



Perspectivas de actualización: cambios en el análisis de series cartográficas

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INEGI



**LATIN AMERICA
GEOSPATIAL
FORUM**

**THEME: STRENGTHENING GEOSPATIAL
COLLABORATION FOR SUSTAINABLE GROWTH**

10-12 NOVEMBER, 2015 | HILTON REFORMA, CIUDAD DE MÉXICO

Content

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- **Production and Updating**
- **Where are we going...**



Background ...



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Natural Resources Information

Mexico for its location, shape, soils, and climate, topographic and geologic characteristics, presents a wide range of ecological conditions, which has resulted in a wealth and diversity of natural resources.



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Production and Updating



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Soil Information

Information is available at the scales 1: 50,000, 1: 250,000 and 1: 1 million, plus a national soil erosion data set in scale 1: 250,000.

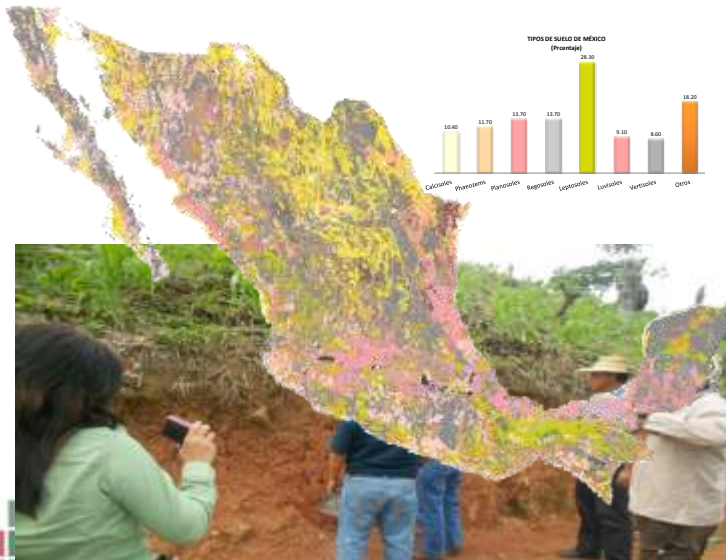
Currently there are two Soil national data sets at 1: 250 000, elaborated in GIS environment with field verification.

The data set includes information from more than 10,000 soil profiles in field sites all over the country.

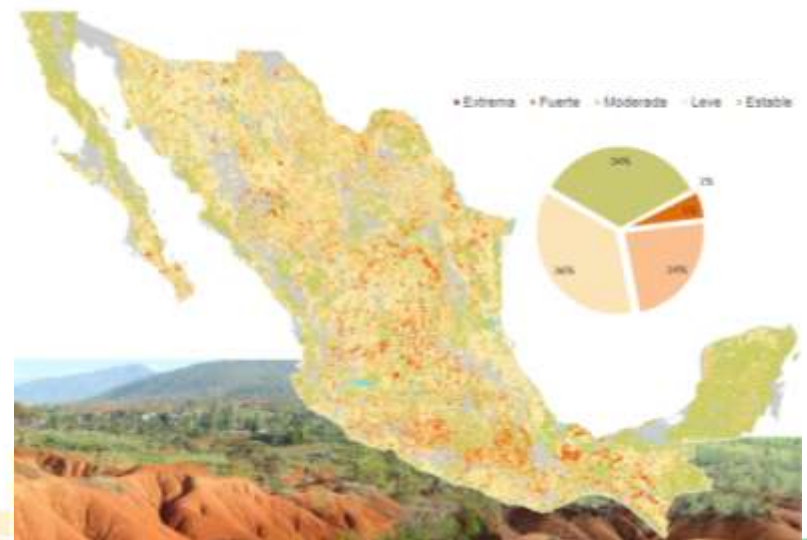
The soil types are based on the classification of the FAO World Base for Soil Resources (WRB).

**National Soils Data Set, series II
generated from 2002-2007**

WRB 1998 Soil Classification (Adapted by INEGI 2000)



**National Soil Erosion Data Set
Generated between 2008-2013**



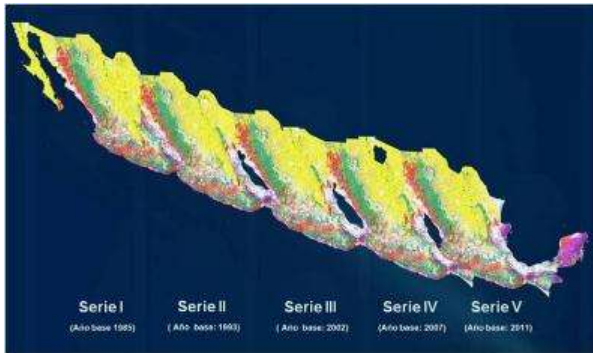
Prospects

- The National Soil Data Set series III is under development
- Based on the FAO WRB 2014 soil classification.
- In parallel the soil profile data set is being developed.
- Also in development: National Soil Erosion Data Set series II
- Several National Data Sets of soil properties; like depth, texture are being generated by Spatial Statistics Methods.

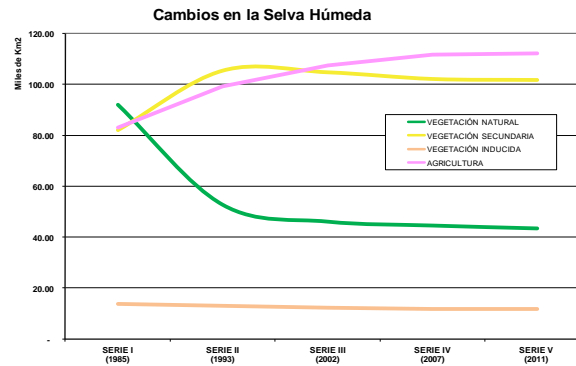


Land Use and Vegetation Information

Since 1978 five 1:250,000 National Land Use and Vegetation Data Sets (series) have been developed in the following time periods:



Vegetation and Land Use change statistics have been derived using the five data sets



International collaborative projects with Canada and the United States.

North American Land Change Monitoring System (NALCMS)
 Mapa de Cobertura del Suelo de América del Norte, 2005



Land Cover Information System (SICT).
 1:50 000

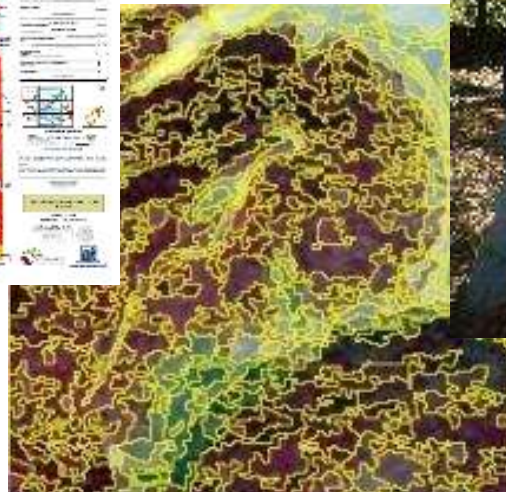
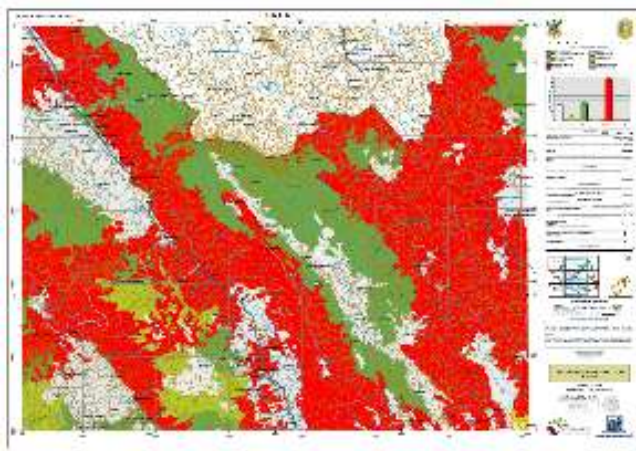


220 data sets available



Prospects

- Update Land Use and Vegetation information and produce the National Data Set series VI by 2017
- Design and develop strategies for statistical quality control data and the constant improvement in the quality of the data.
- Generating Land Cover information by digital processing of remote sensing imagery.



Geological Information

- The data sets contain data about the surface rocks:
 - Rock type.
 - Age.
- Areas of economic interest (mines, material banks, geothermal areas, etc.).
- Geologic Data are useful for themmes as mineral and oil prospection, risk assessment, road planning and construction, among others.

Geological Phenomena National Inventory

Layers:

- Coastal Erosion (being updated)
- mass movement (updated 2014)
- Subsidence (being updated),
- Volcanism, seismicity, Floods

Costal Erosion Susceptibility Maps:
Yucatán, Campeche, Tabasco,
Veracruz and Quintana Roo



Mass Movement Susceptibility
Maps: Zongolica Sierra of Chiapas,
the Huasteca Region and the
Chiconquiaco Region



Subsidence Susceptibility Maps :
Valley of Aguascalientes, Graben of
Villa de Reyes, SLP, San Luis Potosi,
Queretaro, Guanajuato Bajio.



Prospects

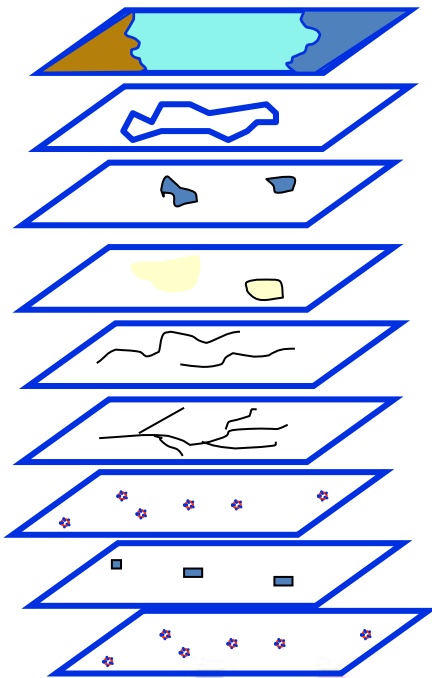
National data sets for:

- Coastal erosion.
- Mass Movement.
- Subsidence.



Surface Water Information

Individual digital data sets at 1: 250 000, Series I and II



Runoff Units
(Polygons)

Hydrographic Division
(Polygons)

Water bodies
(Polygons)

Flooding prone areas
(Polygons)

Precipitation (Lines)

Hydrographic network (Lines)

Field data sampling sites (Points)

Water treatment plants (Points)

Gauge stations (Points)



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Prospects

The new data sets are being produced for physical units: river basins or watersheds.

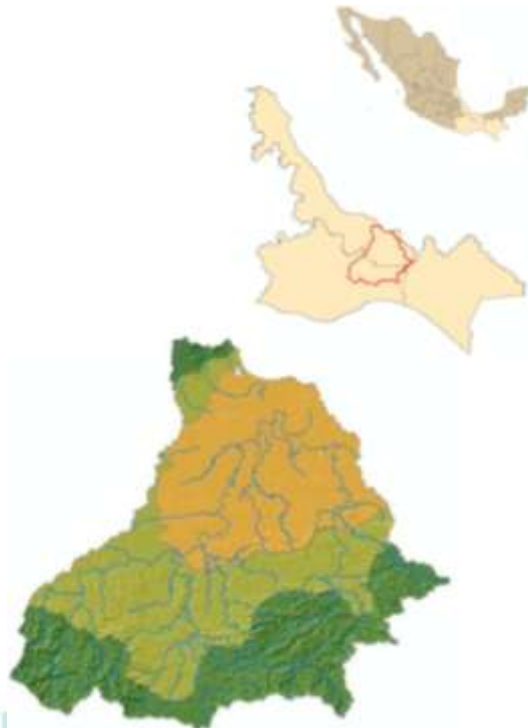
The approach is to make a complete description and analysis of the watershed: climate, relief, geology, soils, vegetation and human influence. The text includes statistical tables, as well as the map layers for each theme.

Vegetación		Clave	%
Evergreen Tropical Forest	SAP		74.86
Fir Forests	BS		7.16
Gallery Vegetation	VG		6.33
Oak Forest	BQ		5.80
Mountain Cloud Forest	BM		3.47
Semideciduous Tropical Forest	SMS		1.78
Mezquital	MKX		0.31
Natural Grasslands	PN		0.27
Deciduous Tropical Forest	SMC		0.02

Source: INEGI. Conjunto de Datos Vectoriales de Vegetación Primaria. 1:1 000 000 (2003)

Cuadro 3.1

Distribution of Primary Vegetation Types



Groundwater Information

Digital data sets at 1: 250,000 and national data sets series I and II

Polygon layers



- Geohydrologic Unit
- Restricted water extraction areas
- Well concentration areas

Line layers

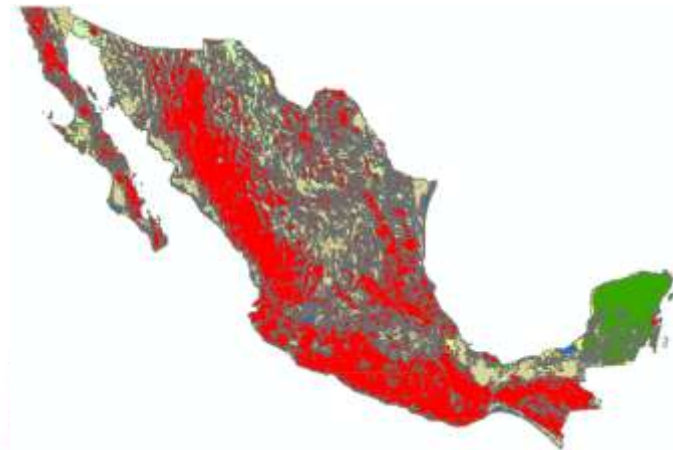


- Static level contour lines
- Geologic structures
- Section lines

Point layers



- Sampled wells
- Groundwater flow direction



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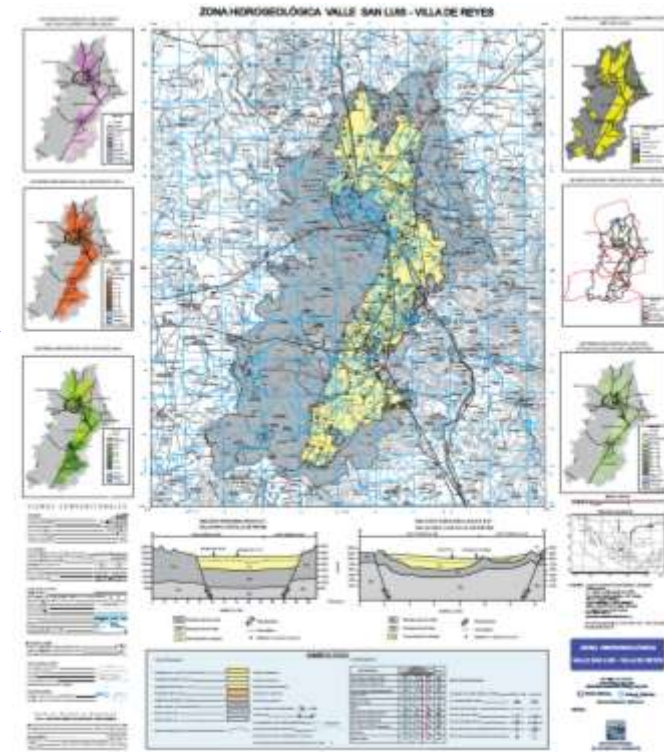
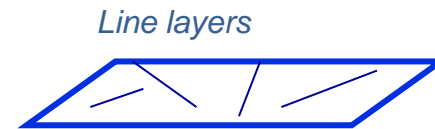
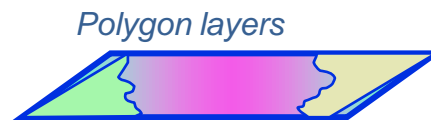
Prospects

In 2007 we initiated the development of the study of groundwater for hydrogeological zones, Currently on the website of INEGI there are 38 sets of data layers and maps in pdf to download and it is intended that by 2017 the first production cycle is closed with approximately 65 zones studied.

*Geohydrologic Units
Acquifer vulnerability
Restricted area
Sea water intrusion*

*Static Level Height Contour Lines
Static Depth Contour Lines
Geologic structures
Section Line*

*Wells, springs, cenotes
Hydrogeologic parameters
PIPEM
Groundwater flow direction*



Petrographic Information

This activity has its origins from 1968, when the newly born mapping agency, began to carry out the mapping of natural resources.

It has an estimated collection of 16,000 petrographic paper reports with their respective thin section from samples from all around the country as well as a database of 8,000 updated records.

Sieve analysis of coastal sediments to support the project of coastal erosion, beginning in 2012-2015 to date a total of 390 analyzed samples. Normative documents as the petrographic data dictionary are being developed.



Prospects

Generate products derived from the database of the petrographic and paleontological sample analysis.

Disseminate Petrographic and Paleontological in the WEB.



The image shows a screenshot of a website for the Department of Petrography and Paleontology. The website has a dark background with white and orange text. At the top, there is a logo for 'PETROGRAFÍA Y PALEONTOLOGÍA' and a navigation menu with links for 'HISTORIA', 'TIENDA', 'SERVICIOS', 'CONTACTO', and 'RECURSOS VIRTUALES'. The main content area is titled 'Historia' and contains a paragraph of text describing the department's history. Below this, there is a section titled 'Objetivo' with a paragraph of text. To the right of the 'Objetivo' section, there is a large orange fossil shell graphic with the text 'PETROGRAFÍA Y PALEONTOLOGÍA' overlaid. Below the 'Objetivo' section, there is a photograph of a laboratory setting with several people working at a counter. To the right of this photograph, there is a paragraph of text. At the bottom of the page, there is a section titled 'Nuestra colección' with a paragraph of text and a small photograph of a laboratory setting.

PETROGRAFÍA Y PALEONTOLOGÍA HISTORIA TIENDA SERVICIOS CONTACTO RECURSOS VIRTUALES

Historia

El Departamento de Petrografía tiene sus orígenes desde el año de 1968, cuando la Comisión de Estudios del territorio nacional y generación comenzó a llevar a cabo la cartografía de recursos naturales. El 25 de Enero de 1983 se crea por decreto presidencial (INCEI) y en el año de 1980 se desmembró de la Ciudad de México para radicarse en la Ciudad de Aguascalientes, México, actualmente este departamento pertenece a la Dirección de Recursos Naturales y Medio Ambiente de la Secretaría General de Geografía.

El **objetivo** de crear este departamento es llevar a cabo los análisis petrográficos de rocas, minerales e identificación de fósiles, mismo fundamental para la actualización de la carta geológica.

El departamento cuenta con un área de exhibición de rocas, minerales y fósiles y participa exponiendo talleres educativos sobre el tema de geología-paleontología a grupos de educación primaria, preescolar y secundaria.

Nuestra colección

La colección tiene su origen en el año de 1968 de la entonces Comisión de Estudios del Territorio Nacional (CETENA).

Por iniciativa del Ing. María Elena Navas, miembro de la Sección de Petrografía del Departamento de Geología en 1977, inicia la organización de muestras

Soil and Water Laboratory

The laboratory performs physical and chemical analysis to water and soil samples.

Presently is under the process of accreditation in the Standard NMX-EC-17025-IMNC-2006 / ISO / IEC 17025: 2005.

As part of the laboratory modernization, several new analysis instruments and other equipment have been acquired, as well as a laboratory areas reorganization has been made.



Prospects

- Advance in all the Laboratory Standard Documents.
- Continue the Laboratory Modernization
- Provide laboratory services to internal and external users.



Botanical Information

The INEGI Herbarium was created in 1975, in order to preserve the plant samples collected during the field trips as part of the Land Use and Vegetation Mapping.

This collection mainly contains species characteristic of different plant communities of the country; consisting of 40,000 specimens. Each specimen data is also contained in a database.

The Herbarium is open to the general public, students and researchers.



Prospects

To continue generating and providing basic, current, reliable and timely information about the country's flora.

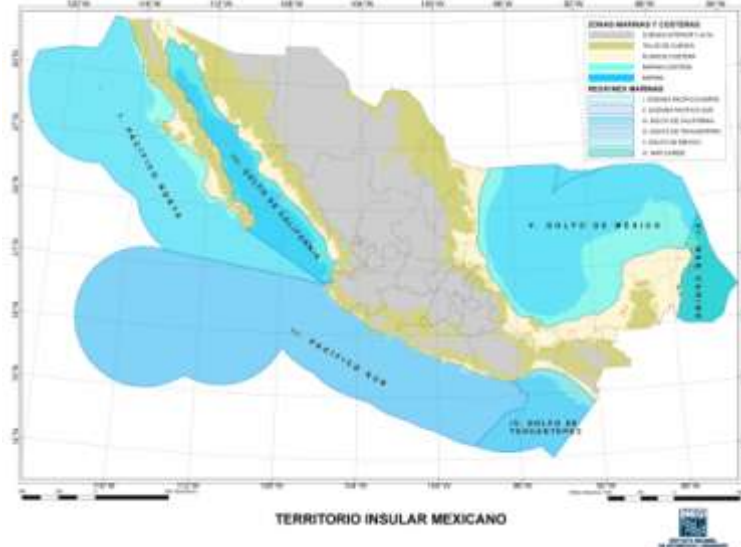
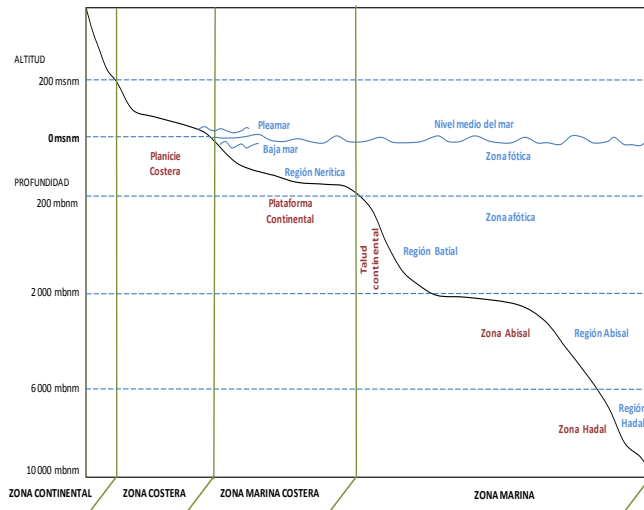
Increase the storage capability of the Herbarium

Digitize all the specimens in the Herbarium



Island Catalogue

ZONIFICATION AND REGIONALIZATION



DISTRIBUTION OF ISLAND FEATURES

FEATURES	NUMBER
REEFS	597
CAYS (KEYS)	304
SEA AND COASTAL ISLANDS	3,210
TOTAL	4,111

FEATURES	SURFACE Km ²	%
REEFS	358.8	4.5%
CAYS	106.4	1.3%
SEA AND COASTAL ISLANDS	7,559.9	94.2%
TOTAL	8,025.8	100%



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Prospects



Catálogo del territorio insular mexicano

Presentación

La riqueza cultural, natural y social de nuestra República se refleja en todo su territorio nacional, desde sus desiertos hasta sus lagunas, en su campo y en sus costas. Y donde haygo, se materializa también en cada uno de sus más de cuatro mil islas, cayos y arrecifes.

En total, estos últimos suman una superficie de 8 mil 25 kilómetros cuadrados. Al igual que en su mar territorial y en la zona económica exclusiva, nuestro país goza de derechos soberanos y jurisdicción.

Junto con otros elementos que conforman el territorio insular mexicano en el Pacífico, el Caribe, el Golfo de México y el Golfo de California, las islas mexicanas son áreas estratégicas desde el punto de vista ecológico, económico, militar y político.

Por lo tanto, conocerlas y administrarlas son tareas indispensables para hacer uso de las mismas a favor de la Nación y aprovecharlas de manera sostenible y sustentable.

Ante la necesidad de contar con información accesible y difundir su importancia, la Secretaría de Gobernación acordó la realización de un recuento integral de las islas, cayos y arrecifes que se encuentran en los mares mexicanos. A partir de esto se elaboró el Catálogo Insular Mexicano.

Para llevar a cabo esta labor, diversas dependencias e instituciones federales colaboraron esfuerzos y realizaron una labor conjunta, que permitió recopilar, homogeneizar y actualizar datos.

Asimismo, en este esfuerzo fue de suma importancia la tarea desempeñada por el Grupo Técnico para la Delimitación de las Zonas Marítimas Mexicanas.

El resultado realizado de islas, cayos y arrecifes, se reporta en el documento de acuerdo con sus coordenadas geográficas.

Resultado de este trabajo conjunto es la publicación del presente Catálogo que representa una clara muestra del compromiso y la coordinación de las Secretarías de Medio Ambiente y Recursos Naturales, Relaciones Exteriores, Comunicaciones y Transportes, el Instituto Nacional de Ecología y Cambio Climático, la Universidad Nacional Autónoma de México, la Comisión Nacional de Áreas Naturales Protegidas y, de forma destacada, la Secretaría de Marina y el Instituto Nacional de Estadística y Geografía.

De igual manera, gracias a esta importante suma de esfuerzos, se elaboró la Estrategia Nacional para la Conservación y el Desarrollo Sustentable del Territorio Insular Mexicano. Sin duda, este condycionará a que, desde una óptica sustentable, todos los mexicanos, presentes y futuros, podamos gozar de estos bienes que nos son comunes.

Así, el Gobierno del Presidente Enrique Peña Nieto refrenda su sólido compromiso con el conocimiento y su divulgación en nuestro país, lo que contribuye a enorgullecerse como Nación y en una oportunidad para potenciar capacidades para el cuidado, el uso y la conservación de nuestros recursos naturales.

LIC. MIGUEL ÁNGEL OSORIO GARCÍA
Secretario de Gobernación

Publication of the Catalog



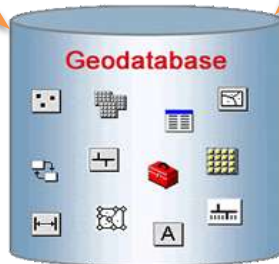
RRFIA

Integration of Natural Resources Data

Multi-user environment



**Data Base
Prototype**



A single database is used in the headquarters, regional and state offices.



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Prospects

Development of WMS and WCS services to support the Natural Resources Mapping Activities

Digital Soil Image Maps: 1:50,000:

http://10.109.1.71/cgi-bin/mapserv?map=/hdd_4/wms/suelos_50k_raster/wms_suelos50k.map&

Digital Topographic Image Maps 1:250,000:

http://10.109.1.71/cgi-bin/mapserv?map=/hdd_4/wms/topo_250k_test/wms_topo_250k_test.map&

State and Municipal Geostatistical Division 2005:

http://10.109.1.71/cgi-bin/mapserv?map=/hdd_4/wms/wms_mgm/wms_mgm_pg.map&

Shaded relief image; 30 m resolution

http://10.109.1.71/cgi-bin/mapserv?map=/hdd_4/wms/wcs_sombreado/wms_somb.map&

SPOT imagery 2010-2011

http://10.109.1.71/cgi-bin/mapserv?map=/hdd_4/wms/spot_2010_2011/wms_spot_2010_11.map&

Rapid Eye imagery 2012 RGB bands 5-4-3

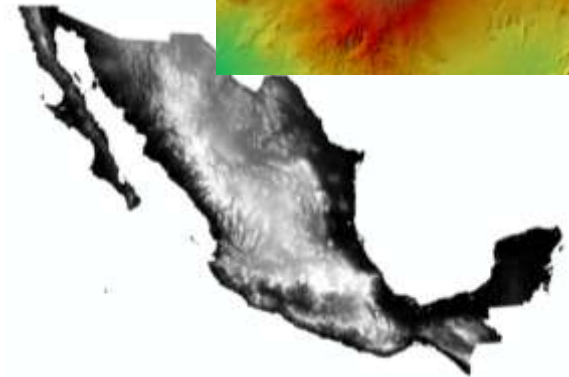
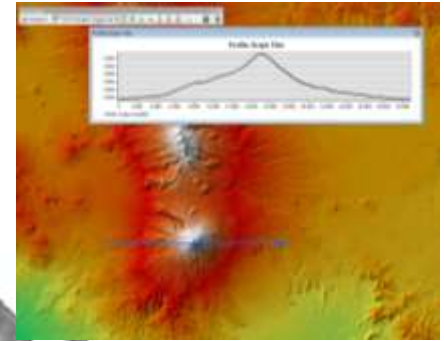
http://10.109.1.71/cgi-bin/mapserv?map=/hdd_3/data_rapideye/multi_rapideye.map&

Landsat 8 imagery RGB bands 4-3-2

http://10.109.1.71/cgi-bin/mapserv?map=/hdd_1/data_landsat8/multi_landsat8.map&

National Digital Elevation Model 30 m INEGI, Versión 1.0.0

http://10.109.1.71/cgi-bin/mapserv?map=/hdd_4/WCS/mod_dig_elev_nal.map&





Where are we going...



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Trends in geospatial information management in the next 5 to 10 years



United Nations Committee
of Experts on Global Geospatial Information
Management (UN-GGIM)

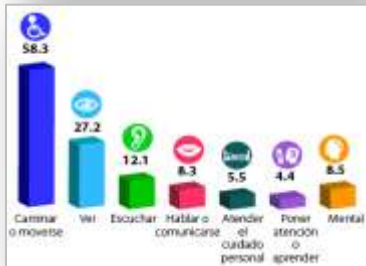
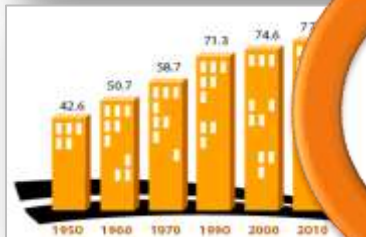
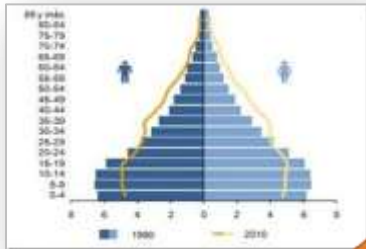
- Quality assurance through standards
- Creating new data and active participation in society
- Using the cloud
- Proliferation of high resolution satellite images
- Open Source Software and Data
- National Datasets and Big Data



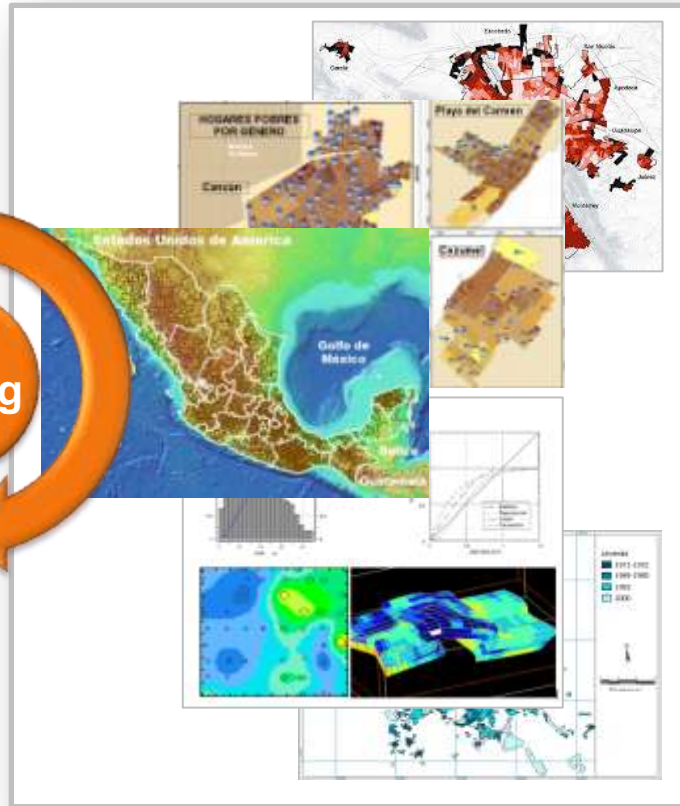
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Reference Information

Statistical Information



Geographic Information



Linking

Challenges ...

- ✓ *Generate and georeference statistical information (censuses, surveys and administrative records).*
- ✓ *Implement a national grid for statistics data.*



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