

# Music to Our Eyes

## Providing metadata for digitized sheet music using MARC and Dublin Core

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### Introduction

This is a case study of a digitization project undertaken by the University of Colorado at Boulder's Music Library involving three of its sheet music collections. As one of the earliest projects sponsored by the Colorado Digitization Program (CDP), this project was instrumental in helping to formulate best practices guidelines for subsequent digitization projects.

This case study will review the project from the perspective of cataloging and metadata creation, and will highlight some of the more important issues encountered during the course of the project. The study will introduce the institutions and key players involved, will provide an overview of challenges encountered, the methods and procedures used to resolve them, and finally, will offer recommendations for other digitization projects. The appendix to the case study will show an example of how one piece of sheet music is represented through each phase of the cataloging process.

The information presented in this case study is intended for anyone who is involved in metadata creation and management.

### Background

#### *Institutional background*

The Howard B. Waltz Music Library at the University of Colorado at Boulder houses one of the largest and most important music research collections between Chicago and Los Angeles. In addition to recordings, books and periodicals, it has a sheet music collection of approximately 150,000 items, many of which date back to the late 18<sup>th</sup> century.

#### *Collections background*

Three collections of popular American music from the 19<sup>th</sup> and 20<sup>th</sup> centuries represent an important part of the Waltz Music Library's research materials. While the Ingram Collection stands alone as a print sheet music collection, the digitized Colorado and Ragtime collections

are derived from five separate sets of printed sheet music owned by, and/or donated to, the library: Dry, Hartke, Krolek, Sister Mary, and the library's basic Musicpop collection.

The sheet music in these collections features lyrics and illustrations based on certain recurring themes that highlight the state of Colorado through its history, its natural beauty and/or the pleasure of returning to one's home there:

- 1) The **Ingram Collection** contains sheet music published by the Tolbert R. Ingram Music Company in Denver, Colorado between 1900 and 1915. The Ingram sheet music in this collection represents approximately one-half of the known output of this local publisher.
- 2) The **Colorado Collection** contains sheet music written specifically about the state of Colorado and published before 1923. Some of the music in this collection is also found in the Ingram Collection since some of the titles published by Ingram were songs written about Colorado.
- 3) The **Ragtime Collection** contains sheet music composed between 1890 and 1920 as either a piano rag or a ragtime song. These tunes were popular in Colorado during the turn of the century.

## Key Actors

The following organizations played an important role in finding solutions to the issues and challenges associated with the digitization project:

The Colorado Digitization Program (CDP) supports the collaborative efforts of Colorado's archives, historical societies, libraries, and museums to provide access to collections through digital technologies. Through the CDP's working groups, best practices guidelines, collaborative resources and grants, cultural heritage institutions are able to unlock the potential of their collections and maximize their investment in technology.

The project team at the University of Colorado at Boulder included: a project manager, a music cataloger, student employees, as well as faculty and staff from both the Cataloging Department and the Systems Department of the University Libraries. Their roles on the team were as follows:

- *Project manager* – responsible for overall project planning, direction, training, cataloging, and the quality control of both the scanning and the cataloging.
- *Music cataloger* – cataloged the original sheet music and programmed the macros used for creating the bibliographic records for the electronic versions.
- *Student assistants* – performed the majority of the scanning and cataloging of the electronic versions; a Masters student in the Music Department assisted in the design and programming of the project's Web site.

- *Libraries' Cataloging Department* – advised on cataloging strategies and on development of the metadata crosswalk from MARC to Dublin Core.
- *Libraries' Systems Department* – aided in the decision making on database issues and equipment.

## The Challenges

There were four major planning issues that needed to be resolved before work on the project could begin. One issue was whether to create a stand-alone database for the digitized collections, or whether to integrate the records for the sheet music into Chinook, the library's local online catalog. The second issue concerned which cataloging format to use: the *MARC 21 Format for Bibliographic Data* or the Dublin Core (DC) metadata standard. The next issue was whether to create combined or separate bibliographic records for each version (print and digitized) of the sheet music. Finally, the study will address issues related to the content and coding of the bibliographic records themselves – namely, controlled vocabularies, the OCLC encoding level, and the use of locally-defined fields.

## Methods & Procedures Used

### *The database*

Management of the bibliographic records in this project was an important concern. Creating a separate database for the sheet music was an option explored but ultimately discarded because of the time and personnel it would have required to design a stand-alone database. At that time, Innovative Interfaces, Inc. (III), the library's bibliographic utility, was expected to develop a new system that would enable images to be added to bibliographic records. It was thought that the library could potentially migrate to that system if/when it became available. Consequently, bibliographic records were created in Chinook, the library's existing online catalog database.

Designing the project's Web site was also a factor in choosing whether to develop a separate database. It was decided that each piece of sheet music would have its own Web page, and would be accompanied by basic descriptive metadata: title, composer/lyricist, edition, publication information, physical description, and the collection name (if applicable). A hyperlink to the full bibliographic record would also be provided. In order to have the basic bibliographic information display on the Web page for each piece of music, that information needed to be stored somewhere outside of the library's catalog. A tab-delimited data file was produced through the use of a macro that extracted the basic metadata for the Web page from the MARC record; this file is then presented on the Internet using a Perl script (see Appendix, #1 for an example of the display). Because the script uses one central data file to present the records on the Web site, information can be updated on that same file, as opposed to changing the HTML file for each individual piece of sheet music. Another advantage to Perl scripting is its strict architecture, which results in consistent presentation of content. This consistency improves usability, decreases the necessity for human intervention, and thereby reduces instances of human error during data entry. Finally, the dynamic qualities

of Perl script allow the presentation to be easily changed. Fields can be added or deleted with only a few changes to the data file and the script. For instance, if, in the future, the library wanted subject headings to display on the Web page for each piece of music (see Appendix, #1 for an example), the script would only need to be modified once.

### *Cataloging & metadata creation*

#### MARC or DC format

Because the CDP exclusively uses the Dublin Core metadata standard for its *Heritage* database, one of the first decisions facing the planning team was whether to create records directly in Dublin Core and translate them into MARC for the library catalog, or vice versa. The decision was made to use MARC for this project because the library's staff had more expertise in MARC than in Dublin Core and because most of the CDP participants at the time were using the MARC format and were able to map it into Dublin Core by means of a metadata crosswalk (see Appendix, #4).

#### Combined or separate records

While brief bibliographic records existed for some of the original sheet music, most of the items in the collections had never been cataloged and were therefore inaccessible through the library's online catalog. As such, the project would require the creation of original records for the majority of the sheet music. The main concern, according to project manager, Marcelyn H. D'Avis, was to avoid having to catalog each piece of music twice—once for the paper format and once for the digitized format. But because the principal goal of this project was to make the digitized music scores accessible to a broader remote audience (e.g., for both formal and informal educational and research activities), it seemed more appropriate to create separate records for each version.

Once a bibliographic record for the original print version was exported from OCLC or created locally, macros were used to facilitate the creation of a new record for the digital version. Relevant information was extracted from the original record for the new record such as author(s), title(s), edition, physical description, and subject headings. While only the bibliographic records for the print versions of the sheet music are currently available in OCLC, the library intends to add the records for the digital versions to OCLC's database at a later date.

The macros were created in OCLC's Passport for Windows. The first macro was developed to provide the constant data related to the electronic version of the sheet music, which included both fixed and variable fields, and the following MARC tags: 007, 533, 539, 856, and various local 9XX tags. These data were created in accordance with the standards established by the *Anglo-American Cataloguing Rules*, the *Library of Congress Rule Interpretations*, and OCLC's *Bibliographic Formats and Standards*. Other adjustments were done manually, such as adding the 245 \$h (General Material Designation, "electronic resource"). A second macro was written to add information to the tab-delimited data file for the records appearing on the project Web site, as described in the 'Database' section above.

### Controlled vocabulary

The use of controlled vocabularies is crucial to consistent and accurate search and retrieval. Because much of the music covers recurring topics and the same geographic areas, the project manager compiled a list of valid subject headings from the *Library of Congress Subject Headings*. Students were then able to apply these subject headings as needed. Whenever possible, established name authority headings were used for personal and corporate author names. Time and budget constraints did not allow for the creation of name authority records when an established form of a name was unavailable. In cases where no authorized heading was found in OCLC's name authority file, the names were entered, as access points, in a form that did not conflict with other unrelated names. For quality control, all student work was revised by the project manager, a professional cataloger.

### Encoding level

All the bibliographic records conform to OCLC's encoding level 'K' standard. This represents less-than-full level cataloging primarily because a local call number (099) was assigned to each record and, in some records, unauthorized personal/corporate author headings were used. Full-level cataloging would have required the use of a standard LC classification number and authorized headings for personal name and corporate author entries.

### Locally-defined fields

The MARC bibliographic records for the digital versions were subsequently sent via File Transfer Protocol (FTP) to the CDP, where a metadata crosswalk was used to map each MARC field to a corresponding Dublin Core element (see Appendix, #4). Certain Dublin Core elements are now considered to be mandatory by the CDP, as outlined in its *Western States Dublin Core Metadata Best Practices*. At the start of this project, the Library was not certain it wanted all of the information in these mandatory elements displayed in the local catalog. For that reason, locally-defined 9XX fields were used (see below). As more experience is gained in cataloging electronic reproductions, some of these decisions could be reconsidered in light of evolving cataloging practice. The purpose of this section, therefore, is two-fold: to outline the 9XX fields used in the initial project, but also offer alternative encoding based on current practice.

**975 (DC element = Type):** records the nature or genre of the work using a controlled vocabulary. While this initial project used a local 975 field for this information, subsequent projects will take advantage of the 655 field and will cite the controlled vocabulary used (Dublin Core Types Vocabulary) in the subfield \$2 (as per p.36 of the *Best Practices* guidelines):

655 #7 \$a image \$2 dct

655 #7 \$a text \$2 dct

**976 (DC element = Format.Use):** identifies the electronic format of the resource being described. This initial project used the phrase “web browser.” Subsequent digitization will employ the 856 subfield \$q and will follow *Western States Dublin Core Metadata Best Practices*, using the Internet Media Type terminology, “image/jpeg.” The Library will also put a mode of access note in a 533 \$n (“Mode of Access: World Wide Web), which would map to Dublin Core’s ‘Relation.Requires’ element.

**977 (DC element = Description.Abstract):** records information about the publisher of the original print version. Future projects will encode this information in a 520 Summary Note field.

**978 (DC element = Format.Creation):** records the file format and file size of the archival and access images, as well as the type and model of the scanner used for the digital imaging. For the purposes of crosswalking, this information was reformatted from the 533 \$e and \$n subfields.

## Recommendations

Many of the issues encountered over the course of the project resulted from the experimental nature of the work involved. The Music Library is currently proceeding with its second digitization project with CDP, and will continue to use the MARC format and macros for creating new records. Catalog records will also continue to be sent to CDP via FTP for mapping into Dublin Core. Some recommendations:

1. Research as many similar projects as possible to see how the metadata creation is handled.
2. Be realistic about staffing and different levels of expertise. In all likelihood, your project will require people with specific knowledge of electronic resources and/or special formats cataloging and database/Web site design, as well as people to do basic data entry.
3. How many records will be created for the *Heritage* database? Decide whether it would be easier to enter the data directly into DCBuilder rather than using another format with a metadata crosswalk.
4. Be flexible. Be prepared to make changes to your plans as you begin to work. You will not be able to anticipate all of the issues you will encounter. Thorough research

- will help to identify some metadata-related issues that are common to most digitization projects, but institution-specific issues may not be identifiable beforehand.
5. If several groups or departments are involved with the project or any of its parts, ensure that communication is open and that the scope of the project is understood by all.
  6. Take all possible security measures to protect the data related to the digitized objects.
  7. If you create your records using a metadata scheme other than Dublin Core, do a test run of your crosswalk to ensure that all fields map to their appropriate element(s) in Dublin Core.

## Summary

Three unique collections of 19<sup>th</sup> and 20<sup>th</sup> century sheet music from the Music Library of the University of Colorado at Boulder were digitized and made accessible through CU's local online catalog, Chinook, and the CDP's *Heritage* database. This digitization project represented a first-time attempt by both institutions to create catalog records for digitized versions of printed sheet music materials.

This project was an innovative undertaking for the personnel involved, both at the Music Library at CU-Boulder as well as the staff at CDP who were instrumental in providing guidance through each phase of the digitization project.

The digitized sheet music collections are presented on the project Web site at <http://www-libraries.colorado.edu/mus/smp/index.html>.

## Resources

*Anglo-American Cataloguing Rules*, 2nd ed.

Colorado Digitization Program. *Western States Dublin Core Metadata Best Practices*. Version 1.2, January 2003.

[http://www.cdpheritage.org/resource/metadata/documents/WSDCMBP\\_v1-2\\_2003-01-20.pdf](http://www.cdpheritage.org/resource/metadata/documents/WSDCMBP_v1-2_2003-01-20.pdf)

Dublin Core Metadata Initiative. <http://dublincore.org>

*Heritage Colorado Collections Database*. <http://www.cdpheritage.org/heritage/index.html>

*Library of Congress Rule Interpretations*.

*Library of Congress Subject Headings*.

*MARC 21 Format for Bibliographic Data*.

*OCLC Bibliographic Formats and Standards*. <http://www.oclc.org/bibformats/>

## Key Contact

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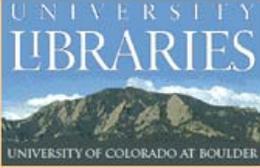
303-492-8235

[Marcelyn.DAvis@colorado.edu](mailto:Marcelyn.DAvis@colorado.edu)

## Appendix

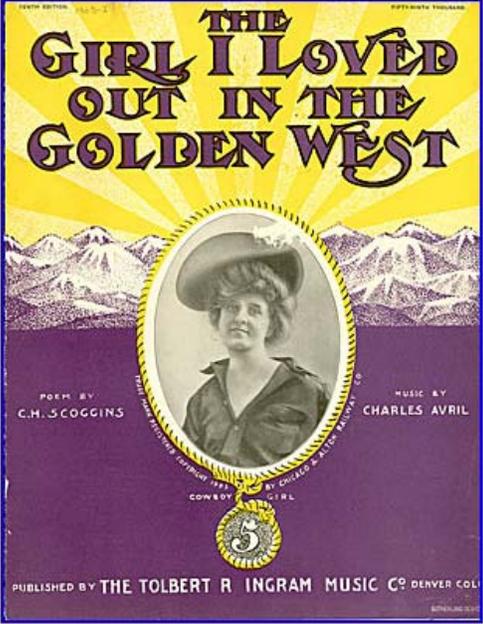
The appendix provides examples of the various representations of one piece of sheet music in: 1.) CU's Digital Sheet Music Collection project Web site; 2.) Chinook (Regular Display); 3.) Chinook (MARC Technical Display); 4.) Dublin Core to MARC crosswalk; 5.) DCBuilder; 6.) CDP's *Heritage* Web site.

### 1.) Record from CU's Digital Sheet Music Collection project Web site:



University of Colorado  
Digital Sheet Music Collection  
[Music Library](#)

[ [Home](#) | [Browse](#) | [Collections](#) | [Digitization](#) | [Education](#) | [User Info](#) | [Copyright](#) | [FAQ](#) | [Contact Us](#) ]



**Title:** The girl I loved out in the golden West  
**Composer/Lyricist:** words by C.H. Scoggins ; music by Charles Avril.  
**Edition:** 10th ed  
**Publication:** Denver, Colo. : Tolbert R. Ingram Music Co., [1905?], c1903.  
**Description:** 1 score (5 p.) ; 35 cm.  
**Collection:** Ingram

[Full bibliographic information available](#)

Image navigation:  
[\[Image 1\]](#)  
[\[Image 2\]](#)  
[\[Image 3\]](#)  
[\[Image 4\]](#)  
[\[Image 5\]](#)  
[\[Image 6\]](#)

[Browse List of Songs](#)

PUBLISHED BY THE TOLBERT R INGRAM MUSIC CO DENVER COL

<http://www-libraries.colorado.edu/cgi-bin/sheetmusic.pl?IngGirl10ed&Ingram&main>

2.) "Full bibliographic information" record in public view (Regular Display):

CHINOOK: THE UNIVERSITY OF COLORADO AT BOULDER LIBRARIES SUPERCATALOG

[START OVER](#)   
 [TECHNICAL DISPLAY](#)   
 [EXPORT](#)   
 [RECALL/HOLD](#)

RECORD #

Author	<a href="#">Avril, Charles</a>
Title	<b>The girl I loved out in the golden West [electronic resource] / words by C.H. Scoggins ; music by Charles Avril</b>
Edition	10th ed
Publisher	Denver, Colo. : Tolbert R. Ingram Music Co., [1905?], c1903
Descript.	1 score (5 p.) ; 35 cm
Subject	<a href="#">Popular music -- 1901-1910</a> <a href="#">Songs with piano</a> <a href="#">West (U.S.) -- Songs and music</a> Ingram Collection

Click on the following to:

[View digital score](#)

Note	For voice and piano Caption title Color engraving of "Cowboy Girl" inserted before p. 2
Lib format	Digital copy. Boulder, Colo. : University of Colorado. Music Library, 2001. 6 digital images : jpeg ; 72 ppi. Scanned on Agfa Duoscan T2000XL scanner
Note	Contact the Music Library at the University of Colorado for information on copyright restrictions applying to the use or reproduction of these images
Other name	<a href="#">Scoggins, C. H.</a>
Other title	First line of text: Twilight shadows come and go First line of chorus: Once again I feel the spell
Call #	MUSICPOP 1905-I Online

[START OVER](#)   
 [TECHNICAL DISPLAY](#)   
 [EXPORT](#)   
 [RECALL/HOLD](#)

<http://libraries.colorado.edu/record=3350527>

3.) "Full bibliographic information" record in public view (MARC Technical Display):

CHINOOK: THE UNIVERSITY OF COLORADO AT BOULDER LIBRARIES SUPERCATALOG		START OVER	REGULAR DISPLAY	EXPORT
005	20000710162107.0			
007	cr cn			
008	000710t19051903cou	n	eng dncmKa	
040	COD cCOD			
049	GWRE			
099	9 MUSICPOP a1905-I Online			
099	9 MUSICPOP a1905-I			
100	1 Avril, Charles			
245	14 The girl I loved out in the golden West h[electronic resource] / cwords by C.H. Scoggins ; music by Charles Avril			
246	1  iFirst line of text: aTwilight shadows come and go			
246	1  iFirst line of chorus: aOnce again I feel the spell			
250	10th ed			
260	Denver, Colo. : bTolbert R. Ingram Music Co., c[1905?], c1903			
300	1 score (5 p.) ; c35 cm			
500	For voice and piano			
500	Caption title			
500	Color engraving of "Cowboy Girl" inserted before p. 2			
533	Digital copy. bBoulder, Colo. : cUniversity of Colorado. Music Library, d2001. e6 digital images : jpeg ; 72 ppi.  nScanned on Agfa Duoscan T2000XL scanner			
539	s b2001 dcou en			
540	Contact the Music Library at the University of Colorado for information on copyright restrictions applying to the use or reproduction of these images			
650	0 Popular music y1901-1910			
650	0 Songs with piano			
651	0 West (U.S.) vSongs and music			
690	Ingram Collection			
700	1 Scoggins, C. H			
856	4  uhttp://www-libraries.colorado.edu/cgi-bin/sheetmusic.pl?IngGirlI10ed&Ingram&main zView digital score			
975	image			
975	text			
976	web browser			
977	Digital version of sheet music originally published by Tolbert R. Ingram Music Co., Denver, Colo., 1905. 6 digital images			
978	TIFF 400 ppi (archival) ; JPG 72 ppi (web). Agfa Duoscan T2000XL scanner			

<http://libraries.colorado.edu/search/.b3350527/.b3350527/1,1,1,B/marc~3350527>

**4.) Music Library's Dublin Core to MARC crosswalk:**

<b>Dublin Core Elements</b>	<b>Dublin Core Qualifiers</b>	<b>MARC Fields</b>	<b>MARC Subfields *</b>
<b>Title</b>		245	a
	Alternative	246	a
<b>Creator</b>		100	
		110	
<b>Subject</b>		600	
		610	
		611	
		650	
		651	
<b>Description</b>	Abstract	977	
<b>Publisher</b>		533	c
<b>Contributor</b>		700	acdq **
		710	ab **
<b>Date.Digital</b>	Available	533	d
<b>Date.Original</b>	Issued	260	c
<b>Type</b>		975	
<b>Format.Creation</b>		978	
<b>Format.Use</b>		976	
<b>Identifier</b>		856	u
<b>Source</b>		300	
<b>Language</b>		008	bytes 35-37
<b>Relation</b>	IsVersionOf	250	
	IsPartOf	240	a **
	IsPartOf	730	
	IsPartOf	740	
<b>Rights</b>		540	a

\* in cases where no specific MARC subfield is indicated, all subfields were mapped

\*\* instances of the subfield *\$t* in 700s and 710s, and instances of the subfield *\$p* in 240s were deliberately excluded from the crosswalking process in order to prevent potentially misleading duplication of the title information already mapped from the 245

5.) Dublin Core record in CDP's DCBuilder:

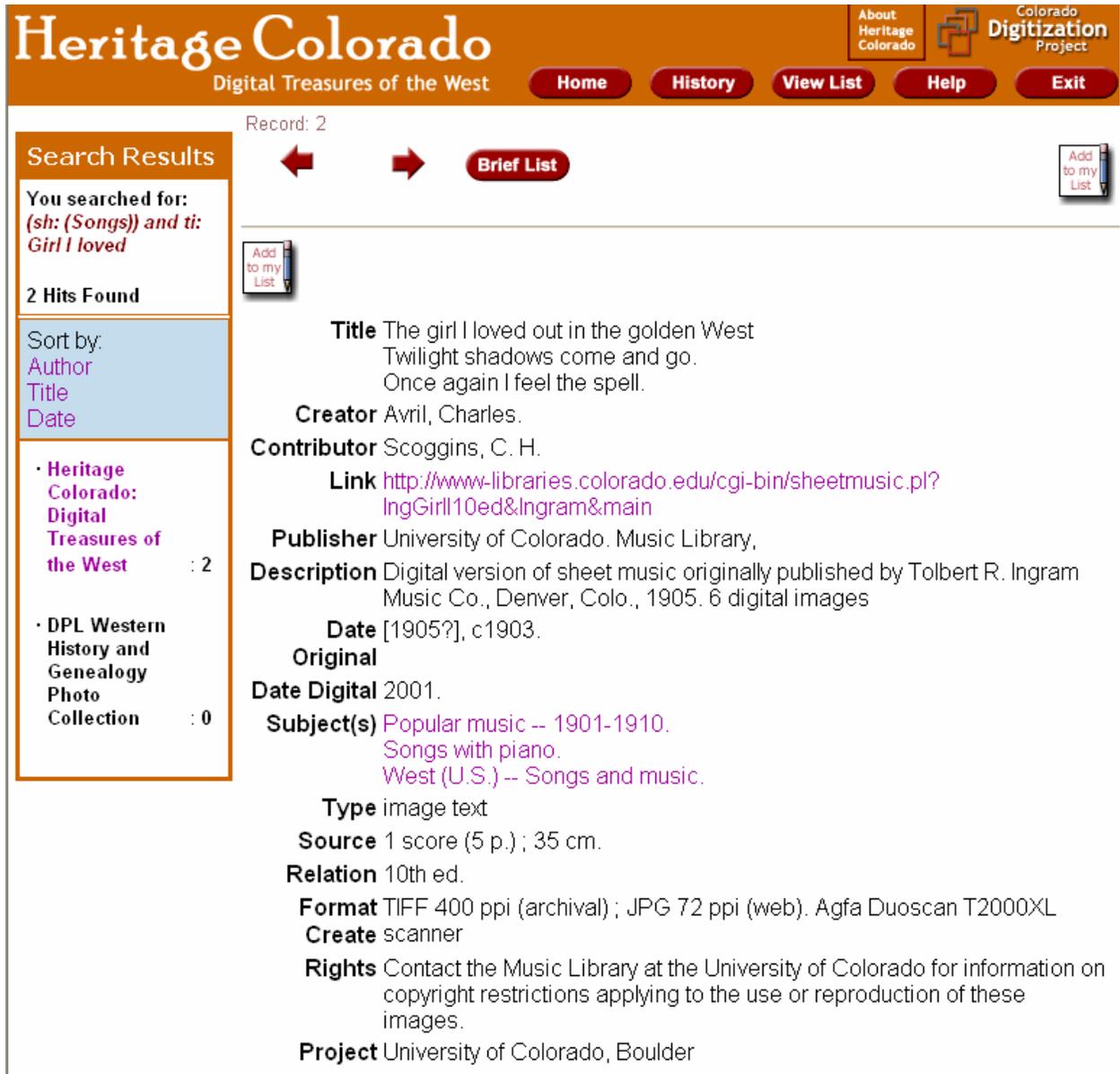
Edit Record	
<b>CDPID:</b> 0016402	
<b>Owner:</b> University of Colorado, Boulder	
<b>Created:</b> 02:14 PM on 14-Mar-02	
<b>Modified:</b> 10:23 AM on 15-Mar-02	
<input type="button" value="Add/Edit"/>	<b>Titles:</b> 1. The <b>girl I loved out in the golden West</b> 2. Twilight shadows come and go. [Alternative] 3. Once again I feel the spell. [Alternative]
<input type="button" value="Add/Edit"/>	<b>Creators:</b> 1. Avril, Charles.
<input type="button" value="Add/Edit"/>	<b>Subjects:</b> 1. Popular music -- 1901-1910. 2. Songs with piano. 3. West (U.S.) -- Songs and music.
<input type="button" value="Add/Edit"/>	<b>Descriptions:</b> 1. Digital version of sheet music originally published by Tolbert R. Ingram Music Co., Denver, Colo., 1905. 6 digital images [Abstract]
<input type="button" value="Add/Edit"/>	<b>Identifiers:</b> 1. <a href="http://www-libraries.colorado.edu/cgi-bin/sheetmusic.pl?IngGirl110ed&amp;Ingram&amp;main">http://www-libraries.colorado.edu/cgi-bin/sheetmusic.pl?IngGirl110ed&amp;Ingram&amp;main</a>
<input type="button" value="Add/Edit"/>	<b>Contributors:</b> 1. Scoggins, C. H.
<input type="button" value="Add/Edit"/>	<b>Publishers:</b> 1. University of Colorado. Music Library,
<input type="button" value="Add/Edit"/>	<b>Date of Original:</b> 1. [1905?], c1903. [Issued]

*Continued on next page...*

**Dublin Core record in CDP's DCBuilder (cont'd):**

Add/Edit	<b>Date of Digital:</b> 1. 2001.[Created]
Add/Edit	<b>Relations:</b> 1. 10th ed.
Add/Edit	<b>Types:</b> 1. image 2. text
Add/Edit	<b>Creation</b> 1. TIFF 400 ppi (archival) ; JPG 72 ppi (web). <b>Formats:</b> Agfa Duoscan T2000XL scanner [Medium]
Add/Edit	<b>Use Formats:</b> 1. web browser
Add/Edit	<b>Sources:</b> 1. 1 score (5 p.) ; 35 cm.
Add/Edit	<b>Languages:</b> 1. eng
Add/Edit	<b>Coverage:</b>
Add/Edit	<b>Rights Management:</b> 1. Contact the Music Library at the University of Colorado for information on copyright restrictions applying to the use or reproduction of these images.
Add/Edit	<b>DDC:</b> Ready to Export? <input checked="" type="checkbox"/> <input type="button" value="Set"/>

6.) Dublin Core record in public view on the *Heritage Colorado* Web site:



The screenshot shows the Heritage Colorado website interface. At the top, there is a navigation bar with the site name and several menu items: Home, History, View List, Help, and Exit. Below the navigation bar, the page displays search results for the query "(sh: (Songs)) and ti: Girl I loved". The search results show 2 hits found. The first hit is a sheet music score titled "The girl I loved out in the golden West". The record includes various Dublin Core metadata elements such as Title, Creator, Contributor, Link, Publisher, Description, Date, Original, Date Digital, Subject(s), Type, Source, Relation, Format, Create, Rights, and Project.

**Heritage Colorado**  
Digital Treasures of the West

Record: 2

**Search Results**

You searched for:  
(sh: (Songs)) and ti:  
Girl I loved

2 Hits Found

Sort by:  
Author  
Title  
Date

• **Heritage Colorado: Digital Treasures of the West** : 2

• **DPL Western History and Genealogy Photo Collection** : 0

**Title** The girl I loved out in the golden West  
Twilight shadows come and go.  
Once again I feel the spell.

**Creator** Avril, Charles.

**Contributor** Scoggins, C. H.

**Link** <http://www-libraries.colorado.edu/cgi-bin/sheetmusic.pl?lngGirl10ed&Ingram&main>

**Publisher** University of Colorado. Music Library,

**Description** Digital version of sheet music originally published by Tolbert R. Ingram Music Co., Denver, Colo., 1905. 6 digital images

**Date** [1905?], c1903.

**Original**

**Date Digital** 2001.

**Subject(s)** Popular music -- 1901-1910.  
Songs with piano.  
West (U.S.) -- Songs and music.

**Type** image text

**Source** 1 score (5 p.) ; 35 cm.

**Relation** 10th ed.

**Format** TIFF 400 ppi (archival) ; JPG 72 ppi (web). Agfa Duoscan T2000XL

**Create** scanner

**Rights** Contact the Music Library at the University of Colorado for information on copyright restrictions applying to the use or reproduction of these images.

**Project** University of Colorado, Boulder

<http://www.cdheritage.org/heritage/index.html>