APPENDIX
C

OUTLINE FOR DATABASE BRIEFING PACKET CONTRIBUTIONS

Audience: The intelligent layperson: to include policy makers & planners, technically-naive persons interested in GIS, as well as elected officials.

Structure: Your portion should be conceived as part of a briefing packet which will be distributed to each workshop participant. The explanations should be easily understood as an overview to the resource with specifics as to what is presented on the map/layers. There will be a front section that explains how a GIS works and the layers involved with some case study examples so your part is to explain what is in that particular set of layers. I.e. for geology/geologia:

what are the major strata: what do they contain (i.e. any valuable minerals, water, etc)

what influence has/does the geology have on the development of on the transportation or infrastructure systems in the region

how do I know what I am looking at or for on the map?

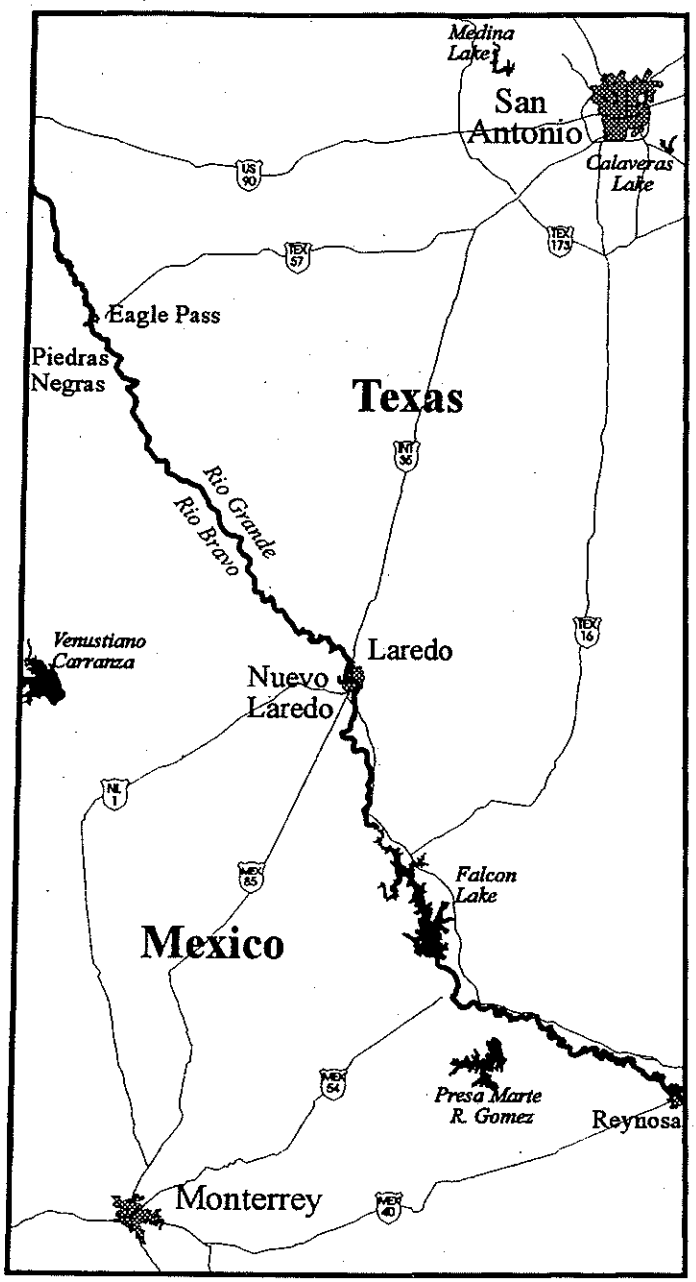
any great valuable resources available?

any serious limitations posed by the character of this resource?

Anecdotal: Any good quotes from references on the resource layer that will reinforce your description: i.e. for vegetation, look in the Cultural Geography of Texas textbook and it has some great quotes from travelers in the 19th century about the thorns, pricks, etc with which this region's vegetation welcomes visitors

This portion can be outlined with an intro paragraph or two, a description of individual elements (with examples of say, towns of a particular size in both Mexico and Texas), some graphic that imprints in the reader's mind (i.e. a scanned roadcut slide) and you've got it.

The NAFTA Corridor Study Region



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26 00'
25 45'
25 30'
25 15'

Study Area Boundary

100 45' 100 30' 100 15' 99 45' 99 30' 99 15' 98 45' 98 30' 98 15'

101 00' 100 00' 99 00' 98 00'

Major Database Categories

Transportation
Geology
Hydrology
Vegetation
Settlements
Climate
Demographics
Political Boundaries

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Transportation

Airports: Airports & Airstrips
Bridge: International Bridges
Dirt: Dirt Roads (Mexico only)
Fair: Fair Weather Roads
Improved: Improved All Weather Roads
Primary: Primary Roads
Rail: Rail Road Lines
Secondary: Secondary Roads
Montgps--New Autopista Monterrey

Vegetation

Vegetall: Vegetation for the Study Region

Irrigated Agriculture and Crops
Areas of Suspended Irrigation
Natural Pastureland / Acacia
Induced and Cultivated Pasture, Native and Introduced Crops
Pine Forests
Pine-Oak Forests
Oak-Pine Forests
Chaparral
Oak Forests
Mesquite, Mesquite-Granjeno Parks
Submountain Scrub, Mesquite-Blackbrush
Spiny Scrubland of Tamaulipas
Scrubland With Flowery Leaf Groups, Succulents
Spiny Scrublands
Sub-Spineless Scrublands
Halofilo Vegetation
Spineless Scrubland
Lowlands Spiny Forest
Areas Without Any Apparent Vegetation
Ceniza-Blackbrush-Creosotebush brush
Mesquite-Granjeno Woods
Mesquite-Live Oak-Bluewood Parks
Live Oak Woods / Parks
Live Oak-Ashe Juniper Parks
Live Oak-Mesquite-Ashe Juniper Parks
Live Oak-Ashe Juniper Woods
Post Oak Woods, Forest, and Grassland Mosaic
Post Oak Woods / Forest
Pecan-Elm Forest
Urban Areas
Water (Lakes)

Geology

Basegeo: Base Geology

24 Types organized by time period and type of deposit.

Surfgeo: Surface Geology

6 Types organized by time period and type of deposit.

Areas where only base geology exists and surface geology is absent.

Hydrology

Canals: Human-made Canals
Dams: Human-made Dams for Lakes and Lagoons
Floodzone: Areas of Inundation

Areas of Water Inundation
Areas Without Inundation

H2oregion: Major Hydrologic Regions

Rio Grande Watershed
Rio Conchos Watershed
Nueces River Watershed
The Gulf of Mexico
San Antonio River Watershed

Intermittent: Intermittent Streams
Lagoons: Small Lakes and Small Reservoirs
Lakes: Large Lakes and Reservoirs
Moderatewells: Wells with Tolerable Water
Perennial: Perennial Rivers
Salinewells: Wells with Saline Water
Minor Aquifers (by Aquifer Name)

Sparta
Queen City

Major Aquifers (By Aquifer Name)

Trinity
Carrizo
Edwards-Trinity
Gulf Coast
Edwards

Subh2o: Subsurface Hydrology

Consolidated Material with High Possibilities for Water
Consolidated Material with Medium Possibilities for Water
Consolidated Material with Low Possibilities for Water
Unconsolidated Material with High Possibilities for Water
Unconsolidated Material with Medium Possibilities for Water
Unconsolidated Material with Low Possibilities for Water

Subsheds: Subsheds of the Major Watersheds within the Study Region

Pinto Creek	West Nueces River
(East) Nueces River	Frio River
Sabinal River	Medina River
San Antonio River	Salado Creek
Cibolo Creek	Lucas Creek
Atascosa River	Hondo Creek
Leona River	Tortuga Creek
Turkey Creek	San Diego
San Rodrigo	Rio Escondido
Acequia de Enmedio	Arroyo Castaño
Rio Grande ('creeks')	Nueces River
Chiltipin Creek	Rosita Creek
Los Olmos Creek	Palo Blanco Creek
Arroyo Baluarte	El Granjeno
Rio Salado	Aqua Verde
El Carizo	Los Salados
Fandango Creek	Las Blancas Creek
La Joya Creek	Rio Salado de Nadadores
Agua Dulce	Candela
Canal Principal	Los Cabazos
Sabinas	El Mezquitito
Falcon Lake	Jacal Blanco
Palo Blanco	El Alamo
Agualeguas	San Antonio
Santa Gertrudis	Anazaldas
Salinas	Pesqueria
Santa Catarina	San Juan
San Lorenzo	Rio Conchos
La Chueca	La Boca

Sweetwells: Wells with Sweet Water
Untestedwells: Wells with Untested Water
Watersheds: Major Watersheds in The Study Region

Pinto Creek	Nueces River
Frio River	Medina River
Cibolo Creek	Atascosa River
Chiltipin Creek	Los Olmos Creek
Palo Blanco Creek	Arroyo Baluarte
La Joya Creek	Las Blancas Creek
Fandango Creek	Rio Grande ('creeks')
Rio Escondido	Arroyo Castaño
Rio Salado	El Alamo
San Juan	Anazaldas
San Lorenzo	Rio Conchos
Falcon Lake	

Settlements

Ranches: Ranches and Culturally Important Cites
Cities: Human Settlements That Classify As Cities

Over 500,000 People
100,000 - 500,000 People
25,000 - 100,000 People
5,000 - 25,000 People
Less than 5,000 People

Demographics

Political Boundaries

Cntymuni: Texas Counties and Mexico Municipios and Estados

Climate

Mexfreezeline: Freeze Lines in Mexico

1-8 Days of Freezing: March; 9 or More Days of Freezing: Nov, Dec, Jan, Feb
1-8 Days of Freezing: Nov, March; 9 or More Days of Freezing: Dec, Jan, Feb
1-8 Days of Freezing: Nov, Feb, March; 9 or More Days of Freezing: Dec, Jan
1-8 Days of Freezing: Nov; 9 or More Days of Freezing: Dec, Jan, Feb
1-8 Days of Freezing: Nov, Dec, Jan, Feb
1-8 Days of Freezing: Dec, Jan, Feb

Mextemp: Mexico's Average Yearly Temperature

14-16C
16-18C
18-20C
20-22C
22-24C

Mexwinprcp: Mexico's Winter Precipitation

25-50 mm Rainfall November-April
50-75 mm Rainfall November-April
75-100 mm Rainfall November-April
100-125 mm Rainfall November-April
125-150 mm Rainfall November-April

Mexprecip: Mexico's Average Yearly Precipitation

201-300 mm Rainfall per Year
301-400 mm Rainfall per Year
401-500 mm Rainfall per Year
501-600 mm Rainfall per Yea
601-700 mm Rainfall per Year
701-800 mm Rainfall per Year
801-900 mm Rainfall per Year

Mexsumprcp: Mexico's Summer Precipitation

800+ mm Rainfall May-October
700-800 mm Rainfall May-October
625-700 mm Rainfall May-October
550-625 mm Rainfall May-October
475-550 mm Rainfall May-October
400-475 mm Rainfall May-October
325-400 mm Rainfall May-October
250-325 mm Rainfall May-October
175-250 mm Rainfall May-October

Summaxtemp: Mexico's Maximum Summer Temperatures

36+°C in May-October
33-36°C in May-October
30-33°C in May-October
27-30°C in May-October
24-27°C in May-October
21-24°C in May-October

Summintemp: Mexico's Minimum Summer Temperatures

21-24°C in May-October
18-21°C in May-October
15-18°C in May-October
12-15°C in May-October
9-12°C in May-October
6-9°C in May-October

Winmaxtemp: Mexico's Maximum Winter Temperatures

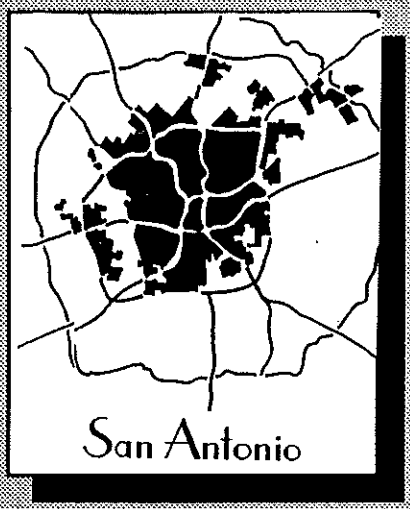
21+°C in November-April
18-21°C in November-April
15-18°C in November-April
12-15°C in November-April
9-12°C in November-April

Winmintemp: Mexico's Minimum Winter Temperatures

9-12C in November-April
6-9°C in November-April
3-6°C in November-April
0-3°C in November-April
-0°C in November-April

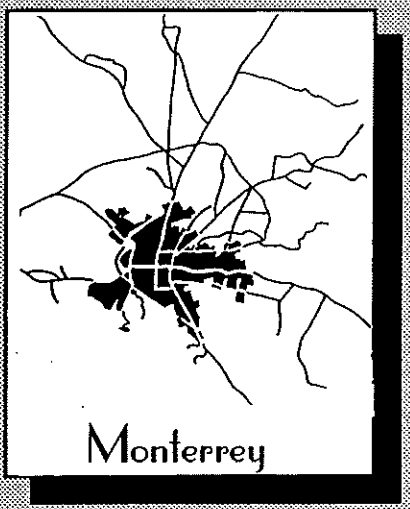
CORREDOR DEL TLC

Proyecto de la Sociedad de Arquitectos Paisajistas

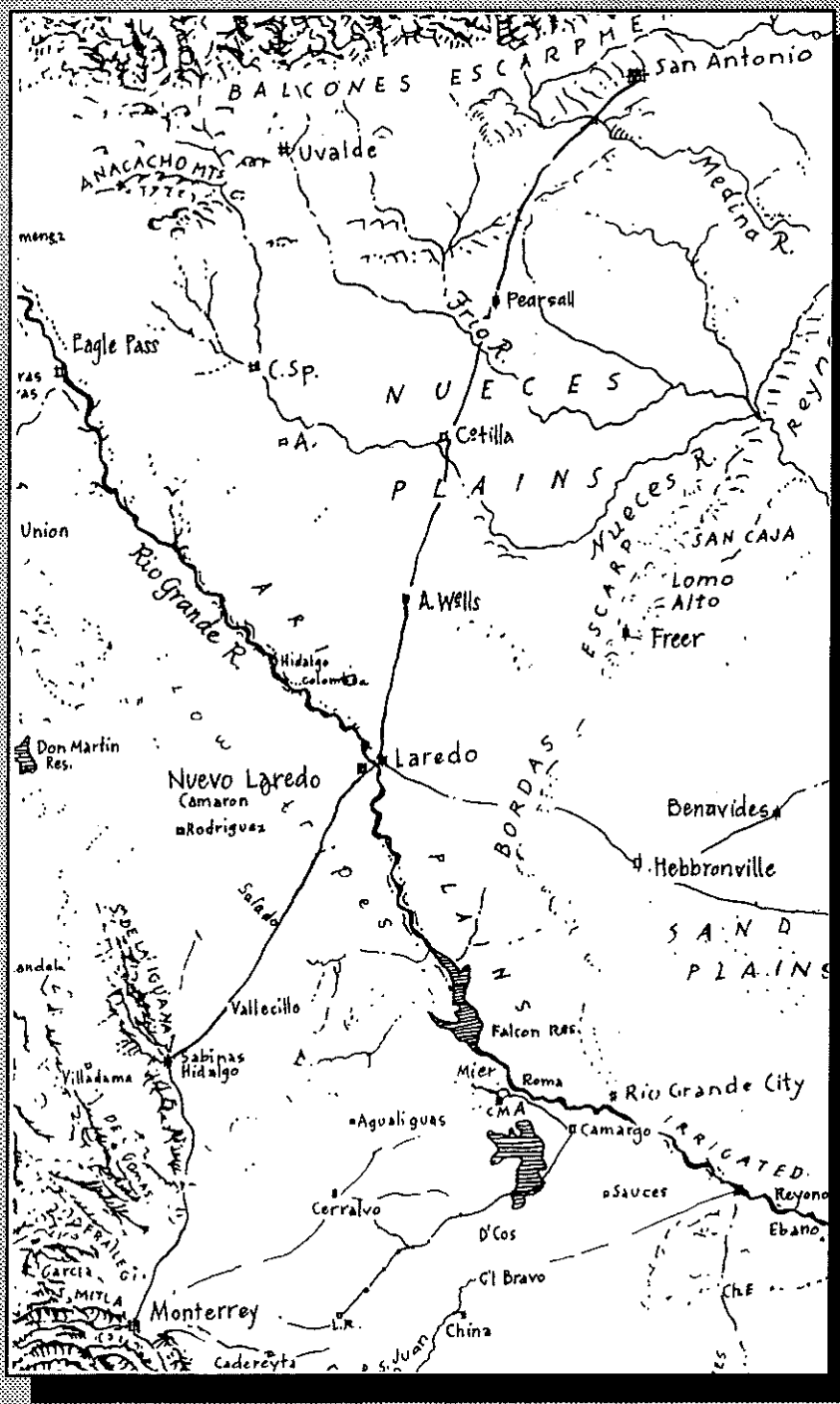


San Antonio

Laredo
Nuevo Laredo



Monterrey



Región del Estudio

El Tratrado de Libre Comercio (TLC) será uno de los factores determinantes más significativos del desarrollo económico del proximo siglo entre los Estados Unidos y México. Los Estudios realizados en Texas sobre el desarrollo regional se enfocan en la zona fronteriza entre Texas y México a lo largo del Río Bravo (Río Grande) desde Brownsville/Matamoros hasta El Paso/Ciudad Juarez, un corredor de 1,920 kilometros de Este a Oeste. Sin embargo, el corredor con las posibilidades económicas más fuertes es el que existe entre Monterrey, México y San Antonio, Texas. Ya entre Laredo, Texas y Nuevo Laredo, México, el punto de enlace internacional de este corredor, el tráfico de exportación equivale al doble de qualquiera otra ciudad de la frontera y Monterrey y San Antonio se están convertiendo en los puertos terrestres más importantes hacia los mercados Estudovnidenses y Méxicanos.

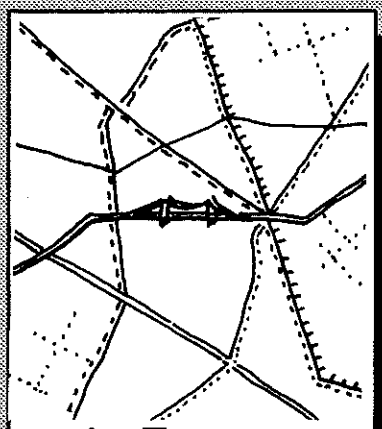
Los retos impuestos por el surgimiento del primer corredor comercial internacional en Norteamérica requieren que ambos lados sean capaces de tener acceso y de compartir información estratégica para la tarea crítica de crear un desarrollo sostenible basado en una visión común del futuro de la región.

Este estudio tiene como objeto involvcrar a quienes tengan la capacidad, tanto en el sector público como en el privado, en un sesión de trabajo para valorar el futuro de la región como un corredor comercial internacional a la vez que enfoquen la vitalidad económica, social y ambiental necesaria para hacer de la región un lugar atractivo para vivir y trabajar. También, el sesión se demonstrará el uso de mapas digitalizados que representan a la base de recursos para facilitar estos esfuerzos. Tres sesiones de trabajo serán efectuadas en Monterrey, México, Nueveo Laredo, México y San Antonio, Texas, y proveerán un foro para los diversos intereses que trabajarán juntos para lograr una visión común de los prospectos de la región.

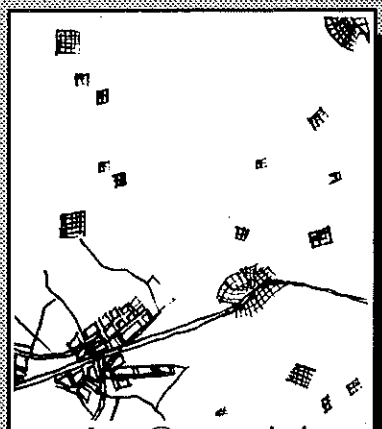
Este proyecto cuenta con el patronicio del Centro de Investigación sobre el Transporte de Southwest University y de la Sociedad de Arquitectos Paisajistos (ASLA) de Texas. El sistema de información geográfica siendo creando podrá ser usado para examinar el desarrollo futuro en relación a las oportunidades económicas y a los recursos naturales y culturales existentes. Este proyecto también sirvirá como prototipo para otros estudios de corredores Norte-Sur entre los Estados Unidos, México y Canada. Los Arquitectos de paisaje y los planificadores de recursos tendrán un papel de líderes en el esfuerzo colaborativo internacional de planeación. A través de la participación de agencias estatales y locales y del sectór privado tendremos la oportuidad de aumentar nuestro entendimiento mutuo del equilibrio requerido para sostener nuestro crecimiento económico hacia las decadas venideras.

REGION DE SAN ANTONIO A MONTERREY

El Sistema de Información Geográfica



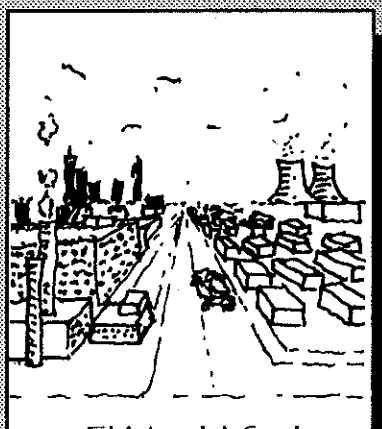
Los Transportes



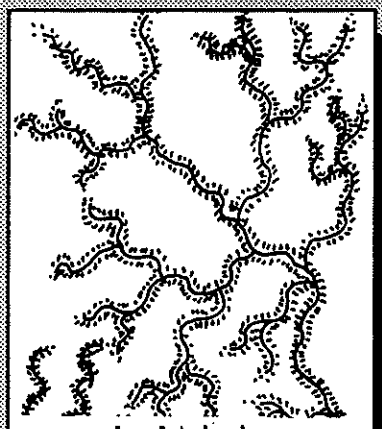
Las Comunidades

La Vegetación

La Topografía

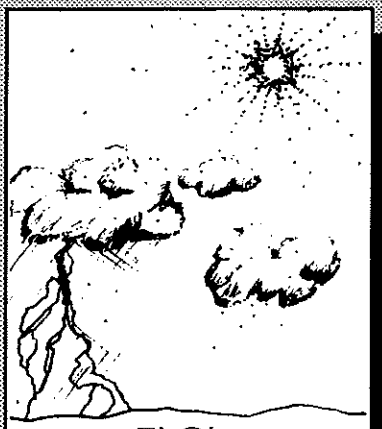


El Uso del Suelo

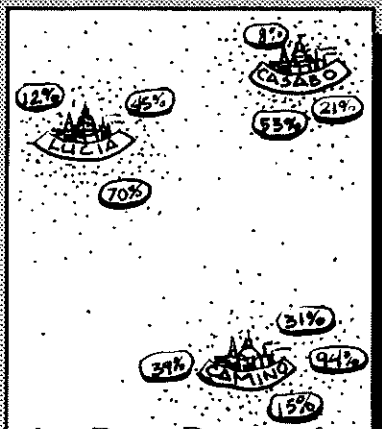


La Hidrología

La Geología



El Clima



Las Datos Demográficos

Los sistemas de información geográfica promeuven una comprensión regional de los recursos y su distribución. Ya sea el interés especifico el agua, las carreteras, ferrocarriles o población, el tener esta información para una región, dada en una formata consistente, promueve el entendimiento y el análisis espacial de los patrones de desarrollo. El ser capaz de ver a la geográfica compartida por las diversas comunidades a lo largo del corredor entre San Antonio, Texas y Monterrey, México ayudará a comprender el valor de los recursos de población, industrias, y transportes para la planeación binacioal.

Si usted está interesado(a) en participar en alguna o varias sesiones de trabajo que se efectuarán en Septiembre de 1994, en utilizar la base digital de información o necesita mayor explicación, favor de comunicarse con:

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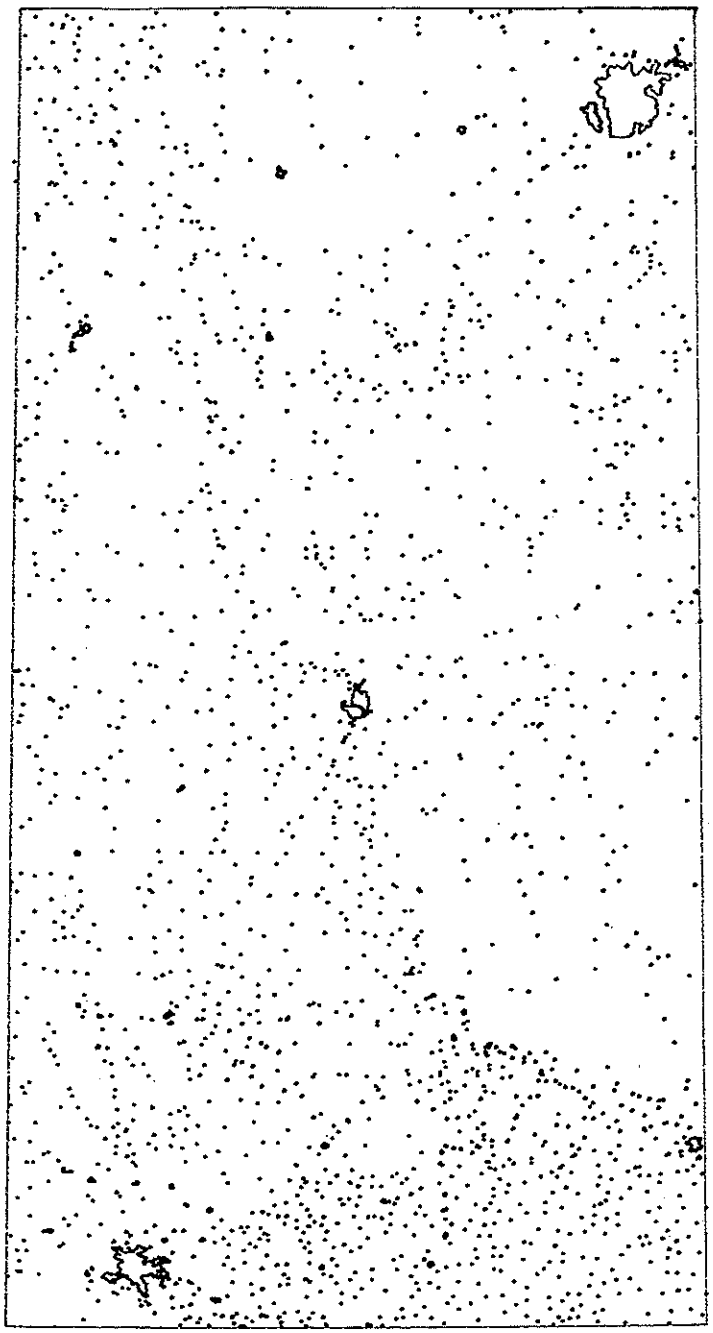
NAFTA CORRIDOR

Community Assistance Team Project

Settlements



This map shows the pattern of human settlements that lie within the study region.

Introduction

One of the human factors that is included in this GIS study is the distribution of settlements over the region. These settlements develop into patterns when viewed at such a broad scale and the patterns then reveal cultural differences between the two nations. This region is subject to a great deal of growth in the coming decades. Fueled by high rates of in-migration and economic growth, the border corridor of nearly 2,000 miles has emerged over the last three decades as one of the most urbanized regions in Mexico. Urban growth has accelerated to the point that border cities are now among the fastest-growing places in Mexico (Arreola and Curtis, 1993). Understanding the settlement patterns and how they relate to other layers in the GIS, will shed light on how sustainable development and growth can be achieved.

Layer Explanation

The settlements were grouped into categories according to population size. Because map sources came from two countries, the mapping of the settlements posed the problem of combining Mexico's population designations with the U.S. designations. For this study, a compromise of the two mapping systems created five categories, or population ranges, to classify many settlements. The largest population group, cities with a population over 500,000, is represented by the north and south anchors of the region, San Antonio and Monterrey respectively. The next group of cities has a population range from 100,000, as the lower limit, to 500,000, the upper limit. The range for the third group of settlements is 25,000 to 100,000. Although there are only a handful of cities in these categories, their identification is important as they are a resource base to the smaller communities. The distribution of these larger cities represents patterns important to understanding human distribution. An intermediate settlement group has a population range of 5,000 to 25,000. A large number of towns fall into the smallest population category, less than 5,000. An additional settlement group was added because it appeared to have a great influence on the developing settlement patterns. That final group was titled ranches and culturally important sites. The exact population of these sites is unknown, however they do represent some kind of human establishment. The great number and wide distribution of these communities merit recognition in this study and in future regional analysis.

Implications

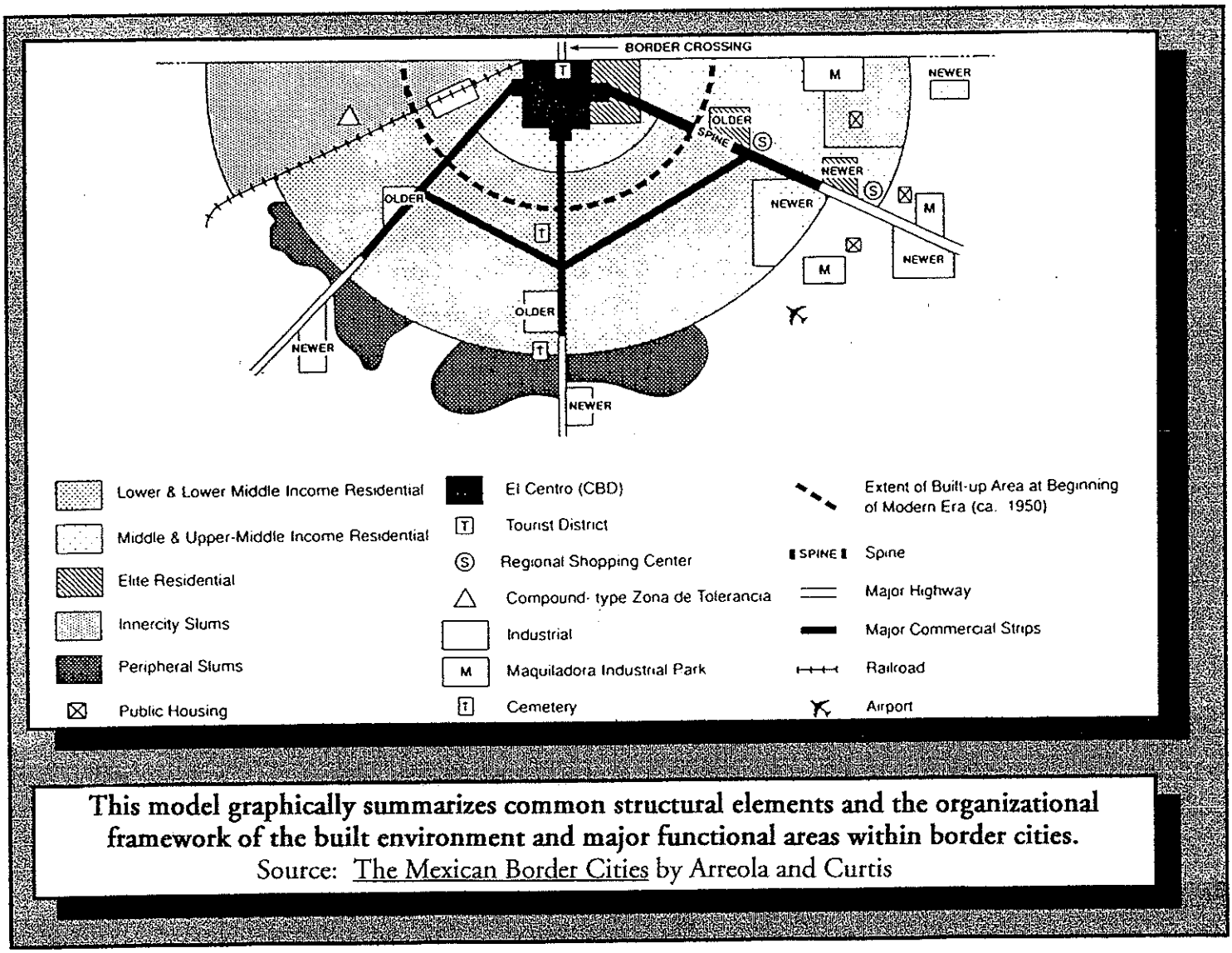
The other influences on the development of settlement patterns can be examined through this GIS. Certainly water is one of the most influential factors in the survival of a colony. Not only the surface water, but the yearly precipitation and ability to drill wells and tap the subsurface water, would also have an impact on the growth of a population. Natural resources, such as vegetation, and cultural resources, like

proximity to larger cities, also set foundations for the patterns that emerge. The transportation network between the settlements is inevitably a factor on the growth and development of new settlements.

Some of the interesting cultural comparisons that can be extrapolated from the settlement layer include the cultural differences in distribution. Comparing the two large cities, Monterey and San Antonio, the sprawl of suburban communities is much more prevalent in the U.S. than in Mexico. This may indicate differing levels of resource mobility, it may geographically show the cultural differences in the urban lifestyle, or perhaps it is the result of infrastructure availability. At the other end of the continuum, the ranches in both the U.S. and Mexico, seem to exhibit a similar, relatively even distribution. Most likely this is the result of the significant limiting factor, water.

Sources:

- Arreola, Daniel D. and James R. Curtis. The Mexican Border Cities. The University of Arizona Press, Tucson, AZ: 1993.



This model graphically summarizes common structural elements and the organizational framework of the built environment and major functional areas within border cities.
Source: The Mexican Border Cities by Arreola and Curtis

Three workshops to be held in Monterrey, Nuevo Laredo, and San Antonio, will provide a forum for the diverse interests to work together for a common vision of the region's prospects. If you are interested in participating in one or more of the workshops to be held in September 1994, would be interested in utilizing the digital base information, or need further explanation, please contact:

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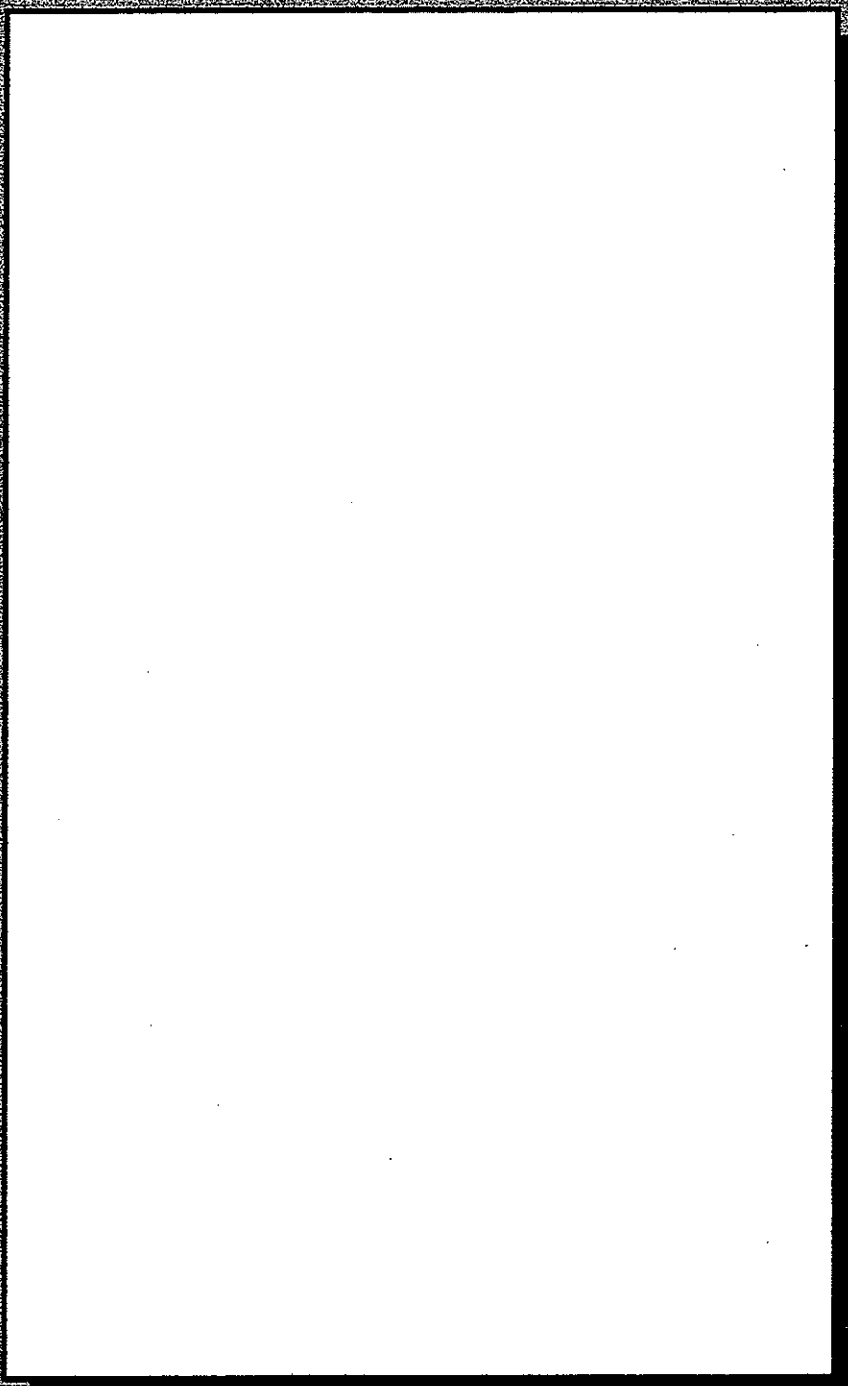
Groundwater and Surface Water



This map shows the general pattern associated with shallow groundwater and the corresponding aquifers.

Introduction

The Sub-Surface Hydrology map shows wells, their locations and the quality of their water as well as the basic type of geologic material as it relates to the likelihood of the presence of sub-surface water. This map is useful in that it reveals patterns of the presence of good, shallow sub-surface water. The waters that are targeted by the sub-surface hydrology are those found in relatively shallow strata such as those that are accessible by windmill driven pumps. The information in the map is somewhat limited in its usefulness as it does not tell the locations of the deeper ground waters, those with a much greater volume of water, that might be needed to support larger ventures such as a city or a manufacturing plant.

Layer Explanation

The Sub-Surface Hydrology map divides the land into two basic geologic categories, consolidated and unconsolidated. The nature of the geologic material is important to sub-surface hydrology as it facilitates or inhibits the flow of underground waterways. The consolidation of material refers to the porosity and/or granulation of the parent rock and the ability of the material to allow movement of water. These two categories are then subdivided into three levels of potential for the presence of good water: high potential, medium potential, and low potential. The potential for water is an interpretation of the base geology in the region. This potential is determined by the presence of aquifers and the proximity to recharge areas. An aquifer is a water-bearing stratum of rock, gravel, or sand, a definition so general as to encompass enormous areas of land. Recharge areas are the points of interchange between surface water and aquifers. The point of interchange is a location where the normally polluted rivers may contaminate the relatively clean-and in many cases pure-water resources in aquifers. These points of interchange are then critical for the management and protection of groundwater resources. (McHarg, 1992)

Well sites are also marked on the map and the quality of their water is indicated as either sweet, tolerable, saline, or untested.

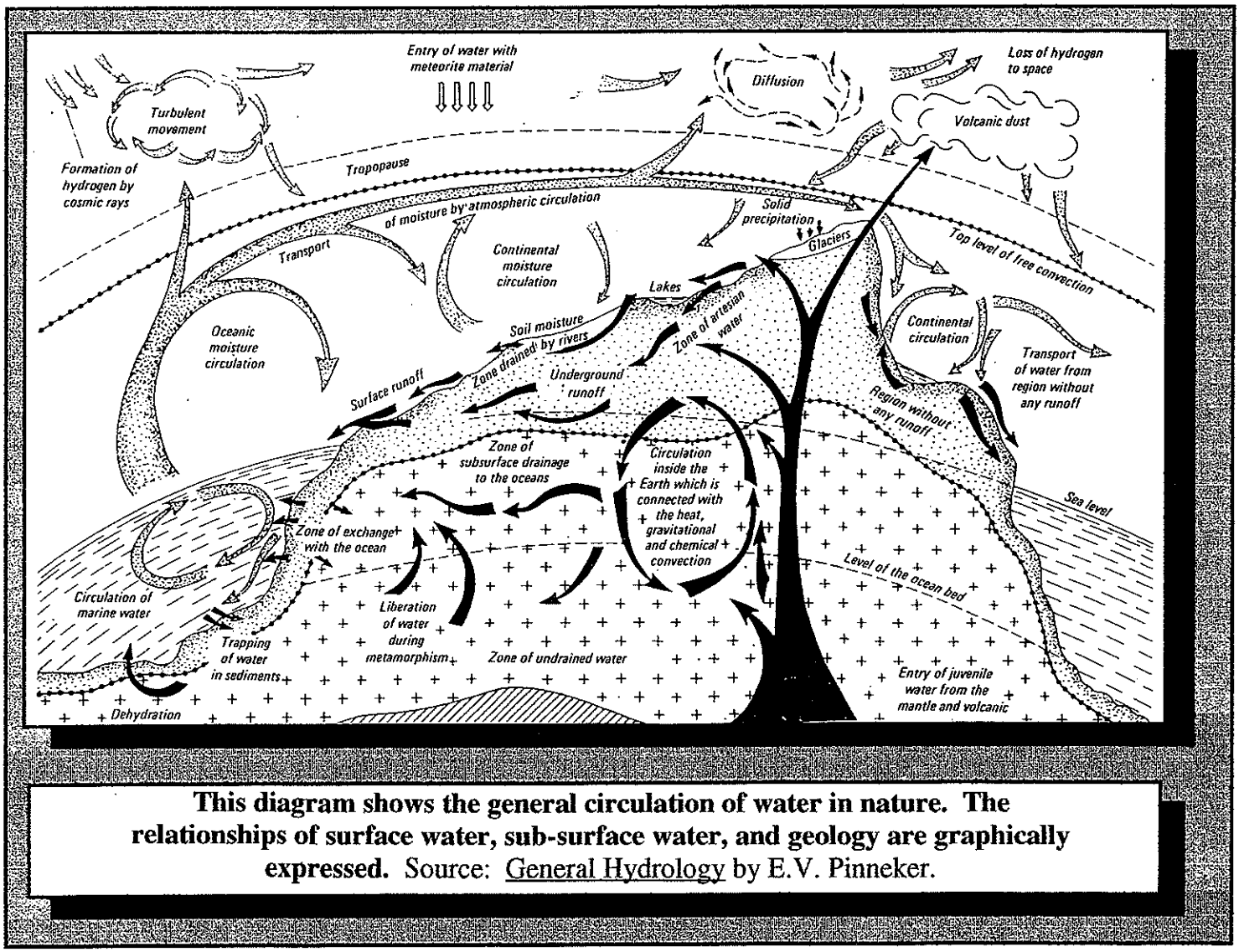
Implications

Water is considered to be one of the most critical factors and one of the first factors that should be considered when planning in the border region. Studying the hydrology of a region might reveal associations between water availability and the sites of human settlements, for example; or relationships between the rate of environmental regeneration and the abundance of water. Designers,

planners, and developers must know the quantity and availability of good water in a region in order to make sound decisions about what an area can support. The regulation and management of aquifers and recharge areas are crucial to the availability of clean water. Land use development should be sensitive to this delicate system. The importance of water should not be underestimated in its effects on vegetation, wildlife, climates and micro-climates, topography, and land development by people.

Sources:

- McHarg, Ian L. Design With Nature. Jon Wiley & Sons Inc., Garden City, NY: 1992.
- Pinneker, E.V. General Hydrogeology. Cambridge University Press, Cambridge, Mass: 1983.



This diagram shows the general circulation of water in nature. The relationships of surface water, sub-surface water, and geology are graphically expressed. Source: General Hydrology by E.V. Pinneker.

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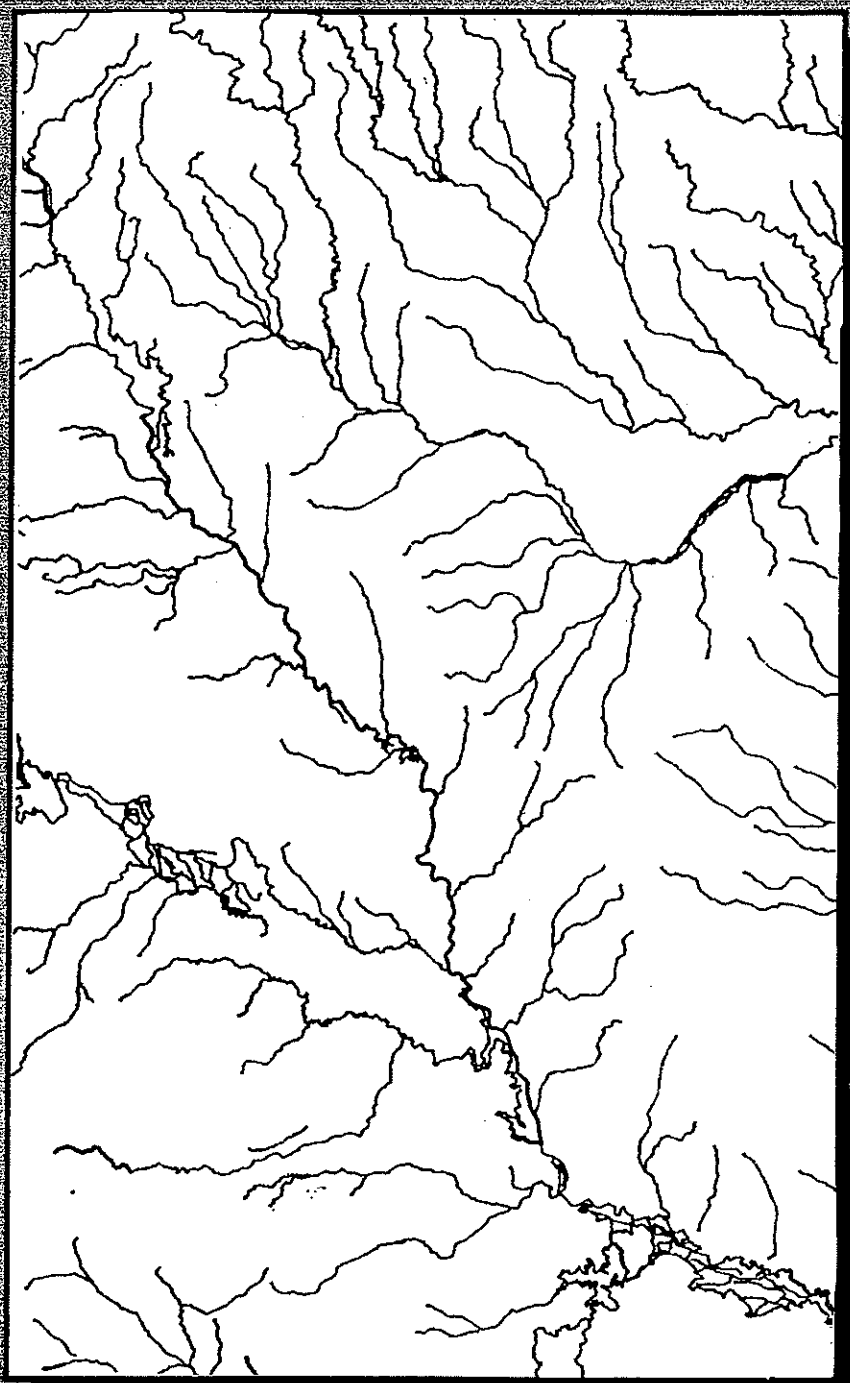
NAFTA CORRIDOR

Community Assistance Team Project

Perennial and Constructed Canals



This map shows the perennial rivers and constructed canals that lie within the study region.

Three workshops to be held in Monterrey, Nuevo Laredo, and San Antonio, will provide a forum for the diverse interests to work together for a common vision of the region's prospects. If you are interested in participating in one or more of the workshops to be held in September 1994, would be interested in utilizing the digital base information, or need further explanation, please contact:

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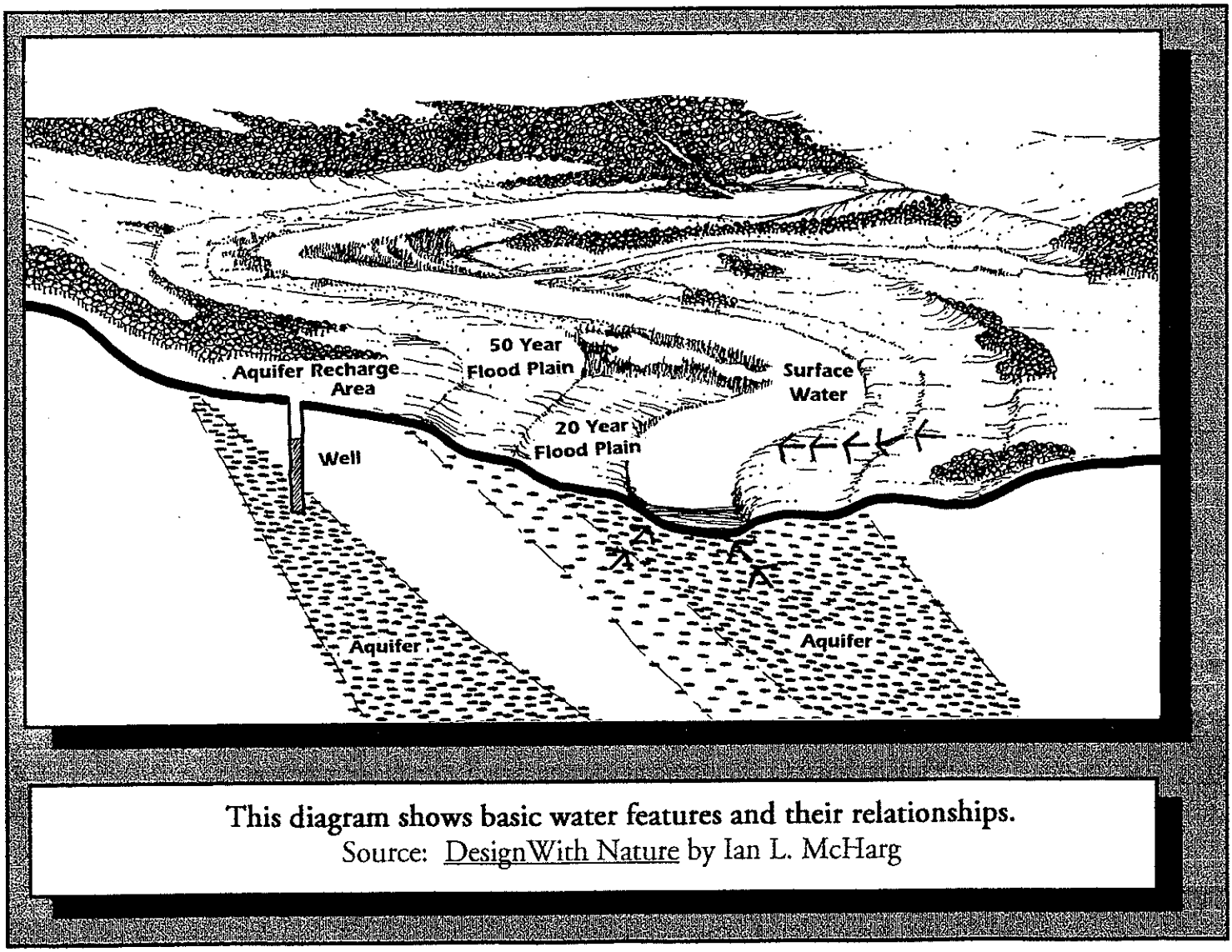
Implications

Surface water has implications beyond limitations on growth and development of cities and human populations. It is also essential to vegetation and the support of wildlife. The resources are provided through irrigation and rely on sub-surface and surface water availability. Diminishing water sources threaten the economic viability of this region. The economy relies not only on the production of crops, but also on the industrial plants which require large amounts of water. Other major economic supports for this region are the hunting and tourism industries. If water limits the productivity of game, the hunting industry is in jeopardy. The growth of the tourism industry is limited, as all other growth and development is, by presence or absence of water, and especially clean water.

Sources:

- McHarg, Ian L. Design With Nature. Jon Wiley & Sons Inc., Garden City, NY: 1992.
- Langewiesche William, "The Border." The Atlantic Monthly, June 1992: vol. 269: pgs. 91-108.



This diagram shows basic water features and their relationships.
Source: DesignWith Nature by Ian L. McHarg

Introduction

According to borderland researcher William Langewiesche, in order to understand the land and its potential uses, you have to look at the water and its availability.

Water is the most limiting factor on the growth and development of the border region. Surface water is a basic need for both plant and animal life. The supply of water, and especially potable water, is finite in this region making it an important consideration for all borderland studies dealing with the growth and development of the area. This layer shows the network of surface water as a result of natural forces and human made structures. This layer shows human influence on the surface water network as exhibited through the miles of canals and prevalence of dams across the region. The yearly flux in water availability can be generally interpreted from the perennial rivers and intermittent streams. Watersheds are also mapped, and they show the land area contributing to bodies of water. This information can be used to determine pollution sources.

Layer Explanation

Surface Hydrology has several components that can be best explained in groups. The first group of mapped information is the watershed group. A watershed is the land area that contributes or drains to a single river or body of water. For this GIS, a hierarchy of three watersheds was mapped. The hydrologic region is the largest watershed. In this study region, there are three major hydrologic regions, the Nueces in the north end of the area, the Rio Bravo/Rio Grand making up the majority of the study area, and a very small area of the San Fernando hydrologic region enters the southeastern corner of the study area. Within these hydrologic regions are watersheds that represent the land area draining to major rivers, and within these watersheds are subsheds that represent the land area draining to minor rivers. The visual result of mapping this group of information is a series of polygons with common edges.

The next group of elements that was mapped as a part of surface hydrology is the network of rivers and streams. Perennial rivers flow year round and are a major water source for cities and towns. Intermittent streams flow during the rainy season and often are the primary contributors to small and large bodies of water. These bodies of water are the next group of mapped information. Lakes were mapped as permanent sources of water, and lagoons, or small lakes that are dammed, represent the man made reservoirs. These dams introduce another group of elements, the engineering influence on the network of water. In addition to the dams, miles of canals have been built to supplement the water supply in agricultural lands where the irrigation of crops is essential to survival. And finally, the areas of inundation, or the flood plains, were mapped because they represent potential sources of surface water.

NAFTA CORRIDOR
Community Assistance Team Project

geology

This map represents the base geology of the study region. The evident pattern is a series of bands running parallel to the coast of The Gulf of Mexico.

of deposits, all from either the Quaternary period or the recent Pliocene epoch.

Implications

I still need a paragraph or two here about the underlying implications of the data.

(end of text somewhere in here)

Materials

al -- alluvial and fluviatile deposits
ar -- sandstone
arena -- windblown sand
bs -- sedimentary breccia
cal -- caliche
cg -- conglomerate
cz -- limestone
i -- igneous rocks
la -- lacustrine deposits
lu -- clay
tr -- travertine
y -- gypsum

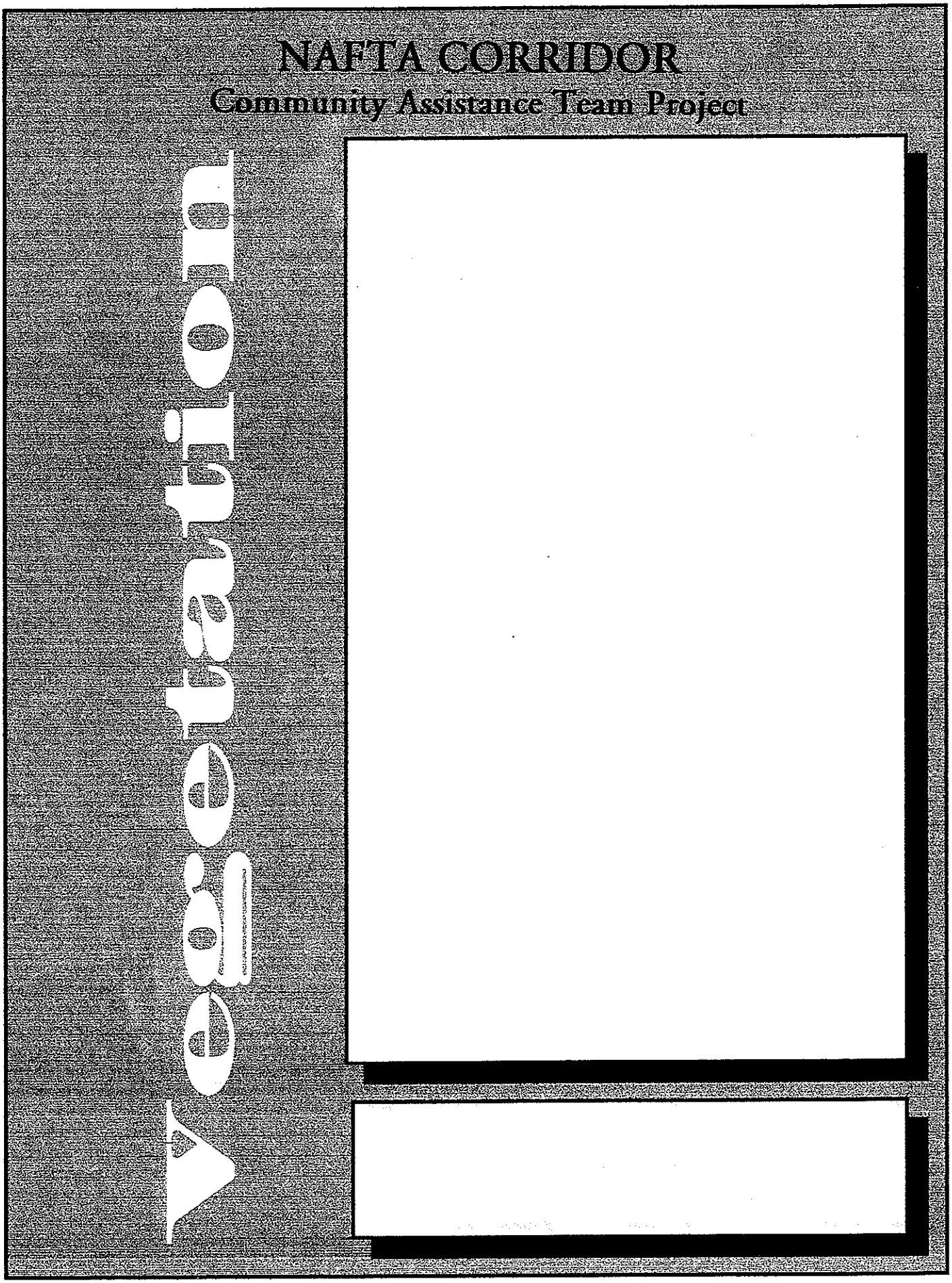
Time Periods

PERIOD		EPOCH
Q -- QUATERNARY		
T -- TERTIARY	Ts -- Upper Tertiary	pl -- Pliocene
		m -- Miocene
	Ti -- Lower Tertiary	o -- Oligocene
		e -- Eocene
		pal -- Paleocene
K -- CRETACEOUS	Ks -- Upper Cretaceous	
	Ki -- Lower Cretaceous	
J -- JURASSIC	Js -- Upper Jurassic	

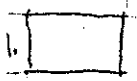
The table shows the primary materials and time periods represented, together with the abbreviations used for each one.

NAFTA CORRIDOR

Community Assistance Team Project



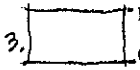
CONCEPTOS - CONCEPTS (revised edition)

1. 

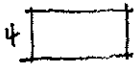
AGRICULTURA DE RIEGO - IRRIGATED AGRICULTURE
Areas where the cycle of cultivated vegetation is assured water by means of irrigation, any technique of irrigation. This includes areas of partial irrigation.

2. 

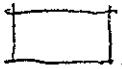
AGRICULTURA DE TEMPORAL - RAINY WEATHER AGRICULTURE
Lands where the cultivated vegetative cycle depends on rain water and seeds for 80% of the year.

3. 

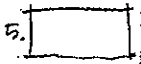
PASTIZAL NATURAL - HUIZACHAL - NATURAL PASTURE LAND - ACACIA
A vegetative community characterized by the combination of graminoides species (grasses) and *Acacia schaffneri* (Huizache) developed in plains with lands of little slope, often found in the central and northern areas of Mexico. This is found in contact with Pastizal Natural and differs from it in its physiognomy of savanna, limited additionally by subtropical and Crasicaule scrub.

4. 

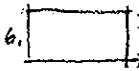
PASTIZAL INDUCIDO - INDUCED PASTURE LAND
Lands where that which arises spontaneously upon the removal of the original growth. This could be the result of clearing, abandoned agricultural land, of over-grazing, or of fire.



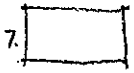
PASTIZAL CULTIVADO - CULTIVATED PASTURE LAND
That which has been introduced intentionally for stabilization or conservation. It requires cultivation work and management. Generally they take the form native pastures from different parts of the world.

5. 

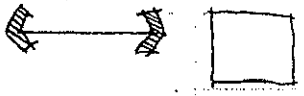
BOSQUE DE PINO - PINE FORESTS
Tree vegetation consisting of different species of the *Pinus* genus amply distributed in the mountain chains of Mexico from about 300 meters to the tree line at qabout 4200 m.s.n.m.

6. 

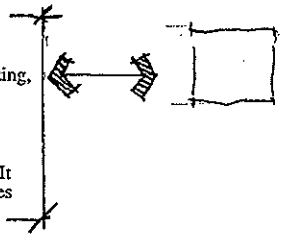
BOSQUE DE PINO - ENCINO - PINE - OAK FORESTS
Forest of *Pinus* and *Quercus* species, amply distributed in mountain chains of Mexico from about 1000 meters to 2800 meters. The pines dominate in these areas.

7. 

CHAPARRAL - CHAPARRAL
Groupings of dense, deciduous, fire resistant shrubs composed mainly of the *Quercus spp.* and or the *Adenostoma spp., Arctosaphylos spp., Cercocarpus spp.,* and others. Commonly this is found above the scrubland (dry and semi-dry) and natural pasture, and occasionally pine and oak forests.



(44) **CROPS**
Cultivated cover or row crows, sometimes portraying grassland associated with crop rotation



(45) **OTHER NATIVE OR INTRODUCED GRASSES**
Principally northeast, east-central and south Texas

8. ☐ **MEZQUITAL** - MESQUITE
This vegetative community is widely distributed throughout the country at times apparently secondarily. They are frequently in deep soils, in alluvial areas near escorrentías, or in areas of poor drainage. The principal plant there is *Prosopis spp.*, also *Acacia spp, Cercidium spp.* (two more sentences)

9. ☐ **MATORRAL SUBMONTANO** - SUBMOUNTAIN SCRUB
These plant communities are formed principally by spineless and deciduous elements. They develop arid scrub land, oak forests, and low deciduous forests, mainly in low regions of the Sierra Madre Oriental, in the northern portions. Some of the more frequent components are: *Helietta parvifolia, Neopringlea integrifolia, Cordia boissieri* (Mexican Olive), *Pithecelobium brevifolium, Zanthoxylumfagara, Acacia amentacea, Gochnatia hypoleuca, Flourencia laurifolia, Karwinskia spp., Leucophyllum spp.*, etc.

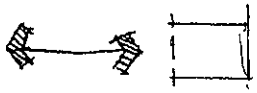
10 ☐ **MATORRAL EXPINOSO TAMAULIPECO** - SPINEY SCRUBLAND OF TAMAULIPAS
Shrubby vegetative community characterized by the dominance of spiney elements and deciduous elements that are bare for a large part of the year. This develops in a broad zone between a desert scrubland micro climate, the submountain scrubland, the Mezquital, and the low, spiney forest in the Northeast of the Republic. It is found in different levels of disturbance, this being one of its secondary characteristics. The principle species are: *Acacia spp., Cercidium spp.* (Palo Verde), *Leucophyllum spp., Prosopis spp.* (Mesquite), *Castela tortuosa, Condalia spp., Cordia boissieri, Celtis pallida, Randia spp.*, etc.

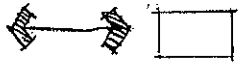
11. ☐ **MATORRAL CON ROSETOFILO ACAULES** - SCRUBLAND WITH FLOWERY LEAF GROUPINGS, ACUALES
Associations of plants with flower shaped leaves, fleshy and spiney like: *Agave stiata, Hechtia spp., Agave deserti, Agave shawii var. goldmaniana, Dasylirion spp., Nolina spp.*, etc.

12. ☐ **MATORAL ESPINOSO** - SPINY SCRUBLANDS
Community has more than 70% spiney plants. This frequently has: *Prosopis spp., Mimosa spp., Acacia Amentacea, Acacia vernicosa*, etc.

13. ☐ **MATORRAL SUBINERME** - SUB-SPINELESS SCRUBLANDS
Community is composed of spiney and spineless plants whose proportions are more than 30% and less than 70%.

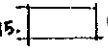
14. ☐ **VEGETACION HALOFILA** - HALOFILO VEGETATION
Plant groupings that grow in saline soils in the low parts of enclosed valley or river basins in arid or semi-arid zones as in salt marsh areas. In this category are included the communities of gipsofila plants. Groupings of *Atriplex spp., Suaeda spp., Batix maritima*, and others like *Salicornia spp., Sarcobatus spp., Flaveria spp., Frankenia spp., Limonium californicum, Abronia maritima, Borrichia frutescens, Alienrolfea occidentalis, Maytenus phyllanthoides, Sesuvium prtulacastrum*, etc.


☐ (16) **MESQUITE-GRANJENO PARKS**
Principally on sandy or loamy upland soils

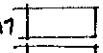

☐ (15) **MESQUITE-BLACKBRUSH BRUSH**
Principally on shallow, gravelly or loamy soils

VEGETACION SECUNDARIA - SECONDARY VEGETATION
Vegetative community that develops after the primary vegetation is eliminated presenting a physiognomically different floristic composition. This develops in abandoned agricultural fields and in areas leveled for a variety of uses.

EROSION - EROSION
The wearing away of the soil caused by the action of water or wind.

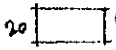
15.  (10) **CENIZA-BLACKBRUSH-CREOSOTEBUSH BRUSH**
Slopes of the Rio Grande River Basin

16  (17) **MESQUITE-GRANJENO WOODS**

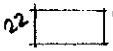
17  (20) **MESQUITE-LIVE OAK-BLUEWOOD PARKS**

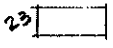
18  (25) **LIVE OAK WOODS/PARKS**
Principally on sandy soils

19  (26a) **LIVE OAK-ASHE JUNIPER PARKS**
Chiefly on level to gently rolling uplands and ridge tops, Edwards Plateau

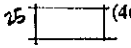
20  (26b) **LIVE OAK-MESQUITE-ASHE JUNIPER PARKS**
Chiefly on level to gently rolling uplands and ridge tops, Edwards Plateau

21  (27) **LIVE OAK-ASHE JUNPER WOODS**
On shallow limestone soils on the hills and escarpment

22  (30b) **POST OAK WOODS, FOREST AND GRASSLAND MOSAIC**
Sandy soils of the post oak savannah

23  (30c) **POST OAK WOODS/FOREST**
Sandy soils of the post oak savannah

24  (38) **PECAN - ELM FOREST**

25  (46) **URBAN AREAS**

VEGETATION LAYER CHECKLIST

VEGETALL.dwg is the most current file.

INCOMPLETE DATA

- VEGETALL.dwg has been amended and is current in the C:\acad\woofin directory in the "corner" computer. I think that you have already imported this updated drawing
- Polygons need to be labeled once in ARC. See hand-labeled plot (the partially prisma-colored one) for identification of polygons. The labeling system that I used is TOTALLY ad hoc--some polygons are represented by color, some by number, some by letter. **IT WOULD BE WORTH YOUR WHILE TO DECIPHER MY LAME LABELING SYSTEM, AND DEVISE A MORE METHODIC SYSTEM OF LABELING** (numerical tagging is perhaps the best). Sorry that my effort is so confusing. [I had planned to color the entire map, then decided that it was a waste of time, so I began to label with numbers.]

The attached 8½ X 11" plot is from an unamended file, thus there are some minor flaws. Don't be alarmed if you see them. The true file is correct.

VEGETATION

> Below the Pecos, the Rio Grande enters the more open chaparral region; but no land of consequence occurs suitable for cultivation. Now and then a narrow meadow is found, and a few short fertile valleys lie upon affluent creeks. These are occupied frequently by old ranches, upon which a little cotton, sugar, and maize are raised by Mexicans. Irrigation is compulsory, no rain sometimes falling for many months. An officer in Laredo told me that, at the end of July, no green thing was to be found within a radius of thirty miles from the town.
>
> Rain so seldom falls during the summer so that ordinary vegetation perishes for loss of moisture, leaving the soil to the occupation of such Bedouin tribes of vegetation as have the necessary powers of endurance. There are here a class of worthless shrubs, whose minute leaves spread as little surface as possible to the dry arid, and whose limbs are studded with the sharpest spines, as if to repel all animal life from seeking to share with their own roots this weak shade. They stand in clumps and patches, leaving intervals which may be traversed with more or less difficulty.
>
> Frederick Law Olmsted, *A Journey Through Texas* (1856-57)

Major Vegetation Strata

The vegetation map portrays information extracted from assembled mosaics of photographically reduced vegetation maps, representing twenty-five plant communities identified between San Antonio and Monterrey. The vegetation types are depicted as associations of two or three plant dominants found in ecological areas such as grassland prairie, scrubland, semi-arid desert, and chaparral. Of these, five vegetation classifications are common to both sides of the Rio Grande Valley. Climate, soil, topography, rainfall, human intervention and technology determine the patterns of vegetation that occur within the region. The uplift of the Balcones Escarpment is responsible for vegetation types found in the north while higher elevations, drainage patterns, and climatic conditions associated with the mountain ranges influence the occurrence of differing plant species to the south. In general, large, highly connected patches of vegetation types occur north of the border. In contrast, the pattern of vegetation south of the border is highly porous and disjoined.

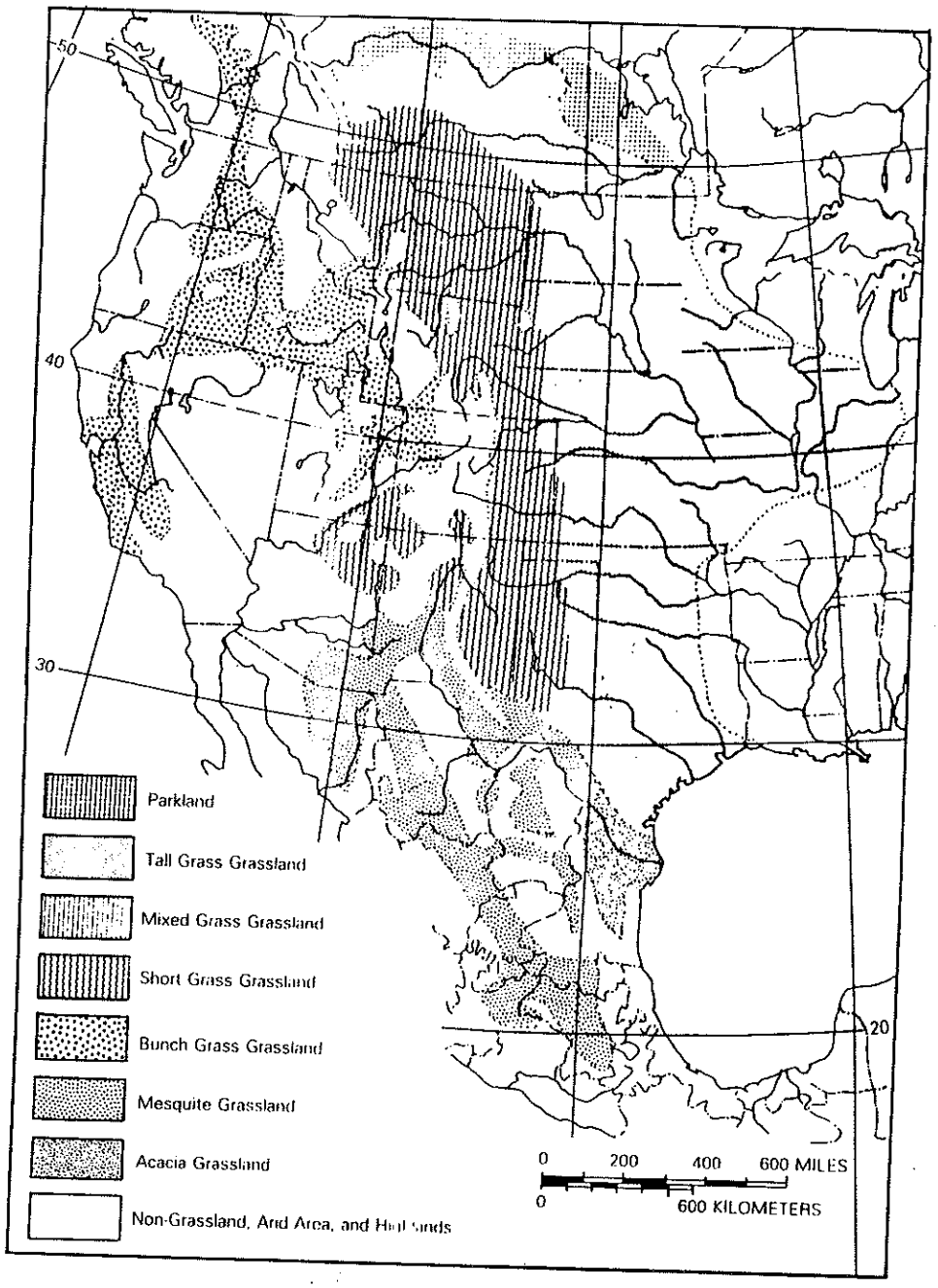
Human-Induced Vegetation

It should be noted that the existing vegetation, particularly in Texas, derives largely from land-use disturbance, and as such is heterogeneous with regard to composition. In addition, the sub-tropical climate and long growing season promote cultivation of sizable amounts of land for farming and livestock grazing. These land-cover types are often the result of advanced irrigation technologies that have enabled cultivation of preexisting semi-arid shrublands. Vast acreage of induced pasture land and farmland form networks north of the border. Almost all of the irrigated farmland is located along rivers and major roadways separated by mesquite and blackbrush vegetation communities. South of the Rio Grande , crop and pasture land at infrequent intervals comprises a very small percentage of the region.

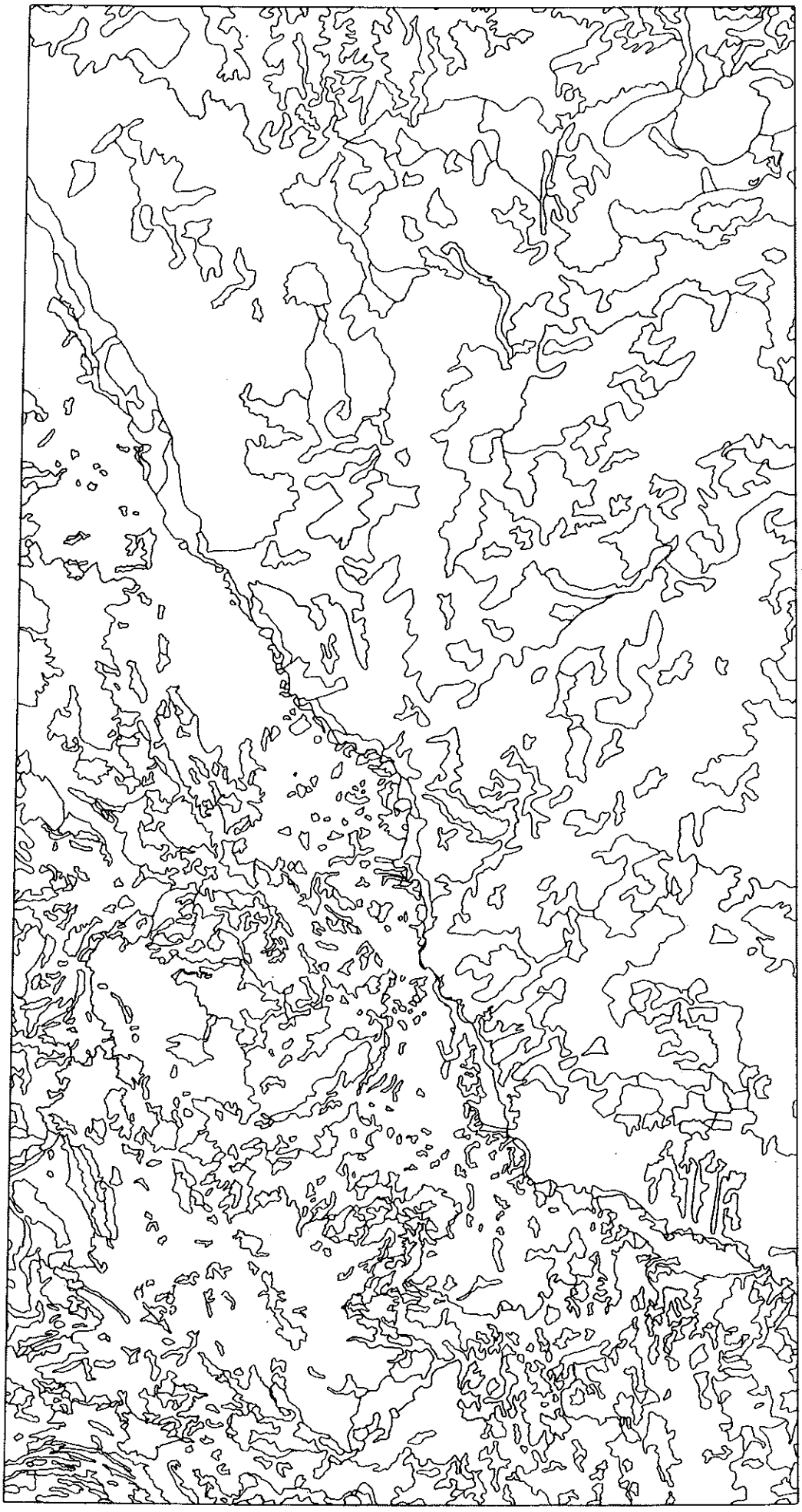
Map Sources

The Vegetation Types of Texas. 1984. 1:1,000,000. Texas Parks and Wildlife Department, Austin, TX.

Carte de Uso del Suelo Y Vegetacion, Monterrey. 1980 1:1,000,000. Estados Unidos Mexicanos. Secretaria de Programacion y Presupuesto.



Distribution of Grasslands and Related Vegetation Types


N

Introduction

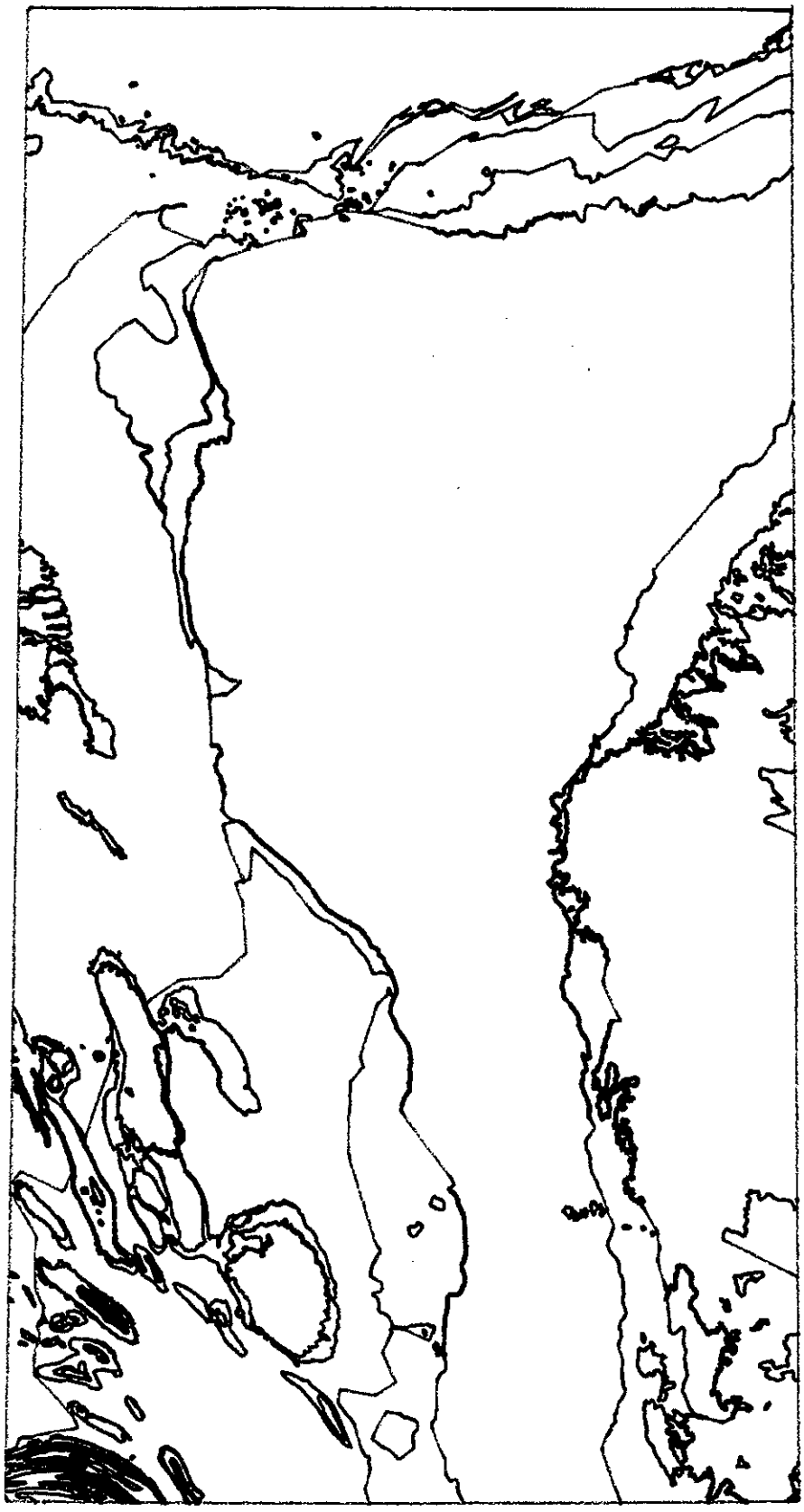
The international border within the study area is marked by a natural feature, the Rio Bravo/Rio Grand, which neatly divides the area in two. However, another natural feature, the geology, follows a different pattern (or rather several different patterns), and unites rather than divides.

Geological formations generally exist in layers, formed in different time periods and more or less "staked" one upon the other. Over the ages, however, various geologic forces have caused these layers to shift, tilt, fracture, etc., so that in different places different layers or formations are exposed to the surface. It is this surface exposure of the various formations which has been mapped. Within the study area, a fairly regular pattern is evident: formations from different epochs generally appear in bands running more-or-less parallel to the coast of the Gulf of Mexico. The most recent formations are found nearest the coast, with earlier formations breaking through to the surface as one moves west and north. The only exception to this rule is found in the mountainous southwestern part of the study area, where more ancient deposits have pushed their way up through the surface, forming concentric rings.

Surficial Deposits: These two underlying patterns are, however, somewhat obscured by the presence of relatively shallow layers of material deposited on the surface in recent times by forces such as water and wind. These deposits are arranged in their won distinct patterns (mostly related to rivers and flood-plains) which differ dramatically from that of the underlying formations; they form a network of finger-like extensions reaching out across the land. Thus, it was found more useful to produce two separate maps: one, "Surface Geology", which shows these surficial deposits; and another, termed "Base Geology", showing the geologic formations as they would appear if the surficial deposits were removed or transparent.

Layer Explanation

In order to produce a map which is accurate and consistent on both sides of the border, the broadest and most inclusive categories available have been used. Thus, individually named formations (Yegua, Wilcox, etc.) have not been indicated; rather, these are combined into larger groupings based on a common time of origin and a similar composition. For example, the entire area labeled "Q(al)" consists of various alluvial and fluviatile deposits laid down in the Quaternary period; "Te(lu-ar)" consists primarily of clay and sandstone formed in the Eocene epoch of the Tertiary period. There are 24 categories represented in the Base Geology map, of various composition and ranging in age from the present Quaternary to the ancient Jurassic periods. The Surface Geology map contains six categories



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