

NGDA Dataset Report

Official NGDA Title: North American Land Change Monitoring System (NALCMS) Collection

Metadata Record Title: North American Land Change Monitoring System (NALCMS) Collection

A-16 NGDA Theme: Land Use - Land Cover

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Metadata:

Registration Status: Complete

Registered on 4/10/2015

GeoPlatform Link*: <https://www.geoplatform.gov/node/243/423c743e-0b11-4264-a52b-f43dd00908f3>

Data.gov Metadata Link*: <http://catalog.data.gov/harvest/object/188950c5-f0ab-411e-bf08-fe54a4376260/html>

*If the metadata has been updated and reharvested after publication of this report, the link may no longer be valid. The dataset may be searched for manually in Data.gov or GeoPlatform.gov.

NGDA Lifecycle Maturity Assessment (LMA) Report

Time Frame:

Baseline assessment responses apply to NALCMS 2005, NALCMS 2010 and the NALCMS 2005-2010 change product.

LMA Submission:

Status: Complete

Date: 9/24/2015

Extension Requested: No

LMA Reviewer(s):

Supervisor: Collin Homer <homer@usgs.gov>

Theme Lead: Jonathan Smith <jhsmith@usgs.gov>

Executive Champion: Did not review

SAOGI*: Did not review

Other: Did not review

LMA Verifier:

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Attachments:

To get access to any attachments referenced in the report, email the LMA Help Desk at NGDA_LMA_help@fgdc.gov. Please use the subject "Dataset Report Attachment(s)" and indicate the associated official NGDA title.

*Senior Agency Official for Geospatial Information (SAOGI)

Lifecycle Maturity Assessment (LMA) Summary

Overall Maturity:

Mature; Consistent

General Questions: 100%

Optimized; Established

Stage 4 - Access: 100%

Optimized; Established

Stage 1 - Define/Plan: 100%

Optimized; Established

Stage 5 - Maintain: 12%

Planned; Initial Development

Stage 2 - Inventory/Evaluate: 100%

Optimized; Established

Stage 6 - Use/Evaluate: 77%

Mature; Consistent

Stage 3 - Obtain: 100%

Optimized; Established

Stage 7 - Archive: 100%

Optimized; Established

NGDA Dataset Maturity Definitions:

How To Calculate Maturity: https://www.geoplatform.gov/sites/default/files/How_to_Calculate_Maturity.pdf

Maturity	Maturity Characteristics for All Lifecycle Stages
Optimized; Established Rank = 5	Dataset meets virtually all business needs of all users. The dataset is considered authoritative by owners and secondary users. It is curated across all stages of the approved lifecycle. Future needs are defined on a regular basis and resources for addressing both current and future business requirements are available.
Mature; Consistent Rank = 4	Dataset meets all the business needs of the primary owner and most of the secondary users. The dataset is curated and used as authoritative by the primary owner. Dataset is used widely by secondary users actively engaged in sustaining the dataset. Future needs are identified and steps are planned to address these. All stages are supported and reviewed on a recurring basis. The dataset is well managed in relation to the approved lifecycle.
Managed; Predictable Rank = 3	Dataset meets a significant number of the business needs of the primary owner and is widely used as an authoritative resource by secondary users. Benchmark activities are occurring in at least four of the approved lifecycle stages. Management practices in relation to the approved lifecycle is moderate but consistent. Dataset is integrating changing business requirements in lifecycle stages impacting overall maturity.
Transition; Transformation Rank = 2	Dataset meets business needs of the primary owner and has moderate use by secondary users. Benchmark activities are occurring in at least three stages. Efforts to integrate funding, include partners, and obtain data are not supported in a sustained manner. Management practices in relation to the stages of the approved lifecycle is limited.
Planned; Initial Development Rank = 1	Dataset limited in meeting business needs of the primary owner. Benchmark activities in the approved lifecycle are just starting to consider secondary uses, partnerships are forming to support additional dataset uses. Dataset development is in a very early stage. Minimal or limited management against the benchmarks in the approved lifecycle.
No Activity Rank = no activity	Dataset meets project or local business needs of the primary owner, secondary or additional uses or users were not considered, not recognized as an authoritative data or is part of a similar dataset. Not managed to any of the benchmarks in the approved lifecycle.

General Questions for All Stages

1) Is there a recurring process to obtain funding for all lifecycle stages of this dataset?

Answer: Funding support is part of agency budget on a recurring basis, funding is consistent and tied to business processes, and supports all lifecycle stages.

Justification Comment:

Attachment(s): 0

Work on the North American Land Change Monitoring System (NALCMS) (<http://www.cec.org/atlas>) is funded through the Commission on Environmental Cooperation (CEC) (<http://www.cec.org>), a trilateral entity based in Montreal and funded equally by the governments of Canada, Mexico, and the United States. In 2014, the CEC celebrated its 20th anniversary. The most recent operational plan obtainable, the draft plan for 2014-2015, showed a budget of \$9,251,000 allocated to 16 projects grouped under 3 strategic priorities, and to communications, administration, and other support functions.

2) Is there a process in place to ensure that open government and transparency guidelines are followed in all lifecycle stages for this dataset?

Answer: Process is published as appropriate with respect to sensitivity requirements, process is transparent, published appropriately.

Justification Comment:

Attachment(s): 0

As a consortium of 3 nations, the CEC adheres to the open government and transparency guidelines of each nation, and complies with the 8 principles of open government data (opengovdata.org). Datasets are complete and made available for download as mosaics that cover all of North America. Land cover is derived at the same 250 meter resolution as the source MODIS data. The 2 epochs of land cover, 2005 and 2010, were released together in 2013. Data are distributed in accessible file formats, GeoTIFF and ERDAS Imagine (IMG), in bundles that include color lookup tables and metadata. NALCMS data may be downloaded by anyone and are in the public domain.

3) Are there processes and tools in place so that staff are sufficiently knowledgeable to ensure a continuity of the dataset for all stages of the lifecycle, especially during staffing transitions?

Answer: Processes and tools to ensure dataset continuity are in place and implemented for all lifecycle stages.

Justification Comment:

Attachment(s): 0

For its U.S. contribution, the NALCMS relies primarily on staff from the National Land Cover Database (NLCD) (<http://www.mrlc.gov/>) project for technical and scientific expertise in the creation, distribution, and archive of NALCMS products. As such, the NALCMS is safeguarded by the staffing continuity of the NLCD project.

STAGE 1 - Define/Plan

4) Are user and business requirements defined and formalized?

Answer: A recurring process is in place, including defining new partner and stakeholder business needs as they arise, and is fully implemented.

Justification Comment:

Attachment(s): 0

The CEC sets strategic priorities and objectives according to guidance from the Council that consists of the environmental ministers from Canada, Mexico, and the United States. Strategic planning is conducted every 5 years. The current CEC Strategic Plan covers 2010 to 2015:

http://www.cec.org/Page.asp?PageID=30101&ContentID=17616&SiteNodeID=580&BL_ExpandID=

Objectives are accomplished through annual Operational Plans that describe the work to be done for each project, how it satisfies one of the CEC's strategic priorities, specific tasks, performance measures, milestones, and budget. The draft 2015-2016 operational plan can be found at:

5) How are partners/stakeholders involved in the requirements collection process?

Answer: A recurring process is in place, including defining new partner and stakeholder business needs as they arise, and is fully implemented.

Justification Comment:

Attachment(s): 0

The 3-person Council that governs the CEC

(http://www.cec.org/Page.asp?PageID=1226&SiteNodeID=207&BL_ExpandID=566) meets at least once a year to review accomplishments and set priorities and strategic direction for the coming year's work. The Council is the primary stakeholder for the CEC, and directs the activities of the operational arm of CEC, called the Secretariat

(http://www.cec.org/Page.asp?PageID=1226&SiteNodeID=206&BL_ExpandID=569). There is also a group of 15 volunteers (5 from each country) called the Joint Public Advisory Committee (JPAC) (http://www.cec.org/Page.asp?PageID=1226&SiteNodeID=208&BL_ExpandID=567). JPAC serves as an advisory group to the Council and Secretariat to aid collaboration among the 3 nations, and to receive input from the user community and the public on issues and priorities.

6) Is there a quality assurance process for the dataset?

Answer: Quality assurance published as appropriate with respect sensitivity requirements.

Justification Comment:

Attachment(s): 0

Quality assurance for the NALCMS was done through a detailed accuracy assessment, based on a combination of a stratified random sampling design and a 2-stage cluster sampling approach. Samples were labeled through visual interpretation of high resolution imagery in Google Earth, and assigned a primary label and a secondary label. Accuracy was calculated as agreement of the NALCMS with the primary and secondary label, or with the primary label alone. Error matrices were calculated along with User's and Producer's accuracies for each NALCMS land cover class. Details may be found in:

Rasim Latifovic, Colin Homer, Rainer Ressl, Darren Pouliot, Sheikh Nazmul Hossain, René R. Colditz, Ian Olthof, Chandra P. Giri, and Arturo Victoria, North American Land Change Monitoring System: Chapter 20 in Remote Sensing of Land Use and Land Cover: Principles and Applications, Chandra P. Giri, ed., CRC Press, 2012. <https://www.crcpress.com/Remote-Sensing-of-Land-Use-and-Land-Cover-Principles-and-Applications/Giri/9781420070743>

7) Is there a process to evaluate the sensitivity, privacy, and confidentiality of this dataset?

Answer: Sensitivity, privacy, and confidentiality evaluations fully implemented, reviewed and updated on a recurring basis.

Justification Comment:

Attachment(s): 0

The NALCMS does not contain sensitive information of any kind. NALCMS products are published at 250 meter resolution. Each 250 meter pixel represents an area of about 15.4 acres on the ground, suitable for mapping land cover at a coarse level of detail, but not for seeing fine detail on the ground, or for locating manmade features. Instead, NALCMS is designed to support analysis of broad, continental patterns of land cover and land cover change over time.

8) Are defined data standards used in collecting, processing, and/or rendering the data?

Answer: Standards fully implemented documented and published as appropriate.

Justification Comment:

Attachment(s): 0

The NALCMS is derived from satellite imagery from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument that is carried on NASA's Terra and Aqua satellites (<http://modis.gsfc.nasa.gov>). The geometric and spectral characteristics of MODIS images are well understood, so that NALCMS data derived from them are consistent and verifiable. Processing flows are based on commercial image processing software and standard scripting languages.

STAGE 2 - Inventory/Evaluate

9) Is there a process for determining if data necessary to meet requirements already exist from other sources (either within or outside the agency) before collecting or acquiring new data?

Answer: Process for determining appropriate data is being reused fully implemented, reviewed, and updated on a regular basis.

Justification Comment:

Attachment(s): 0

In 2006, when the North American Atlas Coordination Group was formed, the CEC had determined that land cover at the needed 250 meter resolution was not available from any other source. The NALCMS was, at that time, the only effort underway to map land cover for all of North America at this resolution and accuracy. The primary land cover mapping agencies in the 3 nations were involved in a collaborative effort with the CEC to design and produce the NALCMS.

STAGE 3 - Obtain

10) Is there a process for obtaining data in relation to this dataset?

Answer: Process is fully implemented, reviewed and updated on a regular basis.

Justification Comment:

Attachment(s): 0

The NALCMS is distributed by CEC through their North American Environmental Atlas Web site and data download page, accessible from <http://www.cec.org>. The NALCMS is also viewable and accessible through the North American Environmental Atlas Viewer, <http://www.cec.org/atlas/map/>. There are no restrictions on use of NALCMS datasets.

11) Is the metadata in a FGDC endorsed geospatial metadata standard?

Answer: Metadata is available in a format endorsed by the FGDC, it fully describes the dataset and provides all the information required to make the dataset discoverable, accessible, and usable.

Justification Comment:

Attachment(s): 0

All NALCMS datasets are distributed with accompanying metadata in CSDGM format. Metadata describe in detail the source datasets and processing steps used to create NALCMS products, and are downloadable from <http://www.cec.org>.

The distributed version of NALCMS metadata was edited to add NGDA keywords to aid discoverability. These edited NALCMS metadata records have been loaded into geoplatform.gov and data.gov.

12) How complete is the geographic coverage as defined in the requirements for the dataset?

Part 1 Answer: Business requirements for cyclic updates identified and a process is in place.

Part 2 Answer: Dataset has presently attained the greatest geographic coverage as defined by the current requirements or roughly 100%.

Justification Comment:

Attachment(s): 0

The NALCMS is currently constituted of North American Land Cover (NALC) 2005, NALC 2010, and a 2005-2010 change product. All three products cover Canada, the United States, and Mexico. As of mid 2015, plans for NALCMS 2015 have not been announced. There are global land cover initiatives underway that may obviate the need for a new NALCMS 2015, but requirements and plans have not yet been announced publicly.

STAGE 4 - Access

13) Do you have a process for providing users access to the data in an open digital machine readable format?

Answer: User access process is fully implemented, data is available, process is reviewed and updated on a recurring basis.

Justification Comment:**Attachment(s):** 0

NALCMS datasets, including 2005 Land Cover, 2010 Land Cover, and 2005 to 2010 Land Cover Change are all available for download from <http://www.cec.org> at no cost to the user in two formats: ERDAS Imagine (IMG) (<http://www.digitalpreservation.gov/formats/fdd/fdd000420.shtml>) and GeoTIFF (<http://www.digitalpreservation.gov/formats/fdd/fdd000279.shtml>).

STAGE 5 - Maintain

14) Is there a maintenance process for updating and storing the dataset?

Answer: Dataset maintenance process is under development.

Justification Comment:**Attachment(s):** 0

Because the CEC is a trilateral agency, the job of ongoing dataset maintenance is complicated by the need to coordinate the requirements and contributions of 3 nations. At this time, a requirement for a 2015 update of the NALCMS has not yet been announced, and it may be that global land cover efforts at the same 250 meter resolution could fill the need for 2015 land cover adequately. Analysis of the requirement for a 2015 update to the NALCMS is ongoing by the CEC (<http://www.cec.org>).

15) Is there an error correction process as part of dataset maintenance?

Answer: No.

Justification Comment:**Attachment(s):** 0

The NALCMS was subject to rigorous accuracy assessment as part of the development process, but the trilateral nature of the mapping effort complicates the ability to correct any errors found by users of the data, because all 3 nations would have to agree on the error and on the correction to be made. This would result in a lengthy and unwieldy process. At this time, the NALCMS is available "as is" and errors are not corrected.

STAGE 6 - Use/Evaluate

16) Is there a process to determine if the dataset meets user needs?

Answer: Process is fully implemented and repeated on a recurring basis.

Justification Comment:**Attachment(s):** 0

In the United States, the NALCMS receives feedback from the user community in some of the same ways as the NLCD project. Questions and inquiries are received directly from users through an established process at the USGS EROS Center's Customer Services section. Customer Service (CS) staff log calls from a wide range of users on a wide range of topics. CS staff answer basic questions about dataset properties, file formats, and access themselves, but pass along to NLCD staff questions of a more technical or scientific nature. In addition, the NALCMS approach and methods have been published in peer reviewed journals and presented at conferences as a way to receive feedback from the science community on both the theoretical underpinnings of NALCMS's development approach, and on the practical experiences of users of NALCMS data.

17) Is there a process to provide users information on how to access and properly use the dataset?

Answer: Process is fully implemented supporting access and proper use, process is reviewed on a recurring basis.

Justification Comment:**Attachment(s):** 0

Information on characteristics, development, access, and use of the NALCMS are available at 2 Web sites. The CEC hosts <http://www.cec.org/nalcms> with background, description, practical applications, and sources of the data, along with links to download data files and metadata. The USGS Land Cover Institute host a Web page on NALCMS at <http://landcover.usgs.gov/nalcms.php>, with similar information on NALCMS derivation and use, a downloadable land cover legend, and links to the CEC Web site.

18) Are the business processes and management practices assessed to meet changing technology?

Answer: Assessment process is being developed to take advantage of changing technology.

Justification Comment:

Attachment(s): 0

As the product of a 3-nation team, any new NALCMS work (which is still to be determined) will include an assessment of new technologies, methods, and source datasets so that potential improvements to NALCMS can be analyzed for cost and benefit. At that time, business and management practices used in the 2005 and 2010 development will be assessed to see if improvements are possible.

STAGE 7 - Archive

19) Is there an archiving process for the dataset?

Answer: Archival and disposition processes are fully implemented.

Justification Comment:

Attachment(s): 0

In the United States, the NALCMS is archived by the U.S. Geological Survey through the Long Term Archive (LTA) project at USGS EROS. LTA performs both interim and longterm archiving of all datasets distributed by USGS EROS. By relying on LTA processes and technology, the NALCMS is assured of following best practices and making use of best technology, and assuring that longterm archive with the National Archive and Records Administration (NARA) is done by an established practice.