



Canadian
Heritage

Patrimoine
canadien

Canada



ANNUAL REVIEW 2013–2014



Published electronically by:

Canadian Conservation Institute
Canadian Heritage
1030, Innes Road
Ottawa, Ontario K1B 4S7

CCI Annual Review 2013–2014

Available on the Canadian Conservation Institute website: www.cci-icc.gc.ca

Également offert en français.

Catalogue No.: CH57-1/2014E-PDF
ISSN 1927-3932

© Government of Canada, Canadian Conservation Institute, 2015

All images in this document belong to the Crown, unless otherwise specified.



CCI'S MISSION

CCI advances and promotes the conservation of Canada's heritage collections through its expertise in conservation science, treatment and preventive conservation. CCI works with heritage institutions and professionals to ensure these heritage collections are preserved and accessible to Canadians now and in the future.

To achieve its mission, CCI organizes its operations under three business lines:

1. **Undertaking research and development in conservation**, including scientific research, advanced techniques for treatment and restoration, and practical and innovative solutions for caring for collections
2. **Provision of expert services**, including scientific services, conservation treatments and preservation advisory services, to heritage institutions and professionals
3. **Sharing conservation knowledge**, through training, professional development, online learning materials and publications, to assist those responsible for heritage objects and collections to make informed decisions about the care of their collections



Alison Fleming, Canadian Intern, works on the treatment of a First Nations leather war shirt, worn by Cree and Blackfoot warriors, c.1860. CCI 120499-0028



Stefanie Litjens, Fine Arts Intern from the Netherlands, carries out an examination of the condition and materials of the Royal Arms of the United Kingdom, which was salvaged from the building in Montréal that housed the Parliament of the United Province of Canada after it burned in 1849. CCI 120499-0045



Director General's Message



Patricia E. Kell
Director General and Chief Operating Officer
Canadian Conservation Institute

I am pleased to share with you the Canadian Conservation Institute's (CCI's) *Annual Review 2013–2014*. Indeed, I am particularly pleased as this is the first annual review since my appointment as director general.

Created in 1972, CCI has become a leading institution in Canada and around the world in the field of conservation. It has improved the understanding of objects and materials and their behaviour, how best to conserve artifacts and how to exhibit and store them so that they are preserved for future generations. It is a privilege to be entrusted with the responsibility for ensuring that this very fine institution continues to make such significant contributions to heritage conservation in Canada.

The Institute's accomplishments in 2013–2014 continued in this tradition. In the following pages, you will learn about the treatment of artifacts that bear witness to pivotal moments in Canada's history. CCI has been working on a range of objects related to significant celebrations leading towards the 150th anniversary of Confederation in 2017. The flag of the [82nd Overseas Battalion of the Canadian Expeditionary Force from the First World War](#) is just one example. We continue to apply our expertise in conservation science to understand Canadian artists' materials better and we are applying years of research and experience in packaging and shipping cultural property to support the preservation of the statues and other works on Parliament Hill as part of the major capital project currently underway.

In addition to performing conservation treatments and research in conservation science, CCI provides expert advice, guidance and training to heritage professionals. In 2013–2014, the majority of our well-known series of technical bulletins was made available online for free, as were our symposia and colloquia proceedings. We are committed to providing Canada's heritage workers with convenient access to the results of our research, as well as with advice on how to apply conservation techniques and tools in an effective manner. We are also reaching out to Canadians at large through social media—join the many who “like” us on [Facebook!](#)

While I am delighted to share the following accomplishments with you, they took place under the leadership of Charlie Costain, who acted as director general for many months before I took over the position in January 2014. I am sincerely grateful to Charlie for leading CCI through this period of transition, and for the support and guidance he has given me since my arrival.

Looking to the future, CCI is developing a strategic plan to guide its activities for the next five years, based on the results of consultations held with clients in 2012 and 2013. Our clients' views on the key conservation challenges for heritage institutions today—and on the role CCI can play in responding to those challenges—will be central to how we refine our direction moving forward.

CCI's success depends on its highly talented, creative and dedicated workforce. Discover more about their activities in the pages of this annual review!

Patricia E. Kell
Director General and Chief Operating Officer
Canadian Conservation Institute

RESEARCH AND DEVELOPMENT

Performance in 2013–2014

Activities – outputs:

36 projects were active in Foundation Research, Applied Research and Collection Preservation Research; 24 partners (14 Canadian and 10 foreign) contributed to CCI research and development projects.

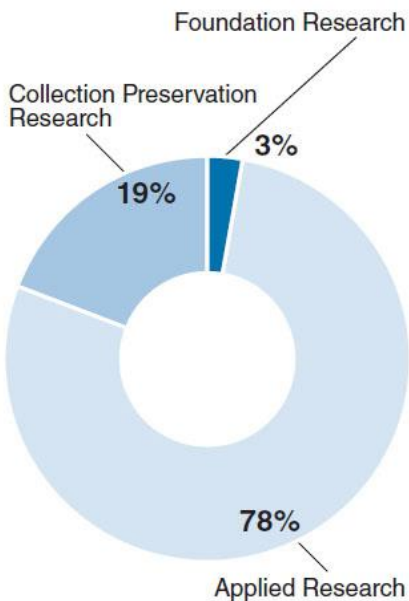


Table 1: Performance indicators

Indicator	Results in 2013-2014
Canadian and international community has access to the results of CCI research and development activities	<ul style="list-style-type: none">• 11 scientific and technical articles authored by CCI staff were published externally (consult the complete list)<ul style="list-style-type: none">o 1 article in a Canadian publicationo 10 articles published by foreign publishers
	<ul style="list-style-type: none">• 18 scientific and technical presentations were given to professional conservation audiences<ul style="list-style-type: none">o 10 presentations at Canadian conferences/educational institutionso 8 presentations at international conferences or in foreign educational institutions

Research and Development Highlights

The Materials and Techniques of J.E.H. MacDonald

This fiscal year marked the beginning of a new research project to analyze the materials and document the techniques used by J.E.H. MacDonald (1873–1932), a founding member of the Group of Seven. The goal of the project is to build a database of MacDonald's materials, which will assist in devising treatments and selecting appropriate display and storage conditions for his work. The project will provide reference analyses for paintings for which the attribution is questioned and will produce new knowledge about the working methods of this important Canadian painter.

The project, led by Kate Helwig, Senior Conservation Scientist, and Alison Douglas, Conservator, McMichael Canadian Art Collection, was initiated in anticipation of a retrospective exhibition of MacDonald's works. Paintings from the McMichael Canadian Art Collection, the National Gallery of Canada and the Art Gallery of Ontario will be studied.

To date, 21 paintings have been examined and microscopic samples have been removed from each one for study. Analysis of the samples is well underway. Some interesting observations about MacDonald's working methods have been noted: in a number of sketches, MacDonald sealed his rigid supports with shellac prior to painting; he occasionally used coloured preparatory layers; he sometimes blocked in the composition prior to painting using a dilute, brushed-applied paint; and he heavily reworked several of his early paintings. The materials identified so far are quite similar to those in previously analyzed paintings by Tom Thomson and by other members of the Group of Seven, demonstrating the close working relationship among these painters.

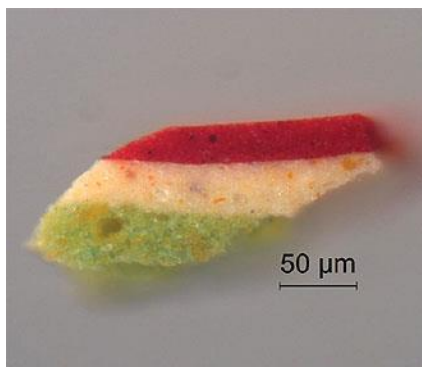


Figure 1: Paint cross-section from *Near Minden, 1916* from the McMichael Canadian Art Collection. Although many of J.E.H. MacDonald's sketches were painted directly on a rigid support with no preparatory layer, this painting has a green preparatory layer followed by a second beige preparation. CCI 126922-0001

Disaster Recovery of Recordable DVD and Blu-ray Discs, and Flash Media

For heritage institutions storing electronic media, the threat of a disaster that destroys the collection is always a concern. One of the most common threats is exposure to water from bursting pipes, extinguishing a fire or flooding of nearby rivers and lakes. A previous study performed at CCI examined the effect of water exposure on a variety of materials (discussed in CCI Technical Bulletin 25 [*Disaster Recovery of Modern Information Carriers: Compact Discs, Magnetic Tapes and Magnetic Disks*](#)). However, since the initial study, new formats have gained prominence in the marketplace and are finding their way into collections of archives, libraries and museums. Unfortunately, there is essentially no information available with respect to the effect of water exposure on these newer materials.

Therefore, a new CCI research project, led by Joe Iraci, Senior Conservation Scientist, has begun to investigate the water resistance of the latest electronic media. In addition to examining more compact discs, other media, such as recordable DVDs (DVD-Rs), recordable Blu-ray discs (BD-Rs), Secure Digital High-Capacity (SDHC) flash cards and USB flash drives, will be tested. These materials will be subjected to tap water soaking for various time intervals, dried and then tested in order to establish the resistance of the materials to this type of disaster event. The information generated from this study will be formulated into recommendations for the recovery of these materials and will assist any collecting heritage institution with the proper care and protection of electronic media.

Iron Stain Removal From Archaeological Composite Artifacts Made of Wood and Iron

Archaeological wood-iron artifacts can become seriously stained with orange iron corrosion products while they are stored in water prior to treatment. This surface staining disfigures the objects and needs to be removed. Experimental studies involved testing different types of solutions to remove iron stains from paper samples (a convenient form of cellulose) to compare the efficiency of chelating agents, reducing agents and mild acids. In partnership with Parks Canada, and under the leadership of Lyndsie Selwyn, Senior Conservation Scientist, the results of these studies were published so that the conservation community could benefit from this work. The research supports the use of a solution of sodium dithionite (a reducing agent) together with a chelating agent, such as ethylenediaminetetraacetic acid (EDTA), to remove surface rust stains on wood-iron composite objects. The stain removal is usually complete after a couple of hours, but is slow enough that the change in colour can easily be monitored visually. The reactions take place at room temperature and at a pH near neutral, conditions that are gentle on wood. The project was completed with the publication of a paper in the 2013 volume of the *Journal of the Canadian Association for Conservation*.



Figure 2: Iron-stained wood from an iron-wood composite object recovered from a fresh water lake. CCI 121376-0002

Estimating Pest Population Growth Rates as a Measure of Relative and Absolute Risk to Collections

In order to better understand the risk to any part of a collection under threat by pest insects, Tom Strang, Senior Conservation Scientist, is developing estimates of the rate of increase of pest insect populations in collections, as well as estimates of the factors that decrease their growth. Over time, information from pests detected by trap captures can be collated to learn how an actual pest insect population compares to estimates of the fastest forecasted population growth. This comparison provides data on how effective the ongoing control operations are for preventing damage and loss to collections.

To date, some insect species have been studied enough to know what factors limit their population growth, such as cleanliness and temperature control. This research will continue to build information to improve advice on limiting pest insect population growth.

By applying developments from agricultural pest control to study pest species in general, and by performing literature reviews to aggregate previously collected data on pest insect populations and their characteristics, CCI aims to provide heritage professionals with useful measures so that they can compare an actual pest insect infestation with the possible damage it could cause to a collection, and to be able to limit that possible damage.

In 2013, Tom Strang presented his research at the University of Natural Resources and Life Sciences, Vienna, and at the University of Guelph at a conference hosted by the Entomological Society of Canada.

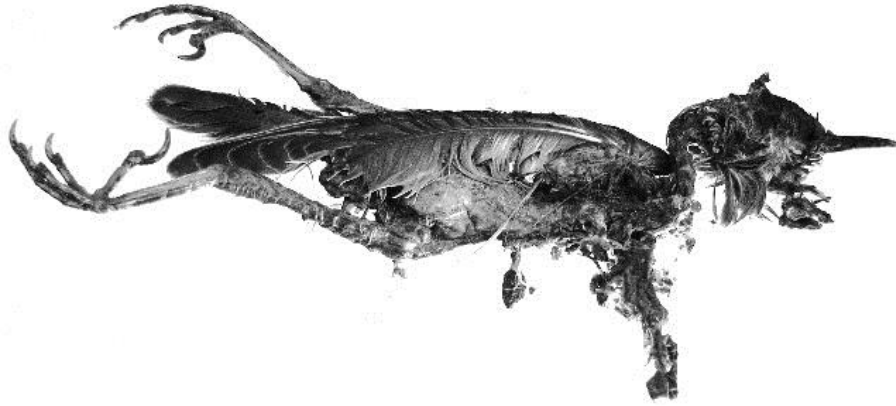


Figure 3: An example of a natural history specimen that has been attacked by insect pests. CCI 126922-0007

Recognition

We recently completed the annual statistical download analysis from our website and your Volume 47 paper, *Applications of X-Ray Diffraction in Conservation Science and Archaeometry*, was downloaded 1,889 times in just the past year – OUTSTANDING! You have the 14th highest download frequency from among the more than 1,000 publications on our website.

Executive Director, International Scientific Centre

We are pleased to present to you [...] an overview of the performance of your article in *Journal of Archaeological Science*. With Article Usage Alerts, a free service, you are able to measure the impact of your article via its usage on ScienceDirect. Your article has been downloaded or viewed 544 times since publication [from October 2013 to February 2014].

International Publisher

EXPERT SERVICES

Performance in 2013–2014

Activities – outputs:

CCI staff completed 238 service transactions for clients, including scientific analyses, conservation treatments, and collection and facility assessments. In total, 428 collections and/or objects belonging to 137 institutions across Canada were better preserved as a result of these services.

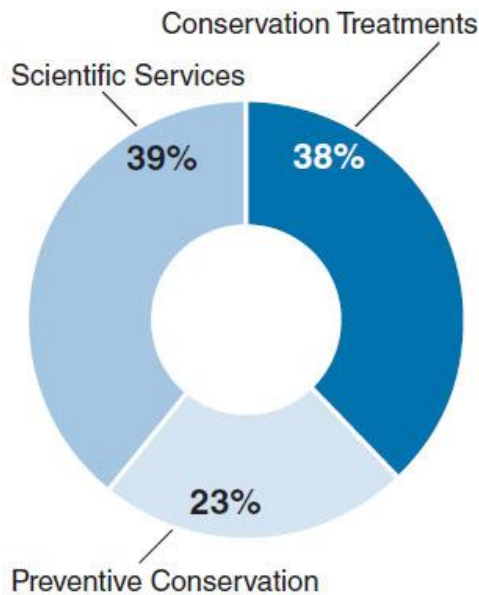


Table 2: Performance indicators

Indicator	Results in 2013-2014
CCI expert services are used by heritage institutions to preserve their collections	<ul style="list-style-type: none">• Expert services were provided 238 times for collections and objects preservation
Heritage institutions use CCI expert services to preserve their collections	<ul style="list-style-type: none">• 137 institutions used CCI's expert services to preserve collections and objects
Heritage collections and objects whose preservation is supported by CCI expert services	<ul style="list-style-type: none">• 428 collections and/or objects benefited from expert services<ul style="list-style-type: none">○ 239 objects and 5 collections were treated○ 135 objects were assessed and/or analyzed○ 15 collections were assessed and/or analyzed○ 34 heritage facilities were evaluated

Expert Services Highlights

Conservation and Treatment Services

The 82nd Overseas Battalion Canadian Expeditionary Force First World War Flag

August 2014 marked the centennial of the start of the First World War, making the conservation of First World War objects a priority for the Department of Canadian Heritage. The 82nd Overseas Battalion Canadian Expeditionary Force (CEF) flag, which belongs to the Firefighters Museum of Calgary, is an example of such an object and is of great historical significance to the museum and the City of Calgary.

The 82nd Overseas Battalion CEF was made up of firefighters from the Calgary Fire Department. Written on the flag's sheer, light-weight wool fabric are messages of encouragement, such as "Good luck" and "Keep the old flag flying," and "Lowrey's Lions" (Colonel W.A. Lowrey was the commanding officer of the Battalion). In the beige areas of the Union Jack are written the names of battles—"Vimy Ridge," "Albert," "Somme," "Ypres Aug 18," "Villers Bois"—and the names of Calgary firefighters. Printing on the pole sleeve, made from cotton, reads from bottom to top as follows: "From the Calgary Fire Dept, the 82nd Overseas Batt. C.E.F. May 18th 1916." These writings make the flag one of a kind.

The flag required conservation due to numerous losses in the fabric and was treated by Janet Wagner, Conservator, Textiles. Fugitive inks limited the treatment options. Creases and folds in the flag were relaxed with localized humidification while ground conservation erasers were used to clean the pole sleeve. In order to fill the losses, textile paint was applied to wool compensation patches, heat set and secured with stitching at the back. The flag was mounted on a padded support covered with a linen display fabric and finished with a five-sided acrylic display case to protect it from light, dust and handling.

Huron-French Dictionary

The Huron-French dictionary is a unique handwritten manuscript that is part of the collection managed by Musées de la civilisation, Québec City, on behalf of the Séminaire de Québec, founded in 1663. The dictionary dates from the third quarter of the 17th century and has been attributed to Father Pierre-Joseph-Marie Chaumonot, a Jesuit priest who worked as a missionary to the Huron-Wendat people in New France from his arrival in 1639 until his death in 1693. He founded the Huron mission of Notre Dame de Lorette in 1674 and is considered one of the most remarkable missionaries of the 17th century in Canada. The Huron-French dictionary is vital to the Yawenda Project, which aims to revive the use of the Huron-Wendat language in the community of Wendake.

Led by Christine McNair, Conservator, Books, the treatment for this artifact focused on the minimal introduction of new materials due to the book's relatively undisturbed state. The original materials were largely sound and could be reused to retain much of the historic integrity of the volume. The book was re-sewn using the original sewing holes to reattach the textblock to the structure with minimal disruption. A custom clamshell box was constructed to store the dictionary in order to provide protection from light, dust, pollution and physical damage.



Figure 4: The Huron-French dictionary, a unique handwritten 17th-century manuscript attributed to Father Pierre-Joseph-Marie Chaumonot. CCI 123266-0028



Figure 5: Manuscript opening before treatment. CCI 123266-0018

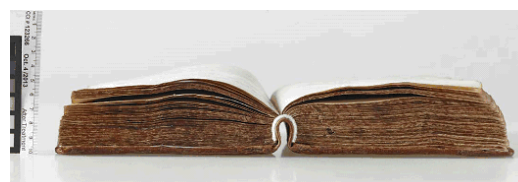


Figure 6: Manuscript opening after treatment. CCI 123266-0056

Kangiakallak Archaeological Excavation

In the summer of 2013, CCI provided conservation field services at the Kangiakallak-1 site, located on Qikirtajuaq (Smith Island) near Akulivik, Quebec. The excavation was run by the Avataq Cultural Institute, the Inuit cultural organization of Nunavik (Northern Quebec). Kangiakallak is considered an exceptional Thule archaeological site because it has the best preservation of organic materials ever excavated in Nunavik, particularly wood. Interesting finds included a sled runner, Thule and Dorset harpoon heads, an ivory panak (snow knife) handle, a stone knife with a wooden handle, a needle, baleen knots and a wooden doll.

CCI services included on-site conservation treatment for the freshly excavated artifacts, assistance with the recovery and packing of fragile artifacts, and basic conservation training for 12 Inuit students from the Akulivik community. The students participated in a five-week field camp where they learned about their local history, the basics of archaeological research and many other aspects of archaeology, such as geomorphology, palaeoenvironments and preservation of artifacts.

Jessica Kotierk, a former intern hired by CCI for this project, was the onsite conservator. She was a mentor to the students and instructed them on how to document, clean and stabilize artifacts in the field laboratory tent, as well as how to assist the Avataq Cultural Institute with the cleaning of faunal material. Jessica Kotierk carried out a difficult block lift of a large section of fur floor covering with hardwood, bone and baleen artifacts in between its folds. These objects were found buried in earth just above the original stone floor of an excavated qarmaq (a single-family dwelling). This block lift was challenging for several reasons. In a standard block lift, the earth under the object would be excavated with a support during removal; this was not possible because of the stone surface. Additionally, the weight and

fragility of the deteriorated fur made this a very delicate operation. Artifacts requiring longer and more complex treatments were brought back to CCI.

Beyond the Law

Beyond the Law (1933), painted by Group of Seven artist Franz Johnston, depicts the end of a manhunt. In the painting, the Mountie pursuing the fugitive stands over him, finding him dead by a self-inflicted gunshot wound; his death makes him “beyond the law.” Considered as one of the most significant paintings in the RCMP Heritage Centre’s collection, Johnston’s painting is a priority conservation project for the Centre. The painting was covered with dark, yellowed, very tough varnish layers that prohibited it from being exhibited.

Kate Helwig, Senior Conservation Scientist, identified the materials of the varnish and the paint layers and, with this critical information, CCI fine arts conservators, led by Wendy Baker, Senior Conservator, Fine Arts, were able to test and develop a safe method to cause the varnish to swell in small increments so that it could be separated successfully from the fragile paint beneath. A method of invisible tear repair was used to reintegrate damaged areas by reweaving using original threads or by inserting new canvas into areas of loss. The original canvas stretcher was kept as an integral part of the painting, but it was further supported by an aluminum insert as well as a rigid panel insert.

With the remaining varnish removed, the hues of the painting have been re-established—the whites of the snow are no longer brown and the sky is blue rather than green. The painting is structurally sound and protected from destabilizing vibrations and humidity changes. *Beyond the Law* returned to the RCMP Historical Collections Unit in September 2013 where it was featured in an exhibit “Beyond Friberg: The Mounted Police in Art.” It is currently on permanent exhibit at the RCMP Heritage Centre.



Figure 7: *Beyond the Law* by Franz Johnston, from the RCMP Heritage Centre’s collection. Before treatment. CCI 120113-0003



Figure 8: *Beyond the Law* by Franz Johnston, from the RCMP Heritage Centre’s collection. After treatment. CCI 120113-0041

Japanese Cabinet

CCI conservators treated a Japanese, or “Empire,” cabinet dated from 1890 that was a souvenir of the 1897 world tour of the Harris family, which for generations occupied and developed Eldon House in London, Ontario. The Harris family was representative of a class of wealthy and confident Canadians, looking beyond the borders of what was then a new and growing nation at the end of the 19th century to explore the world and their place in it. For this reason, and given the complexity of the materials and their conservation, CCI accepted this object for conservation treatment.

The cabinet was studied by a team of CCI conservators and scientists who characterized the cabinet’s materials and the processes of their deterioration. For example, the ivory panels had badly warped. They were removed and treated for months with elevated relative humidity in a closed chamber and flattened in small increments. In other decorative parts of the cabinet, the original ivory had been replaced prior to arrival at CCI with polyester-based synthetic ivory since ivory is now a restricted material and cannot be obtained. In addition, delicate carved ivory and bone floral motifs had been reset in incorrect locations with epoxy and cellulose nitrate adhesives. These were removed under the microscope and the decorative motifs were re-adhered with a reversible adhesive. CCI conservators also designed and built an adjustable compression framework to gently coax the warped and bowed structure back into plumb over several months.

The cabinet provided an opportunity to train several CCI interns who dealt with issues like the sprung brass wire decoration and the removal of adhesives.



Figure 9: 19th-century Japanese, or “Empire,” cabinet from the Eldon House collection. Before treatment.
CCI 121408-0001



Figure 10: 19th-century Japanese, or “Empire,” cabinet from the Eldon House collection. After treatment.
CCI 121408-0135

Treatment of David Cronenberg Film Props and Accessories From His Films The Fly and eXistenZ

The maquette of the mechanically operated fly-creature from the film *The Fly* and the MetaFlesh Game-Pod film prop created for the film *eXistenZ* were treated in 2013 by Alison Fleming, Intern, Objects Laboratory. Both objects were treated for the David Cronenberg retrospective exhibit at the Toronto International Film Festival (TIFF) in the fall of 2013 and provided an opportunity for CCI to gain further practical experience in the conservation of modern synthetic materials.

The maquette from the *The Fly* is made of polyurethane (PUR) foam over a metal-wire structure with a painted surface. This object arrived in relatively good condition for its age and original function. The treatment focused on stabilization and surface retouching: light cleaning, localized paint consolidation and localized repairs or replacements to small loose or missing elements in the area of the claws and teeth. The client specifically requested that CCI provide recommendations for future display, storage and travel. CCI analysis using Fourier transform infrared (FTIR) spectroscopy and thermal desorption-gas chromatography-mass spectroscopy (TD-GC-MS) identified the foam as ether-type PUR, which is known to actively degrade by photo-oxidation caused by light exposure. Strict control of light exposure was therefore recommended.

The MetaFlesh Game-Pod film prop from *eXistenZ* consisted of a moulded game console made of flexible silicone plastic with hidden inset metal components and was coloured with dry pigment directly applied to the surface. The silicone was unstable: a sticky residue was leaching out, to which lint and dust had adhered, and cracks were forming in areas around the metal components. The leaching was most probably due to an unbalanced mixing of silicone components at the time of manufacture. As there are as yet no known methods of stabilizing this type of degradation, the treatment focused on mechanical surface cleaning, taking care not to disturb the loose powdery pigments on the surface; and on providing a secure environment by constructing a protective support and box. Because this piece will continue to degrade, an exact replica made of similar but stable silicone-based materials was cast and moulded. The replica provides a faithful three-dimensional documentation of the original's current form and surface details and, since it can better withstand handling, can be used for travelling exhibits.





Figure 11: Maquette from David Cronenberg's *The Fly*. The creature's right proper hand was missing a claw before treatment. CCI 124917-0001

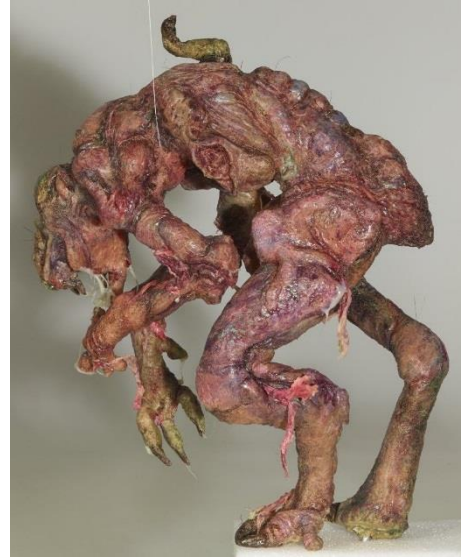


Figure 12: Maquette from David Cronenberg's *The Fly*. After treatment. CCI 124917-0044

Treatment of a Kindling Basket

A birchbark kindling basket was treated by Alison Fleming, Intern, Objects Laboratory, under the supervision of Carole Dignard, Senior Conservator, Objects. Owned by the York Sunbury Museum (Fredericton Regional Museum), the basket is dated circa early 1900s, and was most probably the work of Passamaquoddy artist Joseph Tomah, who was well-known for his skill at incising *wikhegan* (picture writing or map-making on birchbark). He occasionally signed his works and is known to have often used as his signature the owl pictograph, which is present on this kindling basket. The museum requested the treatment in view of a future exhibit planned on the works of Joseph Tomah and his son, Sabattis Tomah.

The birchbark was extensively damaged and distorted with numerous cracks, splits and losses; additionally, the bark had been partially fire-damaged, showing signs of charring, blisters and some very brittle areas. Common means of repairing birchbark were modified and adapted to accommodate the condition of the kindling basket's birchbark and the fact that it was immobilized within a wooden frame. The treatment involved reshaping and repairing the bark in a localized manner using solvent vapours and various clamping methods. Once softened and reshaped, the areas were repaired with a paper backing, infilled and inpainted. The challenges posed by this extensively damaged object and the innovative solutions developed during the treatment were presented at the Canadian Association for Conservation's 40th Annual Conference in Québec City. This treatment will support further research aimed at refining treatment options and parameters to reshape and repair birchbark.



Figure 13: Early 20th-century kindling basket attributed to First Nations artist Joseph Tomah. Before treatment.
CCI 124697-0019



Figure 14: Early 20th-century kindling basket attributed to First Nations artist Joseph Tomah. After treatment.
CCI 124697-0026

Recognition

I would like to take this opportunity to express my sincere appreciation for the wonderful work that has been done by the Canadian Conservation Institute in restoration of [...] a priceless artifact [...] [The CCI Senior Paper Conservator and Preservation Advisor] have been instrumental in ensuring that the manuscript receives the care and consideration it deserves, as it makes the journey to becoming an outstanding artifact. I very much appreciate their guidance and advice as decisions arise over the next steps to take. The staff and services provided by CCI are world class. The work performed by the Institute is instrumental in ensuring that Canadians have continued access to the rich cultural heritage that makes Canada strong.

Librarian, University Library, Nova Scotia

I am writing to thank the Canadian Conservation Institute for its significant contribution to the preservation of Nunavik's heritage. [...] We also truly appreciate CCI's participation in the archaeological dig [...] northeast of Hudson's Bay. [CCI Archaeological Conservator] was a consummate professional. She helped people [in our community] become more aware of conservation-related issues through engaging Inuit youth in the pre-processing of artifacts.

Archaeologist, Inuit cultural organization, Quebec

From August 2010 to September 2013 [a CCI Archaeology Conservator] and the Canadian Conservation Institute generously assisted the [Federal Department] with the stabilization and storage of newly-recovered items from a Second World War aircraft. [...] In the winter of 2012, the CCI refurbished multiple items belonging to both the Canadian and British airmen - items which held a great deal of meaning for the surviving families such as an inscribed cigarette case and embroidered pilots wings. [...] In a letter received from the Canadian and British families, these small items, and the care in which they had been restored, ended up being one of the most meaningful gestures of the recovery.

Director, Federal Department, Canada

Scientific Services

Onsite Microfade Testing of Baskets, Dyed Quills, Silks and Embroidery on Costumes and Moccasins, Canadian Museum of History

The Canadian Museum of History (CMH) has an extensive collection of baskets, costumes and quill-embroidered moccasins. These objects are on display in the museum or are on loan to other institutions. Many of them have components that are known to be light sensitive.

Microfade testing is an accelerated light fading test that can be safely performed on objects and can identify colourants that have high sensitivity to light and are at risk of light damage. In June 2013, the portable microfade tester was used by Season Tse, Senior Conservation Scientist, and CMH conservators to test 23 objects. Most of the objects were found to have “high sensitivity to light” with lightfastness ratings between ISO Bluewool 2 and 3. The test results were presented to museum staff, with the CCI [Light Damage Calculator](#) as a visual aid. The CCI Light Damage Calculator is a web tool that helps visualize the impact of light level and exposure duration on the fading of objects.

This onsite service provides valuable lightfastness data to museum staff, helping them plan safe exhibitions of Canadian collections. Training the conservation staff to carry out testing enabled them to understand how different materials in the objects they conserve react to light. Presenting the results to other museum staff together with conservation staff helped build consensus among different departments in developing safe exhibition protocols for these collections. For CCI, collecting light sensitivity data from historic artifacts is valuable for research and for supporting existing tools such as the CCI Light Damage Calculator.



Figure 15: Conservators at the Canadian Museum of History carry out lightfastness testing on artifacts using the portable microfade tester.
CCI 124825-0001

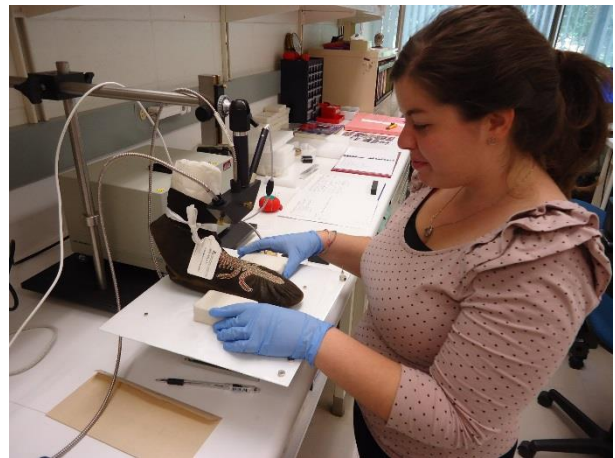


Figure 16: A conservator at the Canadian Museum of History carries out lightfastness testing on artifacts using the portable microfade tester.
CCI 124825-0003

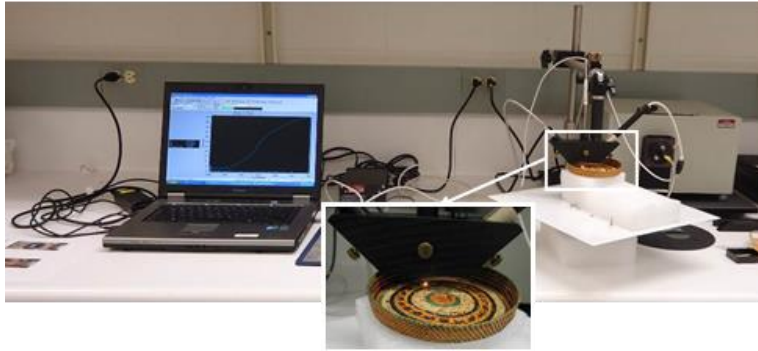


Figure 17: CCI portable microfade tester. CCI 124825-0020

Lienzo of Tlapiltepec, Royal Ontario Museum, Ontario

The *Lienzo of Tlapiltepec* is a 16th-century pictographic painting on cotton from southern Mexico and is one of the most important Latin American objects in a Canadian collection. In January 2013, the *Lienzo* travelled from the Royal Ontario Museum (ROM) to CCI for photographic documentation and scientific analysis. The examination at CCI, led by Kate Helwig, Senior Conservation Scientist, was undertaken to inform ongoing research into the history and interpretation of this rare textile.

Infrared photography and ultraviolet fluorescence photography produced a slight improvement of the readability of some areas of the pictograph. Although the painting is very faded, analysis allowed many of the original colourants to be identified. All the pigments were available locally and have been described in contemporaneous Aztec sources: red and yellow ochre, charcoal black, Maya blue (natural indigo in a clay matrix) and cochineal (an insect-based red). Organic compounds in the samples, which could correspond to binding media or later superficial coatings, include gum, animal glue, animal fat and beeswax. Identification of the pigments in specific areas of the *Lienzo* helped ROM staff produce a re-coloured image of the textile illustrating what its original appearance might have been.



Figure 18: CCI Textile conservators and a conservation scientist unfold the *Lienzo of Tlapiltepec*. CCI 125143-0037

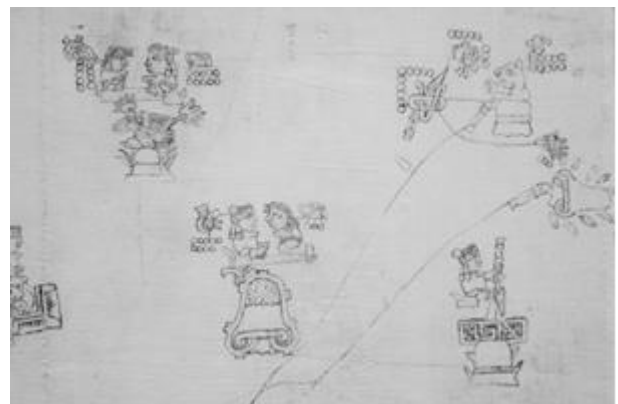


Figure 19: Infrared photograph of one area of the *Lienzo of Tlapiltepec*. CCI 125143-0015

White Plastic Sheeting Attached to Architectural Drawings, Canadian Centre for Architecture, Quebec

Long strips of white plastic sheeting have been taped along one edge of a large collection of contemporary architectural drawings at the Canadian Centre for Architecture (CCA). The strips were applied to approximately 1,600 drawings as part of their mounting system. Scientists at CCI, led by Kate Helwig, Senior Conservation Scientist, studied the plastic sheeting to determine whether it could eventually damage the drawings if left in place.

Results showed that the plastic is poly(vinyl chloride) (PVC) with a calcium carbonate filler and an epoxidized sunflower oil (ESO) plasticizer. Hydrochloric acid can be produced as the PVC degrades. However, in a controlled museum environment, this type of degradation is unlikely. The more significant issue for the long-term preservation of the drawings is the possible migration of additives, which can cause sticky surfaces or oily stains on materials in contact with the PVC.

Based on the results of the analysis, the CCA plans to remove the strips from the most precious drawings and monitor the rest of the collection regularly for signs of damage.

Polychromy of the Bas-reliefs of the Oka Calvary, Musée de la civilisation, Quebec

The Oka Calvary is a way of the Cross comprising seven aedicules (three chapels and four oratories) built between 1740 and 1742, located on the hill at the centre of the Oka National Park. Originally, each chapel and oratory contained a canvas painting. After being exposed to the elements for some thirty years, these paintings were replaced in 1775–1776 by bas-relief wood sculptures created by François Guernon, *dit* Belleville, (c. 1740–1817). This set of sculptures, unique in Canada, has also been damaged by time and weathering and is now part of the collection of the Musée de la civilisation. All of the bas-reliefs have been repainted twice, first at the end of the 19th century and then in the 20th century.

To better understand the structure and nature of the original polychromy and the layers of overpaint on the bas-reliefs, the Centre de conservation du Québec, which is responsible for the restoration of these sculptures, called on CCI's expertise to analyze samples collected from two of them, *La flagellation* and *L'Ecce Homo*. The analysis was carried out under the direction of Marie-Claude Corbeil, Manager, Conservation Science Division.

CCI's analysis revealed the presence of an additional intervention previous that predates two known restorations. This new information helped guide the treatment process. Although it is not possible to determine the date of this earliest intervention from the composition of the first layer of overpaint, this layer will be conserved after the removal of the 19th- and 20th-century overpaints because it reflects the spirit of the original polychromy, which has been too badly damaged to be exposed today.



Figure 20: Bas-relief *L'Ecce Homo* before treatment. Centre de conservation du Québec: Photo J.Beardsell 2011, © Ministère de la Culture et des Communications du Québec



Figure 21: Details of the bas-relief *L'Ecce Homo* during the treatment process. The right part of the left figure (Christ) and the left part of right figure (Pilate) were revealed from beneath the top layers of overpainting. Centre de conservation du Québec: Photo J.Beardsell 2014, © Ministère de la Culture et des Communications du Québec

Recognition

Thank you on behalf of the Conservation Team and the other Museum staff who attended your presentation on micro fading testing. This is such a great example of your, and CCI's, ability to make available a very practical tool for our use. [The CCI Conservation Scientist] also explained a complex topic in a very clear way.

Manager, National Museum, Canada

Thank you very much for these results; they confirm what I believed regarding the use of commercial alkyd paint by Calder during this period. These results will be very useful for a young [...] conservator who is working on the paints Calder used during this period as part of a [New York museum's] research project. [...] I greatly appreciate the thoroughness of your work.

Head of conservation, Art Gallery, Quebec

Many thanks to you and the CCI staff that worked on identifying the work the [art gallery] was given. It has helped us immeasurably with this sensitive bequest. Your scientific analysis along with our curatorial analysis makes us 99% certain that this is not an authentic work.

Director, Art Gallery, British Columbia



Preventive Conservation

Storage and Display Case for the Proclamation of the Constitution Act, 1982

Library and Archives Canada (LAC) holds two signed copies of the *Proclamation of the Constitution Act* (1982) and has loaned one of the documents for display. Recent loan requests have highlighted two fundamental issues: (1) the need for purpose-built cases to transport, display and store the documents and (2) the risk of light damage to the signature inks when displayed. CCI and LAC collaborated to address these issues.

High light-sensitivity of the signature inks was identified in 2012 by microfade testing at CCI. In 2013, a study was undertaken by Eric Hagan and Season Tse, Conservation Scientists, to determine if a low-oxygen (anoxic) environment would permit viewing with reduced light damage. The project involved examining the fading response of several fountain pen ink samples under low-oxygen and ambient conditions plus a review of relevant literature. A visual inspection of more than 10 commercial products showed that all of the light-sensitive materials faded significantly slower under anoxia. A storage/display case for each document was concurrently designed by Eric Hagan to have features that would allow for anoxic display if necessary. The primary components were manufactured locally through computer numerically controlled machining of large, solid blocks of aluminum, with details included for o-ring seals, gas fittings, glazing and document support materials.



Figure 22: The assembled *Proclamation* storage case, shown with handles attached for removing the lid from the base. CCI 125821-0009



Figure 23: The *Proclamation* storage case with the lid and document support plate removed. Details of the lower support plate are shown prior to being anodized black. The cavity beneath the aluminum plate is designed to store the bellows, silica gel, activated carbon and oxygen scavenger (not shown). CCI 125821-0011

Facilities Assessment for the Legacy Art Galleries, University of Victoria

The University of Victoria art collection consists of more than 20,000 objects stored in four museum facilities and exhibited primarily in two museum galleries. Approximately 2,300 artworks are displayed in non-museum buildings across and off campus. Irene Karsten, Preservation Development Advisor, conducted a facilities assessment at the request of the director of the Legacy Art Galleries to review the degree of preservation afforded to the University of Victoria art collection.

Of particular interest was the suitability of display and storage facilities for objects that have been certified by the Canadian Cultural Property Export Review Board. The Legacy Art Galleries were designated as a Category A institution under the Movable Cultural Property Program in 1980. This current assessment was requested specifically to address the degree to which the facilities meet the current preservation requirements for maintaining this designation. With minor improvements, the Legacy Art Galleries' museum facilities could provide for adequate display and storage of certified cultural property. However, certain risks to art are higher for objects exhibited in ordinary university buildings: damage from large temperature and relative humidity fluctuations, fading due to high light exposure, theft or vandalism in less secure buildings, and pest and physical damage. Display of art in non-museum facilities at the University of Victoria was still encouraged as long as lower value, non-certified works were used and risks to these objects were managed.

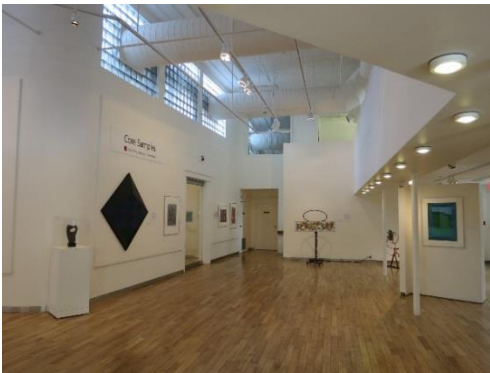


Figure 24: Large exhibition gallery in the Legacy Art Gallery Downtown, University of Victoria.
CCI 125713-0001



Figure 25: Legacy Maltwood exhibition space with storage for art on paper in the cabinets, University of Victoria.
CCI 125713-0067

A Novel Approach to Risk Assessment for the Hamilton and Scourge National Historic Site of Canada

During the War of 1812, the *Hamilton* and the *Scourge*, two merchant schooners pressed into service by the American navy, sank near the City of Hamilton in Lake Ontario. The City has collected a wealth of information on their state of preservation, culminating in a 2011 report by Parks Canada. It has also heard many opinions on what to do next.

After learning about CCI's comprehensive risk assessments for museums, the City asked for an assessment of its shipwrecks. Unlike the process used for museums, where CCI collects the technical data before ranking risks and recommendations, the risk assessment for the shipwrecks was performed in a single day under the leadership of Stefan Michalski, Senior Conservation Scientist. The assessment was built on the combined wisdom of the experts and stakeholders already in contact with the City. Correspondence allowed CCI to identify a preliminary list of risks, which were partitioned into two questions: How soon would the damage occur? How much loss in value would occur as a result?

Experts and stakeholders were invited to a meeting to discuss options for preserving the shipwrecks. Ten point scales were developed for the two questions described above and the

questions, as applied to each preliminary risk, were presented to the participants to vote on. The questions were asked prior to discussions in order to collect the range of opinions before entering the meeting. They were then asked again after discussions, allowing consensus forming.

The final reports submitted to the City of Hamilton included top priority risks that were agreed upon by consensus at the meeting. They also detailed areas where further technical analyses are needed and provided recommendations. The reports also considered the shifts between votes before and after the discussion (minimal) as well as systematic differences due to demographics (not much). No differences could be ascribed systematically to a particular institution, profession or diving experience of the site.

Sculpture Relocation on Parliament Hill

As part of the major construction project for the West Block on Parliament Hill, Public Works and Government Services Canada requested CCI assistance to relocate two monuments on the west side of the Centre Block that were affected by the growing site requirements of that project. One of the monuments depicts Sir George-Étienne Cartier, a Father of Confederation, and the other is of former Prime Minister Alexander Mackenzie. Paul Marcon, Senior Conservation Scientist / Engineer, and John Ward, Preservation Development Advisor, led a project to plan the relocation of the statues to the north east side of Parliament Hill, flanking the Baldwin-Lafontaine monument. The relocation recommendations were accepted by representatives of the Senate of Canada and the House of Commons, by the Federal Heritage Buildings Review Office and by the National Capital Commission. Last fall, the two monuments were successfully disassembled and stored in staging areas to the north side of the Hill over the winter for reassembly in 2014–2015. CCI will continue to provide advice for the construction project on the Hill as other heritage monuments require relocation for their protection.



Figure 26: CCI Senior Conservation Scientist / Engineer (right) works with fine arts conservators from Atelier Ville-Marie to move the Sir George-Étienne Cartier sculpture on Parliament Hill. © 2015 TPSGC-PWGSC

Recognition

I want to make sure you know how much we appreciate your help in ensuring [...] argillite pieces were well protected and packed as they travelled to Vancouver to be included in [the exhibition]. These were especially vulnerable pieces and your advice helped us feel like we did all we could do to protect them on their journey. We were very relieved when [the museum conservator] examined them in Vancouver and saw no new damage!

Manager, National Museum, Canada

I love the Executive Summary [of the CCI Facility Assessment Report]. [...] We will then be developing an action plan for how we implement these changes.

Director, Art Gallery, British Columbia

SHARING CCI'S KNOWLEDGE — PROFESSIONAL DEVELOPMENT PROGRAMS

Performance in 2013–2014

Activities – outputs:

CCI conducted 39 professional development events in Canada. CCI knowledge was also shared through 22 conferences, lectures and papers presented by CCI experts invited to Canadian and international events. Almost 2,100 individuals (nearly 760 from Canada; and more than 1,330 from other countries) participated in professional development events organized or presented by CCI, including internships, lectures and conferences.

Regional workshops in Canada: 325 Canadians from all provinces and territories and 6 foreign participants learned about caring for objects and collections or their proper shipping, storage and display at 19 hands-on regional workshops delivered in 9 provinces and 2 territories. The most popular workshop was *Packing and Shipping of Cultural Property* (offered 3 times to 60 participants). The following 5 workshops were each offered twice:

- *Mount-making* (61 participants)
- *Storage Reorganization* (36 participants)
- *Care of Photographic Materials* (30 participants)
- *Care of Metals in Collections* (24 participants)
- *Digital Photodocumentation of Museum Objects* (19 participants)

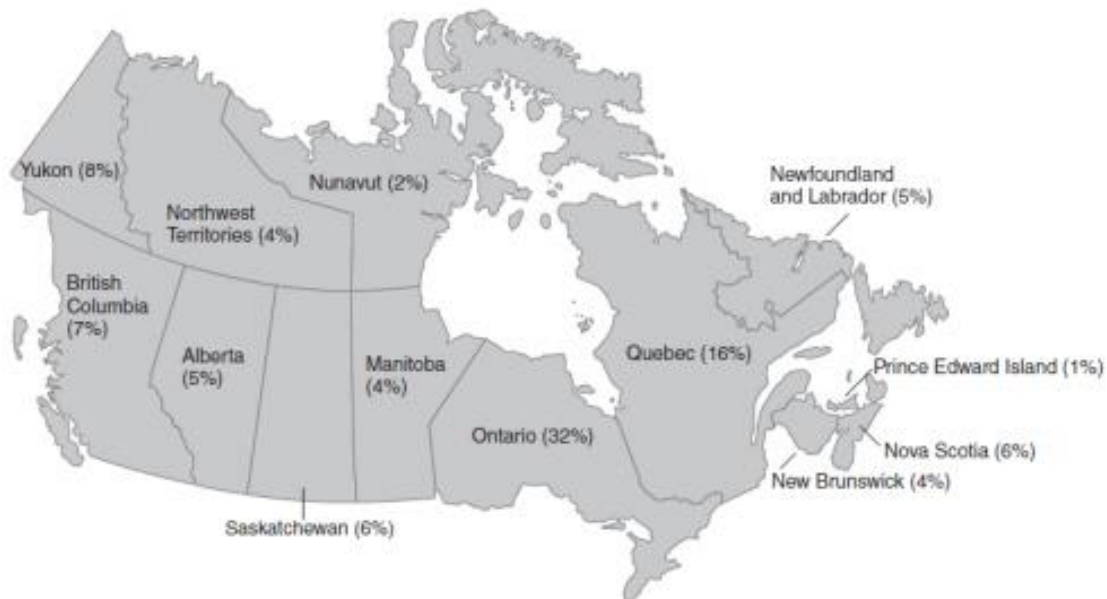


Figure 27: Percentage of CCI workshop participants from each province or territory

Advanced Professional Development Workshop: 45 Canadian and 5 foreign conservators and other museum professionals attended 2 Advanced Professional Development Workshops entitled *Display Cases: Preservation, Sustainability and Design* and *Wet Treatment of Graphic Art on Paper with a Hydrogel of Gellan Gum*.

Internships: CCI offered internships to 18 conservation students or young professionals to improve their theoretical and practical knowledge of conservation:

- 4 Canadians participated in CCI's paid internships
 - 1 in Textiles Laboratory
 - 1 in Objects Laboratory
 - 1 in Fine Arts Laboratory
 - 1 in Preservation Services
- 14 interns benefited from curriculum internships
 - 3 in Conservation Science
 - 3 in Paper Laboratory
 - 3 in Fine Arts Laboratory
 - 3 in Objects Laboratory
 - 1 in Heritage Interiors
 - 1 in Preservation Services

Among the 14 curriculum interns that CCI accepted, 7 were Canadian and 7 were foreign.

Table 3: Performance indicators

Indicator	Results in 2013-2014
Heritage institutions and heritage workers improved their professional knowledge, skills and practices	<ul style="list-style-type: none"> • 83% of participants answered the training evaluation survey • 99% of them reported improvement <ul style="list-style-type: none"> ○ 73% reported significant or very significant knowledge improvement ○ 62% reported significant or very significant professional practice improvement ○ 72% reported significant or very significant skills improvement
Canadian and international heritage institutions and workers used CCI learning programs and opportunities (i.e. took part in CCI learning opportunities)	<ul style="list-style-type: none"> • 210 heritage institutions benefited from CCI learning programs (regional and advanced professional workshops) <ul style="list-style-type: none"> ○ 204 Canadian institutions ○ 6 foreign institutions • 399 individuals participated in CCI internships and learning programs <ul style="list-style-type: none"> ○ 381 from Canada ○ 18 from other countries • More than 2,085 individuals attended CCI lectures or papers presented at conferences and other events <ul style="list-style-type: none"> ○ approximately 755 from Canada ○ more than 1,330 from other countries

Professional Development Highlights

Advanced Professional Development Workshop, Display Cases: Preservation, Sustainability and Design

Display cases, if well designed, can be used to control the environmental conditions for valuable and vulnerable collections, and can help reduce the risk of damage (e.g. from light, climate, theft and vandalism) when objects are on display. For designers, they provide the opportunity to highlight particular objects and to tell a story. Due to the varying functions display cases fulfill, there are many issues relating to their use, such as the need for retrofitting, sustainable approaches to design, leakage measurements, pollutants, humidity control and new lighting technologies.

In November 2013, 23 Canadians and 3 international participants (United Kingdom, Norway and Belgium) attended this four-day Advanced Professional Development Workshop delivered by many CCI experts led by Jean Tétreault, Senior Conservation Scientist, with valuable contributions from partners, including Alessandro Goppion from Goppion S.p.A, Italy; David Thickett from English Heritage, United Kingdom; Chantal Baril from the Canadian Museum of History; and Nancy McCarthy from the City of Ottawa. The workshop consisted of lectures on key issues combined with hands-on exercises, demonstrations and discussions. Participants had the opportunity to examine display cases in context, by visiting the Canadian Museum of History and the Canada Science and Technology Museum.

Advanced Professional Development Workshop, Wet Treatment of Graphic Art on Paper with a Hydrogel of Gellan Gum

Gellan gum is a new method for cleaning works of art on paper that is especially designed for sensitive paper objects that would be damaged if cleaned using traditional methods. The main advantage of the technique is that it optimizes the properties of water by controlling the method and timing of solvent transfer to the paper without altering the object's original morphological characteristics (the surface texture and printing ink marks). Using the Gellan gum method, chemical stabilization of paper can be carried out by means of non-aqueous or aqueous treatments. The latter allow the further extraction of any inorganic and organic acids still present in the cellulose without interfering with the deacidifying and/or reductive bleaching mechanisms.

In partnership with the Art Gallery of Ontario, CCI offered this three-day workshop in March 2014, given by international Gellan gum experts and pioneers of the method, Simonetta Iannuccelli and Silvia Sotgiu, two book and paper conservators at the Istituto Centrale per il Restauro e la Conservazione (ICPAL) in Rome. The workshop combined lectures on key issues with hands-on exercises, demonstrations and discussions. Attendance included 22 Canadians and 2 international participants from the United States.



Figure 28: Gellan gum treatment on graphic art on paper.
© Silvia Sotgiu – Simonetta Iannuccelli Cons. Dpt. ICRCPAL (Rome)

Care of Inuit Collections Workshop

CCI delivered a two-day module on preventive conservation as part of the “Nunavut Heritage Training Institute 2, March 2014,” which took place in Edmonton and was attended by seven participants from Nunavut. This tailored workshop was designed and presented by Elisabeth Joy, Manager, Treatments and Collections Division – Textiles, Archaeology, Objects and Paper, with the assistance of Jessica Kotierk, Archaeology Conservator for the Inuit Heritage Trust.

The Nunavut Heritage Training Program (NHTP) is a professional development project organized by the Inuit Heritage Trust. The purpose of NHTP is to provide training for Inuit and non-Inuit heritage workers in Nunavut so that they may ensure, through their achievement of professional standards and practices, the adequate preservation and presentation of the cultural materials in their care for public access and enjoyment. The NHTP plans and delivers a train-the-trainer workshop for heritage workers from Nunavut, which CCI’s workshop was a part of, as well as introductory museum or heritage training geared toward the needs of the Nunavut heritage community.

Recognition

Thank you both for the wonderful workshop. I have had much positive feedback from our attending visitors. You taught us so much. We often think we know more than we do but you showed us we have a lot to learn. [...] My staff feel empowered now to make some changes that will better protect the things that deserve protection. We are going ahead with some preservation planning including the tiering of the collection to differentiate these things that are more about preservation and those things that are more about access.

Participant, Lighting Display Workshop

I thoroughly enjoyed the Mount Making workshop put on by CCI and the PWNHC (Prince of Wales Northern Heritage Centre). It entirely captured my complete concentration for both days and was very enlightening and productive in terms of hands-on creation and design of museum mounts. What a huge selection of materials to learn about and to use and all necessary tools to experiment with was fantastic. [...] Thank-you very much for hosting and organizing the workshop and opening it up to Northwest Territories organizations.

Participant, Mount-making Workshop

I thought that the course was the single most useful conference/educational trip that I had ever taken part in, and that it provided me with techniques and information that I could make use of immediately on returning to Medicine Hat.

It was perfect – innovative, intensive but enough variety in the lessons. I also enjoyed the different perspectives of the different museum people and approachability of the speakers.

The scope of material presented was *incredibly* enlightening, beneficial and transferable.

Participants, Advanced Professional Display Cases Workshop

Quana for your great hands-on component and presentations on knowledge that I can take home with me and use day-to-day.

Participant, Nunavut Heritage Training Program

SHARING CCI'S KNOWLEDGE — PUBLISHING AND ONLINE RESOURCES

Performance in 2013–2014

Activities – outputs:

Publishing

Training materials: Every workshop includes valuable training materials for participants. In 2013–2014, more than 400 Canadian participants and hosts received training materials, which they could keep for future reference to enable them to care for their objects and collections.

Print Publications: More than 900 CCI scientific and technical print publications were distributed in Canada (65%) and abroad (35%), including the sale of 536 CCI publications. The three most popular publications sold were:

1. *Lighting Methods for Photographing Museum Objects*
2. Technical Bulletin 30, *The Digitization of Audio Tapes*
3. *Mount-making for Museum Objects*

Online Resources: There were 739,414 unique visitors to CCI's website who visited a total of 952,894 pages. More than 498,500 of these visitors consulted learning material documents designed for the heritage community, which represents an increase of 63% compared to fiscal year 2012–2013. As part of its web accessibility compliance, CCI improved search engine optimization and implemented better document tagging features. The former helps clients find content easier, and the latter helps CCI identify the content that is most frequently accessed by clients. Both factors help to explain the increase in online content usage.

Online conservation resources represented 2,125 web pages and these pages were consulted 622,391 times. The most consulted online resources were [Conservation Resources](#) web pages (248,968 unique visitors) and [CCI Notes](#) (226,565 unique visitors).

Top Three Online Resources:

1. Caring for Objects and Collections, *Agent of Deterioration: Light, Ultraviolet and Infrared* (consulted 33,042 times)
2. Caring for Objects and Collections, *Agent of Deterioration: Physical Forces* (consulted 11,954 times)
3. Caring for Objects and Collections, *Agent of Deterioration: Incorrect Relative Humidity* (consulted 1,632 times)

Top Three CCI Notes:

1. *Care of Objects Made From Rubber and Plastic* – CCI Note 15/1 (consulted 13,449 times)
2. *Removing Mould From Leather* – CCI Note 8/1 (consulted 10,525 times)
3. *Care of Ivory, Bone, Horn, and Antler* – CCI Note 6/1 (consulted 9,754 times)

Library Services: In addition to supporting the research and library requirements of CCI staff (the library's primary clients), CCI's library handled 236 requests for services from external clients:

- 157 books were loaned
- 66 articles were distributed
- 13 reference questions were answered

Table 4: Performance indicators

Indicator	Results in 2013-2014
Canadian and international heritage institutions and workers used CCI's learning materials	<ul style="list-style-type: none">• 935 printed learning materials were distributed• 498,544 unique visitors consulted 2,125 online learning materials

Publishing Highlights

CCI Notes Updates

CCI Notes deal with topics of interest to those who care for cultural objects and offer practical advice about issues and questions related to the care, handling and storage of cultural objects. The following CCI Notes were updated:

CCI Note 9/5 [*Tannic Acid Coating for Rusted Iron Artifacts*](#) (formerly published under the title *Tannic Acid Treatment*) was reviewed and updated to clarify the scientific content and to improve the safety precautions for the treatment.

CCI Note 13/1 [*Textiles and the Environment*](#) was updated to include more details on protecting textiles from light, ultraviolet and infrared; incorrect relative humidity; incorrect temperature; and pollutants. Information on protecting textiles from pests and physical forces was also added. This CCI Note was updated in conjunction with the review and update of the materials for CCI's Caring for Textiles Regional Workshop, which was delivered in Montréal in March 2014.

[*Online Resources for Flood Response*](#)

CCI offers [*emergency advice*](#) to Canadian museums and heritage institutions dealing with floods or other disasters, and can provide guidance on salvage and recovery of objects and collections. During the devastating floods in southern Alberta in June 2013, CCI was in regular contact with the Alberta Museum Association (AMA). The AMA indicated that both heritage institutions and citizens were seeking online resources to help them properly care for and protect their objects. CCI compiled and published a list of online resources to help those seeking information on salvaging valuables.

[*Technical Bulletins and Symposia Materials Made Available Online for Free*](#)

To ensure that the greatest number of heritage employees and professionals have access to CCI's resources, the majority of [*CCI Technical Bulletins*](#) and all [*CCI symposia and colloquia*](#)

[proceedings](#) were made available online for free, similar to the approach taken for CCI Notes in 2010.

CCI Technical Bulletins share techniques and principles of conservation on topics of a specialized technical nature to assist heritage professionals in the preservation of the cultural artifacts under their care. New CCI Technical Bulletins will continue to be sold for a period of five years on a partial cost-recovery basis. After that time, they will also be made available for free. Providing these resources online for free will allow CCI to better share the expertise gained through research and treatments.

CCI symposia have provided opportunities to explore conservation issues and topics with the heritage community. The proceedings from these symposia are now available online at no cost so that the information can further reach our clients and continue to contribute to the dialogue on conservation interests.

External Publications

The 18 CCI scientists and conservators identified in bold below wrote or contributed to 11 articles in professional journals in science and conservation.

Binnie, Nancy, Elizabeth Moffatt and Alastair Fox. “Restoring the Colour of Fredericton City Hall National Historic Site: A Successful Communication of Paint Archaeology Findings for Windows and Associated Decorative Elements.” In *5th International Architectural Paint Research Conference: Innovation Through Baseline Proficiencies, Stockholm, Sweden, 12–15 March, 2014: Preprints*. Stockholm, Sweden: Archetype Publications, 2014.

Dancause, Renée, and **Jan Vuori**. “Lessons Learned: The Use of 20 Denier Nylon Net in the Treatment of Two Oversized Flags.” In Sarah C. Stevens, comp., *Conserving Modernity: The Articulation of Innovation, 9th North American Textile Conservation Conference (NATCC), San Francisco, California, November 12th–15th, 2013: Preprints*. NATCC: San Francisco, California, 2013.

Down, Jane, Joe Iraci and **Greg Hill**. “Photographic Activity Tests of Various Adhesives Suggested for Use on Water-sensitive Photographs.” *Topics in Photographic Preservation* 15 (2013), pp. 475–483.

Helwig, Kate, Valery Monahan, **Jennifer Poulin** and Thomas D. Andrews. “Ancient Projectile Weapons from Ice Patches in Northwestern Canada: Identification of Resin and Compound Resin-ochre Hafting Adhesives.” *Journal of Archaeological Science* 41 (January 2014), pp. 655–665.

Lambert, Simon, and **Eric Hagan**. “Optimising Climate Control for Canadian Collections.” *Muse* (November/December 2013), pp. 38–45.

Michalski, Stefan. “Stuffing Everything We Know About Mechanical Properties Into One Collection Simulation.” In Jonathan Ashley-Smith, Andreas Burmester and Melanie Eibl, eds., *Climate for Collections: Standards and Uncertainties*. London, UK: Archetype Publications, 2013.

Poulin, Jennifer, Carole Dignard and **Kate Helwig**. “Identification of White Efflorescence on Wooden African Objects.” *Studies in Conservation* 59 (2014), pp. 69–78.

St-Jacques, Doris, Maria Bedynski, Lynn Curry and **Season Tse**. “A 1763 Illuminated Haggadah Manuscript: How Ineffective Past Treatments Resulted in an Antioxidant Research Project, Impacting Current Treatment Decisions”. In Lieve Watteeuw and Christa Hoffman, eds., [*Paper Conservation: Decisions & Compromises: International Council of Museums – Committee for Conservation \(ICOM-CC\) Graphic Document Working Group – Interim Meeting, Austrian National Library, Vienna, 17–19 April 2013*](#). ICOM: Vienna, Austria, pp. 17–20.

Strang, Tom. “Mould Risk to Cultural Property – On the Problem of Defining Adverse Environmental Conditions and Potential for Harm.” In *36th International Symposium on the Conservation and Restoration of Cultural Property – Microbial Biodeterioration of Cultural Property: Recent Topics on the Investigation of and Countermeasures for Biodeterioration of Outdoor/Indoor Properties and Disaster-affected Objects*. Tokyo, Japan: National Research Institute for Cultural Properties, Tokyo, 2013, pp. 149–166.

Sullivan, Kathleen, W. Ross McKinnon and **Lyndsie Selwyn**. “Carbon Dioxide Absorption in Alkaline Treatment Solutions for Archaeological Iron.” In E. Hyslop, V. Gonzalez, L. Troalen and L. Wilson, eds., *Metal 2013: Interim Meeting of the ICOM-CC Metal Working Group Conference Proceedings, 16–20 September 2013, Edinburgh, UK*. Edinburgh, UK: Historic Scotland, 2013, pp. 77–84

Tétreault, Jean, A.-L. Dupont, **Paul Bégin** and S. Paris. “The Impact of Volatile Compounds Released by Paper on Cellulose Degradation in Ambient Hygrothermal Conditions.” *Polymer Degradation and Stability* 98 (2013), pp. 1827–1837.

Recognition

On behalf of the organizing committee of the 40th Annual Symposium of the Ontario Archaeological Society, please accept our most sincere appreciation for participating in the bookroom [...]. The services and publications of the Canadian Conservation Institute are well known in our profession and always add a high degree of professionalism to any conference.

Coordinator, Professional Association, Ontario

I just want to [...] tell you how much we appreciated your help, in figuring out the proper set up for our [author's name] books. Your ability to explain over the phone what we needed was quite incredible. [...] your “Lighting Methods” publication was exactly what we need when we were feeling overwhelmed by our personal work schedule and a brand new digital photo studio filled with lots of unfamiliar equipment and no on-site photographer. [...] Your book is an incredible resource that you should be very proud of.

Conservator, National Museum, Canada

Congratulations on the publication of your study of the Jack Chambers paintings in *Studies in Conservation*. [...] It is a really excellent article which I have just read with great interest. The research and analyses are very impressive and clearly described. Jack Chambers was a wonderful artist and you've added a great deal to our knowledge about his materials and methods.

Conservation Scientist, Canada

CORPORATE INITIATIVES

Corporate Initiatives Highlights

Collection Salvage Assistance, Museum of the Highwood, High River, Alberta

The southern Alberta floods of June 2013 impacted several heritage institutions. The Museum of the Highwood in High River was hit especially hard. Artifacts in the museum basement and its collection in an off-site basement storage area were submerged for up to two weeks, coated with mud and badly damaged in many cases. Remarkably, the museum's exhibitions and archives on the main floor were spared. While museum staff were responding to the effects of the flood damage to the museum and collections storage, they were also dealing with personal losses from the event.

Irene Karsten, Preservation Development Advisor, flew to High River in July 2013 to help manage collections salvage at the off-site storage facility. She assisted Irene Kerr, Museum Director/Curator, Museum of the Highwood, and crews from Belfor, a restoration company contracted to assist with the salvage and complete the restoration of the museum facilities. Conservators from Edmonton and Calgary were joined later by CCI's Greg Hill, Senior Conservator, Paper, to assess which artifacts could be conserved for future display and which were damaged beyond repair. Conservators also worked with crews to clean the mud from artifacts that could be saved, which included several items of particular significance to the community, like the hat of Calgary Stampede founder, Guy Weadick. CCI's conservators stayed on-site until the entire collection had been moved from the basement and cleaning was almost complete. In recognition of their contribution in the face of this natural disaster, Irene Karsten and Greg Hill were presented with the Deputy Minister's Inspiration Award.



Figure 29: Museum of the Highwood collections storage area after the flooding in June 2013: shelves collapsed and artifacts toppled over onto each other and into the aisles.
CCI 125856-0009



Figure 30: CCI Senior Conservator and a volunteer clean a saddle salvaged from the Museum of the Highwood basement after the floods of June 2013.
CCI 125856-0091

Road to 2017

CCI continues to proactively seek heritage objects and works of art linked to anniversaries leading up to the 150th anniversary of Confederation in 2017 for conservation treatment services. In 2013–2014, more than 20 such heritage objects were selected. Among the completed treatments related to the centennial of the First World War there were three gas masks; a pair of boots belonging to General Georges Vanier, Royal 22e Regiment Commander; the flag of the 82nd Overseas Battalion; and a military jacket of the 4th Battalion, Canadian Mounted Rifles. All of these objects have been returned to their respective museums for exhibition as part of First World War commemoration events.

Ministerial Visit

CCI welcomed the Honourable Shelly Glover, Minister of Canadian Heritage and Official Languages, in August 2013, only weeks after her appointment to the position. Meeting with all CCI staff and witnessing first-hand their passion for their work, Minister Glover commented that the work entrusted to CCI was in “good hands!”



Figure 31: During her visit, Minister Glover learned about the conservation of the “Confederation Quilt” (part of the collection of the Kings County Museum in Hampton, New Brunswick) which is made from scraps of the fabrics used to make the gowns worn by many ladies of Charlottetown to the balls and galas at the Confederation Conference in Charlottetown, 1864. CCI 125964-0017

Communication and Public Relations

Social Media

September 2013 marked the one-year anniversary of CCI’s foray into the use of social media. With more than 1,400 “likes” on the English and French Facebook pages in the first year, the number grew to 2,160 by the end of this fiscal year. This represents an increase of 54% in the number of “likes” since the end of the previous fiscal year.

As the use of social media becomes an increasingly popular approach for sharing government information, CCI has continued to showcase conservation treatments as well as

other conservation research and projects to highlight objects, heritage institutions and the importance of conservation in preserving Canada's rich history.

Of particular interest over the past year were the Facebook posts about the *National Geographic* interview with Nancy Binnie, Senior Conservator Scientist (with a reach of 1,355 views); the meeting between astronaut Chris Hadfield and Jennifer Poulin, Senior Conservation Scientist (with a reach of 1,315 views); and the CTV News interview with Irene Karsten, Preservation Development Advisor, during salvage work following the High River flood (with a reach of 1,080 views).

CCI Website

As part of CCI's ongoing work to deliver a website that provides clients with conservation resources in a user-friendly manner, we continued to enhance web accessibility and usability. Notable among this work was achieving Web Content Accessibility Guidelines (WCAG) compliance for CCI's library catalogue and staff bibliography content—making it among the first federal libraries to comply with the WCAG standards.

By increasingly delivering CCI information and conservation resources online through our website, we continue to serve clients and align with the Government of Canada's procedures for publishing. After analyzing sales and trends, as well as overall printing, publishing and warehousing costs, CCI established a plan for ensuring clients receive the information they need to care for their objects and collections while reducing these costs. Providing all CCI symposia materials and most CCI Technical Bulletins online for free were key components of this plan.

Doors Open Ottawa

CCI's participation in Doors Open Ottawa proved successful for a fifth straight year. Not only did the day provide an opportunity for visitors to see up close the work of the Institute, but it also afforded the opportunity for CCI staff to share their enthusiasm and passion for their work while showcasing clients' objects and projects. A number of objects undergoing conservation or analysis, including three paintings associated with the Group of Seven, the Confederation Quilt and the Niagara Falls panoramic photograph, were featured and thoroughly enjoyed by the more than 289 visitors who came to CCI.



Figure 32: Doors Open visitors listening to explanations from CCI intern, on the kindling basket treatment. CCI 126922-0002

[*CCI e-news*](#)

234 new clients registered for *CCI e-News*. The distribution list now comprises 8,418 clients, of which 38% are from Canada and 62% are from other countries.

[*Client Services*](#)

CCI staff responded by telephone or email to 931 requests for information, of which 693 were for scientific and/or technical advice.

[*Human Resources*](#)

[*Arrival of New Director General*](#)

CCI was thrilled to welcome new Director General Patricia Kell to CCI in January 2014. Patricia Kell brings to CCI nearly 25 years of experience in a wide variety of jobs with Parks Canada. Her most recent positions included Director of Heritage Conservation and Director of the National Historic Sites Policy Branch. Her academic credentials, which include Master's degrees in museum studies and in science as well as a Doctorate in history, are especially well suited to the unique mandate of CCI.

[*Building*](#)

[*BOMA Certification*](#)

In July 2013, CCI proudly received Level 1 BOMA BEST certification. The BOMA BEST Program is a national environmental recognition and certification program for commercial buildings in Canada. The program critically assesses six key environmental performance and management areas: 1) energy, 2) water, 3) waste reduction and site enhancement, 4) emissions and effluents, 5) indoor environment and 6) environmental management system.

BOMA BEST Certification demonstrates that CCI is moving towards sustainability in energy and environmental performance through sound management.

[*Media Coverage*](#)

Media coverage in 2013–2014 highlighted CCI's work in the field—both on land and under water—as well as the return of several paintings and objects treated at CCI which were of particular importance to local communities.

For instance, two paintings by famed Group of Seven members—Franklin Carmichael's *Spring Snow* and Lawren Harris' *Near Mongoose Lake, Algoma*—as well as a painting by Tom Thomson, *Algonquin Park*, underwent examination, analysis and treatment by a team of conservation experts at CCI. The paintings belong to the McMaster University Museum of Art, and not only did McMaster highlight CCI's work in their summer 2014 university newsletter and [museum blog](#), but the *Hamilton Spectator* featured the work in "[Historic Paintings Brought Back to Life at Mac](#)."

Also noted in the media was the [Japanese cabinet](#), with intricate metal wiring and hand-carved ivory panels depicting Japanese life, that belongs to Eldon House, an historic site in

London, Ontario. The return of the cabinet was celebrated in London and [highlighted in the local media](#) after extensive conservation at CCI over 18 months.

Media interest extended to CCI's work in the field through coverage on [salvage and recovery efforts during the flooding in High River](#) (two articles in the *High River Times*, [July 9, 2013](#) and [July 10, 2013](#), the *Calgary Herald* and CBC Radio); [archaeological excavations in Kangiakallak \(described here\)](#); and the underwater archaeology and conservation of the [Hamilton and the Scourge War of 1812 shipwrecks](#) (*National Geographic* and *Diver Magazine*).

Awards and Recognition

External Awards and Recognition

Marie-Claude Corbeil, Manager, Conservation Science Division, was highlighted in a 2014 calendar produced by the International Centre for Diffraction Data to celebrate the international year of crystallography. The section about Marie-Claude and CCI's work describes how X-ray diffraction plays a key role in the study of works of art and museum objects to answer questions related to the stability or deterioration of materials used, the date of execution or manufacture, country of origin or material history of the objects.

CCI Awards

CCI Technical Achievement Award

Implementation of the Image Management System

Carl Bigras, Senior Scientific Documentation Technologist, received the CCI Technical Achievement Award for his leadership and professionalism to develop and implement the Image Management System (IMS), a useful tool to manage and access thousands of images needed by CCI staff to perform their work. He was responsible for selecting an image management program and implementing its use. IMS has been fully functional and available to all staff since the end of fiscal year 2011–2012.

CCI Director General Excellence Award

The Director General Excellence Award recognizes an exceptional contribution to the achievement of CCI's mission, goals and objectives. This year, it was presented to Sean Coyne, English Editor-Writer, Client Relations and Professional Development Division, for consistently demonstrating high quality work through his technical editing expertise, particularly for his work on the upcoming CCI publication *Adhesives Compendium for Conservation*. The award also recognized Sean Coyne for his ability to inspire a "teamwork" attitude and for his marked contribution to employee morale.



Figure 33: From left to right: Patricia Kell, Director General, and Sean Coyne, English Editor-Writer. CCI 101363-0094

Recognition

I would therefore like to thank CCI again for the expertise it makes available to the museum and academic community. The skill of your staff as well as the wealth of information one can find on the CCI website are first class resources, and I can guarantee that your work is not done in vain. The tour provided by [CCI Scientific Documentation Technologist] was an enriching experience and all of it was perfectly in line with the course I am teaching entitled *Collection et Conservation* [...].

Professor, Museology and Heritage University Program, Quebec

Amazing, educational...

You people are so knowledgeable

This site is one of the best

We only visited this building and it was fabulous, staff were the best

Various comments from visitors, Ottawa Doors Open, 2013

PARTNERSHIPS AND COLLABORATIONS

Performance in 2013–2014

Big Stuff Conference

Big Stuff is an international triennial meeting that focuses on the conservation of world technology heritage. The 2013 Big Stuff Conference was held in Ottawa and hosted by the Canada Science and Technology Museums Corporation (CSTMC) under the theme “Saving Big Stuff in Tight Economic Times.” It was attended by about 70 conservators, collections managers, curators and architects from around the world, many from archaeology and industrial heritage sites, and science and technology, military, ship and aviation museums.

Elisabeth Joy, Manager, Treatments and Collections Division – Textiles, Archaeology, Objects and Paper, assisted Sue Warren, Manager, Conservation Division, CSTMC, with the organization of the conference papers and tours. Over 30 presentations were given during the three-day conference, covering conservation topics on objects ranging from the space shuttle orbiter to an 1812-era gunboat to mining equipment in the Yukon. Irene Karsten, Preservation Development Advisor, gave a presentation describing CCI’s risk management approach to the industrial sites and heritage sector, including examples from the CSTMC risk assessment project that is currently underway. The conference was also an opportunity for CCI experts to have discussions with members of the international conservation community on emerging trends, such as green building products that may increase the capacity for passive environmental control. As part of the event, CCI also hosted a tour of its facilities.

Etruscan Wall Paintings at Caere, Italy

A new excavation campaign at the ancient Etruscan city of Caere, near the town of Cerveteri, Italy, was initiated in 2012 under the direction of the Department of Classics at Queen’s University. As part of the excavation, Barbara Klempan, Associate Professor, Art Conservation, Queen’s University, documented wall paintings in a rectangular niche in an underground sanctuary called the *Hypogaeum of Clepsina* and removed microscopic samples for future analysis. The paintings in the niche date from the third-century BCE and may be the earliest recorded wall paintings of a non-funereal nature from the Hellenistic era.

A team of CCI scientists, led by Kate Helwig, Senior Conservation Scientist, analyzed a selection of samples from the niche to determine the painting materials and techniques and to investigate the condition of the wall paintings. The project provided an excellent opportunity for collaboration between CCI and the Queen’s University’s Art Conservation Program.

Analysis indicated that the paint was likely applied *a secco* using lime water. Complex mixtures of earth pigments, charcoal black and Egyptian blue were used to achieve a subtle range of colours. Overall surface blanching is caused by a hard, insoluble accretion composed of finely precipitated calcium carbonate and silica, produced by slow leaching of calcium and silicon from the environment. Because the accretion layer does not obscure the paintings, and in fact functions as a protective coating, the decision was made to leave it in place. The results of the study were presented at the 2014 annual conference of the Canadian Association for Conservation, Québec City.



Figure 34: Removal of a microscopic sample from one of the wall paintings in an underground sanctuary called the *Hypogaeum of Clepsina* in the ancient Etruscan city of Caere. ©Photo: B. Klempan

International Centre for the Study of the Preservation and Restoration of Cultural Property Forum on Conservation Science

CCI was one of the 15 partners who, together with the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM), organized the ICCROM Forum on Conservation Science. Partners included cultural heritage organizations such as national heritage agencies, research institutions and universities from 14 different countries. Marie-Claude Corbeil, Manager, Conservation Science, and Charlie Costain, Director of Research, Conservation and Scientific Services, represented CCI in planning and organizing the event. The Forum took place from October 16 to 18, 2013, in Rome, Italy. Eighty participants from more than 25 countries, including Marie-Claude Corbeil and Stefan Michalski, Senior Conservation Scientist, convened to reflect on the relevance and impact of science within cultural heritage conservation worldwide. Several topics were discussed, including needs assessment and strategies, and the impact of research on conservation practice, education and dissemination. Participants explored ways in which to develop effective strategies for needs assessment, research planning, and capacity building at the national and international level.

Recognition

The view that what we are engaged in with our aircraft restoration is not so much bringing the airplanes back to a shiny and original state, but we are preserving them as storytelling representatives of a time, experience, technology and culture is even clearer to me now. I loved hearing the amazing range of conservation efforts from the hard science to the simplicity of water removal with plastic buckets by a group of such passionate, motivated and skilled people from around the world is exciting and inspiring. Thank you so much for the invitation, for your hard work and for creating the opportunity for me to benefit from it all.

President, Heritage and Conservation Organization, Alberta

Thank you for your ongoing commitment to our Canadian training programs, and our students. [...] The positive energy and enthusiasm exhibited by CCI staff was inspiring. [...] Our students are excited to do well in their studies. Thank you for providing such iconic context for the care and preservation of Canadian collections.

Program Coordinator, University Conservation Program, Canada

Financial Statement for 2013–2014

Program Budget

Operating Budget

Program operations	6,165,752
Custody of real property to PCH-CCI	2,308,697
Crown asset funds	0
Total – Operating budget	8,474,449

Program Support and Employee Benefits

Program Support	347,248
Employee Benefit Plans	1,228,722
Total – Program Support and Employee Benefits	1,575,970

Total – Net Program Budget	10,050,419
-----------------------------------	-------------------

Program Expenditures

Operating Expenditures

Salaries	5,807,696
----------	-----------

Non-Salary

Building operations ¹	1,824,736
Program operations ²	1,079,775
Earned Revenues ³	-598,032

Total – Non-Salary Expenditures	2,306,479
--	------------------

Total – Net Operating Expenditures	8,114,175
---	------------------

Program Support and Employee Benefits

Program Support	347,248
Employee Benefit Plans	970,471
Total – Program Support and Employee Benefits	1,317,719

Total - Net Program Expenditures	9,431,894
---	------------------

Crown asset transfer to Fiscal Year 2014–2015 ⁴	0
--	---

Total balance	618,525
----------------------	----------------

Note: This is not an audited financial statement.

Footnotes

¹ Real property operating costs for CCI.

² Program operations include the following: transportation and communication (telephone, courier, travel including museum and site visits, conference attendance, professional association business, and travel for training and emergency services), information (printing, publishing, advertising), rentals, repairs and maintenance, equipment, material and supplies and professional services (including contractual work, consulting and advisory contracts).

³ Earned revenues include, but are not limited to, Workshops, Publications and Library Services (79,314) and Conservation and Scientific Services (505,776).

⁴ Unused funds for crown asset transferred to FY 2014–2015.