



Tools to Map and Identify Vulnerable Systems

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Mérida, Mexico





A topographic map of North America, showing the United States, Canada, and Mexico. The map uses a color gradient to represent elevation, with green for low-lying areas, yellow and orange for intermediate elevations, and brown and white for high mountain ranges and snow-covered peaks. The map is set against a dark blue background representing the oceans.

North American Environmental Atlas

Mapping North America's shared environment



cec.org

Whitecourt Power Partnership
Whitecourt, Alberta
Canada



Pfaunder Inc.
Rochester, New York
United States

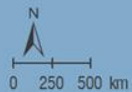


**General Motors de México
S. de R.L. de C.V.**
Cerritos, Guanajuato
México



Industrial Facilities
Reporting Pollutants, 2006

Hawaii (U.S.)

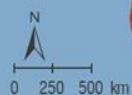


- Marine Ecoregions – Level I
- Bering Sea
 - Beaufort/Chukchi Seas
 - Arctic Basin
 - Central Arctic Archipelago
 - Hudson/Boothian Arctic
 - Baffin/Labradoran Arctic
 - Acadian Atlantic
 - Virginian Atlantic
 - Northern Gulf Stream Transition
 - Gulf Stream
 - Carolinian Atlantic
 - South Florida/Bahamian Atlantic
 - Northern Gulf of Mexico
 - Southern Gulf of Mexico
 - Caribbean Sea
 - Middle American Pacific
 - Mexican Pacific Transition
 - Gulf of California
 - Southern Californian Pacific
 - Montereyan Pacific Transition
 - Columbian Pacific
 - Alaskan/Fjordland Pacific
 - Aleutian Archipelago
 - Hawaiian Archipelago

Southern Californian Pacific



Hawaii (U.S.)



Baffin/Labradoran Arctic



Map created by
GreenInfo Network, 2010

Southern Gulf of Mexico

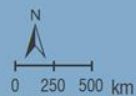




Grassland Priority Conservation Areas

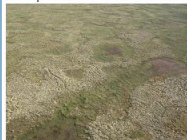
- | | |
|-----------------------------|---------------------------------------|
| 1 Hole in the Wall | 31 Flint Hills |
| 2 Thunder Basin | 32 Chalk Bluff |
| 3 Conata Basin | 33 Carrzozo |
| 4 Southern Coteau | 34 Thunder Basin, Bill |
| 5 Cheyenne River | 35 Pawnee |
| 6 Chase Lake | 36 Sioux Box Butte |
| 7 Lostwood | 37 Roosevelt |
| 8 Montana Glaciated Plains | 38 Panhandle |
| 9 Aspen Parkland | 39 Kiowa |
| 10 Prairie Montana | 40 Curry |
| 11 State-Line Wetlands | 41 Cuatro Cienegas |
| 12 Tall-grass | 42 Tokio |
| 13 Poverty Plains | 43 Mapimi |
| 14 Rocky Mountain Front | 44 Cuchillas de la Zarca |
| 15 Milk River Ridge | 45 Valle Colombia |
| 16 Cactus Hills/Dirt Hills | 46 Valles Centrales |
| 17 Great Sandhills | 47 Marfa |
| 18 Suffield | 48 Otero Mesa |
| 19 Bow Island | 49 Sonoita |
| 20 Monet/Matador | 50 Sulphur Springs |
| 21 Porcupine Hills | 51 Janos |
| 22 Rumsey Sandhills | 52 New Mexico Bootheel |
| 23 Manitou | 53 Armendaris |
| 24 Wainwright/Neutral Hills | 54 Sage Creek Milk River |
| 25 Central Red Hills | 55 Frenchman River - Bitter Creek OMB |
| 26 Western Red Hills | |
| 27 Ellis | |
| 28 Cimarron | |
| 29 Mescalero Sands | |
| 30 Rita Blanca | |

 North American Grasslands
 Grassland Priority Conservation Areas



Map created by
GreenInfo Network, 2010

Sub-polar shrub-lichen-moss



Temperate needleleaf evergreen



Mixed Forest



Temperate Grassland



Wetland

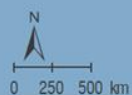


Cropland



- Mixed Forest
- Tropical or sub-tropical Shrubland
- Temperate or sub-polar Shrubland
- Tropical or sub-tropical Grassland
- Temperate or sub-polar Grassland
- Sub-polar or polar shrubland-lichen-moss
- Sub-polar or polar grassland-lichen-moss
- Sub-polar or polar barren-lichen-moss
- Temperate or sub-polar needleleaf evergreen
- Sub-polar open needleleaf evergreen (Taiga)
- Tropical or sub-tropical broadleaf evergreen
- Tropical or sub-tropical broadleaf deciduous
- Temperate or sub-polar broadleaf deciduous
- Wetland
- Cropland
- Barren Lands
- Urban
- Water
- Snow and Ice

Hawaii (U.S.)



LAND COVER

North American
Environmental Atlas

Mapping North America's shared environment



North American Environmental Atlas

Mapping North America's shared environment

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▼ Customize Map

Layers

+ Add

▲ Political Boundaries

x

▲ Shaded Relief

x

▲ Bathymetry

x



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WWW.CEC.ORG/NAATLAS





Explore Data

Base Maps

Terrestrial Ecosystems

Marine Ecosystems

Pollution and Waste

Human Influence

Climate

Search: x 12 data layers

Show Grid ☐

Show Legend ☐

Sort: A-Z Z-A



Political Boundaries

Show labels ☐

This North American Atlas base layer shows political entities in North America as polygons representing jurisdictional areas, and as lines representing political boundaries including International boundaries, Provincial boundaries and State or territory boundaries. ...



Populated Places

Show labels ☐

This North American Atlas base layer shows a selection of named populated places suitable for use at a scale of 1:10,000,000. Places, which refer to individual municipalities, are represented as points. Each point indicates the approximate location of a place, relative to data in the North American Atlas roads, railroads, and hydrography layers. The selection of populated places was based on ...



Population Density

This map shows the population density of North America for the year 2000 in number of people per square kilometer. The

Customize Map

Layers

+ Add

Populated Places ☐ X

Political Boundaries ☐ X

Bathymetry ☐ X





North American Environmental Atlas

Mapping North America's shared environment

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Terrestrial Ecosystems

Marine Ecosystems

Pollution and Waste

Human Influence

▼ Customize Map

Layers

[+ Add](#)

Level IV Watersheds

[X](#)



Data SIO, NOAA, U.S. Navy, NGA, GEBCO
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Image IBCAO

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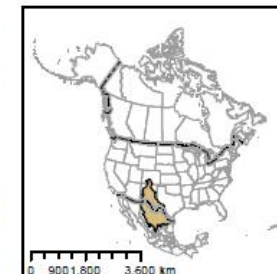
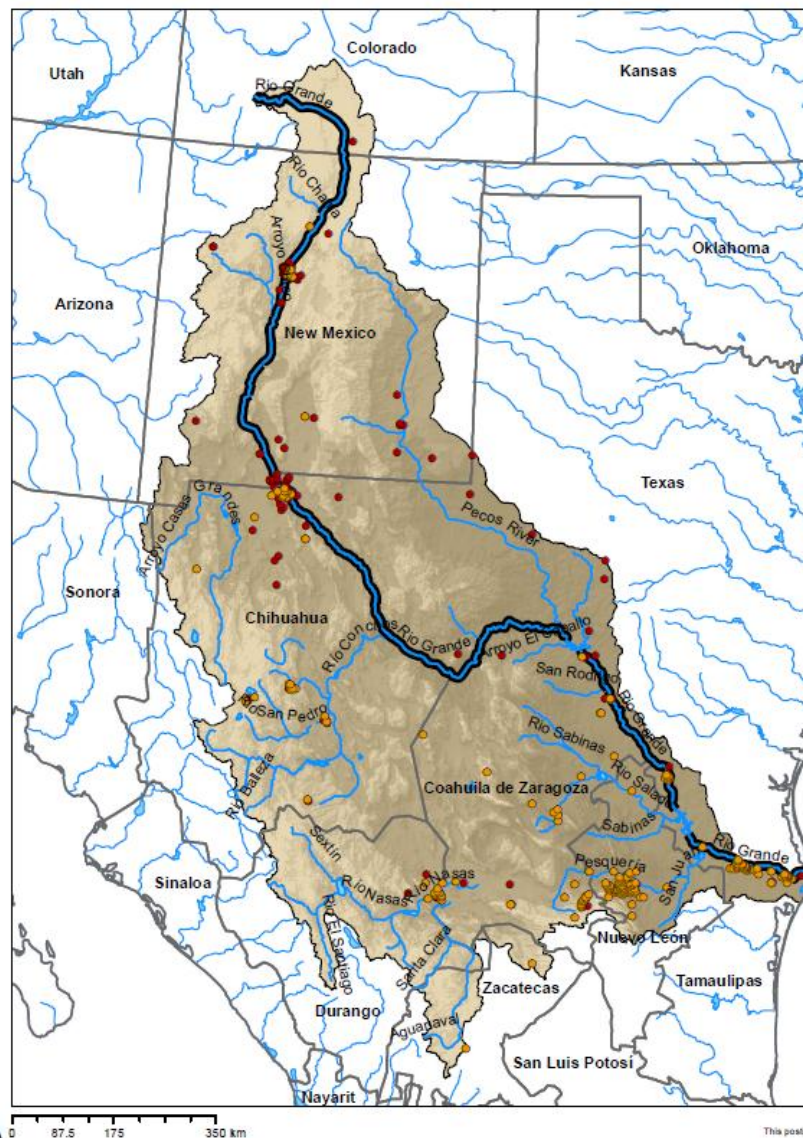


Con un análisis especial sobre las emisiones a aguas superficiales

Comisión para la Cooperación Ambiental

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Facilities Reporting Pollutant Releases and Transfers in the Rio Grande/Rio Bravo Watershed, 2006



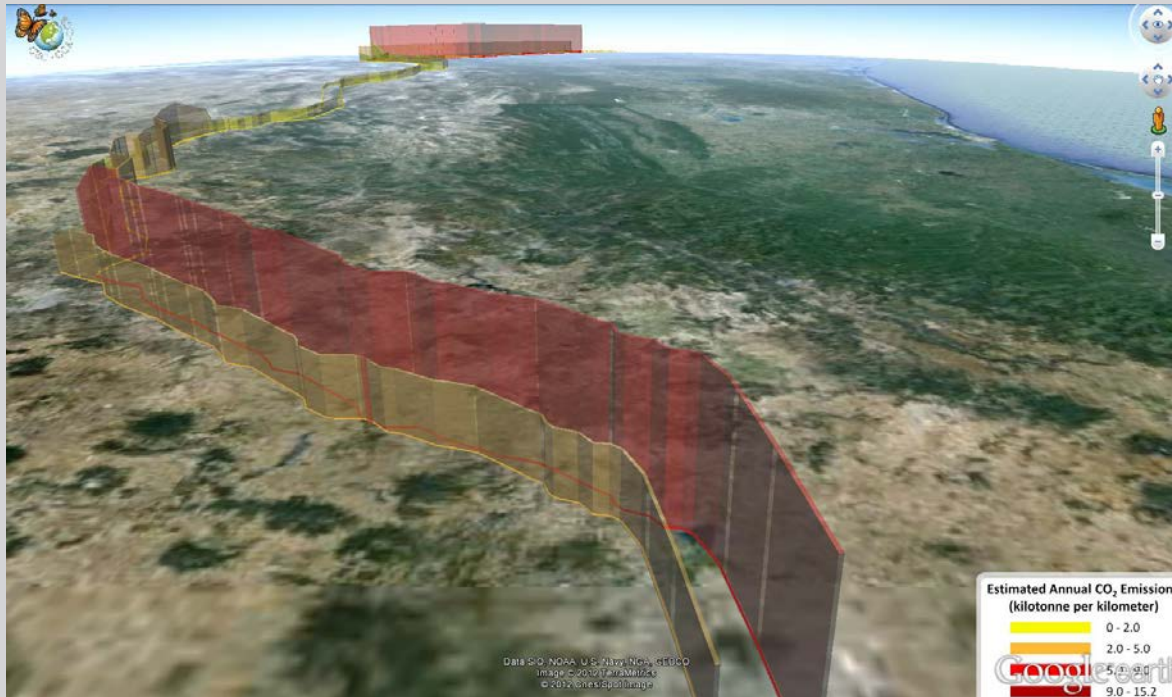
- Reporting Facilities
Total Number of Facilities: 577
Total Annual Release and Transfers: 12,393,735 kg
*Facilities reporting releases and transfers greater than 0.
- Facilities Reporting Releases to Surface Water
Total Number of Facilities Releasing to Water: 335
Total Annual On-site Surface Water Releases: 58,072 kg
*Facilities reporting releases and transfers greater than 0.

- Rio Grande Watershed
- Rivers
- Rio Grande / Rio Bravo River
- Lakes and large rivers

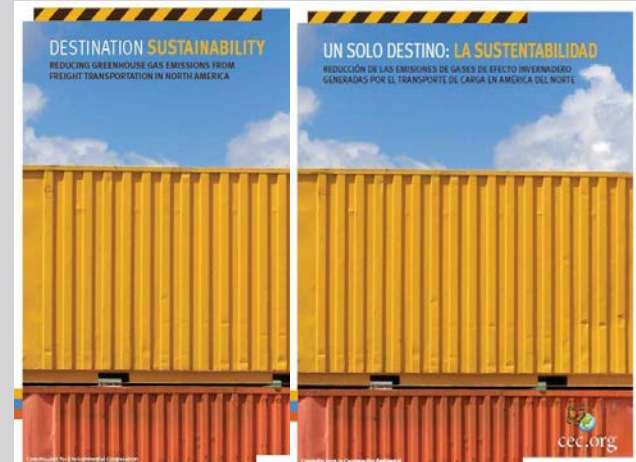
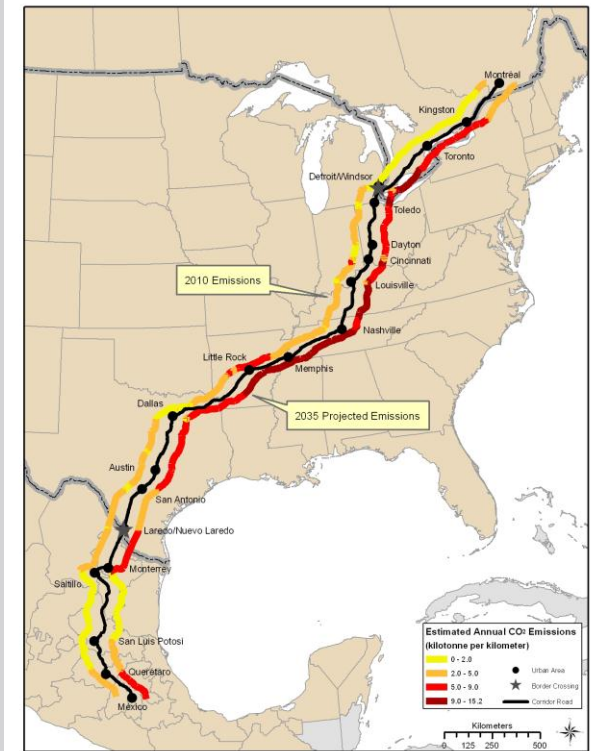
Projection: Lambert Azimuthal Equal Area
This poster was created on October 21, 2010 by the Commission for Environmental Cooperation



Estimated volumes of annual CO₂ emissions from trucks along the Mexico City to Montreal trucking corridor for 2010 (left) and 2035 (right)

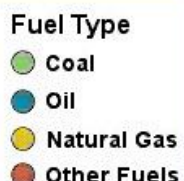
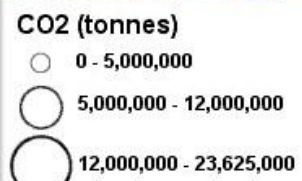
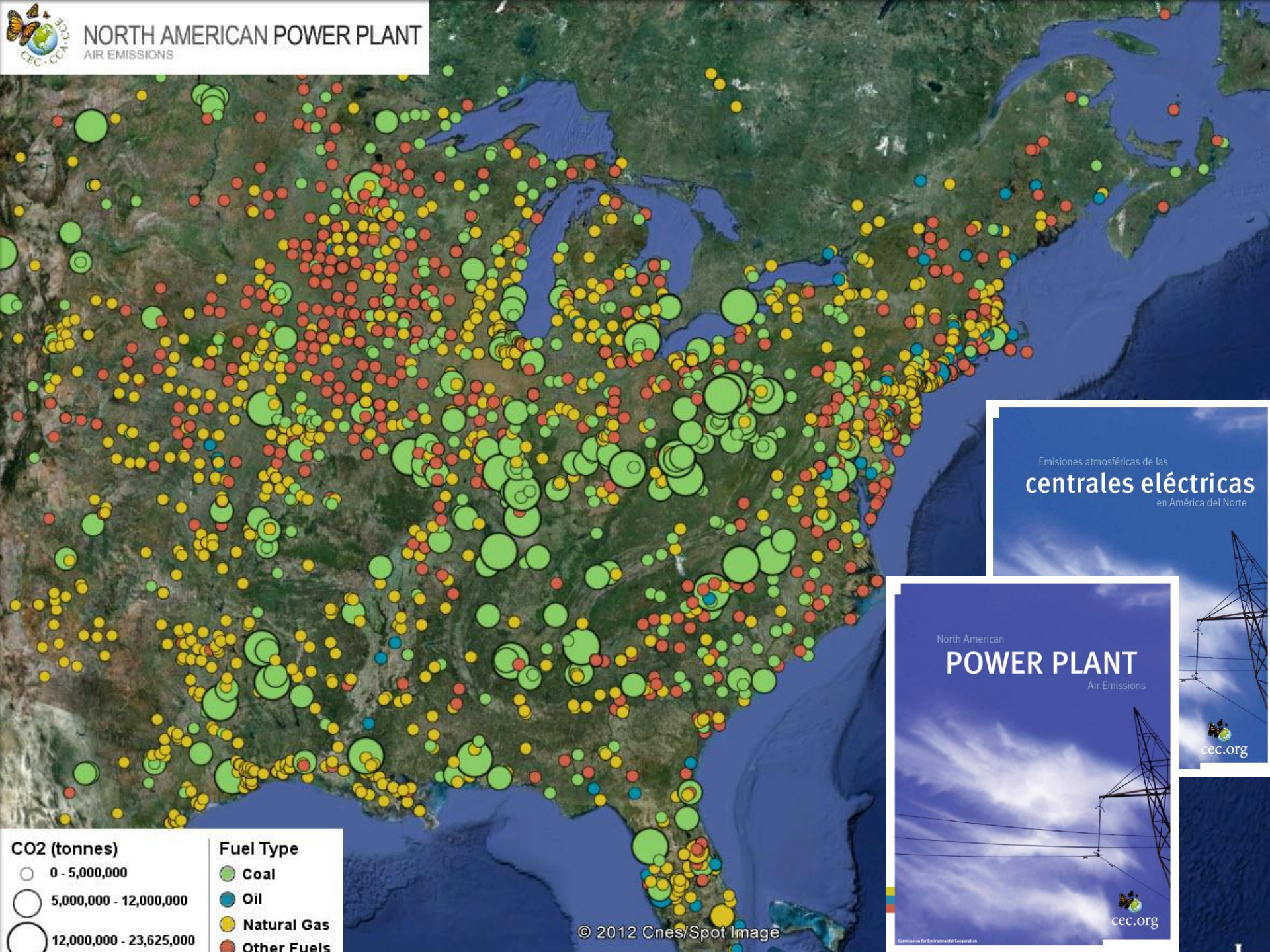


Estimated Truck CO₂ Emissions, 2010 vs 2035





NORTH AMERICAN POWER PLANT AIR EMISSIONS



© 2012 Cnes/Spot Image

Emisiones atmosféricas de las
centrales eléctricas
en América del Norte

North American
POWER PLANT
Air Emissions

cec.org

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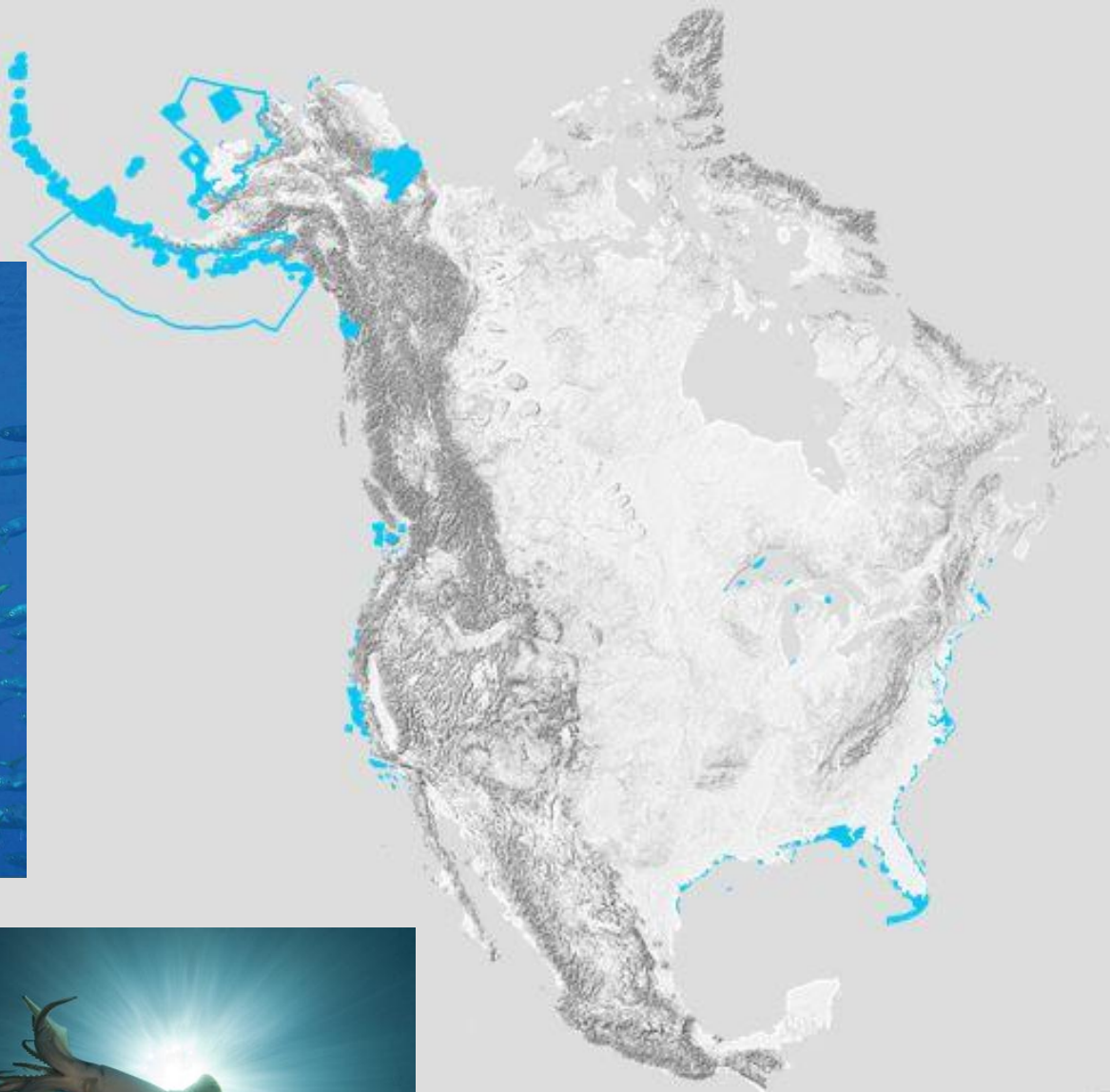
Commission for Environmental Cooperation

Scientific Guidelines for Designing Resilient
Marine Protected Area Networks
In a Changing Climate

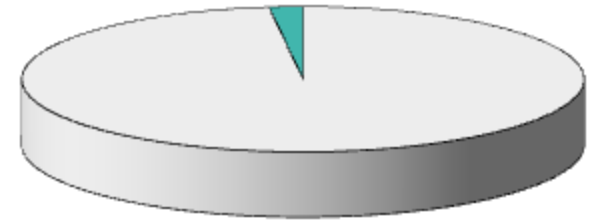
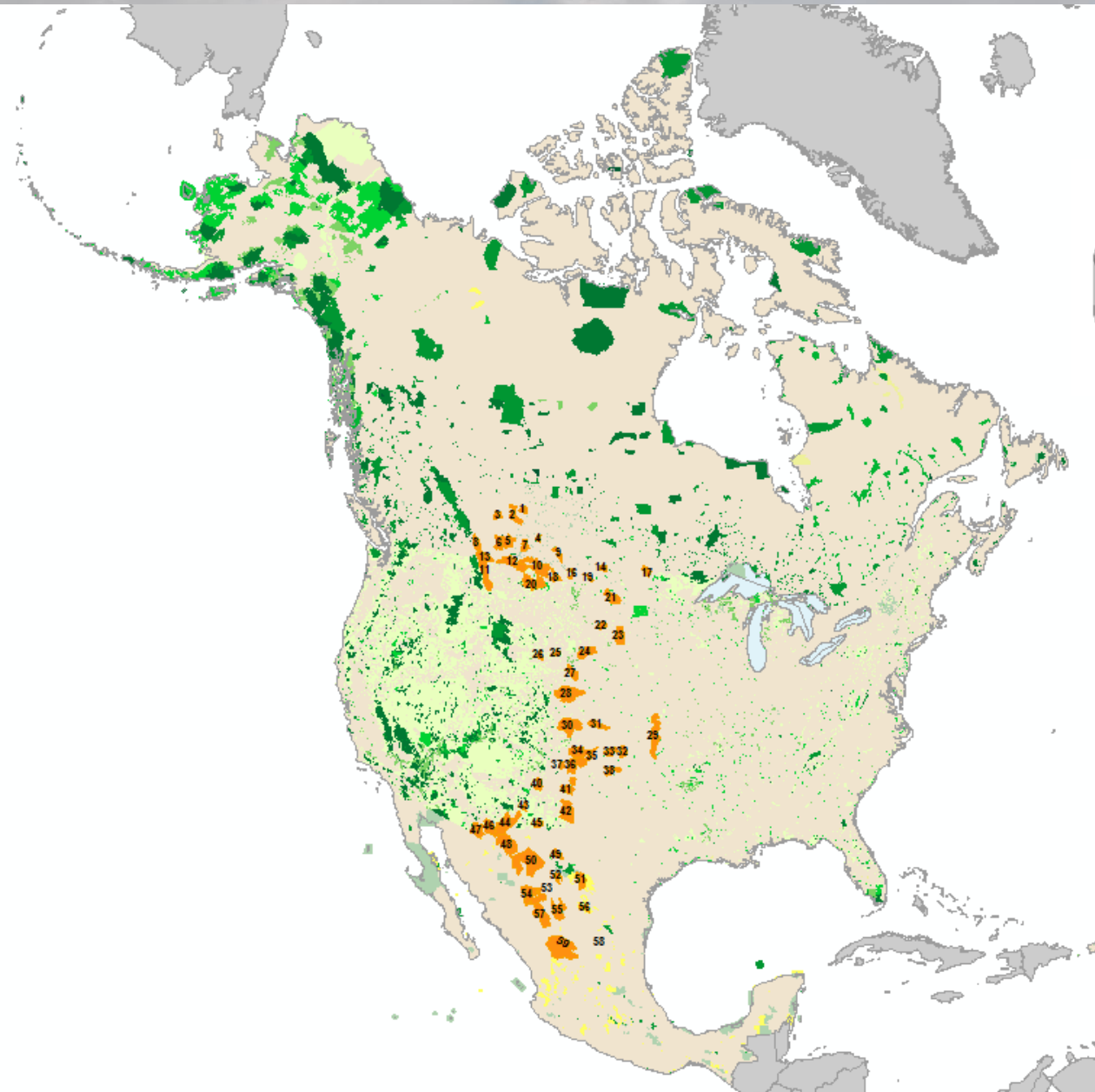
Directrices científicas para la creación de redes de
áreas marinas protegidas
en un contexto de cambio climático

Comisión para la Cooperación Ambiental

cec.org

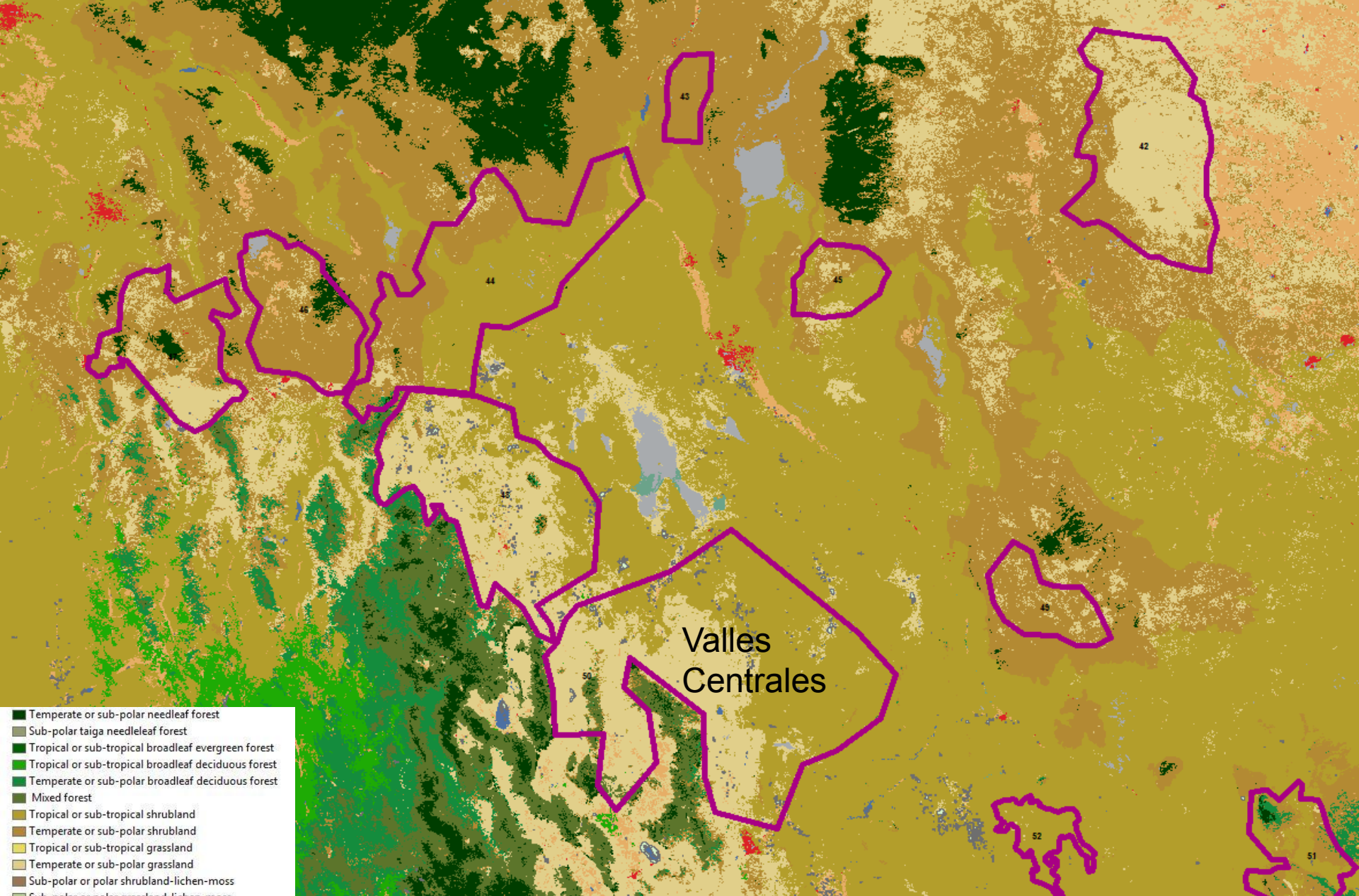


Terrestrial Protected Areas and Grassland Priority Conservation Areas



Amount of grasslands formally protected (2%)

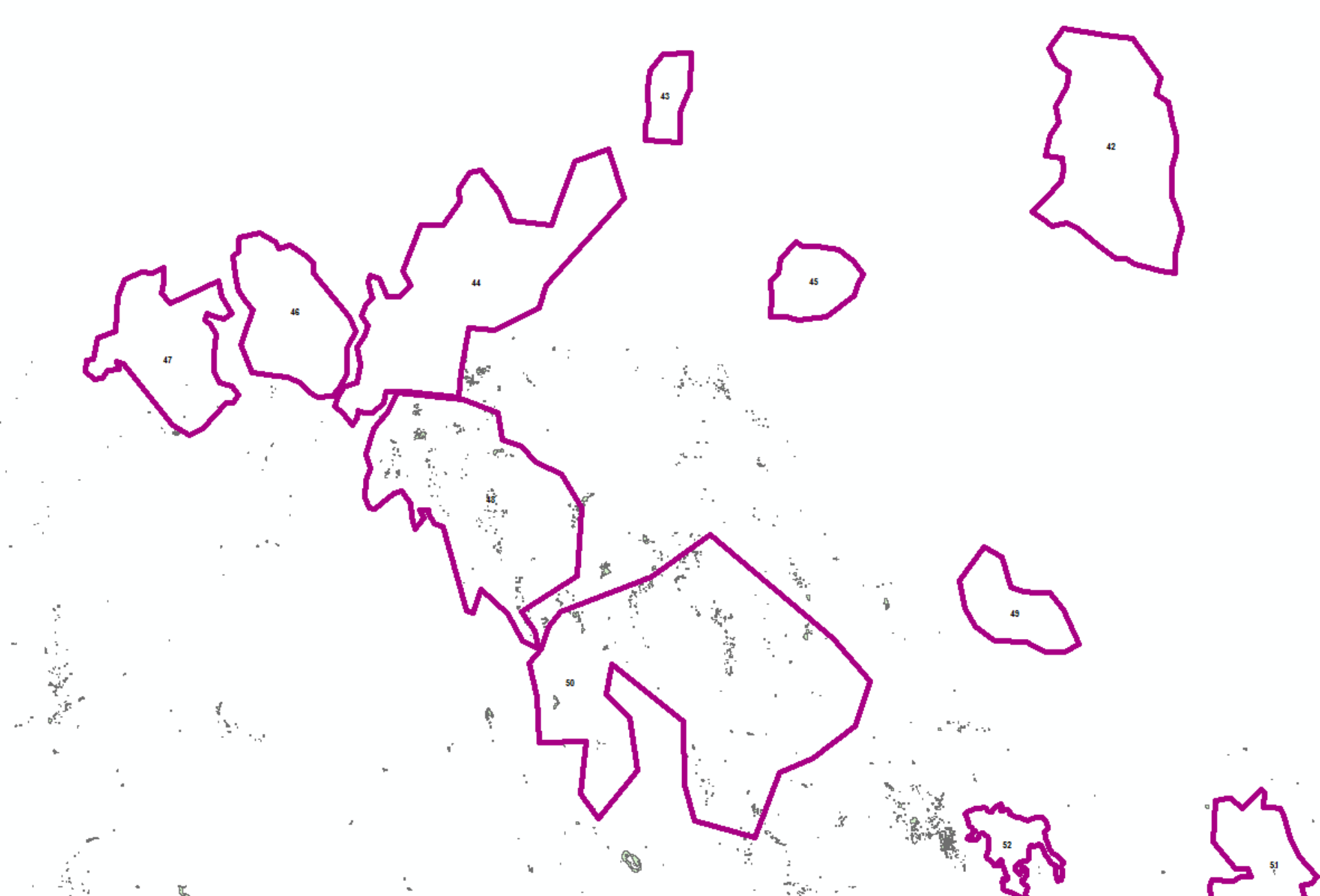




- Temperate or sub-polar needleleaf forest
- Sub-polar taiga needleleaf forest
- Tropical or sub-tropical broadleaf evergreen forest
- Tropical or sub-tropical broadleaf deciduous forest
- Temperate or sub-polar broadleaf deciduous forest
- Mixed forest
- Tropical or sub-tropical shrubland
- Temperate or sub-polar shrubland
- Tropical or sub-tropical grassland
- Temperate or sub-polar grassland
- Sub-polar or polar shrubland-lichen-moss
- Sub-polar or polar grassland-lichen-moss
- Sub-polar or polar barren-lichen-moss
- Wetland
- Cropland
- Barren lands
- Urban and built-up
- Water
- Snow and ice

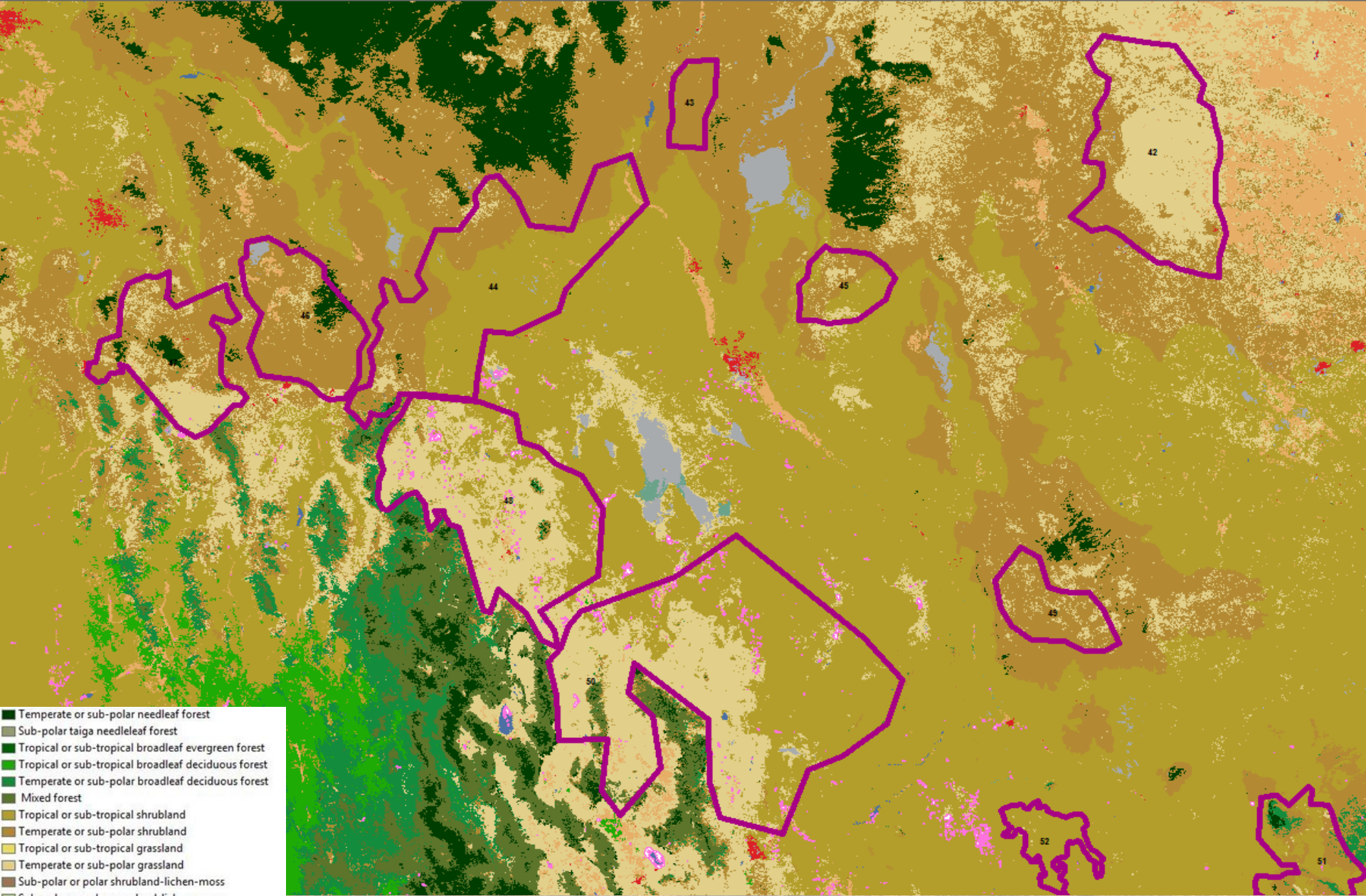
2005 Land Cover





2005-2010 Land Cover Change



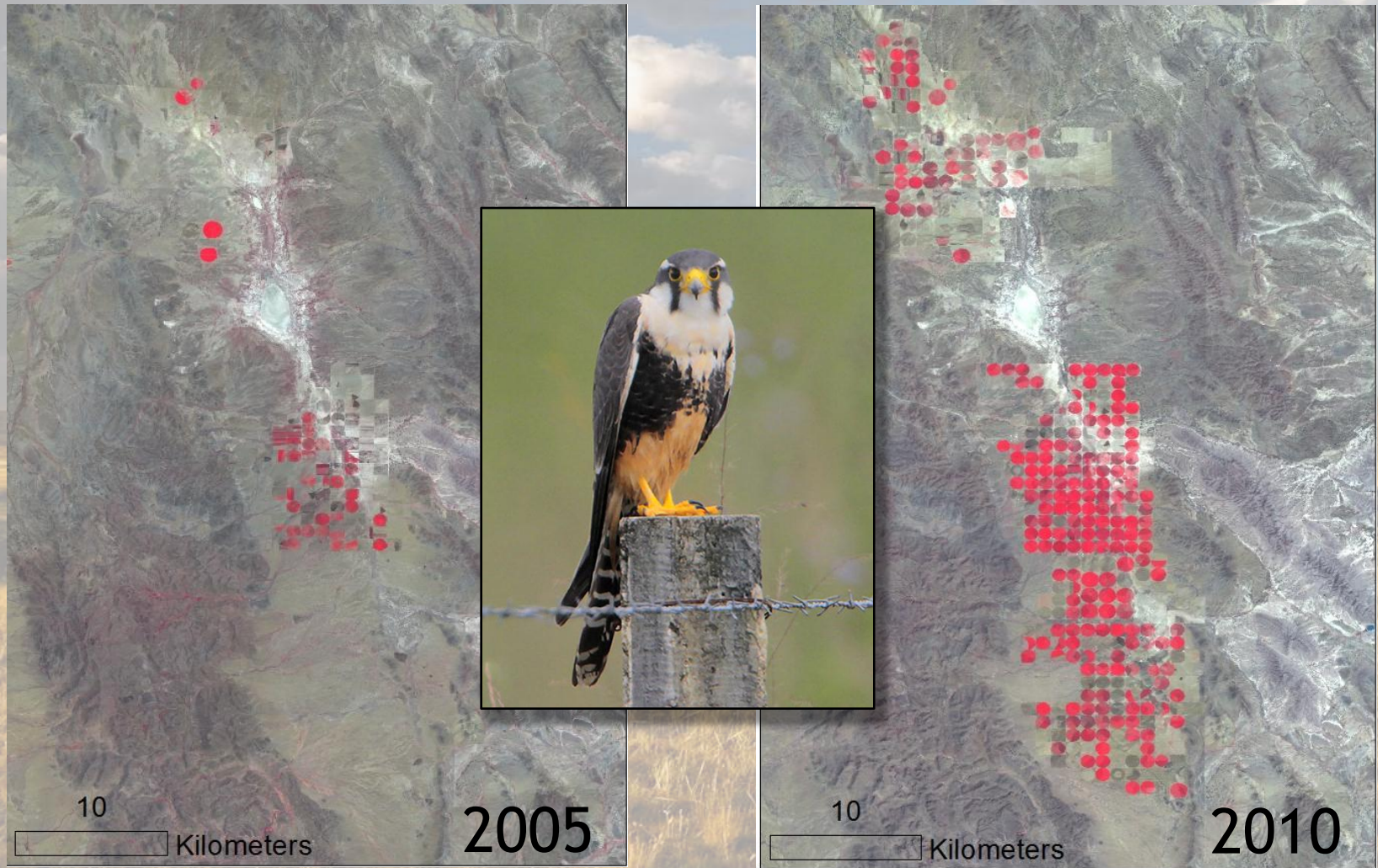


- Temperate or sub-polar needleleaf forest
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- Sub-polar or polar grassland-lichen-moss
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2010 Land Cover



Rapid agricultural expansion in Northern Mexico

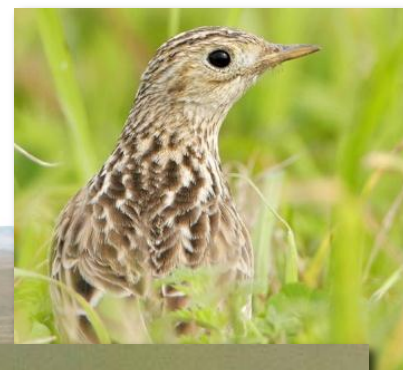


Tarabillas Valley, in Valles Centrales GPCA, Chihuahua



Population Declines: Breeding Bird Survey (BBS) 1966-2010

Species	Annual Change	Population Loss
McCown's Longspur	-5.5%	-92%
Lark Bunting	-4.4%	-89%
Chestnut-collared Longspur	-4.4%	-87%
Loggerhead Shrike	-3.2%	-77%
Mountain Plover	-2.8%	-72%
Baird's Sparrow	-2.7%	-71%
Short-eared Owl	-2.5%	-68%
Grasshopper Sparrow	-2.5%	-68%
Sprague's Pipit	-2.4%	-66%

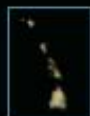


North America land cover

Couverture terrestre de l'Amérique du Nord

- 1 Temperate or subtropical deciduous or evergreen forest
Forêt à feuilles caduques tempérées ou à feuilles
persistantes subtropicales
- 2 Subtropical or tropical evergreen forest
Forêt à feuilles persistantes subtropicales ou tropicales
- 3 Temperate or subtropical broadleaf evergreen forest
Forêt à feuilles persistantes à large feuilles tempérées ou subtropicales
- 4 Temperate or subtropical broadleaf deciduous forest
Forêt à feuilles persistantes à large feuilles tempérées ou subtropicales
- 5 Temperate or subtropical broadleaf deciduous forest
Forêt à feuilles persistantes à large feuilles tempérées ou subtropicales
- 6 Mixed forest
Forêt mixte
- 7 Temperate or subtropical deciduous
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Forêt à feuilles persistantes subtropicales ou tropicales
- 100 Subtropical or tropical deciduous forest
Forêt à feuilles persistantes subtropicales ou tropicales

Land cover data from the Earth System
40°N and 100°W
Population data from the Earth System
40°N and 100°W
Data source: USGS



This striking picture of North America's land cover is the product of a collaboration between Canada, Mexico and the United States through the Commission for Environmental Cooperation's (CEC) North American Environmental Atlas Initiative. The CEC is an international organization established to promote environmental cooperation among the three countries. This first-ever map forms the basis of the North American Land Change Monitoring System, developed to track annual land cover change and promote understanding of significant continental-scale environmental issues.

Quelques renseignements généraux sur les données. Les données sont le résultat d'une collaboration entre le Canada, le Mexique et les États-Unis à travers la Commission de coopération environnementale (CCE) de l'Amérique du Nord. La CCE est une organisation internationale établie pour promouvoir la coopération environnementale entre les trois pays. Cette première carte sert de base au Système de surveillance des changements de l'Amérique du Nord, développé pour suivre les changements annuels de la couverture terrestre et promouvoir la compréhension des enjeux environnementaux à l'échelle continentale.

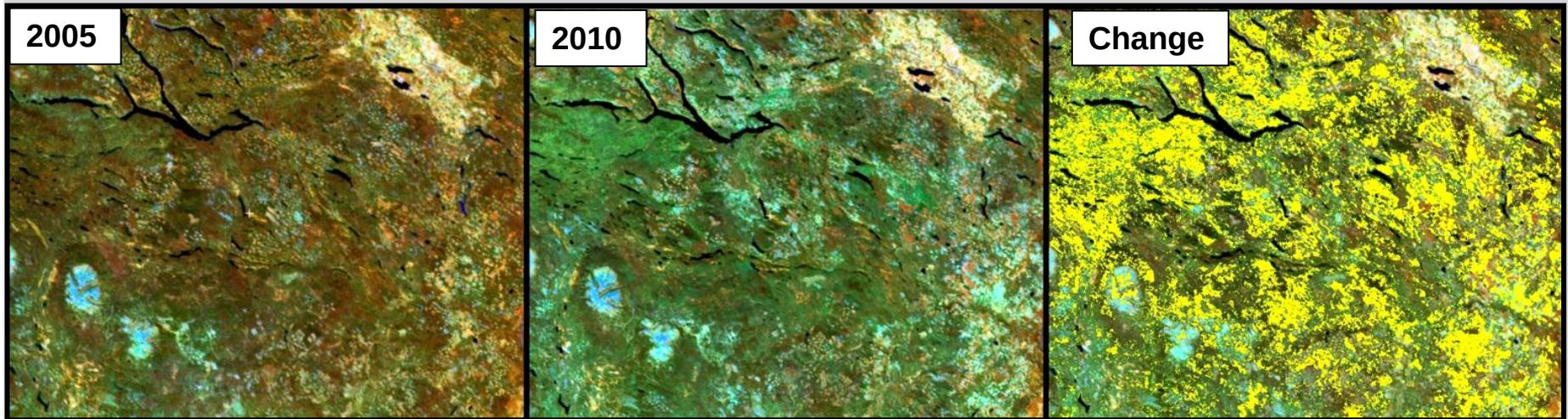
Map data provided by the following sources: (1) Digital data from the following sources:

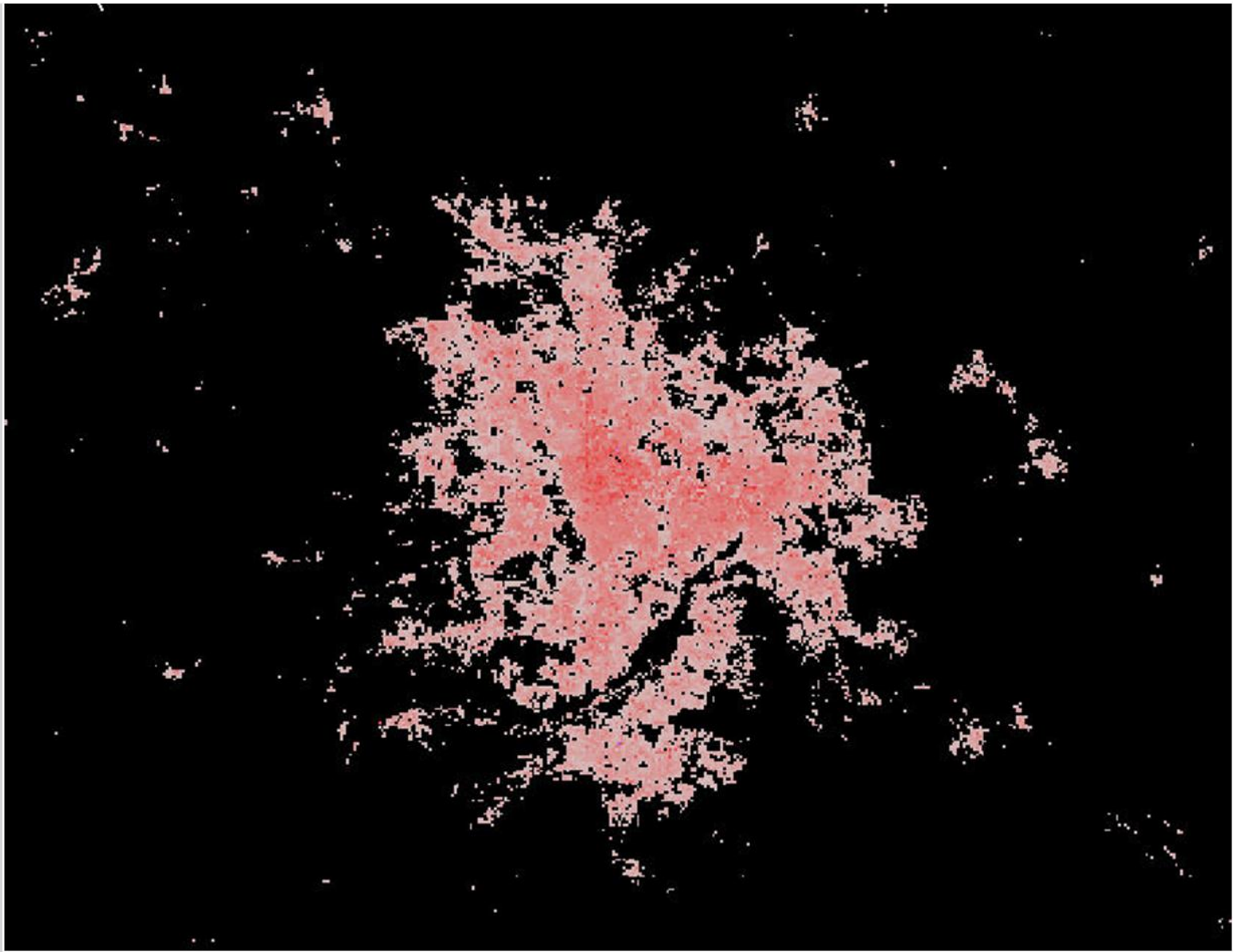


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Pine Beetle Damage, British Columbia, Canada

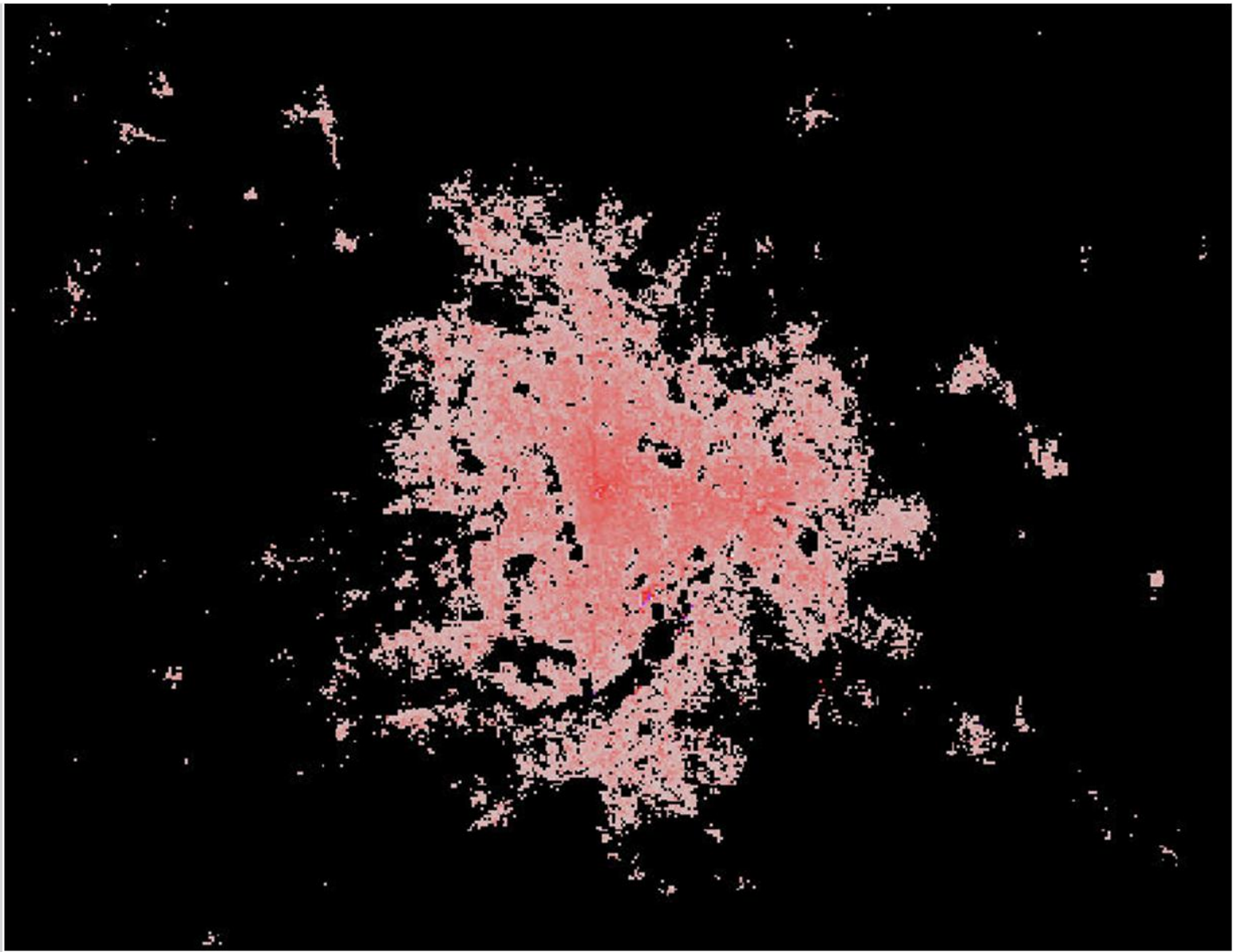




Source: USGS

2005 Minneapolis, MN

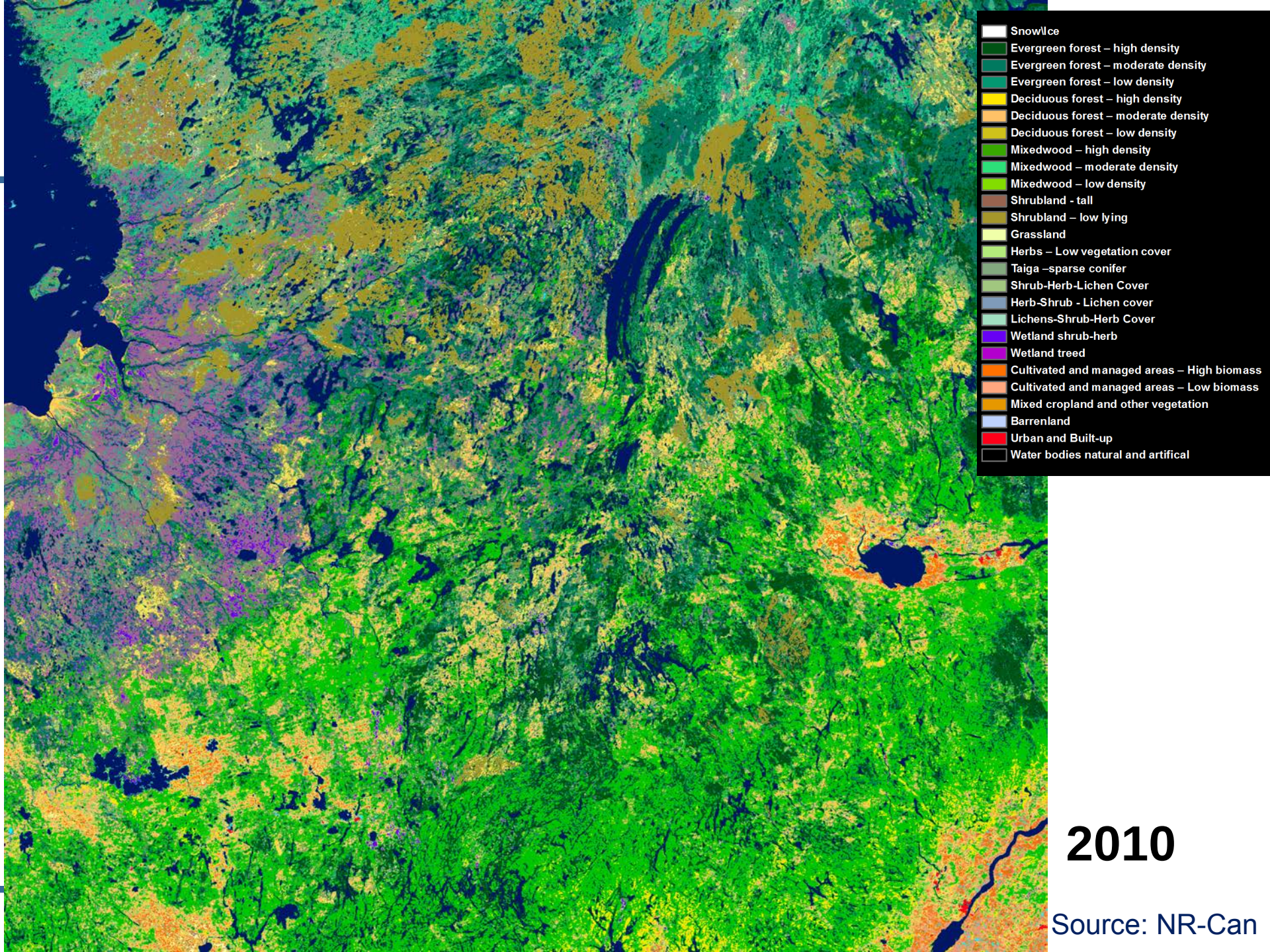




Source: USGS

2010 Minneapolis, MN





- Snow/Ice
- Evergreen forest – high density
- Evergreen forest – moderate density
- Evergreen forest – low density
- Deciduous forest – high density
- Deciduous forest – moderate density
- Deciduous forest – low density
- Mixedwood – high density
- Mixedwood – moderate density
- Mixedwood – low density
- Shrubland - tall
- Shrubland – low lying
- Grassland
- Herbs – Low vegetation cover
- Taiga –sparse conifer
- Shrub-Herb-Lichen Cover
- Herb-Shrub - Lichen cover
- Lichens-Shrub-Herb Cover
- Wetland shrub-herb
- Wetland treed
- Cultivated and managed areas – High biomass
- Cultivated and managed areas – Low biomass
- Mixed cropland and other vegetation
- Barrenland
- Urban and Built-up
- Water bodies natural and artificial

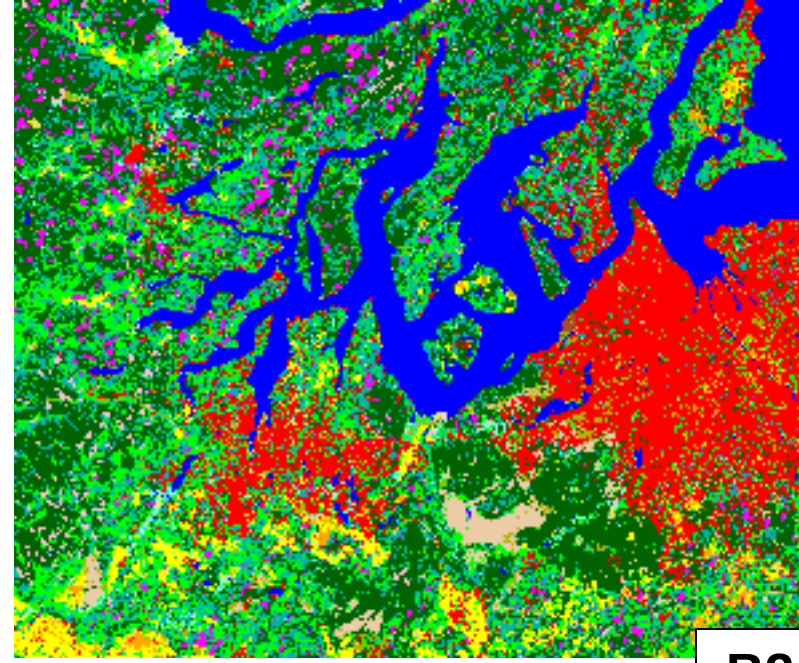
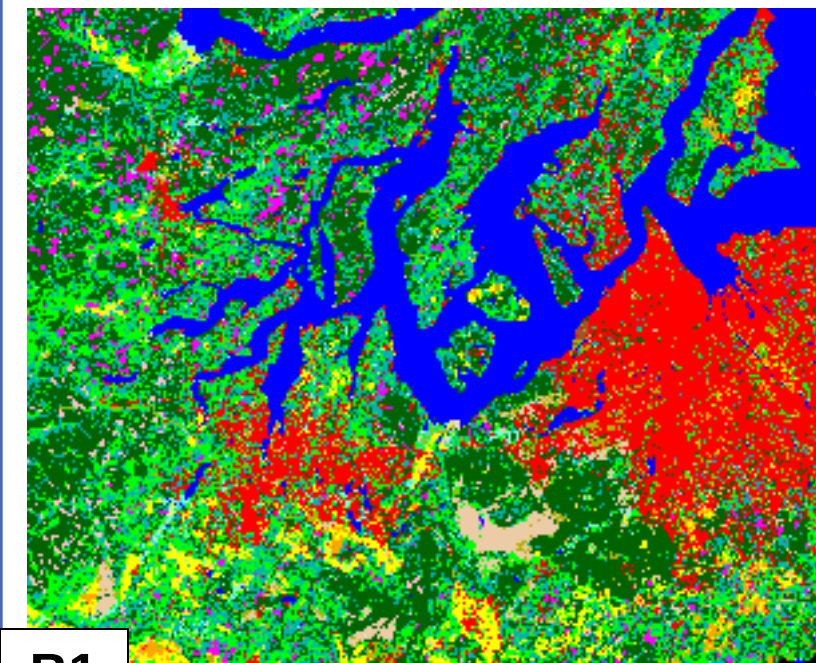
A1**A2**

*Tacoma,
Washington*

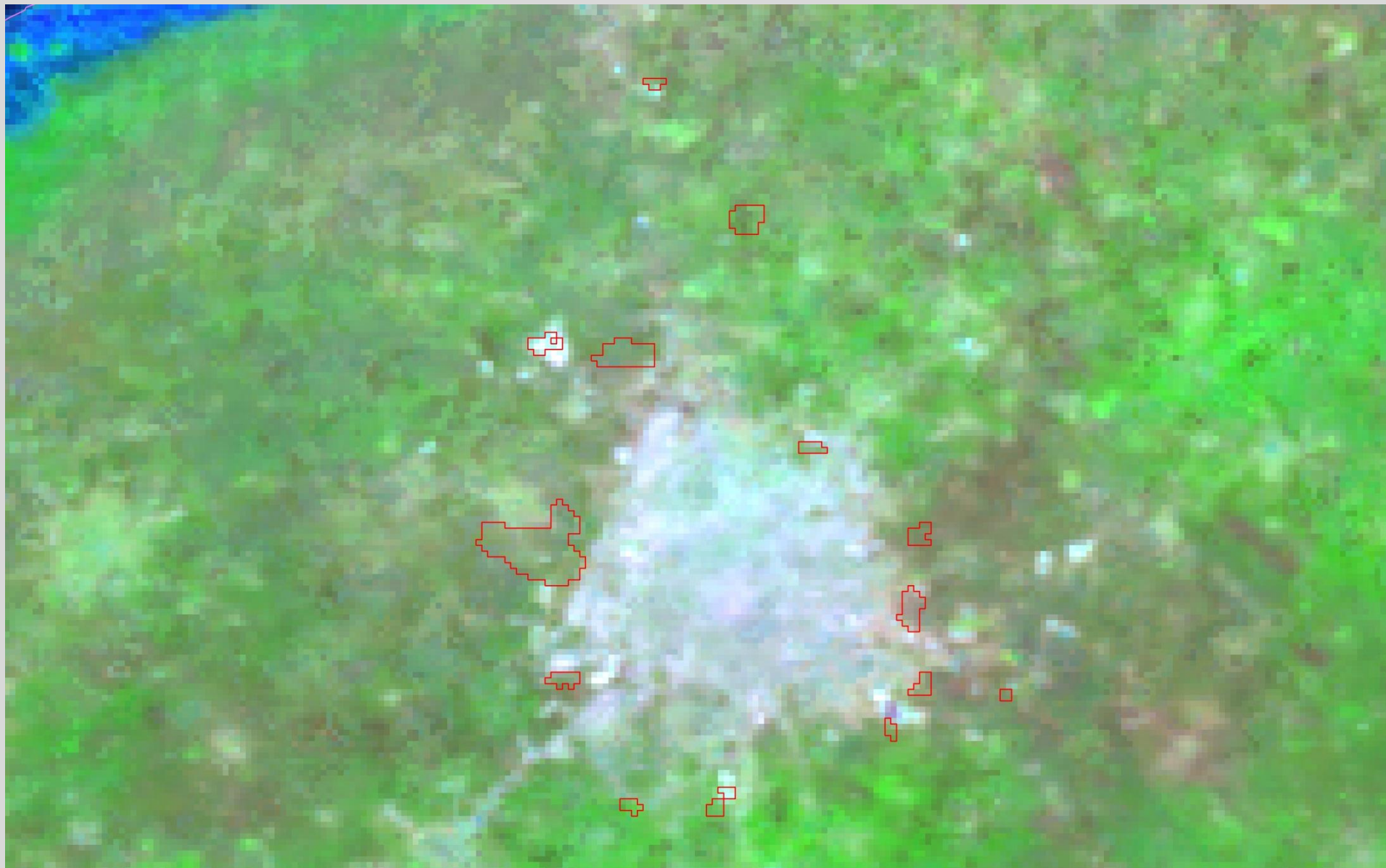
2006



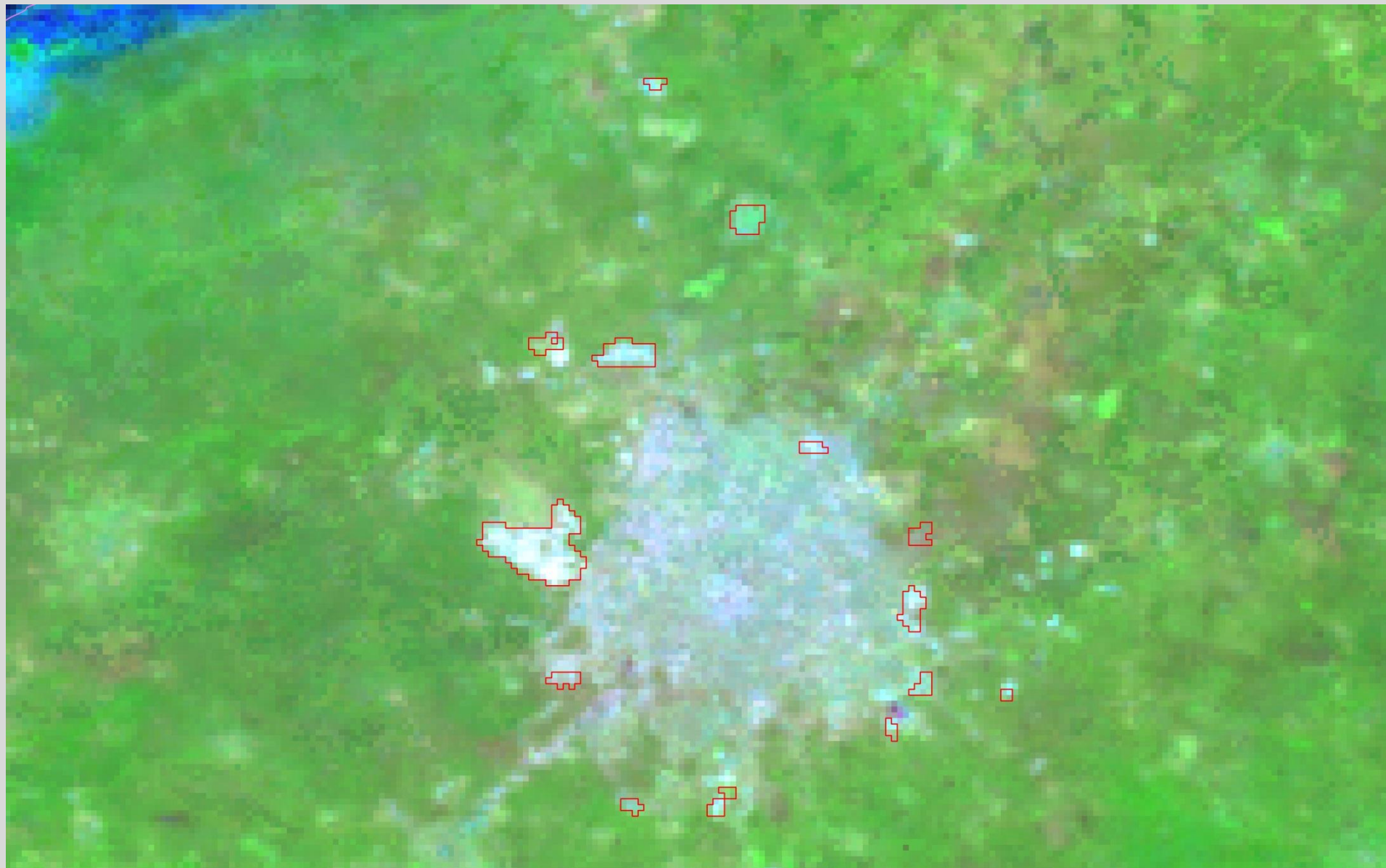
Source:
USGS

**B1****B2**

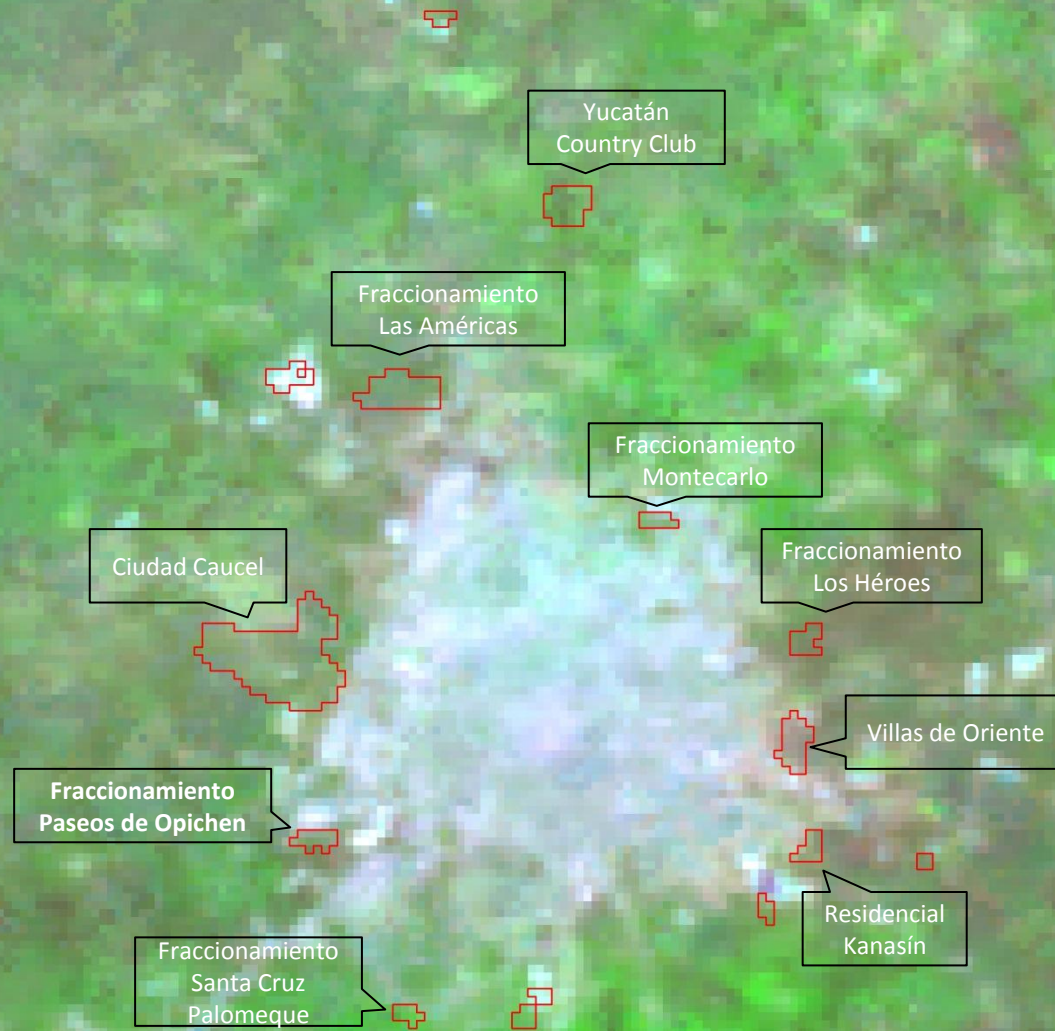
April 2005



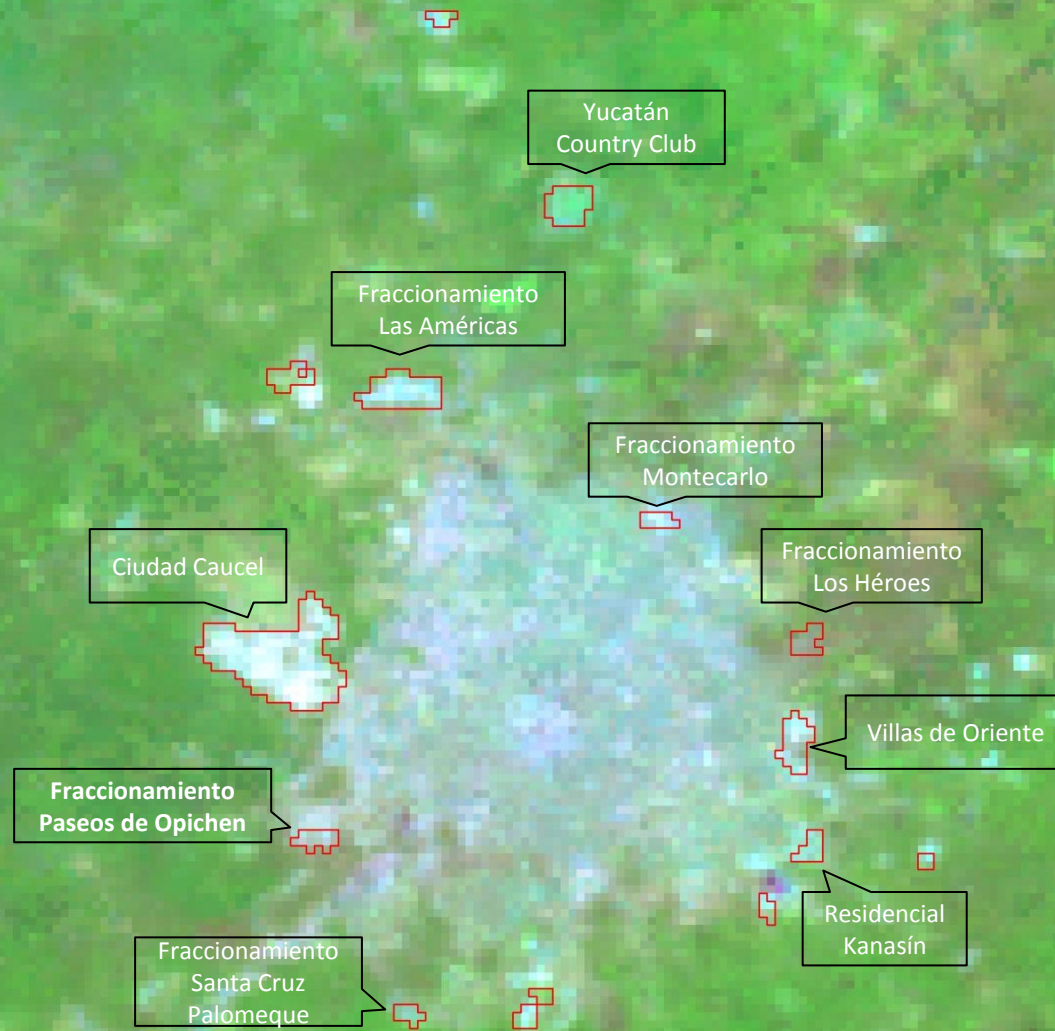
April 2010



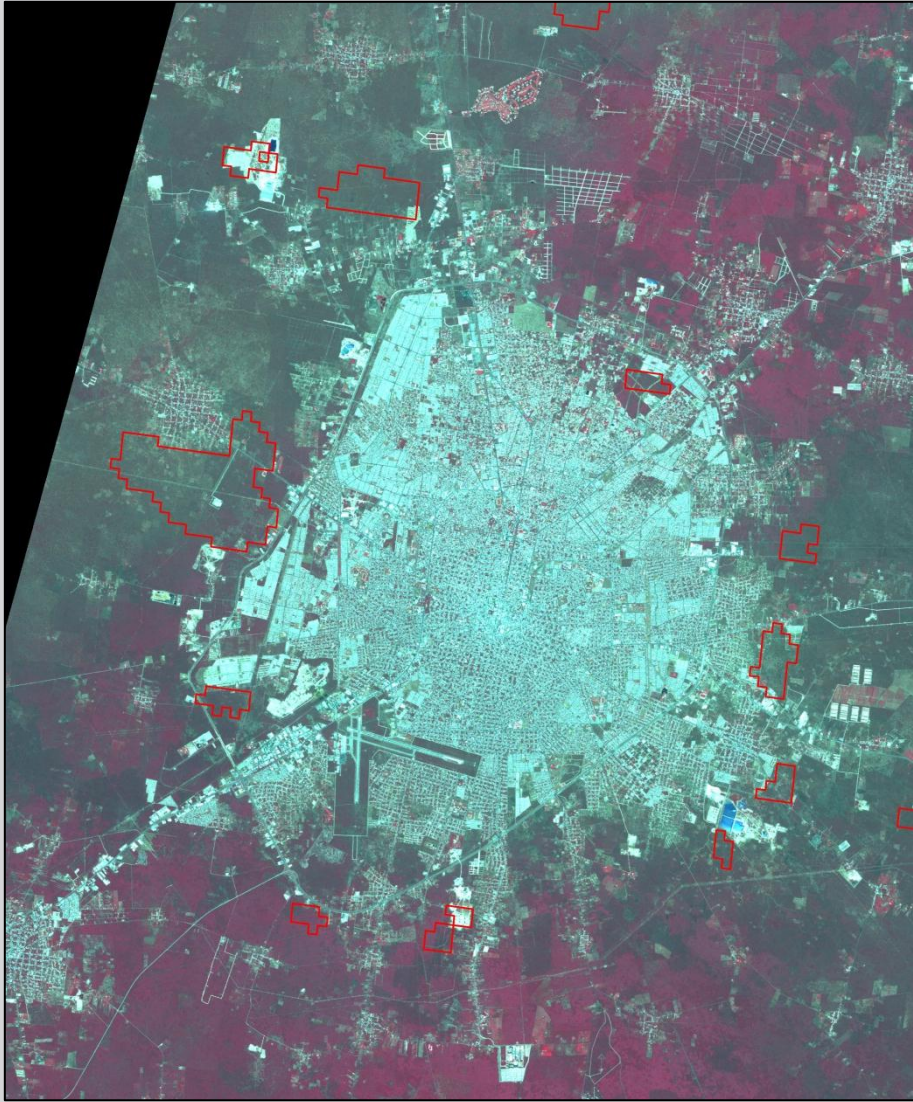
Urban Sprawl (2005)



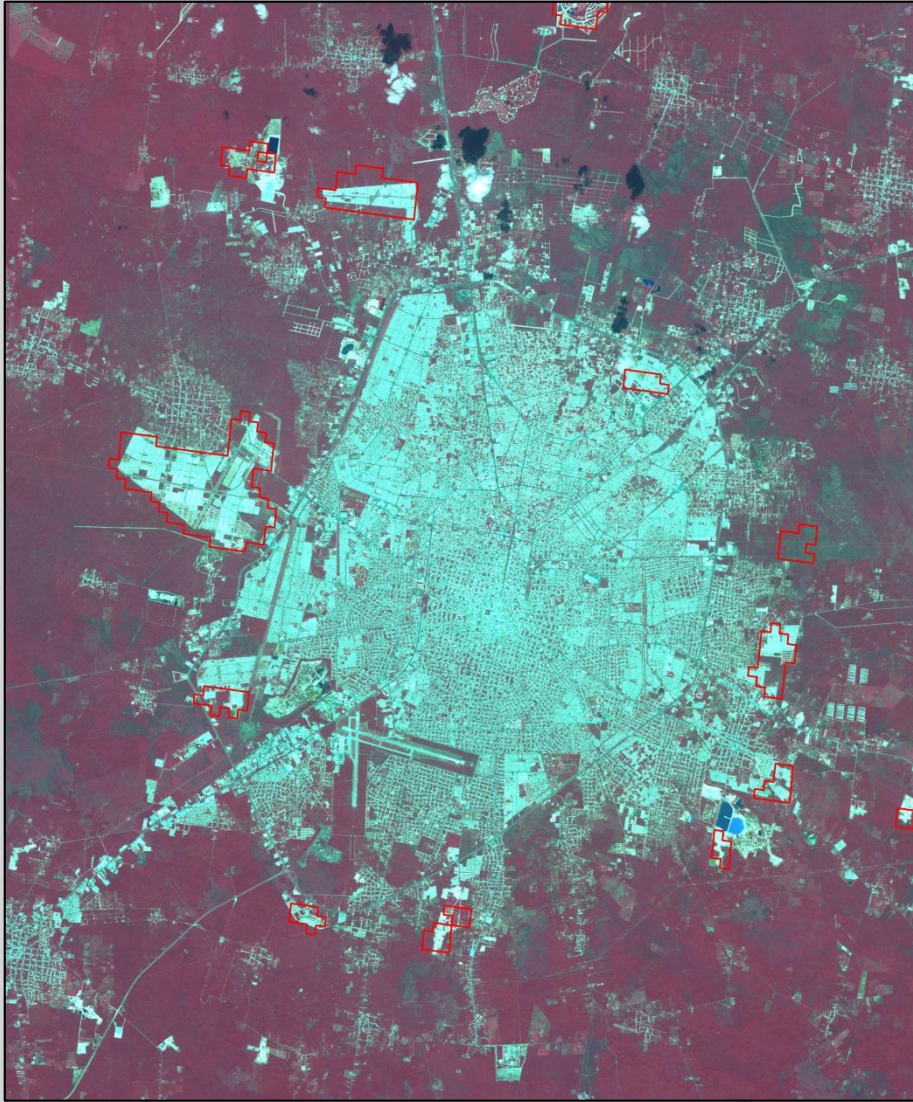
Urban Sprawl (2010)



Mérida, 2005 (SPOT)



Mérida, 2010 (SPOT)





Yucatán Country Club



Ciudad Caucel



Villas de Oriente



Fraccionamiento Montecarlo



Fraccionamiento las Américas



Fraccionamiento Paseos de Opichen



Group Exercise

Tools to Map and Identify Vulnerable Systems

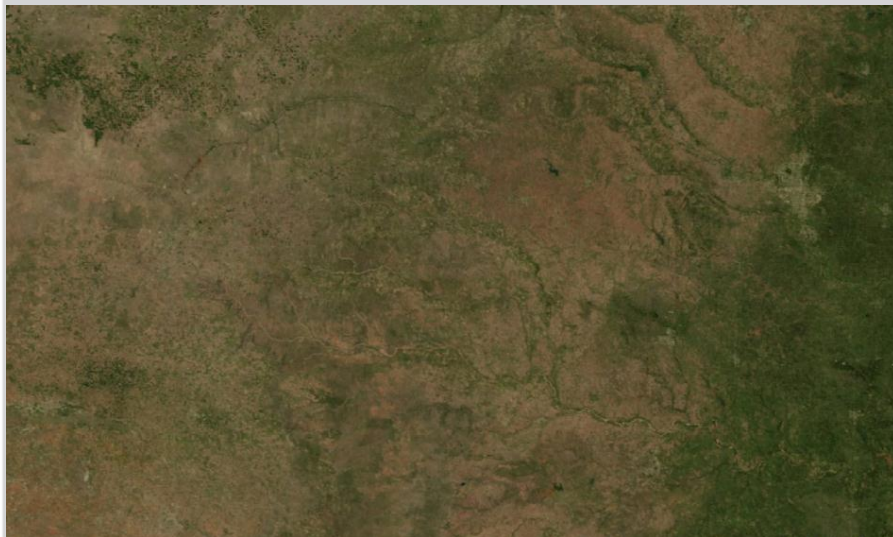


1. Water Depletion in the Texas Portion of the High Plains Aquifer/**Agotamiento del agua en la porción texana del acuífero de High Plains**
2. Tourism Development in Cancún/**Desarrollo turístico en Cancún**
3. Pollutants in the Columbia River Watershed/**Contaminantes en la cuenca del río Columbia**



Water Depletion in the Texas Portion of the High Plains Aquifer

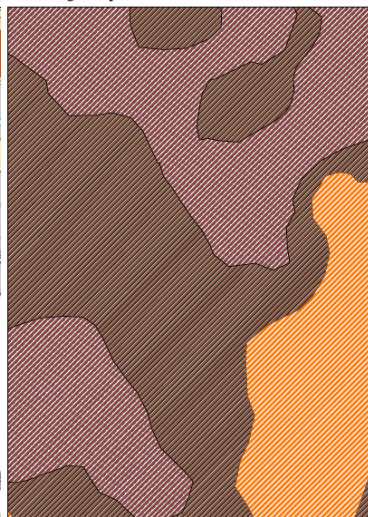
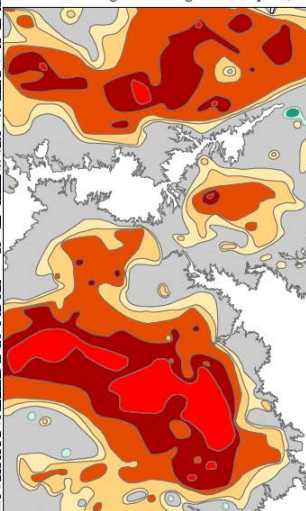
Agotamiento del agua en la porción texana del acuífero de High Plains



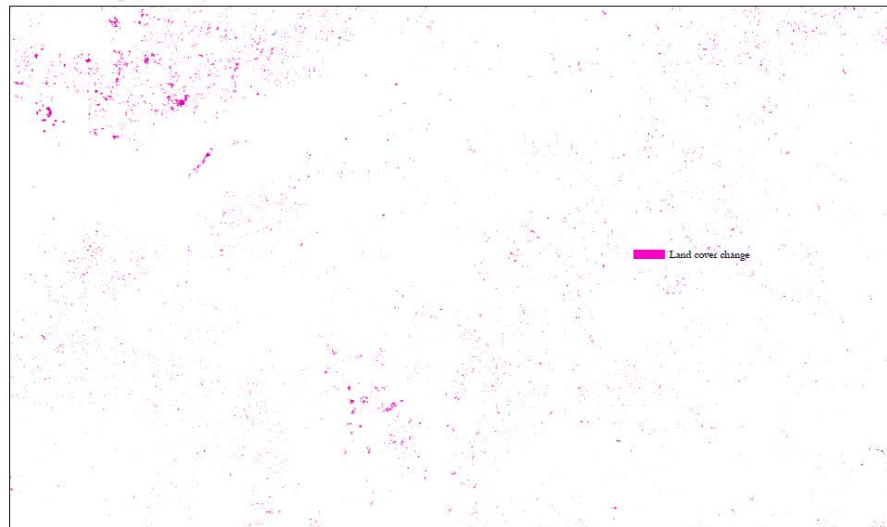
Location of Groundwater Wells



Water-Level Changes in the High Plains Aquifer, Pt. U.S. Drought Map



Land Cover Change (2005-2010)



Questions to Consider

1. How can this information and data help to empower communities? **¿De qué manera pueden estos datos e información ayudar a empoderar a las comunidades?**
2. What are ways these data can be used? **¿Cómo se pueden usar estos datos?**
3. What are the different scales that need to be considered to be able to identify vulnerable communities and ecosystems? **¿Cuáles son las diferentes escalas que es preciso considerar para poder identificar comunidades y ecosistemas vulnerables?**
4. Looking ahead, what data are needed to understand new threats and to avoid unintended consequences? **¿ Con una visión a futuro, ¿qué datos se requieren para comprender las nuevas amenazas y evitar consecuencias no intencionadas?**
5. Recommendations to make data accessible/ **Recomendaciones para hacer los datos accesibles**



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Gracias/Thank you

Three countries. One environment.