;
- Marina Darveau, Head, Information Management;
- Christian Ruel, Assistant Director General, Finance, Operations and Technology;
- Richard Cournoyer, Supervisor, Conservation and Laboratory;
- André Gagnon, Head, Technical and Artistic Resources.

In addition to these interviews, several hours were spent with Richard Cournoyer and André Gagnon in the vaults and other storage areas within the NFB Head Office building to obtain a global view of the collection. A closer examination of a small number of individual items in the collection was also undertaken. A follow up site visit was completed on November 22, 2012 to better assess the archival and artifact collections and obsolete technical equipment. At the same time, Joe Iraci further examined materials and conditions within the main vault (cool) and secondary vault (cold).

## 3. SUMMARY AND RECOMMENDATIONS

The collections of the National Film Board of Canada are an extraordinarily rich heritage resource of truly national significance. They comprise all aspects of the development of film projects as well as unique



innovations in film technology. The richness and breadth of the collections combined, tells in large measure, the story of film in Canada. Currently the NFB mandate extends to production and distribution of films. A by-product of this is the preservation of all film elements so that the distributed copy films can be produced to the highest possible technical standards. This has been largely addressed by the current storage vault and handling procedures. The conditions are, for the most part, appropriate for the long term preservation of the material within. Many other collections are present in the Norman McLaren building that have not received the same attention as they are not officially considered “collection” material. With the exception of the archival and the still photographic collection, the collection and preservation of film production artifacts and artwork, historic and obsolete equipment, technical innovations, promotional materials, and exhibitions, do not fall within a protective corporate mandate for retention. As a consequence their preservation has been ad hoc.

It is strongly recommended that the NFB examine all currently non-mandated collections and first of all determine the value of these collections, secondly determine who should assume responsibility for them and thirdly develop a strategy for their long term preservation. A broader collection mandate and long term preservation plan for all collections would facilitate a more systematic approach.

The NFB should encourage film makers to properly store and handle media during and post production. A number of pieces of media were discovered with signs of improper handling such as fingerprints on optical media and poor labeling of materials. Improper storage and handling can lead to media that is compromised before even entering the NFB vaults and can pose significant and costly problems in the future for the NFB. Basic guidelines with respect to storage and handling procedures can be written and provided to film makers. Similar guidelines should be provided to NFB staff and they should be trained accordingly.

The collections expertise resides within a relatively small group of staff members. Those with a global awareness of the collections and their extent are few. The departure of these key staff members, whether through job transfer or retirement, would result in potentially substantial work flow continuity issues. Though hardly unique to NFB, succession planning must be incorporated into the strategic plan. Collection management and preservation expertise would be highly desirable.

### **3.A. Storage**

#### **3.A.i. NFB Cool and Cold Vaults**

1. Due to the size of the vaults, additional temperature and humidity sensors should be added and regular monitoring performed in order to ensure that conditions are consistent within different areas of the vaults.
2. On a regular basis (monthly) staff managing the vaults should be provided with the temperature and relative humidity data from the Public Works and Government Services Canada (PWGSC) to ensure that the set points are being met and the alarm system functions as designed.
3. The acetic acid smell in the cold vault should be explored further. If acid vapour concentrations are too high, the vapours need to be exhausted from the storage area, perhaps by increasing the air exchange rate in the room. If persistent, sub-zero storage is required to stabilize acetate based materials.
4. The cold vault is possibly too dry and may cause physical damage to the films. The conditions in this vault should be monitored and if the relative humidity (RH) is consistently too low, adjustments should be made to ensure the RH is always above 20 percent.



5. In order to ensure the safety of materials being extracted from the vaults, they should always be acclimatized prior to being exposed to the main building environment. This is more of a concern in the summer months when the humidity in the building is higher. Monitoring of the building conditions on a regular basis will determine whether acclimatization is necessary in order to prevent moisture build-up on collection material.
6. It is imperative that a system be implemented where only materials required to be accessed are removed from the vaults instead of removing the whole box, which also contains items that are not required. This is necessary to limit problems developing with the media.

### **3.A.ii. On-Site Ambient**

1. The environmental conditions within the Norman McLaren building are designed essentially for human comfort and are not ideal for the long term preservation of the artifact collections. Specific enclosed areas such as the archives storage room could be humidified during winter months and dehumidified in summer months to mitigate extremes.
2. Security hanging devices for framed works in the corridors should be installed so that objects cannot be easily removed.
3. Store rooms need to be organized in such a way as to minimize the potential for damage and extraneous materials removed. Access to the storage rooms should be strictly controlled and doors locked.
4. The corridors are lit with overhead fluorescent lights, possibly sleeved with ultraviolet light filters. Filters should be tested to determine their efficacy as they breakdown over time allowing light damage to occur. They should be replaced as required to mitigate photochemical degradation and fading.
5. Removing the framed original film elements from the corridors and replacing them with facsimiles would eliminate light damage to originals.

### **3.A.iii. Underground Archives**

1. The fluctuation values in the storage conditions should be obtained from Underground Archives to ensure the conditions are not too cold (for magnetic tapes) or too dry (for film).
2. Thought should be given as to whether the storage conditions need to be adjusted to better protect colour films from fading at the expense of possible complications of storing magnetic media at the lower conditions.
3. More details should be acquired with respect to the acclimatization procedure to ensure there are no moisture problems developing.
4. The stack heights of the horizontally stored film cans should be reduced.

## **3.B. Moving Image and Sound Collections**

### **3.B.i. Motion Picture Film (8mm, 16mm, 35mm, 70mm, Super 16mm) and Audio Magnetic Film (16mm, 35mm)**

1. For acetate materials, continue the monitoring of films that are currently in good condition with A-D strips and ensure all acetate films at advanced levels of deterioration are digitized. Films at advanced levels of deterioration should be stored at sub-zero temperatures.



2. Acetate material both black-and-white and colour and polyester based colour film in good condition should be stored in the cold vault in order to meet the ISO 18911 standard to prevent the premature fading of the dyes used in colour film and acceleration of acetate degradation.
3. The rehousing of films in better quality storage cans should be performed regularly instead of only when an item is accessed. In particular, the corroded film cans located on the first floor should be replaced immediately.
4. Plastic bags wrapped around films in vented plastic cans should be removed and all extraneous material such as paper should also be taken out of the cans. All film cans should be stored horizontally to avoid distortion and damage to the films and dye fading in colour films.
5. Develop a periodic inspection of representative samples of the collection. ISO standard 18911 recommends every two years but in light of the conditions in the vaults, perhaps every five to ten years would be more practical. Inspections would involve looking for curl, distortion, brittleness, base/gelation adhesion failure, proper wind etc., and visual changes such as fading or colour changes in the film images.

### **3.B.ii. Film Strips**

1. A closer look at the quality of storage box is recommended. In addition, an examination of the entire contents of the boxes is required to ensure the elements are being properly stored.
2. Audio cassettes found within the boxes should be surveyed to determine their condition and a strategy for digitizing the audio component developed.
3. In order to bring greater stability to the colour film strips, they should be separated out and stored in the cold vault. This should not happen until the air quality in the cold vault is determined.

### **3.B.iii. Magnetic Tape – Audio, Video, Data**

1. Formats that are currently obsolete or close to becoming obsolete (2” videotape reels, 1” videotape reels, ¾” U-matic cassettes, D2, DAT, DA88, and others as indicated in Table 7) should be digitized or copied immediately. This is especially important since there does not seem to be any significant funds being allocated to repair old equipment or purchase old equipment to play obsolete formats in the NFB collection. Thought should be given as to whether the obsolete formats should be retained following proper digitization because the prospect of being able to play these formats in the future is poor.
2. Analog formats not in immediate danger of obsolescence such as Betacam SP, Hi8, VHS, and S-VHS, should be digitized (if not already done so) in order to preserve the content before machine population decreases significantly and it becomes more expensive and difficult to perform this task. In addition, copies of current but fragile digital formats should be made where none exist. Digital tapes are thin and vulnerable to damage if played often and overall have a shorter lifetime than analog tape formats.
3. Digitization of any remaining acetate audio reels should be a priority. In addition, it would be important to identify reels that may be suffering from binder hydrolysis and make them a priority for digitization.



4. The lower limit for storage of magnetic tape according to the ISO 18923 standard is 8EC. However, due to the chemical reactivity of acetate material, storage in the cold vault is recommended if the masters are to be kept long term.
5. Migration of LTO1 tapes should occur within the next two years. Migration of LTO3 and LTO4 tapes to the more current LTO format should occur within the next five years while machine population to read these tapes is not an issue. Because the LTO format is renewed to a new version in a fairly short period of time, a detailed future migration plan for LTO tapes is required in order to avoid technological obsolescence and inability to read older tapes.
6. A more thorough examination of the DLT tapes in the collection is required in order to determine if they are at risk for obsolescence. If yes, they should be migrated immediately.
7. Tapes stored collectively in the blue cardboard boxes should be stored in the proper vertical orientation and not packed too tightly.
8. Masters should be used as little as possible and never to make distribution copies (as indicated in the NFB Preservation Plan) in order to limit wear and tear and possibly other physical damage. High quality copies should be used instead.
9. Monitoring of representative samples of the magnetic tape collection for chemical and physical problems should be performed every 10 to 15 years.
10. The use of tape cleaners utilizing burnishing blades should be avoided on older tapes. Although this type of cleaning is acceptable for new tapes, it is not recommended for older tapes that may be more fragile. In some machines, the blade portion of the cleaning machine can be eliminated and the tapes cleaned simply with tissue wiping (Pellon tissue). However, another concern is that these machines often use a high speed wind for cleaning, which may harm older more fragile tapes. Careful consideration should be given to which tapes get cleaned by this type of equipment. Alternative procedures for the safe cleaning of magnetic tapes should be investigated.
11. Tapes should be stored vertically and not horizontally. Any paper storage containers should be inspected and if the containers are of poor quality then they should be replaced.

### **3.B.iv. Optical Disc Media**

1. Convert all low stability media (non-gold CD-Rs and DVD-Rs, read only DVDs, erasable media, dual layer recordable DVDs) to gold CD-Rs or gold DVD-Rs if the information stored on the low quality media is the sole copy.
2. Optical media stored in paper or plastic sleeves should be rehoused into standard size (10 mm) jewel cases in order to prevent physical damage to the discs. Those stored in thin jewel cases (five mm) can remain in those cases as long as the cases are handled infrequently and the rows of discs on shelves are not tightly packed. All jewel cases should be stored vertically with no leaning. Paper materials stored with the discs inside of the enclosure should be removed.
3. Discs containing adhesive labels or writing on the surface should be copied onto new media. Labeling of discs should only be performed on the clear hub of the disc with a water-based permanent marker.
4. Information currently stored on MO disks should be transferred to another format while machine population is reasonable, instead of performing the migration on an as needed basis.



5. Laserdisc players are no longer being produced and the availability of used equipment is diminishing. Laserdisc collections should be transferred to a digital format as soon as possible.

### **3.B.v. Works in Progress**

1. These materials should be stored (e.g. vertical orientation) and handled as recommended for the permanent collection because some of these materials will eventually become part of that collection.
2. When materials are moved from the works in progress collection to the permanent collection the materials should be prepared for long-term storage by removing excessive labeling, removing paper materials stored in the case with the tape, providing a proper storage enclosure, etc.
3. Hard drives and hard drive RAIDs have a short lifetime (on average two to five years) and longevity when sitting on a shelf is unknown. The content on hard drives should be copied immediately in case the hard drives fail within the five years that these materials will remain in this collection area. In addition, any obsolete or near obsolete formats (e.g. floppy diskettes, ZIP disks) should be copied immediately as it may not be possible to do so after the five year time frame.

### **3.C. Moving Image and Sound Digitization Plan**

1. Two digital copies should be produced for all digitized materials, whether they are at risk or not. It would not require much additional resources or cost to do this and would provide insurance against loss of the digitized material should something go wrong with the lone digital copy.
2. Consideration should be given to performing the digitization of all materials at the highest quality, regardless of whether or not the materials are at risk. The digitization effort for each title can be quite time consuming and if it is performed properly initially, then the process will not need to be repeated in the future.
3. Due to the importance of the digitization effort it is recommended that the digitization procedures be reviewed and proper resources, human and otherwise, be dedicated to this effort. In addition, an important element in any digitization project is the development of a long-term migration strategy, a clear pathway for the future migration of current digital collections to the next generation.

### **3.D. Non Moving Image and Sound Collections**

#### **3.D.i. Archival**

1. The current conditions are boarder line acceptable for archival paper documents. The ambient temperature and relative humidity was recorded on Nov. 22, 2012 and measured 23°C and 22% RH. It was considerably warmer and more humid when the site was visited in June 2012. Relocating the entire collection to a more stable environment, would be advantageous. The extremes in relative humidity in particular might be addressed in the short term by installing a humidifier during the winter months and a dehumidifier in the summer months. This is dependent on being able to close off the space from the rest of the building. This does not mean seal the room but rather slow down the exchange of air in order to modulate the conditions. Paper based



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collections of this nature are subject to degradation in high humidity and temperature environments. Mould is always a concern when the humidity level exceeds 65%.<sup>20</sup>

2. The Norman McLaren paper based film elements currently being stored in acid free boxes in the archival storage area have high artifactual value. It is recommended that they be returned to the storage vault where the more stable vault conditions will ensure the long term preservation of these items. Access to this material should be limited as it is paper based, fragile and subject to mechanical damage. Facsimiles could be provided for researchers.
3. A digital records collection and digital preservation policy needs to be developed and implemented as much material resides within departments without any transfer policy.
4. The disposition schedules for the administrative files needs to be formalized and rigidly adhered to.
5. Archival, acid free sleeves/filing folders for paper based records would be advisable for the long term stability of the permanent records.<sup>21</sup>
6. A formal policy outlining the transfer of corporate records from the regional offices would help to control what is kept locally and what needs to be transferred.
7. If it is not already being done, an annual review of the service contract with Recall should be conducted.

### **3.D.ii. Photographs**

1. The photograph collection should be surveyed to determine what plastic film based negative materials and colour prints and negatives are present and to facilitate their segregation. Stabilization of this material is accomplished by slowing chemical activity, most easily done by lowering the temperature (cold storage). Subzero is ideal but slightly above zero found in the NFB cold vault will provide considerable protection from deterioration. Humidity levels also need to be strictly controlled. Black and white silver gelatin print materials are fairly stable in ambient conditions. Early sheet and roll films on the other hand could be cellulose nitrate or cellulose acetate. Both are potentially chemically unstable and require cool or cold storage with humidity control. During advanced stages of deterioration they will emit corrosive gases which can damage other collection material in proximity. Chromogenic, standard colour photographic materials are subject to not only light fading which is well recognized, but also dark fading, meaning fading in the absence of light resulting from dye/colourant instability, controlled by cold temperature storage.<sup>22,23,24</sup>

### **3.D.iii. Trophies and Awards**

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<sup>20</sup> ISO 11799:2003 (E). Information and documentation - document storage requirements for archive and library materials.

<sup>21</sup> CAN/CGSB-9.70:2000. Permanence of paper for records books and other documents. Ottawa : Canadian General Standards Board.

<sup>22</sup> ISO 18911:2010. Imaging materials -- Processed safety photographic films -- Storage practices.

<sup>23</sup> ISO 18934:2011. Imaging materials -- Multiple media archives -- Storage environment.

<sup>24</sup> McCormack-Goodart, M. The Allowable Temperature and Humidity Range For the Safe Use and Storage of Photographic Materials. *The Journal of the Society of Archivists*. Vol. 17, No. 1, 1996, p.7-21.



1. A complete inventory of the trophies and awards collection should be taken (if not previously done) and should include condition surveys and full photographic documentation. Cataloguing and descriptions should be completed and accession numbers assigned.
2. Greater security and environmental control would be afforded by installing the collection in a dedicated secure space.
3. Objects could be rotated in and out of the cases in order that light exposure is limited on sensitive objects. Light damage is cumulative and irreversible. If there is a requirement for permanent display of all of the items, strategies for light control should be investigated and measures taken to limit exposure. This is particularly important for textiles and painted surfaces. Ultra violet light is the most damaging wavelength of light found predominantly in sunlight and fluorescent lights. UV absorbing filters can be incorporated into the display case glass.<sup>25</sup>

#### **3.D.iv. Film Project Elements (boxed, in the cool vault)**

1. A full survey of the boxes should be conducted to determine if the material is chemically stable and if the boxes are providing adequate protection for the materials stored within. Some boxes may be over filled with uneven distribution of pressure on material on the bottom of the box. Many boxes may require interleaving tissue. The quality of the boxes and interleaving tissue should also be checked and replaced as required.
2. Plastic and foam pieces should be carefully inspected and plastic bags removed in order that there is some capacity for volatiles to migrate away from the object. The rate of deterioration can increase if the gases are trapped in proximity to the degrading material.
3. Proper handling procedures should be developed and implemented for the materials to limit physical damage.

#### **3.D.v. Film Project Artifacts**

1. In order to protect this material for the long term, the NFB must determine its value and whether they wish to maintain it as part of the collection. It has considerable historic value and yet damage is occurring regularly due to improper housing throughout the building. Also, it is likely that much material is being removed from the building as production teams migrate in and out. It is clear that the current situation is not sustainable, particularly in view of a potential move from the current site. If it is deemed collection material it first requires a complete inventory and cataloguing. Proper accessioning of the items needs to be carried out, control numbers assigned, overall organization of the materials completed and finally rehousing in conservation quality materials and environments. An acquisition and preservation mandate for these items is required and must include all regional offices. If the decision is made to not collect this material, disposition avenues must be investigated.
2. Large format and mounted works of art, drawings, photographs, paintings, etc., and promotional exhibits are housed in plan file drawers and on shelves in several small storage rooms throughout the building. These items require acid-free housing materials and more secure shelving.

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<sup>25</sup> ISO 11799:2003 (E). Information and documentation - document storage requirements for archive and library materials.



3. All framed items need to be evaluated to determine the suitability of the framing as elements framed against glass can result in sticking in high humidity. Spacers should be placed in the frames separating elements from the glass.
4. The corridors are lit with overhead fluorescent lights which are thought to be sleeved with ultraviolet light filters. Filters should be tested to determine their efficacy as they breakdown over time. Light levels are high though they were not measured.
5. Cases filled with three dimensional artifacts require greater protection in designated, secure, environmentally controlled storage rooms. Extraneous materials must be removed from the store room.

#### **3.D.vi. Film Production Equipment**

1. Obsolete equipment including magnetic media playback units that can provide back up for copying/digitization efforts should be inventoried and stored in more stable environments and properly wrapped to protect from air borne particulates.
2. Due to the instability of some of the component parts of the video/magnetic media play back units (rubber, various plastics, etc.) there is a limited amount of time that this equipment will remain functional. It is recommended that this equipment be used now to capitalize on their current functionality. If not required, this equipment should be made available to other institutions facing equipment shortages.
3. Obsolete equipment such as cameras, sound equipment, film/sound synching, tripods, lenses, etc., that have only historic artifactual value should be properly inventoried, their condition assessed and rehoused in more stable environments.

## **4. CURRENT COLLECTION STORAGE**

- A. Climate controlled on-site storage vaults.
- B. On-site ambient storage, small store rooms, offices and corridors, numerous locations throughout the Norman McLaren building.
- C. Off- site storage, Underground Archives in Wampum Pennsylvania.

### **4.A. Storage Vaults**

The main environmentally controlled storage area or the cool vault at the NFB has been in place since 1995 and it presently contains three floors – first floor, mezzanine, and second floor. Prior to the existence of this vault, material was stored in a variety of locations (such as the offices of producers, etc.) and under a variety of conditions. Some materials were also stored in the conservation area of the NFB which had a temperature set-point of 20 degrees centigrade (EC) but variable relative humidity (RH). A good portion of the collection was stored in the basement of the Grierson Building where the conditions were cool, humid, and uncontrolled. At least on one occasion, there was a flood in the basement and although the materials stored in this area did not directly come in contact with water, they were exposed to a very high humidity event which could have accelerated degradation of some materials.



Within the cool vault the shelving is a mixture of stationary and moveable and many shelves have not been adapted to the new formats that are being stored in the collection. A variety of material is stored in this vault and the segregation is as follows:

- first floor – 90% of the floor space is for the film collection; 8% is for the stock shots collection; two percent is for the 35mm film strips collection;
- mezzanine – 100% of the floor space is for the film collection;
- second floor – mixture of film, audiotapes, videotapes, data tapes, optical disc media (CDs, DVDs, Blu-rays, MOs), Laserdiscs, LPs, still photographic prints and negatives housed in archival storage boxes, and approximately 5000 boxes of film production material including drawings, scripts, cels and three dimensional animation puppets, to name a few.

All new material is bar coded and entered into the Vault Management System (VMS) database prior to entering the vault (see Figure 1). Older material that has not been bar coded gets coded when an access request for the material is made and the item is pulled from the vault.



Figure 1. New material prior to entering the vault.

The collection in the vault can be divided into two types. The first is the heritage or permanent collection which is material deemed to be of exceptional heritage and historical value and designated to be kept long term. The second is the current production collection which includes elements for works in progress.

#### **4.A.i. Works in Progress Collection Area**

This collection is complex as it includes many different formats for each individual production. When a production is completed there is a set of procedures in place to deal with the items in this collection (see Procedure Respecting the Conservation of Production Shooting and Temporary Material document). After three years, the Vaults and Laboratory Section compiles a list of temporary materials from the works in progress to be purged from the vaults. The list is submitted to the producer or executive producer of the film and they decide whether the materials should be purged or kept for the near term. If the producer or executive producer decide that the materials should be kept, then they are maintained in the vaults for another year after which another request for purging is made. This procedure continues for a maximum of three times meaning the maximum time the materials are in temporary status is five years. After this time period or if no response was obtained from the producer or executive producer after 90 days of the purge request being made, then the materials will be marked for disposal. However, prior to being disposed of, they are submitted for evaluation by the stock shot selector who decides whether to:

- destroy the materials;
- conserve the materials in the vaults for the near future in order to allow stock shots to be selected for sales;



- add the materials to the NFB heritage collection.

Next, the materials are passed to the Sound Library Manager for the selection of useful sound clips. Finally, the materials are either destroyed or kept as part of the NFB heritage collection as previously decided.

The procedure in place to purge material is an excellent way to ensure only material of value remains in the permanent collection. Because of the nature of electronic media, minimizing what is kept will make management and preservation of this material more efficient and feasible in the future.

#### **4.A.ii. Environmental Conditions**

The conditions in the vaults provide a very significant benefit for the collection materials in terms of slowing down degradation. In some cases, these conditions can neutralize some harmful factors which are present with some items.

#### **4.A.iii. Cool Vault**

The NFB building was built in the early 1950s and the current cool storage in 1995. Consequently all post 1995 audio visual materials have been stored under cool conditions, which is very beneficial for the longevity and the stability of the materials. Currently, the condition set points within the cool vault are 12EC and 33% RH with allowable fluctuations of  $\pm 2$ EC and  $\pm 2$ % RH. These conditions are maintained throughout the three levels of this vault. Monitoring of the temperature and relative humidity was conducted in various areas and the results were very uniform within each floor level. In addition, there was little difference in the conditions between floors as shown in the average readings in Table 1. The conditions are within the desired set points.

Table 1. Average temperature and relative humidity values in the NFB storage vaults. The average is for five readings (on each floor) taken in different areas of the vault. Readings were performed with an Elsec Type 764C environmental monitor.

Floor Level	Temperature (EC)	Relative Humidity (%)
<b>First Floor</b>		
Main Area	10.2	35.8
Film Strips Area	12.5	32.9
Stock Shots Area	11.0	34.6
<b>Mezzanine</b>	10.8	35.4
<b>Second Floor</b>		
Main Area	12.0	33.4
Antechamber for Main Area	15.4	25.6
Cold Storage	2.9	11.3
Antechamber for Cold Storage	5.2	13.9

If the vault conditions are outside of the allowable fluctuation limits then an alarm is sent to the Public Works and Government Services Canada (PWGSC) staff (located onsite and available 24 hours per day) and the problem is addressed. Entrance to the vault is not direct. Instead there is an antechamber (or buffer room) in order to prevent the building conditions from affecting the vault conditions.

#### **4.A.iv. Cold Vault**

Within the cool vault there is a separate secondary or cold vault where the condition set points are 2EC and 25% RH with allowable fluctuations of  $\pm 2$ EC and  $\pm 2$ % RH. Table 1 provides the monitoring data for this area. Readings indicated that this vault is drier than the expected set point of 25% relative humidity. Generally, film should be stored at RH levels not lower than 20%. Storage at lower than this value will cause the gelatin to be too brittle and cracking may occur. In addition, the film may experience film curl which could lead to film deformation such as “spoking”.



This area is used primarily for the storage of original audio acetate magnetic film. These items have been identified as being affected by acetate base hydrolysis or the vinegar syndrome at a level two or three according to the Image Permanence Institute AD test strips<sup>26</sup>. These items have been digitized and are being kept in the event that the digitized copies are lost or there is a need to re-digitize them. Some acetate interpositive, internegative, and print film material that has shown reactivity is also stored in this vault as well as some non-acetate original shooting material because there is excess space available.

A faint smell of acetic acid was evident in between shelves of stored material. This is not unusual since there are still acidic vapors being emitted from the degrading film (albeit at a slower rate) even at this lower temperature. The detection of the smell indicates a need for more frequent air exchanges in the room.

#### **4.A.v. Monitoring**

The monitoring is done electronically by PWGSC in their on-site office. It appears there is only one sensor for temperature and relative humidity per floor of the cool vault. Staff in charge of the vaults do not regularly receive monitoring data from PWGSC. This information would have to be requested. There is little independent monitoring of the environmental conditions by NFB staff with additional sensors and therefore, it is assumed that the desired conditions in the vaults are being met.

#### **4.A.vi. Acclimatization**

On average, material is removed from the cool vault three times per day with 300 items being removed daily. Once a suitable number of requests are accumulated, the items are pulled from the shelves and placed on carts. The items are then placed in the antechamber for acclimatization prior to removal into the main building area. The conditions in the antechamber are set for approximately 17EC and 43% RH. On November 22, 2012, monitoring of the antechamber area indicated average conditions of 15.4EC and 25.6% relative humidity. The discrepancy is likely due to the fact that the conditions of the antechamber are affected by both the cool vault conditions and the conditions immediately outside of the antechamber. In November, the building environment outside of the cool vault is considerably drier than during the summer months.

There appears to be no set procedure for acclimatization of the materials that are entering or leaving the vaults except for the general rule that the materials are left for approximately two hours in the antechamber prior to being removed. However, often there is no acclimatization due to urgent requests (about 10 to 20 percent of all requests) and this has led to playback problems primarily due to moisture on the materials.

The cool vault conditions can range in temperature from 10EC to 14EC (set point of 12EC  $\pm$  2EC). Assuming a temperature of 23EC and 50% RH in the main building, the dew point temperature is 12EC. Therefore, if the temperature of the object is 10 to 12EC, condensation will occur on the object if it is removed directly into the building environment. If the media is in a sealed container, then condensation will only occur on the outside of the container. If the tape, etc., is taken out of the storage housing immediately then condensation will occur on the media. As is evident from Table 2, if material is taken out of the cool vault without proper acclimatization then condensation will likely occur on the items.<sup>27</sup>

<sup>26</sup> Image Permanence Institute : A-D Strips

<https://www.imagepermanenceinstitute.org/imaging/ad-strips>

<sup>27</sup> The Image Permanence Institute (IPI) DewPoint Calculator

(<https://www.imagepermanenceinstitute.org/resources/calculators>) is a useful tool for determining the dew point temperature for the actual conditions that exist outside of the NFB storage vaults.



Table 2. Dew point temperatures for a variety of temperature and relative humidity conditions outside of the cool vault. Temperature of the vault is assumed to be 10EC which is the worst case scenario based on the allowable fluctuation. Condensation on the object occurs when the temperature of the object is at or below the dew point temperature.

Temperature Outside of Vault	Relative Humidity Outside of Vault	Dew Point Temperature	Condensation if material is taken directly out of the vault (temp of material at 10EC)
23EC	45%	10EC	Yes
23EC	50%	12EC	Yes
23EC	55%	13EC	Yes
23EC	60%	15EC	Yes
22EC	45%	9EC	No
22EC	50%	11EC	Yes
22EC	55%	13EC	Yes
22EC	60%	14EC	Yes
21EC	45%	9EC	No
21EC	50%	10EC	Yes
21EC	55%	12EC	Yes
21EC	60%	13EC	Yes

The situation is worse for the 2EC or cold vault. Materials in this vault are more susceptible to condensation problems if removed directly into the main building environment because the temperature in the vault and the materials stored within it are well below the dew point temperature of 12EC (assuming 23EC and 50% RH for conditions outside the vault). If materials are removed from the cold vault and placed immediately into the antechamber, the dew point is 4EC and condensation will once again occur because the temperature of the material ranging from 0 to 4EC (2EC±2EC) is below or at the dew point temperature. If materials are removed directly from the cold vault to the cool vault, the dew point temperature ranges from -6EC to -1EC based on the fluctuation of conditions in the cool vault and no condensation will occur.

Proper acclimatization is necessary in order for the proper playback of media, especially tape media where distortion, mistracking, or excessive errors can occur. Helical scan recordings, digital recordings, and narrow track width formats are affected more than longitudinal formats and analog recordings. Proper acclimatization not only prevents moisture condensation on the media but also possible physical damage to the media (playing tape media cold can damage it) and the equipment. Therefore, it is imperative that proper acclimatization is performed before materials are placed in use.

For film, warm up times can vary from one hour to one day depending on the amount of film, size of can, etc. The standard for storing processed photographic safety films (ISO 18911) does not provide detailed information on acclimatization times. For magnetic tape, a better guide is provided for acclimatization and these numbers can roughly be used for film, keeping in mind the mass of film material that needs to be acclimatized. Table 3 is provided in the storage practices standard for polyester magnetic tape (ISO 18923) for the acclimatization of tape.



Table 3. Acclimatization of magnetic tape as per ISO 18923.

Tape width inches	Temperature Acclimatization Time hours	Relative Humidity Acclimatization Time days
1/4	0.5	1
1/2	0.5	4
3/4	1	8
1	1	14
2	4	50

Based on the NFB cool vault conditions, the above table approximates well the acclimatization times required to avoid condensation on materials. Large format tapes or films will require at least four hours in order to prevent moisture condensation whereas smaller formats will require an hour or less. The typical guideline used by the NFB of two hours is excellent for smaller formats but should be extended for larger formats. Acclimatization is a procedure that should be adhered to, even for urgent requests in order to protect the materials from damage. Alternatively, if the cool vault temperature is raised to  $15^{\circ}\text{EC}\pm 2^{\circ}\text{EC}$ , then the lower end temperature would be  $13^{\circ}\text{EC}$  and this is above the dew point. No acclimatization would be required in order to prevent moisture condensation but of course this higher temperature means a faster degradation rate for the rest of the collection. The NFB will have to decide the proper balance between degradation rate of the collection and need to access material without delay.

Acclimatization of RH can take a lot longer as illustrated in Table 3. For proper moisture equilibration, tight cases should be left slightly open in order to allow acclimatization to take place. Generally, tapes can be played even though the RH has not been properly acclimatized. However, if playback problems are noticed then more acclimatization is required. When the tape is in good condition, fast forwarding and/or rewinding the tape a few times can accelerate the RH acclimatization since more of the tape surface is being exposed to the use environment.

For materials at  $2^{\circ}\text{EC}$ , they should be placed in the cool vault prior to being moved to the antechamber. Table 3 can be used as a guide for how long the material should remain in the cool vault prior to being moved to the antechamber, although to be more secure these times should be doubled. Some experimentation on samples may be required to determine the optimum warm up times required for different masses of material.

Note, if possible, it is best to condition material to the vault RH prior to being placed in the vault. Otherwise, the moisture content of the material will be higher than recommended until the conditions within the material can equilibrate with the outside vault conditions. This can take several months for vented film cans and may take many years for storage containers that have a tighter seal such as unvented film cans or rigid plastic magnetic tape storage containers. Alternatively, media that re-enters the vault can be left uncovered for several weeks to allow moisture equilibration with the vault conditions.

#### **4.A.vii. Lighting**

The vaults are lit with fluorescent lighting. Although some lights did have plastic covers on them most did not. However, all the fluorescent tubes do contain a protective coating that prevents the spreading of debris should a tube break. This coating also filters out harmful ultraviolet rays. In addition, materials are stored in cases or boxes and are not exposed to light and lights are usually turned off when the vaults are not being visited. Overall the issue of light causing damage to the collection material in the storage vaults is being properly addressed by the NFB.



#### **4.A.viii. Cleanliness**

The vaults are clean with no significant accumulation of dust or debris on the floor or on shelving. The first and second floors consist of painted concrete that is in good condition with no significant flaking that would produce dust and debris. The mezzanine area consists of steel grating and no floor cleaning is required. Dust mopping of the floors occurs every week and there is a sticky floor mat outside of the cool vault in the antechamber to ensure dust and debris are not carried into the vaults on the underside of shoes. Carbon filters are present on incoming air vents to filter out particulates and to also filter out any organic pollutants. The ISO 18923 magnetic tape storage standard recommends that Class 100000 clean room conditions are met for magnetic tape storage areas. These conditions are summarized below:

- no more than 100,000 0.5 µm particles in one cubic foot of air;
- no more than 700 5 µm particles in one cubic foot of air;
- 10 to 20 air changes per hour;
- HEPA filters or 95% HEPA's (95%+ ASHRAE box filters) located downstream of the HVAC unit.

According to ISO 18933, a Class 100000 clean room is like a dust-free office area. The number of particles larger than one micron (one micrometer) in one cubic foot of air shall not exceed 100,000. NFB should verify with PWGSC that these specifications are being met in the cool and cold vaults.

A second type of filter is also present to filter out H<sub>2</sub>S, SO<sub>2</sub>, and NO<sub>2</sub>, which can be detrimental to storage media. Current storage standards for magnetic tape and film (ISO 18911 and ISO 18923) call for the use of the most practical technologies to be used in order to remove gaseous impurities and this appears to be the case in the NFB vaults.

Filter changes and system maintenance occur every six months. There were no strong odours in the cool vault indicating low degradation of materials and good air exchanges. However, there was no thorough analysis of gaseous impurities performed as part of this assessment.

#### **4.A.vix. Fire Protection**

Fire protection appears to be adequate as a number of dry pipe sprinklers are spread throughout the cool vault area on the second and mezzanine levels. No sprinklers are present on the first floor because the mezzanine floor is open.

### **4.B. On-Sight Ambient Storage**

The Norman McLaren Building is a purpose built facility dating from the 1950s. It was designed for the comfort of the human occupants with cooling in the summer and heating in the winter. Aside from the storage vaults discussed above, no consideration was given during the design and development of the facility for the preservation or long term stability of mixed media artifact collections as these collections were not developed at the time. The allocation of storage space to the collections of film related elements, artifacts, equipment and ephemera appears to have been generally ad hoc, as the need arose. The current storage has and will cause substantial physical damage to the artifacts. Because of their ephemeral nature, little attention has been paid to their protection and security. Much of it could be easily removed from the premises.

#### **4.B.i. Temperature, Relative Humidity (RH), Air quality**

The conditions within the building have not been systematically recorded though generally seem to be within the range of human comfort. Conditions seem to be variable depending on the location within the building. When visited in June, the archival storage area on the ground floor was particularly warm. Little



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consideration has been given to the provision of preservation environments for the archival, artifact and equipment collections.

#### **4.B.ii. Lighting**

Light levels within the building generally appear to be very high in public spaces. Corridors are lit with overhead fluorescent lighting. It was thought that the tubes were sleeved with UV absorbing plastic but this was not confirmed. UV filtering sleeves have a life of approximately 10 years before they need to be replaced.

Many film project elements are framed and hung in the corridors. These are at particular risk as many of the component parts are light sensitive and subject to fading and deterioration. Also at substantial risk of fading and degradation are the textile wall hanging in the stair well and the paintings and painted drum in the trophy display cases at the main entrance. Most of the store rooms, however, are not lit when not occupied and light damage is not a significant consideration for material stored within.

#### **4.C. Off-Site Storage Facility (Underground Archives)**

The off-site storage facility is Underground Archives located in Wampum Pennsylvania. The primary purpose of the off-site facility is to ensure that copies of content are located in a location different than the NFB vaults in Montreal. This will provide excellent protection against loss should a disaster event strike the NFB main building. Details on which materials are to be stored off-site are provided in the NFB Preservation Plan. There was no on-site evaluation of the Underground Archives storage facilities. Comments below are based on the written specifications provided by Underground Archives.

The storage area in use for the NFB has fire protection systems in place and security monitoring systems as well. A Carbon/HEPA scrubber is used to ensure air quality standards as specified by the NFB are met. A third party is used for pest management, although this is not a significant concern in the underground vault. Maintenance staff is onsite in order to monitor and maintain the proper operation of the storage facility.

The storage conditions are 7EC and 30% RH and the NFB is able to monitor the conditions in the vault at any time via the Internet. The vault conditions are slightly below what is recommended in the storage standard for magnetic tape where the lower limit is 8EC (ISO 18923). This may be a problem for some older tapes but because the temperature is fairly close to the limit, no major problems are anticipated. However, this depends on the temperature fluctuations in the vault. If the fluctuations are large, then more significant problems may be encountered. The fluctuation in the vault conditions was not available in any of the literature provided by the NFB. For film, the storage conditions are acceptable for acetate and polyester black-and-white films but not for colour films (see ISO 18911).

Acclimatization for outgoing records is performed in a room warmer than the 7EC storage room and low humidity for 12 hours. Alternatively, the item removed from the vault is placed in an isolated container and it acclimatizes during transit. For incoming records, the vault will be adjusted to the specified storage environment over a period of weeks. Transportation of material is performed in climate controlled trucks. The acclimatization procedures appear to be acceptable in terms of preventing moisture condensation and damage to the materials.

Storage of video cassettes is in the recommended vertical position. Films are stored horizontally as follows:

- 16mm/1200ft – 36 reels;
- 35mm/1200ft – 24 reels;



- 35mm/2000ft – 6 reels;
- 35mm/3000ft – 6 reels.

The horizontal storage of film cans is appropriate. However some of the stack heights appear to be too high. This causes a risk of the stacks toppling over and also places enormous amounts of stress on the film cans lower in the stack, possibly leading to physical damage of the film. Various recommendations call for stack heights to be:

- no more than eight cans high<sup>28,29</sup>
- no more than 12 inches high.<sup>30,31</sup>

The STIL cans used by the NFB are designed to be stacked without movement and also possess reinforcement so that the cans do not compress and damage the film with stacking. Nevertheless, the manufacture does not recommend going beyond 24 inches in stack height and less so for heavier reels.<sup>32</sup>

## 5. SYNOPSIS OF COLLECTION

Following an in depth, on-site review of all of the materials/objects found at the NFB and staff interviews, collection or potential collection materials have been identified and divided into 10 separate groupings listed in Table 4. Each of these groups will be considered individually within the body of this report.

Table 4. A summary of the NFB collection material.

Moving Image and Sound		
	Material	Formats
1.	Films (about 78% of the moving image collection)	<ul style="list-style-type: none"><li>• 8mm, 16mm, 35mm, 70mm, Super 16mm</li><li>• 16mm magnetic film, 35mm magnetic film</li><li>• 35mm film strips</li></ul>
2.	Magnetic Tapes (video, audio, data)	<p>a. Video Formats (about 22% of the moving image collection)</p> <ul style="list-style-type: none"><li>• 2 inch, 1 inch, ¾ inch, Betacam SP, Digital Betacam, D2, DLT, DVCam, DVC Pro, DVD, HDCAM, HDCAM SR, Mini HDV, MiniDV, VHS, S-VHS, Hi8, LTO</li></ul> <p>b. Sound Formats</p> <ul style="list-style-type: none"><li>• 2 inch, 1 inch, ½ inch, ¼ inch, DA88, DAT, LTO1, LTO3, LTO4, MiniDV</li></ul>
3.	Optical Discs	<ul style="list-style-type: none"><li>• CDs, CD-Rs, CD-RWs, DVDs, DVD-Rs, DVD+Rs, DVD+R DLs, Blu-ray, Blu-ray Recordable, Magnetic-optical disk (MO)</li></ul>

<sup>28</sup> Kodak - Cinema and Television -

[http://motion.kodak.com/motion/Support/Technical\\_Information/Storage/storage\\_room.htm#ixzz26ween5L9](http://motion.kodak.com/motion/Support/Technical_Information/Storage/storage_room.htm#ixzz26ween5L9)

<sup>29</sup> University of Alberta - Preservation of Canadian Motion Picture Films -

<http://capping.slis.ualberta.ca/cap09/MichellePapineauCouture/preservation.html>

<sup>30</sup> Library of Congress – Collection Care: Care, Handling and Storage of Motion Picture Film -

<http://www.loc.gov/preservation/care/film.html>

<sup>31</sup> United Nations Educational, Scientific and Cultural Organization (UNESCO) – Audiovisual archives: A practical reader - <http://www.unesco.org/webworld/ramp/html/r9704e/r9704e0z.htm>

<sup>32</sup> Email communication with Frederic Lapointe, STIL (January 21, 2013).



4.	Works in Progress	<ul style="list-style-type: none"> <li>a variety of formats (analog and digital; audio and video)</li> </ul>
<b>Non Moving Image and Sound</b>		
5.	Paper Based Archival	<ul style="list-style-type: none"> <li>administrative/project files - on site in the basement level and at offsite storage (Recall)</li> </ul>
6.	Photographs - Negatives and Positives	<ul style="list-style-type: none"> <li>movie stills</li> <li>promotional materials</li> <li>project documentation</li> </ul>
7.	Trophies and Awards	<ul style="list-style-type: none"> <li>awards, prizes, honours bestowed on the NFB including Oscars, Genies, etc.</li> </ul>
8.	Film Project Elements (boxed, in the cool vault)	<ul style="list-style-type: none"> <li>scripts, musical scores, drawings/paintings/cels/small three dimensional film elements (puppets, etc.) - approximately 5,000 boxes stored in the cool vault</li> </ul>
9.	Film Project Artifacts	<ol style="list-style-type: none"> <li>large format drawings, photographs and art works stored in plan file drawers and on shelves in small store rooms throughout the building</li> <li>exhibits mounted by NFB promoting films and programs</li> <li>framed original animation film elements found hanging in hallways</li> <li>large three dimensional elements used on film projects such as sets, puppets, props, etc., found in a number of store rooms through the building and held in production offices</li> <li>specialized equipment developed for production of specific film projects such as Norman McLaren's drawings and cutting tables</li> </ol>
10.	Film Production Equipment	<ul style="list-style-type: none"> <li>obsolete equipment that can provide back up for copying digitization efforts such as various magnetic media playback units</li> <li>cameras, sound equipment, film/sound synching, tripods, lenses, etc., having intrinsic artifactual value</li> </ul>

### **5.A. Moving Image and Sound Collections**

The NFB collection contains a large number of items in many different formats, both in analog and in digital form, and from obsolete to current. Some of the analog materials have been digitized (e.g. one inch video tapes to digital Betacam) and the masters are kept in case there is a need to redigitize the content. Redigitization is always performed from the original and not the digital copy. There are no plans to discard the masters but it is an issue that is currently being examined by the NFB.

Materials in the vaults are tracked using the Vault Management System (VMS) database. Initially, this served the need of the NFB in terms of managing the assets in the vaults but over the years has been altered to try and accommodate changing needs. One shortcoming of the VMS is that it is not an ideal method for monitoring and tracking information on the health of the collection. There are also some inaccuracies in the information stored in the database and this poses a particular problem because it slows the digitization of the collection. The way in which information is stored in the VMS database also poses a direct risk to the collection. For example, in some situations many cassettes related to one production are stored within the same document box. If there is a need to access one cassette, then the whole box is removed from the vault. This exposes the other cassettes to unnecessary environmental cycling, possible physical damage, and increased probability for loss of the items.

As a result of all these factors, the VMS has become fairly tedious to use and not performing as presently required. The NFB is aware of the need to improve and update the capabilities of the VMS and correct inaccurate or missing information on collection elements (see the Digitization and Archiving Plan).



A regular monitoring program focusing on the health of the collection does not seem to be in place and is necessary especially because the collection does contain some unstable materials. Standards such as ISO 18923 and ISO 18925 suggest that representative samples of the collection should be monitored or examined every five years if storage conditions have been good. The NFB vault conditions are very good and thus, this interval can be expanded to every 10 to 15 years, assuming vault conditions remain as is.

#### **5.A.i. Motion Picture Film (8mm, 16mm, 35mm, 70mm, Super 16mm) and Audio Magnetic Film (16mm, 35mm)**

A majority of the space in the vaults is occupied by motion picture film in various formats. Often there are four copies of each film: print, interpositive, internegative, and original. Within the cool vault the copies are not stored together in order to protect the films from a localized disaster event within the vault. Instead, the print and interpositive are stored in one area of the vault and the internegative and original in a separate area. This is an excellent procedure to follow in order to protect the original and copies. With the move of some elements of the film collection to an offsite storage facility the films are even better protected in the event of a disaster. The elements being sent off-site are the internegative and a print.

#### **5.A.ii. Film Base**

In terms of film degradation, the main concern is the film base. Nitrate film base is very problematic but as determined by discussions with vault staff, no nitrate is present at the NFB. The next film base of concern is cellulose acetate. Acetate film base can degrade via a reaction with water (hydrolysis) which leads to shrinking, brittleness, and the presence of an acetic acid or vinegar smell (thus referred to as the vinegar syndrome). The NFB has monitored the degradation of its acetate film base collection using A-D Strips from the Image Permanence Institute (IPI). These strips are placed in closed film cans and change colour according to the acidity level in the can. The level of acidity indicates the degree of degradation of the film base (Table 5).

Table 5. IPI A-D Strips acidity levels indicate the probable condition of the acetate film base. Recommended actions are also provided.<sup>33</sup>

<b>A-D Strip Level</b>	<b>Film Condition</b>	<b>Recommended Actions</b>
<b>0</b>	Good—no deterioration	Cool or cold storage
<b>1</b>	Fair to Good—deterioration starting	Cold storage; Monitor closely
<b>1.5</b>	Rapid decay starting—point of autocatalytic decay	Cold or frozen storage
<b>2</b>	Poor—actively degrading	Freeze; Copying advisable
<b>3</b>	Critical—shrinkage and warping imminent, possible handling hazard	Freeze immediately; Copy

According to NFB vault staff and the NFB Digitization and Archiving Plan, most but not all acetate material with an A-D Strip Level of 1 to 3 have been digitized and are now being stored in the cold vault. Most of the Level 2 or 3 materials are the audio magnetic film formats prior to 1960. After this date, staff has noticed that this deterioration problem is not a significant issue. No problems have been experienced

<sup>33</sup> Image Permanence Institute : A-D Strips  
<https://www.imagepermanenceinstitute.org/imaging/ad-strips>



with the acetate motion picture film. No regular acetate monitoring is being conducted at this time and there does not appear to be a regular inspection program in place to evaluate deterioration of all types of films. A quick survey that involved opening a number of plastic film cans in the cool vault storage areas did uncover at least one can that smelled of acetic acid, which indicates active degradation. This can was located on the first floor and coded F101761.001.

According to the IPI, acetate based film material that is in good condition should be stored cool or cold. The cool vault conditions taking into account the fluctuations can have a maximum temperature of 14EC and a maximum relative humidity of 35%. Therefore, the cool vault conditions are higher than what is recommended (see Table 6).

Table 6. ISO 18911 storage conditions for undegraded acetate and polyester black-and-white and colour film material.

Film Type	Storage Conditions
Acetate Black-and-White	20 to 50% RH and 2EC max temperature 20 to 40% RH and 5EC max temperature 20 to 30% RH and 7EC max temperature
Polyester Black-and-White	20 to 50% RH and 21EC max temperature
Acetate/Polyester Colour	20 to 50% RH and -10EC max temperature 20 to 40% RH and -3EC max temperature 20 to 30% RH and 2EC max temperature

For material that has started to degraded (Levels 1 or 1.5), cold storage is recommended. This can only be achieved in the cold vault where the conditions are 2EC and 25% RH. Finally, for highly degraded materials (Levels 2 or 3), the IPI recommends copying/digitizing the materials and then frozen storage if the originals are to be maintained. Although it appears that most of the material at Levels 2 and 3 have been digitized (initially to magneto-optical discs and now to LTO tapes), the degraded originals are not being stored as recommended. In fact, the cold vault did have an acetic acid (vinegar) smell in between the rows of shelves, indicating that degradation, although slowed, is still active.

For black-and-white polyester based film material, the storage conditions in the cool vault are excellent. However, for colour polyester or undegraded acetate colour films, the cool vault conditions are inadequate (see Table 6).

### 5.A.iii. Storage Cans

A large portion of the film collection has been rehousing in STIL rigid and inert polypropylene plastic vented film cans (Figure 2) that provide excellent physical as well as dust, dirt, and debris protection. However, the collection still contains many films that are in their original metal cans/boxes or paper boxes with some in poor condition (Figure 3). On the first floor there is an area containing about 36 metal cans and several of these cans are rusted on the outside as well as the inside. In addition, a vinegar smell was detected when some of the cans were opened.

The metal cans/boxes are not vented and therefore acidic vapors released from acetate based material can build within the can and accelerate the degradation of the film base. In addition, in some of the plastic vented cans, films were wrapped in plastic which would trap harmful components within the plastic bag and defeat the purpose of having vented film cans.

Currently, rehousing is only being performed on demand – when an item is accessed or for those films being relocated to the off-site storage facility. Otherwise, there is no immediate plan to rehouse films. For films that are not accessed, they may remain in poor quality film cans for many years using this on-demand system for rehousing. Note that metal cans are acceptable as long as they are vented and are



corrosion resistant such as anodized aluminum or stainless steel. Steel is allowed as long as the surface contains a corrosion resistant finish such as powder coating, tinning, or plating (ISO 18902).



Figure 2. Films stored in inert polypropylene vented film cans.



Figure 3. Some of the films are still stored in their original unvented metal cans.

Many of the film cans are stored in the proper horizontal orientation with the stacks not overly high as shown in Figure 4 (i.e. maximum of 10 to 12 cans per stack). However, the films that have not been rehoused as well as some other films that do not fit properly on the shelves are being stored vertically (Figure 5). According to ISO 18911 film rolls greater than 150 m (about 500 ft.) shall be stored horizontally. Rolls less than 150 m, may also be stored vertically if the core is supported by a horizontal spindle inserted into the cores. If the film roll has flanges, a spindle is not required. Vertical storage of films saves 20 percent storage space but can lead to film damage and dye fading in colour films.<sup>34</sup>



Figure 4. Film cans stored in the proper horizontal orientation.

<sup>34</sup> National Film and Sound Archive - <http://www.nfsa.gov.au/preservation/handbook/preparation-long-term-storage/storage-orientation/>



Figure 5. Improper storage of film cans in the vertical orientation.

Vertical storage is especially problematic in cases where there are multiple reels in one storage can and where the films are not stored with flanges, which appears to be most of the films in the NFB collection. There are no immediate plans to store these items horizontally and they have already been stored vertically for many years. In particular, almost all of the IMAX collection is stored vertically and in metal cans (Figure 6). With the move of some items to the secondary storage facility in Pennsylvania, this should free up shelving space to allow the remaining films to be stored horizontally.



Figure 6. The IMAX film collection has not been rehoused and is for the most part stored vertically and not in the proper horizontal orientation.

#### **5.A.iv. Film Strips**

The film strips collection is located in two different storage areas. One area is in the antechamber prior to entering the stock shots area and the other is in the antechamber of the cold vault. The materials are stored in cardboard boxes and a variety of other materials are stored within each box. The environmental storage conditions for each area are provided in Table 1. Both conditions, especially the lower and drier conditions are very good for the type of materials being stored in these areas.



### 5.A.v. Magnetic Tape – Audio, Video, Data

The magnetic tape collection at the NFB consists of a wide variety of audio, video, and data tapes. Some of these formats are obsolete. A list of formats in the collection and their status with respect to obsolescence is provided in Table 7.

Table 7. Magnetic tape formats in the NFB collection.

Format	Dates of Introduction/Use	Obsolescence Status <sup>35</sup>
<b>Video Analog</b>		
2 inch	1956 to early 1980s	Extinct
1 inch	1978 to 1990s	Critically Endangered
¾ inch	1971 to present	Endangered
Hi8	1989 to present	Threatened
VHS	1976 to present	Threatened
S-VHS	1987 to present	Threatened
Betacam SP	1986 to present	Endangered
<b>Video Digital</b>		
D2	1988 to present	Endangered
Digital Betacam	1993 to present	Current
DVCam	1995 to present	Current
DVCpro	1995 to present	Current
HDCam	1997 to present	Current
MiniDV/Mini HDV	1995 to present	Current
HDCam SR	2003 to present	Current
<b>Audio Analog</b>		
Reel-to-Reel (1/4 in, ½ in, 1 in, 2 in)	1935 to present	Endangered
<b>Audio Digital</b>		
DAT	1987 to present	Threatened
DA 88	1993 to present	Endangered
<b>Data</b>		
DLT	1984 to present	Current
LTO1	2000 to ?	Endangered
LTO3	2005 to present	Current
LTO4	2007 to present	Current

**Current** - Format will be in active use over the next five years.

**Vulnerable** - A current but highly proprietary format.

**Threatened** - Playback machinery available; tape format itself is unstable, has less integrity than other available formats, or a more popular or updated format will be replacing this one in a short period of time.

**Endangered** - Playback machinery available; manufacture of the machinery has stopped; machine manufacturing support and tape becomes unavailable; production quality of available tape stock drops.

**Critically endangered** - Small population of aging playback machinery; little or no machinery engineering or manufacturing support; anecdotal evidence to indicate that fewer working machine-hours remain than total population of tapes.

**Extinct** - Very few playback machines exist at specialist laboratories.

In terms of the obsolete formats, a limited amount of equipment does exist at the NFB to play some of these formats (e.g. 1 inch video). However, the ability to use this obsolete equipment is decreasing daily and there are not a lot of funds allocated for purchasing or maintaining older equipment to play the obsolete formats. In other cases such as the two inch video format, equipment does not exist in house to play these formats.

<sup>35</sup> SummitDay Media - <http://www.summitdaymedia.com/format.html>



This collection of tape material is stored in the cool vault on the second floor only and spread between the permanent or heritage collection area and the works in progress collection area. The vault conditions of maximum temperature of 14EC and a maximum relative humidity of 35% are excellent and are better than the ISO 18923 standard conditions for the storage of polyester based media for extended term (minimum of 50 years).

A brief look at some of the collection material indicated some general problems such as too many labels on the cassette housings and often these labels are outside of the recessed portion of the cassette that is intended for label placement. Some loosening of the labels was also noticed. These issues can cause improper loading of the cassettes in the machine and possible playback problems and equipment damage. Paper material was found stored in the storage container with the tape which is not recommended according to ISO 18923.

The tape material (not including the works in progress area) was for the most part stored very well - vertically on the shelves and in rigid plastic cases (Figure 7) although some tapes were stored in the non-recommended horizontal orientation. Some paper boxes were found but these were generally in good condition and therefore, not a significant concern. However, paper does offer less protection to the media stored inside from debris and a disaster event such as flooding.

Some of the tape collection is stored in light blue cardboard boxes (in order to group the contents of a production together) and a variety of different formats may be present in each box. These boxes are placed on the shelf as shown in Figure 8. This is not necessarily problematic unless the media are not stored properly within the box. From a brief look inside of some of these boxes, media were found to be in plastic cases or paper boxes but sometimes stored horizontally (Figure 9). In addition to horizontal storage, a number of typical problems were found with the items in the blue cardboard boxes such as improperly wound audio tape reels, the presence of audio reels commonly found to suffer from binder hydrolysis (such as Scotch 226), and other problems mentioned for the various different tape formats that are discussed in more detail below.



Figure 7. Video tape stored in paper storage containers and stored in the recommended vertical orientation.



Figure 8. Materials in the collection can also be found stored on the shelf in a document box.



Figure 9. Improper storage of video tapes within a document box. The tape containers should be stored vertically.

Analog tapes generally have a rated lifetime of 10 to 30 years whereas digital tapes have a lifetime of five to 10 years. These lifetime ranges are for storage under standard room conditions such as 23°C and 50% RH. With storage under the current cool vault conditions the lifetime of materials should conservatively be doubled.

#### **5.A.vi. U-matic ¾ inch Video Cassettes**

Many of the tapes in the collection have not been digitized and the NFB has a limited amount of equipment available to play this format in house. Problems such as the tapes stopping half-way through play were experienced in the past. Problems with these tapes are common and it has been speculated that they could be due to binder degradation, improper acclimatization, or the tape deck itself. Tapes affected with the binder hydrolysis problem might play well initially but as debris builds up on equipment parts the tape will stop playing. Examining and cleaning the tape path would help evaluate whether this is the issue or not. If so, then the tapes require treatment such as baking or other alternatives for remedying binder hydrolysis. If this expertise does not exist in house, then it should be sought after externally. There are several commercial services that digitize U-matic cassettes. However, not all properly treat tapes prior to digitization. The binder hydrolysis issue and how they deal with it should be thoroughly discussed with the commercial service prior to having the work performed.

Alternatively, if binder hydrolysis is not the problem, then the playback issue could have been related to poor acclimatization of the tape to playback conditions and thus proper conditioning of the tape would alleviate this problem. Finally, playback problems might have occurred because of tape-machine interaction issues which can be remedied by playing the tape in another machine.

#### **5.A.vii. Audio Reel-to-Reel - ¼ inch, ½ inch, 1 inch, 2 inch**

The collection of audio reels in the NFB collection was not examined in detail but nevertheless there are some common problems that should be brought to light with this type of material and remedied when encountered and possible to do so.

This format has not been in the mainstream for a while and although machines and spare parts are still available, the window to cost effectively play and digitize this format is shrinking.

The main problem with reel audio tapes is binder hydrolysis, especially with many tapes produced from the mid-1970s to the mid-1980s. A list of tapes commonly affected by this problem is provided below:

- Agfa (pre-1990): PEM 468, PEM 469;



- Ampex/Quantegy (1970s-1980s): 406, 407, 456, 457;
- Scotch/3M: 226, 227, 806, 807, 808, 809.

Another degradation problem with reel audio tapes includes the hydrolysis of the acetate base (vinegar syndrome). Acetate reels are generally those before the late 1960s or early 1970s and can be identified by holding the reel up to a strong light. If the reel is translucent then the tape is likely acetate based, if it is opaque then the base is polyester (Figure 10). Acetate material is for the most part kept in the cold vault but several acetate audio reels (such as Scotch 111) are present in the cool vault area of the second floor. Any acetate audio master tapes would benefit from storage in the cold vault. According to the NFB Digitization and Archiving Plan, ¼ inch acetate audio reels with acidity levels in the 1 to 3 range have been digitized.

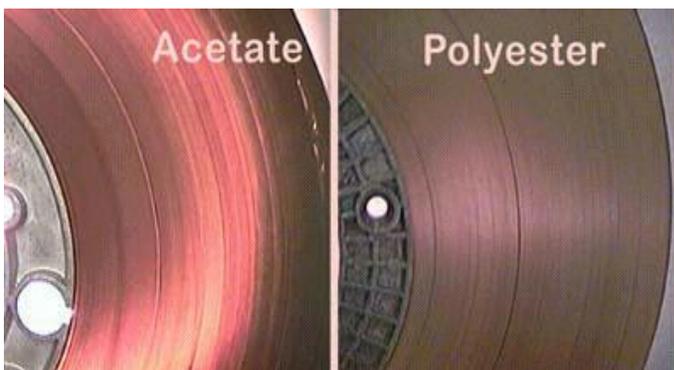


Figure 10. Identifying the plastic base in audio reels.

The ends of reels are often not secured. This can lead to a loosening of the tape wind. It also leads to several strands of tape being damaged when the storage container is opened or closed. If the reel is overfilled, many strands of tape end up unwinding onto the floor.

Many of the audio tape reels are usually housed in paper boxes which do not offer good moisture resistance.

Audio reels are often found wrapped in plastic bags. This is not recommended because the bag will trap volatiles being emitted from the tape and this can accelerate degradation. This is more critical with acetate based tapes.

Adhesive labels are often present on the flanges. Adhesive labels can release volatiles that can harm tape and can also contaminate tape with adhesive.

The wind quality of audio tape reels is often very poor. Examples of tape wind problems are shown in Figure 11 and these can lead to tape damage during long-term storage and result in playback problems.



Figure 11. Wind problems commonly found with audio reel tapes. Popped refers to popped strands of tape out of the tape pack which promotes damage to the edges of tapes. This condition is caused by improper winding speed. Flange Pack refers to the whole tape pack or portions of the tape pack resting on the flange, which also promotes tape edge damage. This often occurs when tapes are stored horizontally. Windowed Pack refers to a loosely wound tape. Gaps in the tape pack can allow debris to enter between strands of tape and also lead to tape folding over onto itself. A Spoked Pack occurs when the tape is wound too tightly and this will lead to tape becoming deformed.

Splices are often used with audio tape reels. Splices can degrade and let go and leave adhesive residue on tapes making them difficult to play without proper cleaning. The adhesive residue will also contaminate playback equipment if it is not removed. Reels of tape with splices should be thoroughly examined before being played.

Many reels often do not contain a leader. The leader protects the front portion of the tape during storage and playback.

The recommended tape wind orientation is tails out with oxide in, to limit the amount of print-through (transfer of signal from one layer of wound tape to an adjacent layer, thereby creating an echo effect).

#### **5.A.viii. LTO1, LTO3, and LTO4**

A significant amount of LTO tapes exist in the NFB collection and newly digitized works are being placed on LTO4. LTO is a format which undergoes changes approximately every two years. The most recent format is LTO5 and LTO6 is slated to be released to the marketplace in early 2013. Once a new format is introduced, equipment availability for previous generations begins to become scarce, especially for equipment two or more generations removed from the new format. The equipment for each new generation of LTO can read and record (in addition to its own generation) the previous generation and can only read the generation before that. This compatibility is summarized in Table 8.

The LTO1 tapes are a concern and there are approximately 2600 of these in the collection. The tapes are older and approaching the average end-of-life. The general lifetime rating of LTO tape is five to 10 years under normal office type storage conditions. However, in the cooler and drier conditions found in the NFB cool vault, the lifetime should be at least double that. However, the main concern is the obsolescence of this format. Only LTO3 and below drives can read LTO1 tapes.



There is no immediate obsolescence threat for the LTO3 and LTO4 tapes since LTO3, LTO4, and LTO5 equipment are still readily available. However, LTO6 tape drives will not read LTO3 tapes and this should be kept in mind if migration to the most current LTO format occurs.

It is also worthy to note that these tapes are fragile and frequent use will lead to errors and eventually unreadable tapes.

Table 8. The compatibility of various LTO generations.

<b>LTO Generation</b>	<b>Read Ability</b>	<b>Record Ability</b>
<b>LTO1</b>	LTO1	LTO1
<b>LTO2</b>	LTO1	LTO1
	LTO2	LTO2
<b>LTO3</b>	LTO1	LTO2
	LTO2	LTO3
	LTO3	
<b>LTO4</b>	LTO2	LTO3
	LTO3	LTO4
	LTO4	
<b>LTO5</b>	LTO3	LTO4
	LTO4	LTO5
	LTO5	
<b>LTO6</b>	LTO4	LTO5
	LTO5	LTO6
	LTO6	

**5.A.ix. Optical Disc Media - Photo Collection and Audio/Video (CDs, CD-Rs, CD-RWs, DVDs, DVD-Rs, DVD+Rs, DVD+R DLs, Blu-ray, Blu-ray recordable, Magnetic-optical disk or MO)**

About six percent or 26,392 items of the NFB photograph collection have been digitized and there are also born digital photos both of which are stored on 600 to 700 CDs or DVDs. Some of these digital images have been placed on NFB servers whereas others only exist on the optical disc media. Audio and video content are also stored to some extent on optical disc media. These discs are found throughout the cool vault including in the works in progress collection area.

In addition to the optical disc media, a brief look at the digital photo collection in the cool vault revealed the presence of other formats such as some mini hard drives, 3.5 inch floppy diskettes, and ZIP disks.

Optical disc media are stored in the cool vault. The conditions compare favorably with the standard for the storage of optical disc media (ISO 18925) where the extended term storage conditions are a storage temperature below 23EC and relative humidity between 20 and 50%. The environmental conditions in the cool vault are excellent for the long-term storage of CD and DVD media and will increase the life of the media considerably. The optical media were also stored in the proper vertical orientation on the shelf and a small percentage was stored in the recommended regular size jewel case.

There appears to be no thought on the use of higher quality CD and DVD media for the storage of digital information. A brief examination of the collection indicated a wide variety of formats (CD-R, CD-RW, DVD-R, DVD+R DL, Blu-ray recordable) and brands (many low quality generic) being used. The storage enclosures used for the media varied considerably and most are not the recommended method for storing optical media. Optical media were found mostly in thin jewel cases or in paper or cardboard sleeves (Figure 12).



Figure 12. Storage of optical disc material in non-recommended paper/cardboard sleeves.

Both thin jewel cases and especially sleeves do not provide appropriate physical protection to the disc surfaces and scratching and other physical damage is likely to occur. In addition, sleeves can chemically interact with the disc surfaces and cause degradation of the disc. Discs were also found with a variety of other problems such as writing on the surface, adhesive labels placed on the disc, and storage of paper materials within the case. All of these factors can cause chemical degradation of the disc layers over time and poor disc performance especially when adhesive labels are used on the media. Many rows of the optical media, although stored in the proper vertical orientation, were very tightly packed and this can promote physical damage in discs not stored in the regular sized jewel cases. Discs in the works in progress collection area are not stored in the proper vertical orientation as shown in Figure 13.

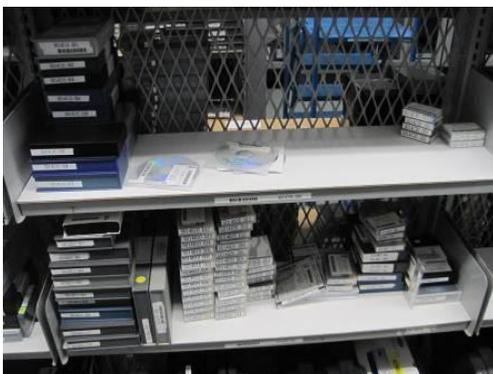


Figure 13. Optical discs stored in the works in progress storage area.

In addition to the above information, some specific information about each individual optical disc format is provided below.

#### **5.A.x. DVD Formats**

The approximate lifetime of read-only DVDs (or commercial movie discs) is in the 10 to 20 year range under normal office temperature and relative humidity conditions. Under the current cool vault conditions of the NFB this lifetime is approximately 20 to 40 years.



The stability of the DVD-R format is similar to read-only DVDs. The exception is the gold DVD-R which has a higher stability. There did not appear to be any gold DVD-Rs in the NFB collection based on the small amount of discs surveyed.

There is no obsolescence threat for this format as the players and drives for the new Blu-ray optical disc format do play DVDs.

#### **5.A.xi. CD Formats**

Read-only CDs (commercial audio CDs, commercial CD-ROMs) have good stability (in the 50 to 100 year range) when stored under office temperature and relative humidity conditions. Under the NFB cool vault conditions, the lifetime range rises to about 100 to 200 years. There is no obsolescence threat for this format as the players and drives for the new Blu-ray optical disc format do play CDs.

The stability of CD-Rs can vary substantially, based on which dye and metal layer is used (see Table 9). Lower stability CD-Rs have a five to 50 year lifetime under standard office conditions and approximately a 10 to 100 year lifetime under NFB cool vault conditions. Therefore, even under better temperature and relative humidity conditions, the lifetime of the low stability CD-Rs is a concern. Most of the CD-Rs in the NFB collection appeared to be on lower stability media instead of the more stable gold media.

Table 9. Recordable CD (CD-R) types and their relative stability.

<b>Dye Type</b>	<b>Metal Layer</b>	<b>Colour (when viewing the base of the disc)</b>	<b>Approximate Stability at 23EC and 50% RH</b>
phthalocyanine	gold	gold	Excellent (>100 years)
phthalocyanine	silver alloy	light green	Very Good (50 to 100 years)
cyanine	silver alloy	blue/light blue	Fair (20 to 50 years)
azo	silver alloy	dark blue/blue	Poor (5 to 10 years)

#### **5.A.xii. Magneto-optical (MO)**

The MO disk was first introduced into the marketplace in 1985 and is a cartridge based optical disk format. It was never adopted as a mainstream format like the CD or DVD, but instead was and is used in more professional settings for data backups. Although MO media and drives are still available, the availability of new drives is diminishing. At the NFB, most of the material on MO disks is content that was digitized from degrading 35mm/16mm magnetic sound film in 2002. This digitized content is being migrated to a more current format on an as needed only basis i.e. when the material is accessed. Otherwise there is no set plan to migrate the information off of MO media.

#### **5.A.xiii. Laserdiscs**

A small number of laserdiscs were found in the NFB collection. These were properly stored in the vertical orientation.

#### **5.A.xiv. Works in Progress Collection Area**

The works in progress area contains a wide variety of analog and digital formats: audiotapes, videotapes, CDs, DVDs, other optical discs, floppy diskettes, hard drives, etc. The formats are grouped on the shelf according to individual productions. Tapes are stored primarily in plastic cases and optical discs in a variety of enclosures. The materials in this area have the same issues as materials stored in the permanent NFB collection (see the above sections for more information). In addition, in order to not utilize a significant amount of storage space, these media are not stored vertically as recommended but generally in a horizontal configuration (Figure 14).



Figure 14. Storage of materials in the works in progress section.

## **5.B. Moving Image and Sound - Digital and Preservation Plans, and Handling Issues**

### **5.B.i. Preservation Plan**

The NFB produced a Preservation Plan in August 2010 entitled, “Preservation Plan for Works in the NFB Collection – The Physical Security of Our Assets.” The main issue addressed in the Preservation Plan is the relocation of copies of moving image and sound assets to an offsite storage facility in order to protect against loss due to a disaster event. In summary, items to be relocated in the first phase include image and sound materials that have been digitized or that will be digitized as part of the NFB’s Digitization Plan. For films that contain all four elements – print, internegative, interpositive, and negative – the negative and print will be relocated off-site. The digital copy on LTO tape will remain on-site with the remaining two film elements. However, not all titles have all four elements and what is relocated depends on what is available for each title. This has been clearly laid out in the Preservation Plan document. For material at risk and heritage material, two LTO copies are made and one is relocated. The relocation exercise is also providing the NFB the opportunity to better organize its database and to eliminate multiple print copies of materials.

Although the Preservation Plan does not address detailed aspects about preserving the collection, it does provide a major benefit by ensuring disaster protection. Having additional copies of collection material stored off-site and under good climate controlled conditions is a major positive step in preserving NFB’s collection material. The Preservation Plan is also providing the NFB an opportunity to better catalogue its collection and dispose of unnecessary materials which will free up valuable vault space for new materials.

### **5.B.ii. Digitization Plan**

In March 2010 the NFB produced its Digitization Plan entitled, “Digitization and Archiving Plan.” The Digitization Plan is linked to the Preservation Plan and is another important undertaking by the NFB towards preservation of its moving image and sound collection. Digitization is important because it allows:

- easy access and distribution of collection material;
- masters to be placed in storage and only used when absolutely necessary thus limiting handling damage and wear and tear;
- the preservation of content on analog audio and video tape materials where the associated technologies are at or approaching obsolescence;



- the restoration of works that have deteriorated;
- the production of additional copies of materials on new media that only have one copy.

The basis of the Digitization Plan is to produce for each title a digital source master (DSM) which is an uncompressed and unaltered digitization of the original, a digital master (DM) which is the colour corrected and restored version of the DSM, and finally mezzanine files for distribution. All three are archived on LTO4 data tapes and additionally mezzanine files are placed on a near line SAN system.

The selection criteria for items to be digitized are based on:

- requests for the content, which is currently how most of the digitization gets done;
- materials at risk which are defined as materials that are on obsolete formats, are deteriorating, or are sole copies of the content;
- the heritage value of the titles.

For materials at risk, digitization is generally performed at higher quality because there is a good possibility that the originals will not be playable in the near future. Where the originals are in good condition and are not at risk, then the digitization is performed at lower quality (e.g. for film 2K instead of 4K) primarily due to various constraints. Also, two digital copies of materials at risk on LTO4 tapes are produced and only one digital copy for materials not a risk.

There does not appear to be a dedicated sector of the NFB that is solely responsible for the digitization effort. Concerns expressed during interviews with NFB staff indicated the need for “someone to be assigned the task of migration” and a need to thoroughly document procedures. There was a sense that the digitization procedures could be more efficient.

The digitization of the NFB collection not only serves the needs of making the content readily available by a variety of distribution formats but also is a significant step in preserving NFB’s content. Estimates of materials at risk have been made by the NFB but a more thorough accounting of these materials is required, which can be obtained by a thorough collection survey. The NFB acknowledges that materials at risk are a priority for digitization and in some cases (degrading acetate), the digitization has been performed. However, as previously indicated, most of the current digitization effort is driven by on-demand requests.

### **5.B.iii. Handling**

The handling of media was not monitored or discussed during the visit to the NFB. There are some basic written handling procedures in place for staff to follow but these were last updated in 2004 and mainly concern film material. These procedures focus on not touching film with bare hands and using appropriate gloves, minimizing dust on the films, and cleaning of the film after use and before being placed back into storage.

For information on handling of media, the following ISO standards can be consulted: optical discs (ISO 18938), magnetic tape (ISO 18933). Resources that discuss the proper handling of film are the National Film Preservation Foundation<sup>36</sup> and Kodak.<sup>37</sup>

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<sup>36</sup> [http://www.filmpreservation.org/userfiles/image/PDFs/fpg\\_3.pdf](http://www.filmpreservation.org/userfiles/image/PDFs/fpg_3.pdf)

<sup>37</sup> [http://motion.kodak.com/motion/Support/Technical\\_Information/Storage/storage\\_handling.htm](http://motion.kodak.com/motion/Support/Technical_Information/Storage/storage_handling.htm)



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## **5.C. Non Moving Image and Sound Collections**

### **5.C.i. Paper Based Archival**

The archival collections are housed in archival storage boxes and the processing of collections appears to follow accepted archival collections management standards. The total number of boxes in the collection is approximately 6000 with close to 1000 of those stored at the Norman McLaren building. The collection is divided into two distinct groups, project files which comprise one quarter of the collection and administrative files comprising three quarters.

Production and administrative files are present in the regional offices as well as in Montreal. All of the Montreal material is stored in uniform sized standard archival storage boxes, which are not acid-free. Filing enclosures within the boxes also appear to be standard acidic materials. This is generally acceptable provided the storage environments are stable with acceptable temperature and relative humidity ranges. All boxes are bar coded for tracking purposes. File folders within the boxes are not bar coded.

The majority of the project files are paper based records and include scripts, musical scores, contracts, technical directions, etc. Some of the project files, specifically some material from the Norman McLaren collection, have been housed in acid-free archival storage boxes. This material, originally housed with the other film project artifact boxes in the cool vault, has been relocated to the archival storage area on the ground floor of the building, in proximity to the film distribution office/mail room. This is due to high demand for this material.

Photographs, prints and negatives are removed from the archival boxes and sent to the still photographic collection for permanent storage.

The administrative records include the broad range of materials found in government departments and agencies including all legal documents, marketing and communications plans, human resources files, budget related materials, documentation, organizational policies, press reviews and annual reports, etc. The records collected at the current time are paper based though there is an understanding of the imminent need to start collecting digital records. At the current time, no policy is in place for doing this though the issue is at the forefront. Most electronic records reside with the creator on office desktop computers. The organization has an informal disposition schedule for administrative records and approximately 10 percent of the collection is retained as archival.

Following the closing of the Regional Service Centre in Montreal in 2011 by the Library and Archives Canada, the NFB records were transferred to Recall, an international private records storage company with offices in Laval. They provide secure environmentally controlled storage and retrieval services. Requests for material are sent out twice weekly. Pickup and delivery services are provided by the company (see Figure 15).



Figure 15. Archival storage box transferred from Recall.

Numerous boxes of unprocessed material (ghost boxes) were moved to the NFB for processing from the Regional Service Centre, ensuring the accessibility of all of the archival material. Processing spaces in the Norman McLaren building appear to be adequate for the amount of material treated regularly and this was confirmed by the staff. The archival storage depot within the Norman McLaren building is located adjacent to the shipping/receiving and mail room. When visited in June, though the levels were not measured, the environmental conditions were warm and humid.

#### **5.C.ii. Photographs - Negatives and Positives**

The NFB Photographic Stills Division evolved in the 1950s and 60s with a mandate to document Canada. This was closed down in the late 1970s and the collection moved to the Norman McLaren building. It currently numbers around 600,000 items and is comprised of production documentation, NFB activities documentation, production stills, stock shots, research and development technical photographs, promotional material, as well as images from outside sources related to Canadian film. About 65% of the collection is black and white prints and negatives, and the rest is comprised of colour transparencies and colour prints and negatives predominantly chromogenic emulsions.

Photographic prints and negatives are stored on the ground floor level of the cool vault. They are all housed in archival storage boxes and archival sleeves. The environments and housing are conducive to long term stability of the collection. However, colour (chromogenic) materials are subject to not only light fading which is well recognized, but also dark fading, meaning fading in the absence of light. The only way of stabilizing this material is through slowing chemical activity in cold storage. Sub-zero is ideal but slightly above zero will provide considerable protection from changes.

#### **5.C.iii. Trophies and Awards**

Many honours have been bestowed on the NFB over the years, from the time of its inception. The trophies and prizes come in a variety of materials and sizes and are installed in the front entrance lobby and the second floor lobby outside the executive offices. Materials include wood, metal, glass, ceramics, enamel, and various organics including skin and feathers (see Figure 16).



Figure 16. Awards and trophies.

Hanging in the stairwell opposite the buildings main entrance is a large textile wall hanging. The stairwell ascends adjacent to an expansive glass window providing very high light levels in both the first and second floor lobbies. The majority of the materials are light stable but even wood and finished metals can fade and discolour in high light levels. The textile wall hanging is particularly sensitive to light and definitely at risk of fading and degradation of the fibres. An enclosed glass case in direct sunlight will also absorb high levels of radiant heat energy which can exacerbate any degradative processes. Most of the pieces are contained in locked glass display cases providing reasonable physical security from theft or vandalism as there is high monetary value for some of these objects.

#### **5.C.iv. Film Project Elements**

The cool storage vault houses a collection of 5000 boxes containing a variety of material: scripts, musical scores, drawings, watercolour paintings, animation cels, scripts, small three dimensional film elements such as props, puppets, etc. Some of the props and puppets are made of cast plastics and polymeric foams and are potentially unstable over the long term. Some of the foam pieces are stored in plastic bags as illustrated in Figure 17. This is extremely valuable documentary material related to the film productions. They are housed in brown cardboard uniform sized boxes of unknown quality containing tracking bar codes (see Figure 18).



Figure 17. Foam puppet in plastic bag



Figure 18. Film project elements stored in brown cardboard boxes.

The boxes appear to be packed with interleaving tissue of unknown quality between some of the elements. Other boxes are partitioned off to create slots for individual three dimensional pieces as illustrated in Figure 19. All types of media are interspersed through all of the boxes and due to the volume of material inside, the range of media is difficult to determine. The quality of the box and interleaving tissue is difficult to ascertain.



Figure 19. Box contents - three dimensional and painted elements.

The temperature and relative humidity conditions are listed in Table 1 and are essentially the same in both areas where these items are located (i.e. second floor of cool vault and stock shots area on the first floor). The lights are kept off when the room is not being visited. The storage environments are very good with respect to the long term preservation of this type of material. Several boxes were opened and some appeared very full, potentially putting a lot of pressure on material stored within. The storage environment in the cool vault will provide a stable preservation environment for the majority of the materials in the boxes.

#### 5.C.v. Film Project Artifacts

- a. Many large format and mounted works of art, drawings, photographs, paintings, etc., and promotional exhibits are housed in plan file drawers and on shelves in several small store rooms throughout the building (see Figure 20). Some of the plan file drawers contain barcodes that tie



the contents of the drawer to specific film projects. A large quantity of material has been stored on shelves, most but not all wrapped with Kraft paper, labelled and stood vertically though there is little evidence of organization beyond that. Both on shelves and in drawers, this material includes a broad range of media including watercolour, gouache, acrylic, inks and collage and photography (e.g. Frederick Back drawings).



Figure 20. Oversized art work in drawers and on shelves.

- b. There are numerous exhibits mounted by NFB promoting films and programs. These are found throughout the building and include large light boxes with transparencies, black and white and colour photographs and collages of pieces of 35mm film to mention a few (see Figure 21).



Figure 21. NFB promotional exhibitions.

- c. Framed original animated film elements are found hanging in hallways in the film production wings of the building as shown in Figure 22. These are comprised of paper cut outs, photographs, drawings and paintings on paper, cels, various acetates, inks, etc. Most are protected under glass though in many cases, original elements are installed directly against the glass. Light levels appeared to be relatively high though they were not measured. Most of this material is sensitive to photochemical degradation, fading readily in high levels of unfiltered light.



Figure 22. Framed film project elements.

- d. Large three dimensional elements used on film projects such as sets, puppets, props, etc., can be found in store rooms throughout the building and within the offices and studios of directors, producers and artists. There is no formal organization of this material within the spaces and no accession numbers or identifying information has been assigned. An example of this is the set and props of the *Bydlo* film found in a store room in the French production zone. Objects, cases, equipment, etc., fill the spaces providing little room for movement and unrelated material is piled on top. Physical damage is inevitable in this environment.

Some items have been installed in substantial display cases and set into hallways and storerooms. All of this material is in ambient environmental conditions and under high light levels in the corridors. Historic props such as the chair used in Norman McLaren's animated short called *A Chairy Tale* sits in a small store room along with other McLaren film elements and equipment (see Figure 23).



Figure 23. Film projects props and equipment.

Most of the material is subject to deterioration due to extreme fluctuations in humidity and temperature. Though air conditioning does regulate the environment, extremes are likely. For example, 23% RH was measured on Thursday, November 22 whereas between 40-50% would be recommended for this type of material.



Figure 24. Norman McLaren Equipment.

- e. Specialized equipment developed for production of specific film projects including Norman McLaren's drawing and cutting tables are housed in small store rooms in the building in ambient conditions (see Figure 24). Considerable historic value could be attributed to this material.

#### **5.C.vi. Film Production Equipment**

Many audio and video formats of film production equipment are no longer supported by manufacturers and consequently deemed obsolete. Many obsolete machines have been stock piled for future use either complete or for parts in order to provide functional capacity for certain formats. They can provide equipment back up in support of copying/digitization programs e.g. magnetic media playback units. They have been stored in a number of locations throughout the building (Figure 25).



Figure 25. Obsolete equipment.

Though most of the storage repositories for the equipment are within the building envelope, the conditions are ambient and subject to fluctuations. Certain components of the equipment, plastics and rubbers, are unstable and will degrade over time. This is potentially a valuable resource that would benefit from a complete inventory and more controlled storage.



There is a substantial collection of obsolete film production equipment that includes such things as specialized film sound synching units, lights, tripods, cameras, lenses, etc., that has potentially great historic artifactual value. Most of this equipment is stored in ambient conditions and in a number of different locations around the building including a loading dock, unprotected from airborne dust and dirt. There is also little security for this material. Much of it could be easily removed from the premises.

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## **Annex 2 – Evaluation matrix**

Evaluation Issues and Questions	Performance Indicator	Methodology
<b>Main Issue: Relevance</b>		
<i>Issue #1: Continued Need for Conservation Activities</i>	Results of surveys on the accessibility of NFB works (public opinion)	- Document review - Key informant interviews
1. To what extent does this activity respond to the needs of Canadians?		
<b>Issue #2: Alignment with Government Priorities</b>		
1. Are collection management activities' objectives consistent with (i) the Government of Canada's current priorities and (ii) the NFB's strategic objectives?	- Federal Government priorities (Speech from the Throne, Federal Budget, etc.) - NFB's Strategic Plan 2008-2012 - Program Activity Architecture - Performance Measurement Framework	- Document review - Key informant interviews
<b>Issue #3: Alignment with Federal Roles and Responsibilities</b>		
2. To what extent does the federal government have a role and responsibilities in ensuring proper collection management of the NFB's collection?	Alignment with existing federal legislation, policies and programs	- Document review - Key informant interviews
<b>Main Issue: Performance</b>		
<b>Issue #4: Achievement of Expected Outcomes</b>		
3. Do existing policies and procedures ensure the safety of the collection?	- Alignment with industry standards and practices (Canadian Conservation Institute) - Number of works in the collection that are conserved on two different physical supports and kept in two different geographical locations (source: 2011 NFB Performance Measurement Framework)	- Document review - Comparative analysis with industry standards and methods - Key informant interviews
4. Are conservation conditions and handling methods efficient?		
<b>Issue #5: Demonstration of Efficiency and Economy</b>		
5. Have the resources been appropriately allocated under this activity? Are the resources adequate?	n/a	- Document review - Key informant interviews