

*BORDERLINK 1994*

# **Economic Profile of the San Diego-Tijuana Region: Characteristics for Investment and Governance Decisions**

*edited by*

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# CHAPTER 1: INTRODUCTION AND SUMMARY BORDERLINK 1994

*by*

**Dr. James Gerber, Project Director**

## **1.1 The Goals of Borderlink 1994**

The following essays were written by graduate and undergraduate participants in the BORDERLINK 1994 summer program. Nine students from San Diego State University (SDSU) and eleven from Universidad Autónoma de Baja California (UABC) worked together on binational teams of three to five students to produce each of the essays.

This was the second year of the program but the first year with the "BORDERLINK" title. Last year's program, called "Eurolink," brought students from Germany to join with those from the United States and Mexico and focused on strategies for marketing Baja California's wines and tourist packages to Germans.

The focus of this year's program was regional development. Our objective was to write a relatively brief introduction to the core issues of the San Diego-Tijuana region. Virtually all the information contained in this report is available to the public and can be found in Tijuana (or Mexicali) or San Diego. We hope that the value of our effort will be found in having brought together into one source an introduction to the very diverse issues that are determining the future of the San Diego-Tijuana region. We also hope that

the bibliographies of existing reports and other "ephemera," which local libraries do not catalog will be of value to those wishing to explore the issues in more depth.

It is easy to spend a great deal of time on the difficult task of becoming familiar with regional issues. This task is difficult because the region is cut in two by an international boundary, and the systems of business, governance, planning, and decision making are radically different on each side of the border. And, inescapably, there is the language barrier. We hope that students, policymakers, and business people will find that these essays have saved them time and effort in becoming familiar with the current issues of the region.

The implicit assumption of the BORDERLINK project is that the future of San Diego and Tijuana are inevitably intertwined. This is a somewhat novel idea for many people living in the region, but, in fact, bonds of family, friends, cultural heritage, and business, tie us together, for better or worse. In our view, these linkages can serve to emphasize in a positive way the dynamism, openness, and creativity of San Diego and Tijuana. For this to happen, however, we must educate new generations of citizens who are at ease working and playing on either side of the border. This goal may be far off (partly be-

within the region's educational institutions), but efforts such as BORDERLINK are necessary first steps. As a more immediate goal, we hope to convince future professionals in San Diego and Tijuana that they must be aware of the binational context of our economy and society.

## 1.2 Basic Guides to Information Gathering

Some of the information contained in this report is available in the region's universities and public libraries. For example, an excellent introduction to the historical geography of San Diego is the book edited by Dr. Philip Pryde of San Diego State University (*San Diego: An Introduction to the Region*). Most of the information we have relied on, however, is not available in the region's libraries. Many of the documents and reports are considered too ephemeral by the larger libraries and, consequently, researchers must be aware of the many small libraries of agencies and departments with local offices, such as CALTRANS and the U.S. Department of Commerce.

This is not to imply that the essays in this report could have been written without local libraries. In particular, Love Library on the campus of San Diego State University offers two excellent guides to doing local area research. The first is a guide to U.S. government (mostly federal) documents that contain information relevant to the San Diego region. This short bibliography was written and compiled by Carolyn Baber in the government documents section of the library. The second guide to local area research was written by Catherine Friedman, one of the two economics and business bibliographers in Love Library. Anyone interested in research on San Diego and Tijuana will find it worthwhile to consult these two bibliographies.

Although there are no equivalent guides, that we are aware of, to doing research on Ti-

juana or Baja California, there are several statements of the issues and policy options. Mexico's tradition of state planning and interventionist government policy, causes a more "macro" planning (at least on paper) of future developments affecting the overall economy. Although the 1980s saw a dramatic shift away from this tradition toward a more laissez-faire approach of government policy to the private economy, Mexico remains more centralized and interventionist in its policies than the United States. As an example, municipal and state governments in Mexico are required by federal law to produce development plans. By their nature, these are political documents representing the views of the party in power. For anyone wanting to know about the regional economy, however, they are a guide to the priorities of the elected administrations and a clear expression of the issues likely to be addressed. The development plan for Tijuana (*Plan de Desa-rrollo Municipal, 1993-1995*) is available in the office of the Comité de Planeación para el Desarrollo Municipal (COPLADEM) located in Tijuana's City Hall (Palacio Municipal). It covers the years in office of the current administration of Tijuana, 1993-1995. The state plan (*Plan Estatal de Desarrollo 1990-1995*) is available from the office of the Comité de Planeación para el Desarrollo del Estado (COPLADE) in Mexicali and from various state offices.

The San Diego agency that comes closest to the functions of COPLADE and COPLADEM, is the San Diego Association of Governments (SANDAG). SANDAG lacks the authority of the former agencies since it is not the planning agency of a single city or state authority, but its production of information about the region is unequaled. In particular, its publication *INFO* and its two recent special reports on economic conditions (*Economic Conditions in the San Diego Region* and *Regional Economic Prosperity Strategy*) contain a wealth of data as well as general information and comparisons be-

tween San Diego and similar U.S. metropolitan areas.

Several other overviews of the region are worth consulting. The San Diego Dialogue's Binational Task Force on Economic Development and Transportation Infrastructure has written *Planning for Prosperity in the San Diego/Baja California Region*. The Dialogue has also formed a Cross Border Industrial Strategy Task Force to investigate the conditions in nine separate economic sectors with the potential to become strong growth poles. The final version of this report should be available in October or November 1994. The Instituto Tecnológico de Monterrey has released a preliminary version of its study of Tijuana and Baja California and should soon have a final draft. And finally, the Centro de Enseñanza Técnica y Superior (CETYS) is working on a competitiveness study of Baja California called *Baja California hacia la competitividad*.

### 1.3 An Introduction to the Issues

Two major forces seem to be fundamental in the impact they have on nearly all economic activity in the region. In Tijuana, rapid population growth during the fiscal austerity of the 1980s (which stemmed from the Mexican debt crisis beginning in 1982) conditions nearly every fact about regional development. For example, it created an overuse of existing roads, water, and waste treatment, and led to inadequate supplies of basic goods such as housing. In San Diego, the delayed emergence from the national recession of 1990-91, and the shift of resources out of defense industries, assumed a similar overarching role. It created a search for new (non-defense) economic bases, an intensified concern over the adequacy of our infrastructure (e.g., water), and a renewed discussion about the sufficiency of the region's labor force training institutions. It also contributed to a downturn in the real estate market and to the general mood of anxiety about the future that many (formerly) middle class peo-

ple feel. Both the issue of population growth and defense conversion are discussed in the volume edited by Clement and Zepeda (*San Diego-Tijuana in Transition: A Regional Analysis*, Institute for Regional Studies of the Californias, SDSU, 1993).

While rapid population growth is the overwhelming determinant of urban conditions in Tijuana (and to a lesser extent in San Diego), several other forces cannot be ignored. In San Diego's case, the growth of foreign trade and its impact on business planning is beginning to be a serious force, most likely for the better. San Diego also shares with Tijuana numerous environmental concerns, which in Tijuana's case are often tied to the importance of the local maquiladora industry.

Each of the forces named above (population, infrastructure, defense conversion, trade, the environment) interact with each other and with additional forces in ways that cut across the boundaries, as discussed on the essays that follow. For example, several environmental problems stem from the lack of adequate infrastructure spending during the period of rapid population growth. A number of these problems (e.g., water availability, wastewater treatment, hazardous waste disposal) have impacts on trade, manufacturing, and tourism; their resolution is already shaping regional political institutions as well as the use and development of human resources.

### 1.4 Conditions of this Study

The policy recommendations that follow were drawn from the essays written by teams of U.S. and Mexican students during a period of four weeks of intensive study and investigation. The shortness of the time available conditioned our efforts and limited the depth and breadth of our focus. Consequently, these essays and the conclusions drawn from them are meant to be suggestive and introductory rather than complete state-

ments of each of the issues and policy options.

## 1.5 A Summary of the Issues and Policy Options

### 1.5.1 Foreign Trade

Foreign trade in Tijuana and Baja California is overwhelmingly dependent on the maquiladora industry. Any policies that influence this sector will impact foreign trade as well. In the case of San Diego, 42.4 percent of exports (\$1.85 billion), went to Mexican markets, again highlighting the cross-border dependency. The role of trade in San Diego's economy has historically been below the U.S. average, but recently that has begun to change. The development of organizations such as the World Trade Center in downtown San Diego indicate the seriousness with which trade is being considered.

#### *A) Creating industrial linkages to the maquiladora sector*

The potential for the maquiladora sector to earn foreign revenue for Mexico and to serve as a generator of further economic growth requires that it develop deeper linkages to the internal Mexican economy through the development of supply networks. It may seem contradictory to argue that foreign trade will benefit most through developing domestic trade, but domestic linkages are necessary for market creation and economic growth inside Mexico.

#### *B) Information gathering and development*

The World Trade Center idea must be carried forward to completion. At the same time, new trade opportunities should be explored. Many small to medium size firms on both sides of the border lack information on market opportunities. Industry-wide trade associations in Mexico (such as CANACINTRA) lack the resources to do in-depth analy-

sis of the possibilities for local manufacturers. Bancomext is better prepared to provide this information, as are the Department of Commerce and the Southwestern College's Small Business Development and International Trade Center. Nevertheless, a more pro-active policy in determining the region's capabilities and export potential is desirable.

In addition, there remain numerous possibilities for U.S. and Mexican firms in the area of joint ventures. Many traditional U.S. industries which have not participated in foreign trade or offshore production remain deeply skeptical about market opportunities, quality of work, and enforceability of contracts in Mexico. Their lack of experience and limited resources for exploring new markets prevent them from taking advantage of the complementarities that exist between the U.S. and Mexican labor force. A more pro-active role by public authorities in providing information would benefit the entire region.

### 1.5.2 Political Institutions

Cross-border cooperation is severely constrained by issues of national sovereignty and diplomatic protocol. Legally, most substantive discussions between San Diego and Tijuana must go through Washington, D.C., and Mexico City. At the same time, most of us are basically ignorant about the structure of political institutions across the border.

#### *A) Circumventing traditional diplomatic channels*

We must look for ways around the obstacles of diplomacy and national sovereignty. Tijuana and San Diego cannot afford to sit passively and wait for our national capitals to act when they are disinclined to focus on border issues. Informal and relatively formal channels of discussion can at least keep both sides informed as to the actions considered for regional development. Over a period of time, and if carried through successive municipal administrations, such discussions en-



courage trust and can serve to institutionalize cooperation. In this vein, the Letter of Agreement between the cities of San Diego and Tijuana is a positive example. Similar agreements should be considered between the County of San Diego and Tijuana.

### ***B) Encouraging the media to take a responsive role***

Television, radio, and newspapers have a role to play which goes beyond simple recitation of facts in the reporting of news events. When reporting on events across the border, they should be encouraged to educate their audiences about basic political institutions. For example, media coverage in San Diego of last April's vote in Tijuana (to form a special assessment district for infrastructure improvements) largely missed the historical significance of the vote.

## **1.5.3 Transportation Systems**

Rapid population growth throughout the region has strained the transportation systems of both Tijuana and San Diego. Here, as in many areas of economic activity, the asymmetry of the region is striking. While Tijuana worries about a lack of paved roads in its newest neighborhoods (and the air pollution dirt roads create), San Diego is rightfully concerned about its congested freeways. Each side's problems are simplified in the short run by a lack of cooperation of regional issues, but in the long run the failure to consider each other's plans creates duplication, wasted resources, and more expensive transportation systems.

### ***A) Expanding the highway system in Tijuana***

Not only must Tijuana come up with funds to pave its intra-city road system, but the highway system around and through the municipality needs to be improved. For goods to flow more smoothly through the region, Tijuana will have to undertake new construction. At this point, there are addi-

tional safety issues related to the hauling of commercial loads through residential neighborhoods. The intra-city infrastructure is not adequate to handle heavy, frequent usage by commercial vehicles and there are serious concerns over the possibility of bridge failure in the near future. Tijuana and San Diego should jointly explore the possibility of funding for projects south of the border through the new multilateral agencies (NADBANK and BECC).

### ***B) Privatizing new transborder highway projects***

Given the anti-tax mood of the public on both sides of the border, it is necessary for public agencies to continue to explore the possibility of funding new projects through private sources. This may require franchises for a period of time. The critical point is to insure the construction of the needed infrastructure.

### ***C) Increasing local autonomy in Tijuana***

The current administration of Tijuana has been very active in pushing the evolution of the municipality towards greater autonomy from the state and federal governments. This appears to be the direction of historical change in Mexico, but the local government should be encouraged and supported in its attempts to speed the process. Greater local control over tax revenues and expenditures would have a positive effect on the ability of Tijuana to handle demands placed on the economy by expanded trade with the United States and rapid population growth.

### ***D) Forming binational planning task forces***

Baja California and the federal government are considering expansion of the Port of Ensenada to handle commercial cargo. There is no joint planning with the San Diego Unified Port District. SANDAG has been commissioned by CALTRANS to do a feasibility study of rebuilding the railroad connec-

tion to Mexicali. The expanded Port of Ensenada will require a rail link to Mexicali, but SANDAG and the Mexican national railroad (FMN) are not in consultation. San Diego is continually agonizing over its airport, while Rodríguez field in Tijuana has the potential to service some of its overflow and provide greater international access. There are currently no discussions going on.

Joint planning in the area of transportation infrastructure is difficult to create because it raises issues of national sovereignty. However, a binational task force in each of these areas could be viewed not as a means to determine an outcome but as a means to increase the flow of information. Small reductions in duplicated efforts or misallocated resources imply large financial savings.

#### *E) Increasing the staffing of the port of entry*

Delay in crossing the border is one of the oldest obstacles to regional economic integration. With passage of NAFTA, increased trade and traffic will only intensify the problem. Increased staffing will help to alleviate the pressure, but new agreements and technologies are necessary as well. Technology will enable a commuter crossing lane. We should also look for ways to speed commercial crossing and to reduce its cost. Some industries, such as fisheries, need faster crossings and twenty-four hour crossing in order to expand their market. Others, electronics, for example, need faster crossings in order to streamline "just in time" inventory systems.

#### **1.5.4 Water, Waste, and Power**

While San Diego has virtually all its homes connected to potable water delivery systems and wastewater disposal systems, only 59.3 percent of Tijuana's homes have safe drinking water and 50.8 percent have wastewater disposal. The most dramatic improvement in the region's average living standard will come from dollars spent in Tijuana building

basic facilities for water delivery and wastewater disposal. The binational sewage treatment plant which broke ground on July 15, 1994, is a step in the right direction.

#### *A) Funding from NADBANK and other multilateral agencies*

Environmental conditions and public health are directly affected by unsafe drinking water and inadequate wastewater treatment. These are precisely the conditions that the NADBANK was designed to address. Every effort should be made to upgrade and expand Tijuana's drinking water. The Tijuana I project is currently moving in this direction.

#### *B) Conserving and reclaiming the region's existing water supply*

Water conservation can meet some of the future needs. Wherever feasible, conservation should be encouraged through appropriate landscaping and other means. At the same time, water reclamation should be expanded into using recycled water for golf courses and other nonconsumption uses.

#### *C) Expanding recycling in Tijuana*

Tijuana currently plans to increase its number of landfills. It should also look for ways to encourage recycling. The lack of recycling facilities may be partially resolved through cooperative use of U.S. facilities.

#### **1.5.5 Tourism**

Tourism in San Diego is the third largest industry in the county and accounted for nearly \$3.5 billion, or about six percent of our total output of goods and services. The same industry in Tijuana generated almost 11 percent of total service sector jobs and 36 percent of service sector revenue (1988). Given the climate and existing tourist attractions, the visitor industry will continue to be an important part of the economic base of the

San Diego-Tijuana region. Although the industry is essentially healthy, a few issues need to be thought about in more detail.

### **A) Visitor safety**

Tijuana appears to have taken a more active role in attacking the problem of visitor safety, perhaps because it continues to be a major obstacle to attracting greater numbers of visitors from the United States. Tijuana has created a special branch of its police force (*policía turística*) to cover the heavily visited areas and to assure visitors of their personal safety. Given the perception of a growth in the United States of random acts of violence directed at tourists, it makes sense for the police department to have a rapid response capability when, and if, such violent acts were to occur in San Diego. The public's perception of the city's response to tourist directed violence will partially determine the extent of the damage to the tourist industry. There is probably no way to prevent random violence, but general confidence in the speed and efficiency with which the police investigate this type of crime will have an important impact on the shaping of the public's image of San Diego.

### **B) Increasing overnight visits to Tijuana**

The average tourist visits Tijuana for only seven hours. As a result, the visitor industry has a smaller impact on the Tijuana economy than it does on San Diego. Businesses such as hotels, car rentals, and airlines are not receiving a lot of tourist dollars. Tijuana needs to better understand why this pattern exists. Although U.S. citizens may feel more comfortable spending the night in their own culture (across the border in San Diego), Tijuana could also attract greater numbers of tourists from the Mexican interior as a means of increasing the revenue of the tourist industry. While it may be true that San Diego and Tijuana are in competition to supply overnight visitors with hotel rooms, there is no reason why joint marketing of the region can-

not expand the entire industry and benefit both sides of the border.

### **C) Joint marketing**

Tijuana and San Diego already engage in joint marketing of the region. Both sides can supply complementary facets of a vacation experience for a total package with features that are unavailable in any other location. Such marketing efforts should be recognized and encouraged wherever feasible.

### **1.5.6 Human Resources**

The region's human resources reflect the asymmetry of Tijuana-San Diego as much as any other area. While just 11.1 percent of the labor force in Tijuana has some technical training or has been to a standard school or college, almost 65 percent of San Diego's labor force has at least some college.

In addition to the asymmetry in levels of formal education, issues of migration, maquiladora turn-over rates, training programs, and defense conversion all impact the use and development of human resources in the region.

### **A) De-escalating tensions over migration**

While everyone should accept the right of the United States to control its border, the casting of blame onto Mexican immigrants who are drawn by higher wages and U.S. employment practices only serves to intensify suspicion and hostility. The vast majority of border crossings into the United States are legal crossings, but given that Tijuana's population is growing rapidly with migration from Mexico's interior, we are likely to continue to experience a growing number of illegal entries into the United States. Tensions will be reduced when a dialog opens between Mexican and U.S. officials. Mexico must acknowledge the United States' interest in controlling its border more effectively and the United States must acknowledge that Mexican immigrants are not the cause of the

economic slump in California, and that their labor is vital to California's economy.

### ***B) Increasing training in the maquiladora industry***

Supervisors need training to improve their relations with wage workers and to reduce the turnover rates. Wage employees need training to raise their productivity and to create long run opportunities to raise their standard of living. The region, as a whole, benefits when worker skill levels are raised.

### ***C) Opportunities for defense conversion***

San Diego's technically skilled labor force has been hit hard by cuts in the U.S. defense budget. It is important for the region not to lose these individuals. Numerous channels for defense conversion have been created (such as the Regional Technology Alliance), recognizing the needs of many small to medium size firms for short run financial support while new products are developed. These efforts are beneficial and should be expanded where possible.

## **1.5.7 Manufacturing**

While San Diego's manufacturing sector has suffered by defense cuts, Tijuana's continues to expand. As best as we can tell, given the unreliability of statistics on the local economy, manufacturing in Tijuana is a larger share of the economy than it is in San Diego. Tijuana's manufacturing is dominated by the maquiladora industry which receives favorable tax treatment that will gradually be phased out under NAFTA. In all likelihood, the manufacturing sector of Tijuana will continue to grow (e.g., the Samsung plant expansion) as a result of its proximity to the United States, California, and San Diego, and the desire of Asian manufacturers to meet the rules of origin requirements under NAFTA.

### ***A) Developing linkages from border manufacturing to the rest of Mexico***

The Border Industrialization Program which created the maquiladora industry was successful as a means of earning foreign revenue for Mexico and creating jobs in the border region. However, it has not lived up to its potential as a regional development program due to the lack of economic linkages to upstream Mexican suppliers. These linkages should be encouraged through the provision of information and credit.

### ***B) Encouraging biotechnology manufacturing***

San Diego's biotechnology sector has successfully grown in the direction of research and development. Manufacturing capabilities depend on the resolution of at least two other issues: the securing of adequate water and a low level hazardous waste disposal site. These two types of public infrastructure are also necessary for other sectors of the economy.

### ***C) Creating market information***

In some cases, the lack of market information may hold back the development of industrial sectors. For example, Mexicali's steel manufacturing is complementary to the construction industry in Tijuana and San Diego. San Diego's boat building and repair is complementary to the capabilities in Ensenada. However, these industries and others lack both the information and resources to take advantage of opportunities. Public authorities should use existing regional talent to investigate specific sectors where there is a potential for growth if private firms had more information about markets and cross border resources. These are exactly the type of studies that San Diego Dialogue's "Cross Border Industrial Strategy Task Force" has undertaken. This work should be examined and the analysis extended by regional authorities such as the San Diego Unified

Port District, SANDAG, COPLADEM, and the Secretaría de Desarrollo Económico.

### 1.5.8 Environmental Issues

New binational environmentally focused institutions in the aftermath of the signing of the NAFTA have created the potential for significant improvement of the border environment. Although the NADBANK will have less money than was at first thought, its ability to provide credibility to projects will enable the region to attract significantly more investment in environmental projects than before.

#### *A) Monitoring the environment*

Additional air quality monitoring stations are needed in Tijuana. Currently, the California Air Resources Board, the U.S. Environmental Protection Agency, and the San Diego Air Pollution Control District are assisting the Mexican Institute for Ecology (INE) in the establishment of an air pollution monitoring station in Tijuana's Instituto Tecnológico Regional. This effort is needed, and at the same time, can serve as an example of cross-border cooperation for future technical projects.

#### *B) Funding of the Border Environmental Plan*

Opposition in the U.S. Congress to the NAFTA agreement resulted in the negotiation of the so-called side agreements on labor and the environment. The environmental agreements committed the United States and Mexico to a serious consideration of the needs of border communities for environmental cleanup and maintenance. Most estimates of the infrastructure needs of the border put the cost at between \$6 and \$8 billion. While these figures are nothing more than educated guesses, there appears to be a serious underfunding of border environmental projects. The NADBANK hopes to seek private funding, but numerous impor-

tant projects are probably incapable of generating revenue streams to pay for themselves and will therefore require public funding. Both the government of the U.S. and of Mexico should be encouraged to keep the border environment high on their list of priorities. Now that NAFTA has been signed, there are many pressures for distant central governments to turn their purses toward more immediate issues. San Diego and Tijuana must join with their respective state governments and other border states to keep the pressure on their federal governments.

#### *C) Conserving wildlife habitat*

SANDAG's habitat conservation study is important to the region's environment. This type of study should be considered for Tijuana. Flora and fauna do not stop at the border and neither should our habitat maps of the region.

## 1.6 Concluding Observations

Many of the suggestions contained in this report itself stem from the need to increase the flow of information between San Diego and Tijuana. There are basically two good reasons why information flows need to be deepened and broadened. Firstly, San Diego-Tijuana is a relatively young multicultural region. Many of the residents on the U.S. side are from the Midwest or East Coast and have migrated since World War II. Unlike the border cities in Texas and Arizona, we do not have a century or more of cultural integration and, consequently, the scope for misunderstanding, mistrust, and xenophobia is much greater than elsewhere along the border. It is partly for this reason that the debate in California over illegal immigration has become so high profile. The lack of cultural awareness is also a source of missed business opportunity.

Secondly, the small and medium size enterprises which are predominant in this region cannot afford to generate the information

they need about market opportunities and joint ventures across the border. This is an area where "strategic interventions" by public agencies can make a difference in the region's future prosperity while at the same time avoiding the negative effects on economic efficiency that often happen when public agencies intervene in the economy. In fact, given that information is costly and not freely distributed, there are strong reasons in favor of its subsidization. BORDERLINK 1994 is but one small step in this direction, but it is our hope that additional projects and programs will be encouraged by its success.

# CHAPTER 2: ECONOMIC AND DEMOGRAPHIC PROFILE

*by*

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## **2.1 Purpose**

The purpose of this introductory section is to provide the reader (student, planner, investor) with basic descriptive statistics of the size of the region consisting of the County of San Diego and the Municipality of Tijuana.

## **2.2 Location and Size**

San Diego County encompasses a large geographic space in the southwest corner of both the state of California and the continental United States. The total land area of the county is approximately 4,261 square miles or 10,890 square kilometers. San Diego County borders Imperial County to the east, the Pacific Ocean to the west, Orange and Riverside Counties to the north, and Baja California, Mexico, to the south.

Politically, San Diego County is divided into 18 incorporated cities along with some unincorporated areas. Geographically, the county is divided into three main areas: (1) the coastal plane which encompasses 70 miles of coastline and extends inland 20-25 miles; (2) the foothill and mountain areas, which encompass the middle section of the county; and, (3) the desert area to the east. These three areas lie parallel to each other from west to east. The majority of the county

population lives along the coast, with over half residing within the City of San Diego (San Diego Economic Development Corporation).

Tijuana is the name not only of a large city, but it is also one of the four municipalities in the Mexican state of Baja California. The municipality of Tijuana comprises the northwest corner of both Baja California and Mexico. Although it is not the largest municipality in the state by size (Ensenada has the largest land area) Tijuana contains 45 percent of the state's total population (INEGI, 1990). The municipality of Tijuana is bordered by Tecate to the east, the Pacific ocean to the west, Ensenada to the south, (soon to be bordered on the southwest by Rosarito, which is becoming a separate municipality) and the United States to the north.

## **2.3 Population**

The populations (1930-1990) of San Diego and Tijuana are shown in Table 1.

The table shows Tijuana's population increased by nearly two-thirds in the 1980s and that San Diego County grew by more than 30 percent. When these numbers are compared with other major United States/Mexico border cities, the San Diego metropolitan area

area (i.e. San Diego County) is clearly the largest urban area along the border (Weeks, 1993). Presently, migration accounts for 68 percent of current population growth in San Diego, with natural increase providing only 32 percent of population growth. However, forecasters believe that the roles will be reversed and that by the year 2015 natural increase will have surpassed migration as the region's primary cause of population growth.

**Table 1**  
**Total Population by Decade**

Year	Tijuana	San Diego
1930	11,000	210,000
1940	22,000	289,000
1950	65,000	557,000
1960	166,000	1,033,000
1970	341,000	1,358,000
1980	462,000	1,862,000
1990	747,000	2,498,000

Source: Weeks, 1993

## 2.4 Age Distribution

The median age of the total population of San Diego County in 1990 was approximately 30.9 years. This median age is expected to rise to 36.7 years by 2015. By that time, over 25 percent of the population will be age 55 or older—an increase of eight percent from 1990. This aging trend should hold true for the total population with only minor differences between ethnic groups (SANDAG, January 1994).

Tijuana's age distribution for the year 1990 shows that the largest percentage of the population consists of people between the ages of 0 and 14. The second largest category is people aged 15 to 29. This young population structure is a result of a combination of natural growth and massive influx of young, working age migrants (Canales, 1993). It is

forecast that this trend will continue, as more young people migrate to Tijuana.

**Table 2**  
**Age Distribution in Tijuana and San Diego, 1990**

Age	Tijuana		San Diego	
	Number	Percent	Number	Percent
0 to 9	176,605	23.6	370,548	14.8
10 to 14	78,689	10.5	152,183	6.1
15 to 29	252,216	33.7	682,046	27.3
30 to 49	154,677	20.7	745,929	29.9
50 to 64	48,251	6.5	274,170	11.0
65+	22,678	3.0	273,140	11.0
Not Specified	14,265	1.9		
Total	747,381		2,498,016	

Sources: 1990 Census of Population; SANDAG, INFO, May-June 1992

## 2.5 Economic Growth

At first glance, the similarity in the average annual growth rates of Tijuana and San Diego from 1980 to 1990 seems striking. When measured on a per capita basis the pattern is even more pronounced (Table 3).

**Table 3**  
**Economic Growth in San Diego and Tijuana, 1980-1990**  
**(in percents\*)**

	San Diego	Tijuana
Real Gross Regional Product	4.9	3.8
Per Capita Basis	-0.15	-1.1

\*Annualized basis

While the economies on both sides of the border grew impressively in the 1980s, per capita growth stagnated. One explanation for this stagnation is the combination of a high rate of economic growth, which was offset



by an even higher rate of population growth, and a lack of private and public investment in plant and equipment and infrastructure (Gerber, 1993; and Clement and Zepeda, 1993).

The comparisons should be viewed as rough estimates since data for Tijuana is less plentiful than is the case for San Diego. Additionally, Tijuana's GRP data is calculated from the estimate for the state of Baja California, and this estimate is of dubious accuracy (Valenzuela, 1992).

The value of goods and services produced in San Diego is estimated at \$63.2 billion 1993, making the area approximately eight percent of the total for California, and one percent of the total for the United States.

## 2.6 Employment Distribution

Tables 4 and 5 show employment in Tijuana and San Diego by sector of the economy. Again, comparisons are difficult because the classification systems are not identical and the level of aggregation is greater for Tijuana. Generally speaking, however, the classification "Industry" usually includes manufacturing, construction, and the group composed of transportation, communications, and utilities. In this case, it is apparent that Tijuana is the more industrial of the two regions since the designation "Industry" is about 19.3 percent of employment in San Diego and 38 percent in Tijuana.

## 2.7 Border Crossings

San Diego and Tijuana have the largest population of any twin city area along the entire United States/Mexico border, and the border crossing here is the busiest in the world. At the region's two border crossings, Otay Mesa and San Ysidro, approximately five to six million legal northbound crossings are made each month. Ninety-six percent of these crossings are made by frequent (4-19 times per month) and very frequent (20+

times per month) crossers, most of whom are residents of the greater San Diego-Tijuana region (San Diego Dialogue, 1994).

**Table 4**  
**Tijuana Employment, 1990**

	Number	Percent
Total Employment	261,526	
Service/Commerce	147,706	56.5
Industry	99,486	38.0
Agriculture/Fishing/ Mining	4,080	1.6
Not Specified	10,254	3.9

Source: *Eleventh General Census of Population and Housing of the Republic of Mexico, 1990*

**Table 5**  
**San Diego Employment, 1992**

	Number	Percent
Total Employment	1,178,958	
Agriculture/Mining	18,604	1.6
Construction	58,231	4.9
Manufacturing	131,587	4.9
Trans./Comm./ Utilities	37,830	3.2
Wholesale Trade	47,268	4.0
Retail Trade	194,156	16.5
Finance/Ins./Real Estate	73,881	6.3
Services	332,942	28.2
Government	179,200	15.2
Military	105,259	8.9

### 2.7.1 Impact on the San Diego Economy

For Mexicans legally crossing the border, the primary reason is to shop in San Diego. In fact, 42 percent of all northbound crossings by Mexicans are for this purpose. The South Bay, and especially Chula Vista, receive the greatest number of Mexican shoppers each month, causing the population to swell by as much as 50 percent at times. These shopping trips to retail stores, combined with spending by Mexicans from Tijuana on other items such as meals in restaurants, tuition for schools, medical and

dental expenses, etc., account for an estimated \$2.8 billion spent annually in the United States (San Diego Dialogue, 1994).

### 2.7.2 Impact on the Tijuana Economy

Although U.S. citizens spend a large amount of money in Tijuana (at least \$2.6 billion a year), they go there less frequently to shop (only nine percent of all trips) than Mexicans come to San Diego. Most of the money spent by U.S. citizens (\$1.5 billion) is during social visits to Tijuana, which account for approximately 40 percent of all south-bound crossings made by U.S. citizens (San Diego Dialogue, 1994).

## 2.8 Bibliography

1. Alegría, Tito. "Ciudad y transmigración en la frontera de México," *Frontera Norte*. El Colegio de la Frontera Norte, Tijuana. 2(4):7-38, 1990.
2. Canales, Alejandro C. "Population Structure and Trends in Tijuana," *San Diego-Tijuana in Transition: A Regional Analysis*, Norris C. Clement and Eduardo Zepeda Miramontes (eds.). San Diego State University: Institute for Regional Studies of the Californias, 1993.
3. Center For Continuing Study of California Economy (CCSCE). *California City & County Rankings*. Palo Alto, 1991.
4. City of San Diego, San Diego Economic Development Corporation, and San Diego Association of Governments. *The Bridge: Baja California Regional Industrial Development Guide* (2nd ed). San Diego, 1992
5. Clement, Norris C. and Eduardo Zepeda Miramontes (eds.). *San Diego-Tijuana in Transition: A Regional Analysis*. San Diego State University: Institute for Regional Studies of the Californias, 1993.
6. Instituto Nacional de Estadística, Geografía e Informática. *Resultados Definitivos-XI Censo General de Población y Vivienda*. Mexicali: INEGI, 1990.
7. ———. *Anuario Estadístico del Estado de Baja California*. Aguascalientes: INEGI, 1993.
8. Gerber, James. "A Comparison of Growth Rates over Three Business Cycles," *Regional Economic Perspectives*. Center for Public Economics, San Diego State University. San Diego. Vol. 6, No. 1, 1994
9. ———. "Cycle and Trends in San Diego and California," *San Diego-Tijuana In Transition: A Regional Analysis*, Norris C. Clement and Eduardo Zepeda Miramontes (eds.). San Diego State University: Institute for Regional Studies of the Californias, 1993.
10. Greater San Diego Chamber of Commerce. *Business Referral Directory*. 1993.
11. ———. "Modest Recovery Forecast For San Diego in 1994," *Economic Bulletin*. January 1994.
12. ———. "San Diego's Economy Ranks 37th in the World," *Economic Bulletin*. March 1994.
13. ———. "Year in Review-1993," *Economic Bulletin*. May 1994.
14. ———. "San Diego Economic Indicators," *Economic Bulletin*. July 1994.
15. San Diego Association of Governments (SANDAG), "Baja California Demographic Profile," *INFO*. May-June 1992.
16. ———. "A Look At San Diego's Future," *INFO*. January-February 1994.
17. San Diego Economic Development Corporation, *San Diego Book of Facts*. 1994.
18. San Diego Dialogue, *Who Crosses The Border: A View of the San Diego/Tijuana Metropolitan Region*. San Diego: Regents of the University of the California, 1993.
19. Secretariat of Economic Development, Baja California State Government. *Baja California Investor's Guide (Book of Facts)*. Mexicali, 1990.
20. Valenzuela, Manuel. *Estimación del PIB para los estados fronterizos a partir de un modelo de desagregación geográfica*. Unpublished master's thesis. El Colegio de la Frontera Norte. Tijuana, 1992.
21. Weeks, John R. "The Changing Demographic Structure of the San Diego Region," *San Diego-Tijuana in Transition: A Regional Analysis*. Norris C. Clement and Eduardo Zepeda Miramontes (eds). San Diego State University: Institute for Regional Studies of the Californias, 1993.
22. ——— and Roberto Ham Chande (eds.). *Demographic Dynamics of the U.S.-Mexico Border*. El Paso: Texas Western Press, 1992.
23. Zenteno, René and Rodolfo Cruz. "A Geodemographic Definition of the Northern Border of Mexico," in J. Weeks and Roberto Ham Chande, *Demographic Dynamics of the U.S.-Mexico Border*. El Paso: Texas Western Press, 1992.

# CHAPTER 3: FOREIGN TRADE

by

Héctor Cisneros (UABC), Tim Ruth (SDSU),  
and Mariana Salazar (UABC)

## 3.1 The Relative Importance of Foreign Trade in Baja California

Table 1 and Charts 1 and 2 underscore the significance of the role that the maquiladora industry plays in the context of international trade in Baja California.

**Table 1**  
**Summary of Baja California's Commercial Balance**  
(in millions of dollars)

	1991*	1992*	January-May 1993*
Imports	1,820	1,753	649
Exports	635	582	124
Commercial Balance	-1,185	-1,171	-525
Plus Value Added by Maquiladora Industry	804	927	401
Net Balance	-381	-244	-124

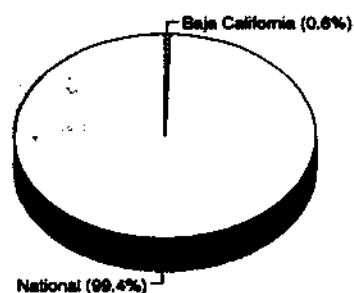
\*Figures are subject to revision.

Note: The value added of the maquiladora industry was calculated using data from INEGI and Banco de México.

Source: Secretaría de Hacienda y Crédito Público, Dirección General de Aduanas, México, D.F.

**Chart 1**

Exports: January-May, 1993



**Chart 2**

Value Added in Maquiladora Industries  
January-May, 1993

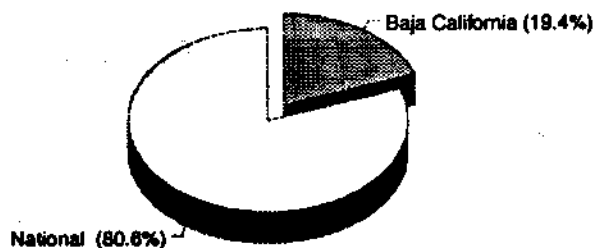


Table 2 lists the exports of Baja California by sector. These industries may represent those with the greatest potential for growth given the demand of the U.S. market in 1992.

**Table 2**  
**Baja California Exports**

Sector	Products	Fractions	Value in 1992 dollars
Agricultural	38	122	133,893,235
Livestock	6	20	1,769,735
Fishing	22	46	70,095,460
Foods	28	66	75,503,515
Extractive	11	11	1,246,289
Chemical	17	28	21,101,615
Plastic	12	23	13,714,826
Leather	6	12	2,957,550
Lumber	6	7	44,229,964
Paper	7	10	18,611,547
Textiles	18	18	23,541,343
Metal Products	60	60	45,638,968
Total	231	423	452,304,047

Source: Administración General de Aduanas, SHCP

### 3.2 The Relative Importance of Foreign Trade in San Diego

San Diego's international exports totaled \$4.4 billion in 1993, according to the International Trade Administration of the U.S. Department of Commerce. Exports were tracked using point of origin information whereas before they were calculated on port of exit information. San Diego's \$4.4 billion exports accounted for approximately seven percent of the \$62.9 billion gross regional product (GRP) in 1993, up from 3.5 percent in 1987. The export trade has grown rapidly while other economic sectors have stagnated, particularly defense related manufacturing. In a ranking of the largest export metropolitan areas in the United States, San Diego had the seventeenth highest volume of export sales.

California is the nation's leading exporter of merchandise (\$68.1 billion) with Texas (\$17.6 billion) and Washington (\$17.1 billion) second and third, respectively. San Diego accounted for 6.4 percent of California's exports in 1993. This percentage of the state's exports was up from 4.9 in 1987. San Diego's growth in exports outpaced California's

**Table 3**  
**San Diego Export Markets**

	Exports (\$000)		Percent Change 1993/1987	Percent of Total	
	1993	1987		1993	1987
Total Exports	\$4,357,840	\$1,623,828	168.4	100.0	100.0
Mexico	1,847,452	550,515	235.6	42.4	33.9
Canada	401,188	137,964	190.8	9.2	8.5
Japan	296,841	134,264	121.1	6.8	8.3
Germany	169,512	99,722	170.3	6.2	6.1
United Kingdom	150,127	89,010	68.7	3.4	5.5
France	129,034	71,730	79.9	3.0	4.4
Hong Kong	115,071	50,680	127.1	2.6	3.1
Singapore	100,142	49,322	103.0	2.3	3.0
Taiwan	98,648	59,999	64.4	2.3	3.7
Netherlands	87,832	N.A.	N.A.	2.0	N.A.
Other	861,993	333,834	158.2	19.8	20.6

Source: International Trade Administration and Exporter Location Series, U.S. Census Bureau, Department of Commerce; Economic Research Bureau, Greater San Diego Chamber of Commerce

gains. Despite a 1.1 percent decrease in exports between 1992 and 1993, San Diego's 168 percent increase of exports since 1987 was still higher than California's 107 percent gain over the same period. San Diego's growth was also higher than the 95 percent increase in Los Angeles' exports since 1987 and the 129 percent gain for San Francisco.

San Diego's largest export market is Mexico, with \$1.8 billion in merchandise sales recorded during 1993. (See Table 3 and Chart 3.) Mexico also had the highest growth of any San Diego export market with sales leaping 236 percent since 1987. Mexico's share of San Diego's total exports jumped from 34 percent in 1987 to over 42 percent in 1993. Much of San Diego's export growth to Mexico was related to the maquiladora industry.

Canada was a distant second for San Diego exports at \$401 million in merchandise sales during 1993. Japan was San Diego's third highest export market in 1993, with \$296.8 million in merchandise sales. Germany was fourth highest at \$269.5 million. Export growth to Germany rose 170.3 percent since 1987, higher than the 121 increase to Japan. The Pacific Rim, including Mexico, Canada, Japan, and other nations bordering

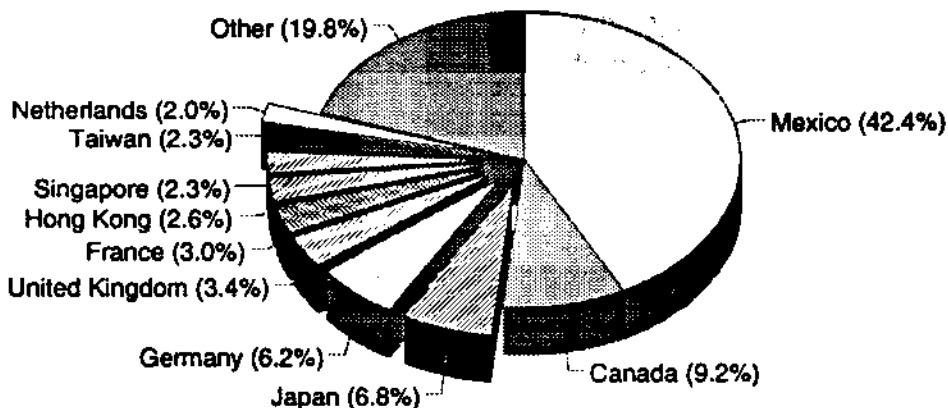
the Pacific Ocean, accounted for \$3.2 billion or nearly three-quarters of San Diego's total export trade.

International trade accounted for nearly three of every ten manufacturing dollars in San Diego during 1992, according to one survey of San Diego's manufacturing industry. Exports accounted for more than one-half (52 percent) of electrical and electronic machinery products manufactured in San Diego during 1992. Sixty percent of San Diego's lumber, wood, and furniture products were exported. Also in 1993, well over one-third of the county's output of fabricated metal products and machinery were exported. Exports accounted for 30 percent of both San Diego's manufactured food products and scientific, medical and other instruments. (See Tables 6 and 7 in Chapter 9.)

### 3.3 Impact of the North American Free Trade Agreement

The North American Free Trade Agreement (NAFTA) has significant implications for San Diego as the agreement further opens trade with the region's two primary export markets. In comparing the impact of NAFTA

Chart 3  
San Diego Export Markets



on Tijuana and San Diego, the effects will perhaps be greatest for San Diego due to the current volume of trade and the relative importance of Mexico as the destination for so many exports.

### 3.4 Foreign Trade Zones

San Diego's position as a port of entry led to the creation of foreign trade zones. Foreign trade zones are areas intended to stimulate economic development in communities by providing facilities for conducting international trade activities. This zone is an area where foreign and domestic merchandise are generally considered to be in international commerce. Foreign and domestic merchandise may enter the zone without clearing customs, paying duties or paying government excise tax. An area in Otay Mesa was approved for foreign trade zone status in 1988. The existing area included five noncontiguous sites comprising 1,415 acres that may be expanded. These sites include: Brown Field (900 acres); the San Diego Business Park (72 acres); the Gateway-Otay International (60 acres); the Britannia Commerce Center (71 acres); and the De La Fuente Business Park (312 acres).

### 3.5 Sources of Information

In Tijuana, information on trade can be obtained from the Director de Asesoría y Gestoría de la Secretaría de Desarrollo Económico, Centro Comercial Plaza Patria, 3er. Nivel, Local 7-K, Tijuana, B.C., C.P. 22441, Tels. (52-66) 21-08-23 through 25 and Fax 21-08-26.

In San Diego, the World Trade Association received World Trade Center (WTC) status in the fall of 1993 in order to strengthen its international posture. Robert Plotkin has been selected as its first president. The WTC, along with the U.S./Japan Industrial Technology Business Resource Center, the U.S. Department of Commerce, an international trade library, and an assortment of other

trade support services are taking over the historic Harcourt Brace Jovanovich (HBJ) building at 1250 Sixth Avenue in Downtown San Diego. The intention is to consolidate trade services and information in one place.

### 3.6 Bibliography

1. SANDAG/Source Point. "A Look at San Diego's Future," *INFO*. San Diego Association of Governments, January-February 1994.
2. San Diego Chamber of Commerce. *Economic Bulletin*. Vol. 42, No. 8, August 1994.
3. Secretaría de Desarrollo Económico. *Estadísticas Básicas de Baja California*. Gobierno del Estado de Baja California, No. 32, 1994.
4. Secretaría de Desarrollo Económico. *Comercio Exterior*. Gobierno del Estado de Baja California, No. 6, 1994.

# CHAPTER 4: POLITICAL INSTITUTIONS

*by*

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## 4.1 Introduction

One of the most puzzling aspects of living and working in a region that spans a national boundary is the difference in political institutions on each side of the border. Most people are probably comfortable with their understanding of their own system but tend to become extremely uncomfortable when they encounter the “alphabet soup” of institutions across the border. While Mexicans may be confused by the acronyms EPA, CALTRANS, and SANDAG, U.S. citizens are no less in the dark over SEDESOL, SECTURE, and COPLADEM. Another problem contributing to the cross-border misunderstanding of political institutions is that both nations share federalist systems of government but the degree of centralization is much greater (although lessening) in Mexico. Related to federalism and relative degrees of centralization is the sometimes bewildering relations between cities, states, and federal governments. The U.S. case is further confused by the existence of counties and single purpose governments such as school districts and water districts that do not exist in Mexico.

Cross-border strategies for cooperation on economic, social, cultural, or political issues require each side to have some understanding of their counterpart across the border. Without such understanding, the possibilities for cooperation remain undiscovered. In

addition, cross-border strategies will be carried out less efficiently without such knowledge because the involved parties will spend time looking for the right person or agency to contact.

At present, there are few binational institutions that can handle the problems that have arisen in the border region. For example, as foreign investment spreads maquiladora-style manufacturing throughout Mexico, there is alarm in both Mexico and the United States about the hazardous wastes it generates. New institutions, such as the North American Development Bank (NADBANK) or the Border Environmental Cooperation Commission (BECC), are needed to monitor and to solve the problems that have remained unaddressed due to the difficulties involved in working on problems that cross national boundaries. To better comprehend how new institutions might perform, it is essential to understand the current political institutions of the United States and Mexico.

## 4.2 Political Institutions in Mexico

As mentioned above, Mexico’s system is the more centralized of the two. The basic units of Mexico’s government below the federal level are the 31 states and their municipalities. There are no counties or townships as there are in most of the states of the

United States, nor are there single purpose governments like sewage districts. The territory of each state is divided into municipalities and, consequently, cities such as Tijuana or Ensenada contain a large amount of rural area as well as their urban cores. The centralism of Mexico is rapidly changing as more authority is delegated to the states, but it remains true today that the federal government wields far more power than the states over revenue, land use planning, infrastructure investment, and so forth. The cities are the weakest elements in the decision making process and have much less control over their futures than is the case in the United States. One illustration of this is that there is no market for municipal bonds in Mexico; all appropriations for infrastructural improvements originate at the federal or state level.

#### 4.2.1 Federal and State Government

Mexico is a union of 31 states and one Federal District. Efraín Moto Salazar, author of a standard text on Mexican law, states that the origin of the federation is artificial in the sense that the states of the republic have never been independent of the federation. States can define their political boundaries, but their division has to be approved by Congress. States have the right to handle most internal affairs, appoint bureaucrats or government officials, make state tax laws, and organize police forces for the well-being of the citizens. It is prohibited for states to create alliances or treaties with other states or countries, print money, or to impose tariffs on interstate trade.

The public administration of the federal government is centralized in the presidency and the secretaries and administrative departments. These include numerous agencies that have a very important role in day-to-day local affairs, such as the Secretaría de Comercio y Fomento Industrial (SECOFI) which is similar to the U.S. Department of Commerce but has an additional role in promoting industrial growth; the Secretaría de Comunica-

ciones y Transportes (SCT), which handles transportation and communications issues, including rail and highway construction; Secretaría de Desarrollo Social (SEDESOL), which handles many issues in the area of environmental improvement; Secretaría de Educación Pública (SEP), the federal department of education; and numerous others. These secretariats often become the mechanism for centralizing public power in Mexico City through their control over investment and project development.

The federation also makes use of nongovernmental agencies (*paraestatales*). These agencies are created by law or by decree from the chief executive, have their own financial budget, and are legally recognized. In the past, they have been the means through which public ownership of industrial and financial enterprises has been exercised. These entities are similar to the single purpose governments one finds in the United States, and are created to help the federation in the development of a specific area. Theoretically, they may be created by local or state governments. In practice, however, the constraints on the ability of cities to raise revenue for their own purposes make these institutions impractical in the sense that U.S. and California cities use special assessment districts to accomplish specific economic goals. Tijuana's historic vote in April 1994, for the creation of a special assessment to build infrastructure in the municipality, was the first such effort by a city in the history of Mexico. Even so, the city was obligated to seek permission for its plan with the state government.

#### 4.2.2 *Municipios*

The *municipio*, or municipality, is the most local of the three levels of government. The primary organization of the municipality is the "Ayuntamiento" or City Hall. The chief executive of the *Ayuntamiento* is the *Presidente Municipal*, or mayor. In addition to the mayor, the city hall has two sets of elected



representatives. Seats are partisan and distributed in two groups: 1) on the basis of the party gaining the absolute majority; and 2) on the basis of proportional representation. The mayor and representatives serve three year terms and cannot run for reelection. The state of Baja California is made up of four municipalities: Mexicali, Tijuana, Tecate, and Ensenada. In addition, Rosarito, currently a part of the municipality of Tijuana, has voted for separate incorporation and will soon do so.

Each *Ayuntamiento* has its own committee of planning for the development of the *municipio*, according to the Law of Planning of the state. This committee is known as COM-PLADEM (Comité de Planeación para el Desarrollo Municipal or Planning Committee for Municipal Development). States have similar entities, know as COPLADE (Comité de Planeación para el Desarrollo del Estado). They have members from all important public sector agencies as well as from social and private communities. Their purpose is to formulate an economic development plan for the municipality (or state) and to insure its consistency across federal, state, and local jurisdictions. More specifically, they are required to:

- Consolidate a permanent process in the planning of various issues; attend and resolve in a systematic manner the problems that the *Municipio* will confront in its future development.
- Determine the mechanisms for the formulation, actualization, instrumentation, control and valuation of the *Municipio* development program.
- Formulate recommendations to the *Ayuntamiento* to improve the *Municipio* administrative and public services.
- Develop studies and gather information in order to achieve its previous obligations.
- Appear before the town hall when it is required or when the commission thinks its convenient.

- Propose the study of the municipal conditions, the development of new construction or the creation or improvement of public services.
- Assist in the creation of establishments in new regions inside the *Municipio*.

### 4.3 Political Institutions in the United States

Perhaps the most baffling aspect of the government of the United States is the bewildering array of jurisdictional levels. Federal, state, county, city, and single purpose governments all seem to overlap at times, and no agency or government seems responsible for coordinating the actions of the rest. In addition, the taxing powers of each level of government seems to provide each with a degree of independence that is unknown in Mexico.

#### 4.3.1 The Federal Government

Many believe that the reason for the success of the United States' constitutional form of government is its explicit separation of powers. The separation of the legislative, judicial, and executive branches of government limits their power.

The executive branch includes the president whose main functions are chief executive, commander-in-chief, chief diplomat, head of state, and chief policymaker. The president is elected for a four year term and may be elected for a maximum second term. Also included in the executive branch is the general bureaucracy, the nonelected body of government which the president is head of. The president's power is limited by the electorate, by Congress who may impeach him, and by the Senate who confirms the President's appointed positions.

The next branch of the federal government is the legislative branch. To varying degrees, the legislative branch adheres to public interests and initiates policies. The first of the two chambers in the bicameral legislature (Con-

gress) is the House of Representatives. Four hundred and thirty-five representatives are elected by the people in direct correlation to the population of each state. Elections take place every two years and there is no limit of terms to serve. The second chamber of Congress is the Senate. There are two Senators elected from every state to total 100. Senators are elected every six years and like members of the House, they may serve an unlimited number of terms.

The last branch of the federal government in this system of checks and balances is the judicial branch. The major function of this branch is to judge or administer justice and interpret laws. The three basic federal courts include 89 district courts, eleven federal courts of appeals, and one Supreme Court.

#### 4.3.2 State Government

State government is very similar to the federal government; however, as a creature of the federal government, it has lesser—or residual—power. The state government consists of an executive, or governor, a state legislature created by the states constitution, and a judicial branch. Each state's government may be set up in a different fashion.

California's system gives the people three important tools in the decision making process. The people have the right to an initiative—the right to place local or state measures on the state ballot; to the referendum—used to block state statutes or local ordinances; and lastly, to a recall—placing on the ballot the question of removing any elected official from office.

#### 4.3.3 Local Government (Three Forms)

Local government in California is very complex. Many say that, of the three levels of government the local governments are the least understood. However, they probably play the most immediate role in the life of the citizens of California. It is not unusual in California for every citizen to be a resident of

a dozen or more units of local government. The largest territorial division for local governments within the state is the county, followed by the municipalities and the special districts.

#### *County Government*

There are 58 counties of varying size that make up California. Counties are governed by boards of supervisors elected by the public. The board then appoints an administrative officer to supervise the county government. Other elected officials of the county include: the district attorney, the sheriff, and the assessor. Some of the most important functions that a county performs include:

- Provide services in unincorporated areas such as law enforcement and upkeep of roads.
- Provide public health programs.
- Administer elections.

Although the most well-known function of the county is to provide for unincorporated areas, the county is also responsible for the Local Agency Formation Commissions (LAFCO). LAFCO serves in every county of California as an efficient clearinghouse for annexation of territory by a local agency and for formation of new cities. It brings together city council members, county supervisors, and representatives of the public, all of whom are empowered under LAFCO to review most all local boundary changes.

#### *City Government*

The county of San Diego consists of 18 municipalities. These municipalities function in a manner similar to county government in that they perform basic government functions; they provide law enforcement, sanitation, and fire control, to name a few. But the city has more autonomy from the state than the county, and is more a unit of self-government. Along with its main functions, each city passes ordinances and provides a general government framework for its communi-

ties. The governing framework includes a mayor, a city council, and an administrative bureaucracy.

### *Special Districts*

Special districts play a key role in local California government. They are the most numerous and least understood of all governments. Their functions include everything from providing water services, public education, and fire districts to mosquito abatement. In San Diego County alone, there are approximately 190 special districts and statewide there are an estimated 3,400 special districts. The chairman of the Local Government Committee of the California State Senate stated: "Celebrated as the best example of democracy, cursed as the worst form of fragmented government, and generally misunderstood even by the experts, special districts are California's unique contribution to local government" (California State Legislature, 1993).

The idea of a special district is not necessarily a new phenomenon, but the growing number of them and interest in them is quite remarkable. California's state law defines a special district as "any agency of the state for the local performance of governmental or proprietary functions within limited boundaries" (Government code s16271[d]). Or in general terms, a special district is a separate local government that delivers public services.

## 4.4 Transborder Impacts

As San Diego and Tijuana expand side by side, each a part of separate sovereign nations, there are a number of concerns in the region and both nations. There is, for example, greater demand than previously for monitoring and resolving mutual problems through the cooperation of binational institutions. This, however, is not an easy task. Fear of losing national sovereignty has contributed to a kind of defensiveness that makes

cooperation more difficult. For example, Mexico has not allowed many U.S. government institutions into the country, even though they may have helped meet demands for technological improvements and solutions to serious problems. An illustration of this is the EPA's historically very slight contact with its Mexican counterpart SEDESOL. Since the signing of NAFTA there has been more communication between the United States and Mexico and historical mistrust on the Mexican side and U.S. inattention are perhaps waning.

Citizens directly affected by the problems of the binational area have begun to expect that their state and local governments will become more involved. Because the United States is closer to the theoretical model of federalism than the more centralized Mexican political system, more power is delegated to its state and local government. This is not to say that local government may conduct foreign policy or deal with national security, but it may become involved in economic, social, and cultural issues. There have been several recent initiatives in this direction and the following local government agencies communicate directly with Mexico about issues that impact the San Diego-Tijuana border region.

### *The Office of the Mayor of San Diego*

The mayor's office is a fairly new vehicle in which the exchange of communication is taking place. In April of 1993, a *Letter of Agreement* between the City of Tijuana and the City of San Diego was signed in the field of binational planning and coordination. The agreement proposes increased cooperation on border issues; regular meetings of discussion, exchanging information related to land planning, arts and culture, pollution, and economic development; and to arrange for more communication linkages. The agreement was signed by the mayor of Tijuana, Héctor Osuna and the mayor of San Diego, Susan Golding.

### *San Diego Association of Governments (SANDAG)*

SANDAG is another local agency that deals with transborder issues. It is a regional planning agency for the area's 18 incorporated cities, the county government, and the international border region. The Association is governed by a Board of Directors which consists of mayors, council members and a county supervisor from each of the region's 19 local governments. Currently, SANDAG has three studies underway and two proposed studies on the status of border transportation. In addition, SANDAG has indicated that it plans to take greater interest in gathering information on the border region and impacts on San Diego county and cities.

### *Police and Fire Departments*

The fire departments of Tijuana and San Diego have a long-working relationship. The two departments meet at least twice a year to discuss regional interests. In case of a major disaster, the two departments will be able to work together more efficiently because their lines of communication have already been established.

The police department is another area in which there is a high frequency of communication across the border. Officials have worked together to investigate cases and to deal with stolen weapons and stolen vehicles. Like the fire department, the police department's main concern is keeping a line of communication open in case of a major disaster and also to keep up with the ever-increasing crime in the region.

## 4.5 Bibliography

1. Anderson, Terry L. *NAFTA and the Environment*. Pacific Research Institute For Public Policy, San Francisco, 1993.
2. Centro Estatal de Estudios Municipales de Baja California. *Modelo de Reglamentos Municipales*, Mexicali, B.C., 1990.

3. Chong, Maria Isabel. *Contrasting Institutional Arrangements and Official Perceptions Shaping Patterns of Crossnational Relations: Tijuana-San Diego Border Area*. Unpublished thesis. San Diego State University, 1992.
4. Clement, Norris C., and Eduardo Zepeda Miramontes. *San Diego-Tijuana in Transition: A Regional Analysis*. A Joint Project of the Department of Economics, San Diego State University, and El Colegio de la Frontera Norte, 1993.
5. COPLADEM. *Plan de desarrollo municipal 1993-1995*, 14 Ayuntamiento, Tijuana, B.C., 1993.
6. Dirección General de Ecología. *Plan de ordenamiento ecológico del Estado de Baja California*.
7. Gobierno del Estado de Baja California. *Plan estatal de desarrollo 1990-1995*. Mexicali, B.C., 1990.
8. Hylink, Bernard L. *Politics and Government in California*. New York, 1985.
9. Monsma, Stephen V. *American Politics*. Hinsdale, IL: Dryden Press, 1973.
10. Sánchez Rodríguez R. *El Medio ambiente como fuente de conflicto en la relación binacional México-Estados Unidos*. El Colegio de la Frontera Norte, Tijuana, B.C., 1990.
11. Secretarías de Comercio de México y de Estados Unidos. *Acuerdos complementarios del TLC. El financiamiento de proyectos de infraestructura ambiental en la región México-Estados Unidos*. 1993.
12. SEDUE and EPA. *Plan integral ambiental fronterizo México-EUA: primera etapa, 1992-1994*. 1991.
13. SNE (Secretaría Nacional de Estudios). *Propuesta para Mejorar y Conservar el Medio Ambiente*. PAN, México, D.F. 1994.
14. SPD (Secretaría de Propaganda y Difusión). *Propuesta para un desarrollo regional equilibrado*. Organó del PRI, México, D.F., 1994.
15. State of California. *California Government and Politics Annual 1988-89*. California Journal Press, 1988.
16. State of California, California State Legislature. *What's So Special About Special Districts?* Senate Local Government Committee. Second Edition, November 1993.
17. Whaley, Shirley. *The LAFCO Incorporation Fiscal Feasibility Study*. Unpublished thesis. San Diego State University, 1993.

# CHAPTER 5: TRANSPORTATION SYSTEMS

*by*

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## 5.1 Surface Roads and Highways

### 5.1.1 The Tijuana/San Diego highway systems

#### *Tijuana*

The Tijuana regional highway system is the major transportation network for people and goods within the region. The system consists of regional highways, primary streets, secondary streets, and local streets.

Regional highways are arterials that join two or more communities within the region, or between the region and its neighbors. There are two federal toll roads and two federal toll-free highways within the boundary of the municipality of Tijuana. The two toll roads are the Tijuana-Ensenada (Autopista Transpeninsular Núm. 1 Benito Juárez) toll road and the Tijuana-Tecate toll road. The two federal highways are Tijuana-Rosarito-Ensenada highway and Tijuana-Tecate-Mexicali highway.

Primary streets are causeways and main avenues that connect to the regional highways. Tijuana's primary street system consists of 40 roadways. Secondary streets are avenues and streets that are connected to the primary streets. The total number of secondary streets in the region is 75. Currently,

only 40 percent of the regions public roadway system is paved; and 60 percent of that system is damaged and no public funds can be allocated for repair. The regional government has no legal authority to levy tax for highway maintenance or construction.

#### *San Diego*

The San Diego regional highway system is the basic and essential transportation network for the movement of people and goods in the region. It includes state highways, regional arterials, and local streets and roads. Currently, there are over 7,020 miles of maintained city streets and county roads, and 586 miles of state highways within the region. These 586 miles include about 2,650 lane miles of pavement.

According to the San Diego Association of Governments (SANDAG), increased traffic throughout the region has begun to exceed the existing highway capacity along most of the major freeway corridors since the late 1970s. There is an urgency in looking for revenues to fund highway improvement projects, and to reduce the backlog of deferred street and road maintenance projects.

The region has exhausted all of its taxing capacity and still does not generate enough funds for its proposed highway program. The TransNet transportation sales tax pro-

gram and the increased state gasoline tax have provided critically needed funds to meet much of the unfunded highway program deficit but a major unfunded shortfall remains.

The cost escalation of highway construction projects is another concern that must be addressed. Many of these cost increases are either the result of escalating land costs or unforeseen environmental impact mitigation costs. Some are the result of delays in approval and longer than foreseen construction times. Cost escalation is compounded by the excessive costs of High Occupancy Vehicle (HOV) lane construction. Although HOV operations can increase ridesharing by 50 percent or more by insuring higher travel speeds, it costs 20 percent more than mixed-flow lanes to construct and has higher operating costs.

As the freeway system in San Diego reaches its planned capacity, a supporting regional arterial system becomes increasingly more important. However, the cost to construct or upgrade the regional arterials exceeds the revenues likely to be available from the local jurisdictions.

### 5.1.2 Transborder Impacts

With the passage of NAFTA, the volume of trade between San Diego and Tijuana is expected to increase significantly. This leads to the demand for upgraded highway systems to facilitate trade and economic development. Unfortunately, the existing highway and surface road system is probably inadequate for the task.

The following routes either have total or partial impacts on the goods movement between the two regions.

- **Interstate 8.** The major east/west route of the San Diego and Imperial regions is Interstate 8 (I-8). This route parallels the entire length of the California/Mexico border from San Diego to Imperial County, onward to and through the state of Arizona.

As the major east/west connector, this route is expected to be subject to considerable increases in goods movement and inter-regional traffic as a result of NAFTA.

- **Interstate 5.** An eight-lane interstate freeway, I-5 serves as the principal north/south route for the coastal portion of San Diego County. It facilitates the exchange of goods among countries within the North American continent.
- **Interstate 805.** An eight-lane interstate freeway, I-805 serves as an alternative north/south route to I-5 and the congested area of San Diego.
- **Interstate 15.** An eight-lane interstate freeway, I-15 serves as the principal north/south route for the inland portion of San Diego County.
- **State Routes 188 and 94.** State Route 188 (SR-188) serves the Tecate Port of Entry (POE). It is a 1.9 mile north/south route that connects to SR-94.

As pointed out by San Diego Dialogue in its *Planning For Prosperity in the San Diego/Baja California Region*, the California Department of Transportation's (CALTRANS) effort in improving the highway system on the San Diego side of the border will not produce the desired benefits for San Diego unless SAHOPE (the Baja California transportation agency), also succeeds in improving the highway system on the Mexican side of the border. Obviously, binational cooperation is vital for success in providing the region a balanced highway system to facilitate trade and economic development.

### 5.1.3 Current Actions and Ongoing Efforts

#### Tijuana

- **Plan of Urban Activation (PAU):** The main objective of the plan is to construct 10 boulevards and 12 roadways at a total length of 77.11 Km. The cost of the plan is estimated at about 500 million *nuevos pesos*.
- **Tijuana Loop:** the Tijuana Loop project is designed as a privately financed and oper-

ated expressway toll road. This toll road will have significant impact on the economic prosperity of the region. It provides accesses from the Otay Mesa border crossing to the Tijuana/Tecate/Mexicali toll road, to the rapid industrial growing region of southeast Tijuana, and to the Ensenada toll road.

Baja transportation officials regard the Loop as a high priority project but have not yet secured funds for a feasibility study.

### *San Diego*

On the San Diego side of the border, two highway projects that have the potential to be highly efficient systems for moving goods and people across the border are under planning.

- State Route 905 (SR-905) is a projected 12-mile, 6-lane highway facility that runs from I-5 through I-805, and ends at the Otay Mesa Port of Entry (POE). Currently, the freeway is partially constructed from I-5 to I-805 with a temporary connection to Otay Mesa Road, which then connects to an existing one-half mile segment of SR-905 that ends at the Otay Mesa POE. The completion of this freeway will reduce the heavy traffic congestion on Otay Mesa Road. It will also smooth the flow of commercial vehicles crossing the border at the Otay Mesa POE as all southbound commercial vehicles are diverted from the Virginia Street border crossing at San Ysidro to the Otay Mesa crossing. The estimated cost of this project is \$174 million. However, at the present time no funds are allocated for the construction.
- State Route 125 is planned as a privately financed and operated north/south expressway toll road of eight lanes and 17-mile length. It will traverse the cities of San Diego, Chula Vista, La Mesa, El Cajon, Santee, and Poway and the unincorporated communities of Bonita and Spring Valley. The existing portion of the route is in La Mesa, beginning at the east junction of SR-94 and ending at I-8.

State Route 125 is essential to the integration of social and economic activities between Tijuana and San Diego for several reasons. First, it will provide a direct north/south connection from SR-54 to a point near the Otay Mesa border crossing. This will facilitate the industrial, commercial, and residential development of Otay Ranch and eastern Otay Mesa. Second, it will serve all Otay Mesa border traffic headed for I-15 and points north, as well as I-8 and points east. Third, at the Otay Mesa border crossing, SR-125 will connect to the proposed Tijuana Loop toll road that will link the Otay Mesa border crossing with the Tijuana/Tecate/Mexicali toll road, and with the rapidly growing industrial and residential region of southeast Tijuana. The project has been awarded to California Transportation Venture, Inc. (CTV) for a lease of 35 years.

In addition to these major highway projects, the region also plans to carry out substantial highway improvements between now and the year 2015.

### 5.1.4 Policy Options

#### *Tijuana*

- Upgrade the regional highway systems through the process of increasing the meters of paved roads.
- Classify the regional highway systems into different priority categories for maintenance.
- Finance PAU through various sources of funds: federal government, state government, and local homeowner one time property tax for highway construction.

#### *San Diego*

Four of the most important policies recommended by SANDAG relating to the regional transportation management and development are:

- The regional highway system should be a balanced system of freeways and express-

ways, and regional arterials, well coordinated with other transportation systems, each consistent with the character of the area through which it passes and the type and volume of traffic to be served.

- Maintenance, rehabilitation and safety should be given high priority in the programming of regional highway projects.
- A regional system of HOV lanes should be developed to encourage higher vehicles occupancy during peak traffic periods.
- All freeway on-ramps in the urbanized area should be metered during peak periods.

## 5.2 Mass Transit and Public Transportation

### 5.2.1 Existing Systems

#### *Tijuana*

There are two types of public transportation systems in the Municipality of Tijuana: interregional transportation and urban transportation.

The interregional transportation center is located at the corner of Lázaro Cárdenas Avenue and Río Almar. Currently, there are a total of 425 buses operated by eight interregional bus lines in the station. All bus lines but one (Greyhound) offer routes from downtown Tijuana to the rest of the country (Mexico). Greyhound travels between Tijuana and the state of California.

Urban transportation is made up of buses and taxis. There are 617 buses and 1,086 mini vans operating on 112 routes in the metropolitan area of Tijuana. The 5,227 cabs operate on 164 routes within the region.

#### *San Diego*

The region's interregional ground passenger travel is served by private bus operations and Amtrak. The intraregional ground passenger travel is served by the region's seven

transit operators. Together, these transit operators provide the region with 10 fixed-route transit services and 12 demand-responsive (dial-a-ride) services.

The North San Diego County Transit Development Board (NSDCTDB) and the Metropolitan Transit Development Board (MTDB) are two regional agencies that oversee the operations of the region's public transit services. In the area north of the City of San Diego, public transit services are provided by the North County Transit District (NCTD), the bus operations arm of the NSDCTDB. In the metropolitan area, the services are provided by the Metropolitan Transit System (MTS) of the MTDB.

Interregional passenger rail service to the north is provided by the Santa Fe Amtrak. It makes nine round trips daily between Los Angeles and San Diego. Interregional bus service is provided by Greyhound to the north and east, and by Mexicoach and Grey Line across the international border to Tijuana.

Finally, taxis are another form of public transportation service within the region. In the cities of San Diego, El Cajon, Imperial Beach, Lemon Grove, National City, and Poway, the number of taxi companies is 240, operating a total of 917 vehicles.

Currently, there is an urgent need to expand the transit services in all major travel corridors in the region to reduce highway congestion during the peak hours. The Regional Transportation Plan also call for the use of major transit facilities and services as a primary means of increasing person-carrying capacity in heavily congested corridors. However, the lack of funding has been a major obstacle for the expansion of public transit systems in the region.

### 5.2.2 Transborder Impacts of Public Transportation Systems

From Tijuana's side of the border, the Greyhound bus line operates between down-



town Tijuana and the state of California. From the San Diego side of the border, there is a privately owned public transportation company rendering services between San Ysidro and downtown Tijuana. This company operates the Transportes Diamante Internacional bus line and the CROC Taxi Company with 15 cabs. The bus line runs a route from the San Ysidro border to downtown Tijuana. The 15 cabs each make approximately five trips anywhere in Tijuana. In addition, the Mexicoach bus line offers service from the Amtrak station at downtown San Diego to the recently built Mexicoach bus station on Revolution Avenue, between 6th and 7th streets in downtown Tijuana.

These private ventures contribute to the mobility of the residents in the San Diego-Tijuana region. They provide connection to the transit systems of Tijuana and San Diego, and extend beyond the geographical boundary of the region to other regions of the two countries. In the long run, it would be helpful to have cooperation between transit authorities on both sides of the border to oversee the transborder services.

### 5.2.3 Current Actions and Ongoing Efforts

Binationally, a Tijuana trolley project is under consideration by Tijuana's transportation authorities. This projected Tijuana trolley is expected to have its border station built next to the San Diego Trolley Station on the other side of the border. A new entry would also be constructed south from the San Ysidro Trolley Station.

On the Tijuana side, the Department of State Transit (Departamento de Tránsito del Estado) of Baja California is planning a street and mass transit development project for the municipality of Tijuana. The estimated cost of this project is about 500,000 *nuevos pesos*.

On the San Diego side, nearly 20 miles of additional trolley guideway will be constructed over the next seven years (FY 1994-

2001). This will include the extension of the East Line north to Santee, the construction of the North Line from Center City to University City, and the construction of the Mission Valley Line from Old Town to La Mesa.

Commuter rail service in the coastal corridor from Oceanside to Center City San Diego will begin in late 1994. Also in the planning is a new commuter express bus route connecting Escondido with employment sites in Kearny Mesa. Ten new transit centers will be constructed in this same period.

## 5.2.4 Mass Transit Policy Options

### *Tijuana*

The Urban Development Program of the municipality of Tijuana considers 1994 as the year of restructuring the mass transit system.

### *San Diego*

Major policies recommended by SANDAG regarding the public transit management and development are:

- Transit should be considered an essential public service because of its social, environmental and economic benefits.
- To facilitate efficient and convenient multi-destination travel, interregional, regional, local, paratransit, and rural transit services should be coordinated as elements of a region-wide system.
- Regional significant routes should be based on travel demand without regard to district or jurisdictional boundaries.
- Private sector participation should be encouraged for the construction of transit facilities.

## 5.3 Rail Freight

### 5.3.1 Description of the Rail Freight Systems

#### *Tijuana*

There are 212 kilometers of railway within the boundary of the state of Baja California. This railway consists of 114 km. of primary routes, 43 km. of auxiliary routes, and 24 km. of private use. The Tijuana to Tecate railroad and the Mexicali to Benjamín Hill, Sonora, railroad are primary routes. Actually, the Tijuana-Tecate railway is the portion of San Diego, Arizona, and Eastern Railway that extends through the Tijuana boundary; the Mexicali-Benjamín Hill railway is the portion of U.S. Pacific railway that extends into the Mexican inland territory.

#### *San Diego*

Currently, there are two major rail freight operations in the San Diego area. One is the Atchison Topeka and the Santa Fe (ATSF) railroad that runs north; the other is the San Diego and Imperial Valley (SD&IV) railroad that runs east to Imperial County and beyond.

The ATSF runs north from central San Diego through Orange County to Los Angeles and San Bernardino. The railway on which the ATSF operates is called the Santa Fe Railway. The right-of-way (ROW) of the Santa Fe Railway within the San Diego County boundary is owned by the Metropolitan Transit Development Board (MTDB) and the North San Diego County Transit Development Board (NSDCTDB).

The right-of-way (ROW) of the 108-mile San Diego, Arizona and Eastern (SDA&E) Railway is owned by the San Diego MTDB. This railway runs from central San Diego south to the San Ysidro/International Border at Tijuana, then crosses the international border and travels along the 44.3 mile U.S.-Mexican Border to the Mexican city of Tecate, and

again crosses the international border back to U.S. cities of Campo and Jacumba. From Jacumba, it travels north to Plaster City and joins Southern Pacific (SP) line at El Centro. The ROW on the Mexican portion is owned by the Mexican National Railways (Ferrocarril Sonora-Baja California Line).

The San Diego and Imperial Valley (SD&IV) railroad, a subsidiary of RailTex Inc., is a Class II Freight Carrier which operate on the SDA&E railway. Due to fire damages to tunnels and bridges on the eastern portion of the railway (the Desert Line), SD&IV is currently operating from National City to Tijuana, eastward to Tecate, Mexico, and back across the border to Campo and Jacumba. The main cargoes on this line are cement, grain, sugar, and maquila supplies.

Crossing the border has long been a major problem in the operation of SD&IV railroad. The shortage of inspection staffing and lengthy processing procedures at the port of entry hurt the competitiveness and operational efficiency of the company. The random unload and search of ten percent of carloads at the company's own expense by U.S. Customs is a major hindrance to the company's operation.

### 5.3.2 Transborder Impacts of the Regional Railroads

The San Diego, Arizona and Eastern (SDA&E) Railway will have significant impact on the regional economy. A well functioning SDA&E railroad will give San Diego a "NAFTA" train that could operate all the way to the Mexican border at Mexicali, which is a major transportation gateway for NAFTA commerce. It would also foster the growth of the Port of San Diego as the international gateway between the nation's Southwest region and the Pacific Rim countries.

Since SDA&E is partially owned by the Mexican National Railway, (Ferrocarriles Nacionales de México, FNM), SD&IV has

an agreement with FNM to set tariffs and provide freight service in Baja California.

### 5.3.3 Current Actions and Ongoing Efforts

On the Tijuana side of the border, rail linkages from the border to the Port of Ensenada are being considered. The estimated cost of the project is 160 million dollars. The project will be carried out by private investors.

On the San Diego side of the border, The Metropolitan Transit Development Board (MTDB) is currently seeking funds for the repairs of the eastern portion (the Desert Line) of the San Diego and Imperial Valley Railroad. The estimated cost of the project is \$60 million. However, no funds are allocated at present.

### 5.3.4 Policy Options

In San Diego the options are:

- Rebuild the rail freight service to Imperial County.
- Increase inspection staff at ports and reduce lengthy processing procedures through innovative technological enhancements.
- Increase the efficiency of the movement of goods rail between Mexico and the United States.
- Promote rail freight service as an alternative to the congested highways.

## 5.4 Air Transportation

### 5.4.1 Description of the Air Transportation Systems

#### *Tijuana*

The commercial airport in the Tijuana region is the Abelardo Rodríguez International Airport. The airport handles 95 percent of the region's air travel passengers and 93 percent of the region's commercial flights. There are 20 arrivals and 20 departures daily. The Federal Aerial Transportation Office (Aero-

transportes y Servicios Auxiliares, ASA) is the official administrator of the airport.

#### *San Diego*

Lindbergh Field, administered by the San Diego Unified Port District (SDUPD), is an international commercial airport located on a 487 acre parcel on the north side of San Diego Bay within the City of San Diego. Currently, it handles 11.5 million passengers and approximately 200,000 aircraft operations annually. There are two runways on Lindbergh Field. The longest runway is the 9/27 and is 9,400 feet in length for air carriers and general aviation. However, it is inadequate to handle wide-body jets such as 747s, DC-10s, and L-1011s. The other runway is the 13/31 and is 4,400 feet long. The runway is for general aviation aircraft use only. It is expected to be closed in the near future.

The major problems with Lindbergh Field are:

- Lindbergh has achieved its optimum capacity. A further increase in the number of passengers will certainly lead to flight delays.
- Traffic congestion on roads to Lindbergh.
- The unavailability of direct overseas flights to Asia and Europe.
- Planes are unable to land in heavy fog and other conditions of low visibility.

### 5.4.2 Current Actions and Ongoing Efforts

#### *Tijuana*

Proposals to lengthen the 9,200-foot long Rodríguez Airport runway to 10,500 feet have been made. In addition, a new taxiway and additional parking are proposed.

Future construction possibilities include a second and parallel 12,000-foot runway approximately 700 feet to the south, a maintenance facility capable of servicing 747s and other wide-body aircraft, a new terminal,

and a "People Mover" for transporting passengers to the border (95 feet from the terminal to the international border). Phase two is scheduled for completion in 1994.

Currently, U.S. passengers using Rodríguez Airport are required to use the Otay Mesa or San Ysidro POE for custom inspection and return to the United States. An alternative to this would be to provide pedestrian access at the border in an area near Rodríguez Airport facilities.

### San Diego

In the short run, the San Diego Port District is considering several actions to improve the existing conditions in Lindbergh Field: constructing a new eight-gate passenger terminal, realignment of terminal roads, improvements to access interchanges, widening local arterials, opening new airport access route, and relocation of the south taxiway to 400 feet from the centerline of Runway 9/27 to meet FAA requirements for accommodating larger jets.

In the long run, the City is considering building a new airport. So far, four options have been explored: "TwinPorts" in Otay Mesa, converting NAS Miramar, expanding Lindbergh Field, and doing nothing. The idea of "TwinPorts" (a U.S.-Mexico airport built as an extension of Rodríguez) is no longer under consideration.

#### 5.4.3 Policy Options

The policy options suggested by SANDAG are:

- Air safety should have the highest priority in the consideration of airport system changes.
- Although Lindbergh Field has inadequate capacity to accommodate the regions long-term future demand for air carrier service, it should continue to be designed as the region's air carrier airport.

- The region should pursue all feasible alternatives to provide adequate air carrier capacity.
- If NAS Miramar is no longer required as a national defense facility, the use of this facility as the region's air carrier airport should be aggressively pursued.
- Camp Pendleton should not be considered a suitable location for a regional commercial airport.

## 5.5 Seaports

### 5.5.1 The Seaport of Ensenada

The Port of Ensenada, Mexico, is mainly for recreational and cruise-ship operations. The port also handles commercial fishing and small commercial cargo vessels. The Port and City of Ensenada are located about 75 miles south of the U.S.-Mexico border, on the west coast of the state of Baja California. The Port and City of Ensenada are connected to their neighbors and the rest of the country by a two-lane conventional (toll-free) road and a four-lane conventional toll road; both of these two roads run north and south.

According to CALTRANS *Draft Report on Transportation Issues Along the California/Mexico Border*, "The commercial portion of the Port of Ensenada has three berths capable of operating semi-specialized containers at a rate of 15 units per hour. This port has 11.4 acres of covered warehouses and 7.4 acres of yards. The existing dockside water depth precludes handling deep draft cargo ships. Only small cruise ships and tuna fishing boats can be docked at the Port."

### 5.5.2 The Seaport of San Diego

The port of San Diego is a natural harbor located just north of the Mexican border. It is 14 miles long and covers over 23 square miles of water and land. There are 10,532 acres of water in the bay and 4,419 acres of surrounding tidelands. The controlling and project depths are 42 feet in the entrance

channel, 30 to 42 feet in the bay channel and turning basin, 26 to 35 feet in anchorage area, and 10 to 16 feet in other channels and areas. The Port is operated by the San Diego Unified Port District (SDUPD).

There are three terminals in the San Diego Port. The Cruise Ship Terminal is located at B Street Terminal, with the capacity of accommodating over 300,000 passengers per year. International waterborne commerce is conducted at the Tenth Avenue Marine Terminal and the 24th Street Marine Terminal. At the Tenth Avenue Marine Terminal, principal inbound cargoes are general merchandise, chemicals, canned fish, newsprint, and cement; the major outbound cargoes are fertilizers and grain. At the 24th Street Marine Terminal, the principal cargoes are vehicles, lumber, and fuel oil.

Based on the analysis of the San Diego Dialogue's Binational Task Force on Economic Development and Transportation Infrastructure, the lack of primary manufacturing industries in the region, and the region's future high-tech oriented manufacturing base, will prevent the port from evolving into a major container seaport in the region.

### 5.5.3 Transborder Impacts

Although the passage of NAFTA will facilitate the development of trade and the economies on both sides of the border, a lack of cooperation and communication between the two local governments in planning for regional growth will certainly lead to unwarranted competition and prevent the region from achieving its potential. As the San Diego Dialogue's Binational Task Force points out, the two seaports are currently pursuing market strategies which are in direct conflict with each other's plan for future development (*Planning for Prosperity in the San Diego/Baja California Region*). A binational port commission should be created to take care of this problem.

## 5.5.4 Current Actions and Ongoing Efforts

### *The Port of Ensenada*

In the short-run, the state of Baja California is considering improvements in its existing facilities. The *State Development Plan, 1990-1995*, calls for the reconstruction and reinforcement of the port's tideland, the construction of fishing docks for tuna fleets, the building of a cruise ship terminal south of the Ensenada River outlet, and the construction of a fuel terminal and a terminal for yachts.

In the long-run, the state of Baja California and the Municipality of Ensenada have a master plan to convert the Port of Ensenada into a major international port by the year 2015. This will include expanding the port's capacity to handle Pacific Rim containerized and general cargo bound for both Mexico, and southwestern and southeastern parts of the United States. This plan will be financed through privatization of port facilities.

A rail link will also be constructed from Tecate to the Port of Ensenada. The total estimated cost of this project alone is \$160 million. It is also expected that this project will be financed through privatization of the railroad.

### *The Port of San Diego*

There is no major action being taken by the Unified Port District in the Port of San Diego. However, due to the growing number of foreign car imports through the port, the Port District is considering development of 21.9 additional acres at the 24th Street Terminal for temporary automobile storage.

## 5.5.5 Policy Options

With its plan to become a major international port by the year 2015, Ensenada is setting a goal to achieve a 50 percent increase in bulk cargo by the year 2003, and a ten-fold

increase in containerized cargo by the year 2015.

The Port of San Diego is aiming toward cultivating a niche business in the areas of soda ash exports, foreign car imports, and refrigerated fruit for either import or transshipment.

## 5.6 Private, Public Agencies and Sources of Information.

### Tijuana

- El Colegio de la Frontera Norte
- Comisión Estatal de Servicios Públicos de Tijuana (CESPT)
- Comité de Planeación para el Desarrollo del Estado (COPLADE), Mexicali, Baja California
- Comité de Planeación para el Desarrollo Municipal (COPLADEM)
- Dirección de Planeación del Desarrollo Urbano y Ecología
- Dirección de Tránsito y Transportes del Estado
- Unidad Municipal de Urbanización

### San Diego

- California Department of Transportation (CALTRANS), District 11
- City of San Diego Planning Department
- Metropolitan Transit Development Board
- San Diego Association of Governments (SANDAG)
- San Diego Unified Port District

## 5.6 Bibliography

1. XIV Ayuntamiento. *Plan de Activación Urbana*. Tijuana, B.C., 1994
2. California Department of Transportation (CALTRANS). *California State Highways Traffic Volumes, District 11, 1981-1993*.

3. ———. *Transportation Issues Along The California/Mexico International Border*. San Diego: California Department of Transportation, March 1993.
4. ———. *Otay Mesa Commercial Vehicle Enforcement Facility*. San Diego: California Department of Transportation, December 1993.
5. ———. *Improvement to State Route 905/Otay Mesa Road*. San Diego: California Department of Transportation, December 1993.
6. ———. *Traffic and Trade Flow Fact Sheet*. San Diego: California Department of Transportation, September 1993.
7. ———. *Summary of Legislative Proposals for the California/Mexican Border Region (San Diego County)*. San Diego: California Department of Transportation, January 1994.
8. ———. *Fact Sheet, State Route 125 (From I-905 to State Route 54)*. San Diego: California Department of Transportation, September 1993.
9. ———. *Carrizo Gorge Railroad Repair*. December 1993.
10. Carrier, Lynne. "Vargas Pushes 'NAFTA Train,'" *San Diego Daily Transcript*, 28 March 1994.
11. City of San Diego Planning Department and, Ayuntamiento de Tijuana Dirección de Planeación del Desarrollo Urbano y Ecología. *Existing Conditions, Trans-Border Airport Study Area*. San Diego, 1993.
12. Dirección de Planeación Urbana y Ecología. *Programa de Desarrollo Urbano del Centro de Población Tijuana*. Tijuana, B.C., 1994.
13. Gobierno del Estado de Baja California. *Plan Estatal de Desarrollo, 1990-1995*. Mexicali, 1990.
14. Instituto Nacional de Estadística, Geografía e Informática (INEGI) and Gobierno del Estado de Baja California. *Anuario Estadístico del Estado*. Mexicali, 1993.
15. ———. *Síntesis Geográfica de Baja California*. 1984
16. Metropolitan Transit Development Board (MTDB). *Metropolitan Transit Fact Sheet*. December 1993.
17. ———. *San Diego & Arizona Eastern Railway (SD&AE)*. San Diego.
18. ———. *Board of Director's Meeting Agenda*. 28 April 1994.
19. Nathanson, Charles. E. "10 Ground Rules for San Diegos Airport Debate," *San Diego Union Tribune*. 23 January 1994.
20. Phillips, Don. "SDIV: Fighting the Odds and the Elements," *Short Lines and Regionals*. February 1989.
21. San Diego Association of Governments (SANDAG). *1994 Regional Transportation Plan*. San Diego. February 1994.
22. ———. *Moving in the Fast Lane*. San Diego Association of Governments.
23. San Diego Dialogue, Binational Task Force on Economic Development and Transportation Infrastruc-

ture. *Planning for Prosperity in the San Diego/Baja California Region*. San Diego: Greater San Diego Chamber of Commerce, September 1993.

24. San Diego Dialogue. *San Diego's Airport Options*. San Diego, 1992.

25. San Diego Economic Development Corporation. *San Diego Book of Facts, 1993-1994*. San Diego, 1994.

26. ———, and Secretaría de Desarrollo Económico de Baja California. *The Bridge: Baja California Industrial Development Guide*. June 1994.

27. San Diego Transit Corporation. *San Diego Transit Corporation Summary*. March 1994.

28. San Diego Unified Port District. *Immediate Action Program, Lindbergh Field*. July 1994.

29. ———. *Tonnage Report, Fiscal Year 1992/1993*.

30. Secretaría de Turismo del Estado de Baja California. *Estadísticas de Turismo*. 4ta edición, 1993.

# CHAPTER 6: WATER, WASTE, AND POWER

by

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## 6.1 Water Delivery Systems

### 6.1.1 Description of the San Diego/Tijuana Systems

#### *Tijuana*

The Municipal Water Office (Comisión Estatal de Servicios Públicos de Tijuana—CESPT) is the administrator of water delivery in the Municipality of Tijuana. There are two distinct sources of water in the region: surface water and groundwater.

The region's surface water is partially supplied by the Abelardo Rodríguez Dam, and partially imported from the Colorado River. Currently, the Abelardo Rodríguez Dam has a volume of 137,900,000 cubic meters of water and an extraction capacity of 0.6 cubic meters per second. This source of supply is unreliable due to the dam's heavy dependence on unpredictable rainfall. The region is highly dependent on imported water from the Colorado River.

The region's groundwater is obtained through 47 wells located along the Tijuana River and Alamar River. These wells yield a total of 0.31 cubic meters per second.

The water supply in the Tijuana region does not meet demands by the population. Records show that 190,000 households have

running water and 15,386 do not. Most of the households that do not have water supply are located either on the hills or in the canyons, where the construction of a pipeline is both costly and difficult.

#### *San Diego*

More than 90 percent of the region's water supply is imported from Northern California and the Colorado River. The San Diego County Water Authority (CWA), the region's sole water wholesaler, is responsible for importing the water through the Metropolitan Water District. The CWA then turns around and sells the imported water to its 26 member agencies.

The recent drought has led to the adoption of regulations and restrictions on the use and delivery of water in the region. In addition, expected population growth will also lead to increasing demands for water in the region. The aging water delivery system and its vulnerability to earthquakes also pose threats to the water supply. Finally, increasing demands for water by the state of Arizona will eventually lead to the cutback of supplies from the Colorado River.

### 6.1.2 Current Actions and Ongoing Efforts

On the Tijuana side of the border, the "Tijuana I" project will construct new water



delivery and water storage systems in the region.

On the San Diego side of the border, several actions have been taken by CWA:

- **Capital improvement program:** Upgrading and expanding the capacity of the Authority's pipeline system, and protecting the Authority's pipelines where they cross the San Luis Rey River.
- **Emergency water storage:** Conducting full environmental and engineering reviews of five alternatives for increasing the amount of emergency water storage capacity in the county. They are Lake Wohlford, San Vicente, Guejito Valley, Moosa Canyon, and Pamo Valley.
- **Water Conservation:** Encouraging water-wise behavior as a way of life for county residents; permanent water-use reductions through such steps as installation of water efficient plumbing fixtures in homes and businesses, and increased use of drought tolerant landscaping.
- **Water reclamation:** Providing financial support for local reclamation programs.
- **Seawater Desalination:** Forming joint ventures with SDG&E in studying a joint desalination and power facility in Chula Vista.
- **Groundwater recovery:** Supporting programs to reclaim and reuse contaminated groundwater.
- **Public Education:** Classroom presentations, teacher training sessions, video and theatrical performances to large student assemblies.
- **Keeping track of legislation and other developments in Sacramento that affect the county's water supply.**

### 6.2.3 Policy Options

#### Tijuana

- Fulfill 95 percent of the region's water demand by 1995.

- Deliver running water to the region's 130 poor neighborhoods within the next three years.

#### San Diego

The general policy regarding water supply in the San Diego region is summarized by SANDAG in its *Regional Growth Management Strategy*, "Ensure a sufficient supply of water, and improve the quality of our coastal waters, bays, reservoirs, streams and groundwater." This statement is being conveyed into several specific policies that are being pursued by the CWA:

- Provide the residents, businesses, institutions, and agricultural uses in the region, a safe and reliable supply of water.
- Stabilize, or reduce, the annual per capita increases in water use through the implementation of various agenda.
- Strike for a goal of locally producing 100,000 acre feet of water per year by the year 2010.
- Individual member agencies of CWA should be able to operate without water service from the CWAs aqueducts for up to 10 consecutive days to allow for CWA aqueduct maintenance and short-term operational outages.
- Emergency water storage facilities should be provided south of major faultlines sufficient to meet a minimum of 75 percent of normal demands for the duration of expected aqueduct outages.
- Groundwater supplies should not be overdrafted in municipal or unincorporated areas.

## 6.2 Wastewater Treatment

### 6.2.1 Description and Introduction

#### Tijuana

The Municipal Water Office (CESPT) is the agency in charge of Tijuana's wastewater (sewerage) management. The agency treats

wastewater through a system of collection and pumping plants. Currently, there are three pumping plants and a total of 19 depots in the Tijuana region; but only 79 percent of these facilities are operating.

The City of Tijuana generates about 1,950 lps. (liters per second) of wastewater. However, the local sewage system only captures 1,470 lps. Of this amount, 950 liters are treated in the San Antonio del Mar plant, 500 liters are incorporated into the San Diego sewage system and are treated by the Point Loma water treatment plant, and the remaining 20 liters are released to a landfill near the middle of the Tijuana River.

Only 50.8 percent of Tijuana's households are served by the municipality's sewage system. This constitutes a total number of 96,464 drainage outlets. The remaining 49.2 percent of households are left out of the system.

### ***San Diego***

In San Diego, sewage treatment is managed by the Metropolitan Wastewater Department of the City of San Diego. The agency was formerly the Clean Water Program within the Water Utility Department of the City of San Diego, and became an official City of San Diego department on January 1, 1994. The department is responsible for operating the metropolitan sewerage system, implementing its upgrade and expansion to protect the ocean environment, adding capacity, and supplementing San Diego's limited water supply by reclaiming wastewater for beneficial reuse.

The system serves a population of 1.7 million at approximately 187 million gallons of waste flow per day. It is expected that by the year 2050, the system will have to provide treatment for an expected waste flow of 340 million gallons per day.

The Point Loma Wastewater Treatment Plant is located near the tip of Point Loma on the ocean side. It is the major facility where wastewater is treated at the advanced pri-

mary level and then carried in an existing ocean outfall pipe, approximately 4.5 miles offshore, where it is discharged at a maximum depth of 320 feet.

### **6.2.2 Transborder Impacts**

Tijuana sewage spills across the border have been a severe problem for South Bay communities in San Diego. According to *The San Diego Union Tribune* (July 15, 1994), Tijuana sewage has spilled north for more than half a century. During the 1980s, the burgeoning growth of population made the problem more severe than ever before; about 10 million gallons or more sewage spewed across the border daily. This spillage poses a threat to San Diego's farm lands, endangered plants and animals, and beaches. Under the request, and agreement between the City of San Diego and the U.S. Government, the San Diego metropolitan system began to receive, and partially treat, Tijuana sewage as early as 1965.

### **6.2.3 Current Actions and Ongoing Efforts**

#### ***Tijuana***

The region is on its way to building a network of 15 drains. This network will have a total length of 73,707 meters, and will include 4,937 drainage outlets.

#### ***San Diego***

The San Diego Metropolitan Wastewater Department is pursuing two important projects that will increase the region's water treatment capacity, produce reclaimed water for alternative uses, and process sewage residue (the biosolids) for agricultural uses. These two important projects are the North City Water Reclamation Plant and the Northern Sludge Processing Facility.

The North City Water Reclamation Plant, located on the east side of I-805, between Miramar Road and Eastgate Mall, is expected to

be in full operation by the summer of 1997. This plant is a wastewater treatment and water reclamation facility that will provide an initial capacity of 30 million gallons of reclaimed water per day. The Northern Sludge Processing Facility will process the biosolids from the wastewater treatment process, and the municipal solid waste (trash). The proposed location of the facility is on NAS Miramar land adjacent to the Miramar Landfill. Construction of the facility is scheduled to begin in late 1994, with completion scheduled for 1996.

#### 6.2.4 Binational Cooperation

On July 15, 1994, construction on a binational water treatment plant broke ground on the 26-acre parcel located at the corner of Dairy Mart and Monument roads in San Ysidro. This plant will consist of two facilities: a primary sewage treatment plant, expected to begin its operation in 1996 with a capacity of 25 million gallons per day; and a secondary treatment plant, to be put into operation by 1997. In addition, a 3.5-mile sewage discharge tunnel will be completed in 1998.

The purpose of the binational treatment plant is to treat raw Mexican sewage flowing into San Diego. The agency in charge of the project is the Comisión Internacional de Límites y Aguas (CILA), known in the United States as the International Boundary and Water Commission (IBWC). The total estimated cost of the project is \$338 million.

#### 6.2.5 Policy Options

The construction of a sewage system with the capacity to absorb all the waste generated by the city is a major priority in building the region's infrastructure.

The general policy of the sewage treatment in the greater San Diego area is to meet federal sewage treatment standards and to treat wastewater and its by-products as resources rather than waste.

## 6.3 Solid Waste Management

### 6.3.1 Introduction

Trash management is a serious problem in the Municipality of Tijuana due to lack of equipment and service coverage. The region generates an estimated 1,450 tons of trash daily. Of this 1,450 tons, 650 are household waste, 300 are commercial waste, and 500 industrial waste. There is only one landfill in the region. This landfill accommodates 80 percent of the city's waste, and is privately owned.

Solid waste management is a prominent issue in San Diego as well. The agency in charge is the Solid Waste Division of the County Department of Public Works. It is expected that the authority will be transferred to an independent agency in the near future. This new independent agency will take control of the landfill system.

According to sources from SANDAG's publication, the San Diego region generates about four million tons of trash per year; this number translates into one and a half ton per person each year. As the region's population grows rapidly, so will the trash it generates. It is forecast that by the year 2010, the volume of trash will be doubled. As the region runs out of landfill space, the cost of managing trash will increase dramatically.

### 6.3.2 Current Actions and Ongoing Efforts

The municipal government of Tijuana is proposing to improve the solid waste management system within the region. Their plan calls for investing in infrastructure and creating new landfills to satisfy the needs of the region. The plan also calls for increasing public awareness of ecological well being, and encouraging recycling. The maintenance and repair of 174 garbage trucks are also included in this plan.

San Diego has organized a policy task force and technical and citizens advisory

committees to identify the programs, facilities, and funding sources needed to meet the 25 percent and 50 percent recycling objectives set by the state of California. To achieve these objectives, the region is currently expanding its curbside pickup of recyclables from households; encouraging more recycling by businesses and industries; increasing the collection and composting of both household and nonresidential landscape cuttings; promoting the solid waste source reduction such as using less packing; generating demand for products using recycled materials; and increasing the level of public awareness on recycling, reuse, and source reduction.

### 6.3.3 Policy Options

Solid waste management in the San Diego region is dictated by the state of California's *California Integrated Waste Management Act of 1989 (AB 939)*. The objectives of this law are to:

- Have each city and county reduce and recycle 25 percent of the solid waste it generates by 1995, reaching 50 percent by the year 2000.
- Have all of the 18 cities and the county jointly identify and agree on the facilities needed to manage the region's solid waste for at least the next 15 years.

## 6.4 Hazardous Waste Management

In the Tijuana region, there is no site for toxic disposal. Companies are asked to return toxic by-products to countries where the preprocessed materials were purchased. Increasing enforcement of Mexico's environmental regulations has resulted in significantly less dumping of toxic material. The actual degree of compliance is still unknown, however.

The San Diego region generates about 135,000 tons of hazardous waste per year, or about 120 pounds per person. The disposal of the hazardous waste is much more diffi-

cult and costly than that of the nonhazardous waste. Over 90 percent of the region's hazardous waste is created by businesses, industries, and the military.

The region's hazardous waste management is governed by federal and state legislation, and by the San Diego County Hazardous Waste Management Plan. All of the federal, state, and local regulations require:

- Treatment of hazardous waste prior to disposal in "designated landfills."
- Reduction of hazardous waste generation by 30 percent through the substitution of nonhazardous chemicals and through more efficient industrial operations.
- Citing one (large size) to five (small size) hazardous waste facilities by the year 2000.

## 6.5 Power Generation Systems

### 6.5.1 Description of the Regional Systems

#### *Tijuana*

The agency in charge of the power supply for the Municipality of Tijuana, as well as for the country of Mexico, is the Comisión Federal de Electricidad, CFE (Federal Bureau of Electricity). Tijuana obtains its electric power from the thermoelectric plant of Rosarito. This plant has a power generating capacity of 685 megawatts.

There are 18 power substations and 73 power circuits in the region. The total number of electric transmitters, primary power lines, and secondary power lines in the region are 10,557 units, 2,022 Km., and 2,586 Km., respectively. The official figure of households that have power supply is 214,000, while 25,918 commercial businesses and 1,057 industrial business are also connected.

According to CFE, the demand for electricity in the region has increased 8.9 percent each year.

## San Diego

San Diego Gas and Electric is the main supplier of electricity and natural gas in the San Diego region. According to the SDG&E *Annual Report*, "It generates and purchases electric energy and distributes it to 1.1 million customers in San Diego County. It also purchases natural gas and distributes it to 690,000 customers in San Diego County." SDG&E owns two fossil fuel burning plants; Encina in Carlsbad which generates 921 megawatts, and South Bay in Chula Vista which produces 690 megawatts of electricity. These power plants are also equipped to burn natural gas. In terms of nuclear power, SDG&E owns 20 percent of the three units in the San Onofre Nuclear Generating Station. Competition, population growth, changes in interest and inflation rates, environmental and other laws, and the issues of regulation and deregulation are factors that affect the cost and the level of availability of power supply in the region .

### 6.5.2 Current Actions and Ongoing Efforts

Binationally, San Diego and Tijuana will benefit from the sharing of alternative forms of energy. The Tijuana side could export its excess electric energy to the United States (the San Diego region) while San Diego Gas & Electric supplies its counterpart in Tijuana the natural gas needed to generate electric power.

The proposed project "Vecinos" is a joint effort of SDG&E and the Southern California Gas Company to transport natural gas to the Mexican border. The two companies received approval from the Federal Energy Regulatory Commission (FERC) on August 6, 1993, to transfer to Baja California's Rosarito Power Plant up to 500 million cubic feet of natural gas per day. Rosarito's 600 megawatt fuel oil plant, which supplies most of Tijuana's electricity, is expected to burn natural gas in 1996. The Mexican government has yet to decide if they want SDG&E

and the Southern California Gas Company to follow through with the project.

### 6.5.3 Policy Options

In Tijuana, the CFE has designed a five year plan (1992-1997) to construct a second stage of the thermoelectric plant "Rosarito II" with a capacity of 160 megawatts.

Some of the major energy policies proposed by SANDAG for San Diego are:

- Capitalize on trends toward an increasingly competitive energy marketplace to minimize the region's energy cost.
- Provide ongoing support for cooperative regional energy planning and decision making.
- Meet the energy needs of the region with a diverse portfolio of resources, preferably local-based efficiency improvements and renewable resources.

## 6.6 Private and Public Agencies and Sources of Information

### Tijuana

- Comité de Planeación para el Desarrollo del Estado (COPLADE), Mexicali, Baja California
- Comité de Planeación para el Desarrollo Municipal (COPLADEM)
- Dirección de Planeación del Desarrollo Urbano y Ecología

### San Diego

- City of San Diego Water Utilities Department
- I Love a Clean San Diego (nonprofit environmental organization and library)
- San Diego Association of Governments (SANDAG)
- San Diego City Metropolitan Wastewater Department
- San Diego County Water Authority Library

- San Diego Gas & Electric (SDG&E)

## 6.7 Bibliography

### 6.7.1 Water Delivery Systems

1. City of San Diego, Water Conservation Program. *Water Conservation News*. Spring 1994.
2. City of San Diego, Water Utilities Department. *Pipeline*. Summer 1991.
3. Dirección de Planeación Urbana y Ecología. *Programa de Desarrollo Urbano del Centro de Población Tijuana*. Tijuana, 1994
4. Gobierno del Estado de Baja California. *Plan Estatal de Desarrollo, 1990-1995*. Mexicali, 1990.
5. Méndez Mungaray, Elizabeth. *La Distribución del Agua*. El Colegio de la Frontera Norte. Tijuana, 1990
6. San Diego Association of Governments. *Regional Growth Management Strategy*. San Diego, January 1993.
7. San Diego County Water Authority. *Water for Life*.
8. ———. *Capital Improvement Program*.
9. ———. *Why the Delta is Important to San Diego's Economy*. May 1994.
10. ———. *Fact Sheet, 1994-1995*.
11. ———. *Water Talk*. Winter 1994.
12. ———. *Emergency Water Storage Project, A Guide to the Project and its Environmental Review Process*.

### 6.7.2 Waste Disposal Systems

1. Balint, Kathryn. "Sierra Club Suit Muddies Treatment Plant Outlook," *The San Diego Union Tribune*, 15 July 1994.
2. ———. "Ground Broken for Plant to Treat Tijuana Overflow," *The San Diego Union Tribune*. 16 July 1994.
3. ———. "Plant Won't Keep Mexico's Sewage Off Beach," *The San Diego Union Tribune*. 5 July 1994.
4. Californias Against Waste (CAW). *Summary of 1994 Recycling and Solid Waste Legislation*. Sacramento: 19 July 1994.
5. California Waste Management Board. *California Laws Affecting Recycling*. 1 November 1989.
6. City of San Diego. *The City of San Diego Metropolitan Wastewater Department*. May 1994.
7. City of San Diego, Clean Water Program. *North City Water Reclamation Plant*. May 1993.
8. ———. *Point Loma Outfall Extension*. February 1993.
9. City of San Diego, Metropolitan Industrial Waste Program. *Guidance for Industrial Users*. San Diego: Rev. May 1992.
10. City of San Diego, Metropolitan Wastewater Department. *Answering Your Questions*.

11. ———. *Clean Water*. San Diego: April 1994.
12. ———. *The Benefits of Biosolids*.
13. ———. *Water Loop*. San Diego: Spring 1994.
14. Dirección de Planeación Urbana y Ecología. *Programa de Desarrollo Urbano del Centro de Población Tijuana*. Tijuana, 1994.
15. Gobierno del Estado de Baja California. *Plan Estatal de Desarrollo, 1990-1995*. Mexicali, 1990.
16. ———. *Tomo 1. 4to Informe de Gobierno*. Mexicali. 1 Octubre 1993.
17. Husted, Deniene. "Supervisors OK Makeup of New Trash-Disposal System," *Times Advocate*. 20 January 1994.
18. San Diego Association of Governments. *Regional Growth Management Strategy*. San Diego: January 1993.
19. San Diego County, Department of Public Works. *Mandatory Recycling Ordinance-Summary*. San Diego.
20. ———. *The Resource Recovery—Annual Report, FY 1991-92*. October 1992.
21. Sutherland, Billie. "Landfill Gas Profits Refuse to Expand." *San Diego Business Journal*. 31 January 1994.

### 6.7.3 Power Generation

1. Dirección de Planeación Urbana y Ecología. *Programa de Desarrollo Urbano del Centro de Población Tijuana*. Tijuana, 1994
2. San Diego Association of Governments. *Draft Regional Energy Plan*. July 1994.
3. San Diego Economic Development Corporation and Secretaría de Desarrollo Económico de Baja California. *The Bridge. Baja California Industrial Development Guide*. June 1994.
4. San Diego Gas & Electric. *10-K Annual Report 1993*. San Diego: SDG&E. 1993.
5. ———. *Project Vecinos Fact Sheet*. December 1993.

# CHAPTER 7: TOURISM

by

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## 7.1 Introduction

Better and more efficient transportation systems, new global communication systems, and a truly global economy are bringing even the most distant countries, cities, and towns together into a more integrated world some would call the "Global Village." One economic activity that is benefiting from global integration is tourism or the "visitor's industry." According to Earl H. Fry of *The San Diego Union Tribune*, international tourism is at a record high level; the number of tourists worldwide is estimated to be 476 million, who spent \$268 billion in 1992 (Fry, 1994).

Although international tourism is a large sector of the global economy, the visitor industry in cities such as San Diego and Tijuana also depend on domestic visitors (from their own country) and rely most heavily on visitors from within a fairly close proximity. In the case of San Diego and Tijuana, visitors from the southwestern United States and Baja California make up the majority of the total visitors to the region.

## 7.2 Size of the Tourism Sector

The tourism sector of the economies of San Diego and Tijuana can be defined as the economic entities that either cater to visitors di-

rectly, or that are related indirectly to the tourists' activities in the region. This ambiguity in the definition of the tourism industry may cause some businesses to underestimate its importance. For example, many small vendors and services may profit from tourist activities, even though the businesses do not directly cater to tourists. In order to remove the ambiguity surrounding the classification of the "tourism sector," it shall be defined as the entities that cater directly to visitors, such as hotels, restaurants, tour operators, retail stores, and transportation companies (CONVIS, 1994).

The tourism sector or visitor industry is the third largest industry in San Diego and brought in nearly \$3.5 billion in 1993. Revenues from visitors accounted for almost six percent of San Diego's gross regional product (GRP) and, thus, were third in size behind the \$15 billion manufacturing industry and the \$9 billion defense industry in total dollars brought into the local economy. Although the visitor industry brings in a large amount of revenue, it experienced losses in 1993 as was true in other San Diego economic sectors. Some of the blame may be due to the fact that 1992 was a very good year for the visitor industry because of three major events that were held in San Diego: Major League Baseball's All Star Game, the 1992 America's Cup, and the Volvo World Cup Equestrian Championship (San Diego

Chamber of Commerce, April 1994). Blame may also be placed on the lingering effects of the recession in California.

There are two different estimates of the number of visitors to San Diego for 1993 (excluding Mexicans who come to work or do business). According to the San Diego Convention and Visitors Bureau (CONVIS), there were 12.9 million overnight visitors in 1993. The second figure is more difficult to estimate, but according to CONVIS there were approximately 30 million total visitors to San Diego, including those visitors that drove to San Diego as a day trip only. According to Sal Giametta of CONVIS, the slower economy caused many visitors from the Los Angeles Basin to drive to San Diego to spend the day at one or more attractions, and to return in the same day rather than rent a hotel room and spend the night.

Tijuana has had an active visitor industry for many decades. Its proximity to the United States made it a popular spot for vacationing Americans (U.S.) in the 1920s. During the Prohibition Era of the 1920s and 1930s, dry mouthed Northerners crossed the border in search of a drink. Today, it is one of the most heavily crossed borders in the world, and hosts about 84 percent of the total tourist traffic to the state of Baja California (Secretaría de Turismo, 1994). In fact, Tijuana registered over 1.1 million "lodging" visitors in 1991, closely behind Mexico City, Guadalajara, Cancún and Puerto Vallarta (COPLADEM, 1993). These visitors were important to Tijuana's economy, according to the economic census of 1988, as tourist activity generated 10.8 percent of employment in the service sector and 36 percent of that sector's total revenue (Secretaría de Desarrollo Económico, 1993).

The sectors most influenced by tourism in Tijuana are quite similar to those affected in San Diego, including hotel/motel, restaurant, and taxis. However, because the average tourist only stays in Tijuana for about seven hours (Secretaría de Turismo, 1994)

some sectors are more strongly affected than others. As Tijuana tourists are attracted principally by the desire for diversion and shopping, businesses such as hotels and rental car companies benefit the least while retail stores are one of the greatest beneficiaries. Restaurants and tertiary businesses such as street vendors and pharmacies also benefit from relatively wealthy tourists who drop an average of \$36.89 per person each visit (Comité de Turismo, 1994). Since the majority of visitors are from California (75.80%) with only a small percentage (7.63) flying in from the rest of the world (a third of these from Germany and a third from England) the airline and related industries benefit less.

## 7.3 Visitor Industry Issues

### 7.3.1 Popular Attractions

San Diego County has many different attractions and activities to entertain and educate the visitor. Although the climate and recreational activities associated with the beaches (surfing, swimming, sunbathing, relaxing) help to lure visitors to San Diego, most who come are attracted by conventions and four major attractions.

Conventions are important to San Diego because convention delegates make up approximately 35 percent of the total number of visitors and they spend approximately 50 percent of all visitor dollars. In fact, conventions are considered so important to San Diego that the San Diego Convention and Visitors Bureau spends most of its time and energy trying to convince convention organizers to have them in San Diego. CONVIS cooperates in Mexico with the Comité de Turismo y Convenciones (COTUCO) and it sends representatives to the United Kingdom, Germany, and Japan in order to sell their cities as good convention sites. Currently, CONVIS is booking conventions through the year 2011 (CONVIS, 1994).



In addition to conventions, there are four attractions in San Diego county that receive the most visitors:

- Old Town San Diego State Historic Park
- Sea World of California
- The San Diego Zoo
- The San Diego Wild Animal Park

Each attraction is family oriented and has educational exhibits as well as entertainment for all ages (Beel, 1993).

The majority of tourists in Tijuana visit the stores and restaurants downtown and along the Avenida Revolución. There, and in the Zona Río, one can find a variety of products including perfume, European clothing, electronic goods, and Mexican artisanry. Restaurants and clubs such as the Baby Rock discotheque and the Guadalajara Grill are popular attractions as are the Jai Alai Palace and the costly, but unique, museum of miniature Mexican buildings and historical sites, Mexitlán. The bullfighting ring and the sports book, Calientes, offer excitement while the Tijuana Cultural Center offers history, art, and an OMNIMAX theater.

### 7.3.2 Obstacles to Attracting Tourists

Although San Diego continues to attract an increasing number of tourists, there are some obstacles to its rate of growth. Sal Giametta, of CONVIS, says that the three main obstacles for San Diego are:

- The lack of an airport with capacity for direct international flights;
- The lack of infrastructure at the border;
- Visitor perceptions of safety.

Because Lindbergh Field is inadequate for international flights, most international passengers use Los Angeles International Airport (LAX). This deters many potential travelers to San Diego due to the distance between the two cities and Los Angeles' current reputation for violence (CONVIS, 1994).

The lack of infrastructure at the border is a second major obstacle. San Diego is affected as it places obstacles in the way of Mexican tourists and hinders the marketing of Tijuana as another reason to visit San Diego. More crossings are needed, along with easier access, more open gates, and better staffing. The long waits at the border prevent people from crossing more frequently, as many feel the wait and the hassles are just not worth the trouble. In addition to limited access and slow crossing times, the aesthetically unpleasant nature of the border area and dour border guards turn people off (CONVIS, 1994).

The last major problem for attracting more tourists to San Diego is crime. San Diego is the sixth largest city in the United States and along with most other major U.S. cities, it has a high crime rate. So far, visitors have not been singled out as special targets by criminals, but if this were to happen, it could be devastating to the visitor industry. This was the case in Florida recently when German tourists were the victims of violent crimes. After the incidents, many travelers chose other destinations, such as San Diego, and avoided Florida. Although the threat of crime is always present, and visitor safety is a major concern, there is no special program to protect tourists.

Tijuana has a number of obstacles to the promotion of tourism, some of which it shares with San Diego. For instance, due to prevailing ocean currents, marine pollution affects the beaches of both cities. San Diego recently earned the dubious distinction of having the highest number of beach closings of any city in the U.S. last year.

Crime is also a concern both cities share. While San Diego prefers to control the damage to the city's image after an incident, the Tijuana police department has a separate *Policía Turística* that covers the heavy tourist areas of Avenida Revolución and Zona del Río (COPLADEM, 1993). The Tijuana police department plans to continue the high visibil-

ity of officers in these areas, including bicycle patrols.

An intangible obstacle unique to Tijuana is the negative stereotype visitors have of the area. Recent events (Colosio assassination, shootouts over drugs, the assassination of the chief of police, and police corruption) have caused people to question their security. This negative image is in addition to the negative stereotype many U.S. citizens have about sanitation and health issues. For example, two of the most commonly asked questions of CONVIS by prospective visitors to Tijuana are: Is it safe to eat in Tijuana restaurants? Is it safe to shop there? Misconceptions such as these need to be remedied, particularly if Tijuana hopes to capture more overnight visitors. Interestingly, one of the highest priorities for improving tourism, spelled out by the Subcomité Sectorial de Turismo in their planning strategy for 1992-1995, was to change the bad image of the state.

## 7.4 Levels of Cooperation

### 7.4.1 Intra-city

The visitor industry is one of the only private sectors in San Diego that has developed a workable private-public relationship with various government agencies. This relationship can be advantageous for both the private sector and government. One example of this relationship is the cooperation between the California State Parks and private vendors found at Old Town San Diego State Historic Park. At this state park, there is an area called Bazaar del Mundo, which features many different stores and restaurants that specialize in Latin American artisanry and Mexican cuisine. Although the park and Bazaar Del Mundo are owned by the state of California, the state government leases the space to the private vendors. Both sides gain from this cooperation since the vendors get business from the tourists, and people who go to the Bazaar to shop or eat, may also visit

the park. There are many other examples of cooperation between different government agencies and the private sector, such as San Diego City-owned Mission Bay which has private hotels, city information centers that advertise for private entities, and so forth.

Because Mexico's economic history is more interventionist and because tourism is a substantial part of Baja California's economy, the state government supports a variety of investment activities and actively helps private firms, both foreign and domestic, to invest in tourism related businesses (Secretaría de Desarrollo Económico, 1993). In 1989, the Office of Tourism Investment in the Secretariat of Tourism (Dirección de Fomento e Inversión de la Secretaría de Turismo) was created to help regulate and organize new development and also to help cut through the bureaucracy involved in new development projects. In line with national foreign investment policies, the government of the state of Baja California is seeking to promote the environmentally sound development of its tourism infrastructure. The new spirit of cooperation among federal, state, and municipal authorities, as well as foreign and national investors, has created a highly favorable climate for this venture (Secretaría de Desarrollo Económico, 1993).

### 7.4.2 Binational Cooperation

San Diego and Tijuana have cooperated for many years in the development of their respective tourism industries. These efforts are mainly between private entities rather than between governments. One example is the relationship between the San Diego Convention and Visitors Bureau (CONVIS) and their sister group in Baja, Comité de Turismo Y Convenciones de Tijuana (COTUCO). Both are private organizations, although COTUCO does receive some funding from the municipal government of Tijuana. One way in which these organizations cooperate is by traveling together to areas targeted as potential visitor and convention markets. The or-

ganizations send representatives to the United Kingdom, Germany, and Japan where they try to sell the idea of San Diego/Tijuana as an ideal place to vacation or hold conventions. Representatives from both organizations promote not only their own county or municipio, but also their neighbor's region. This strengthens the marketing effort since San Diego and Tijuana represent two different cultures, with different types of attractions, and different cuisine. Both organizations feel it is advantageous to promote their close proximity to a totally different country and culture. Although this cooperation exists, there is also a feeling of competition between the two because both sides want their city to be the primary destination of the visitors (CONVIS, 1994).

## 7.5 Current Activities and Policy Options

### 7.5.1 San Diego

The San Diego Convention and Visitors Bureau was started 40 years ago as a private nonprofit organization for the sole purpose of promoting tourism and conventions in the region. Their main activity is promoting San Diego as a desirable destination. Eighty percent of their staff is geared toward marketing San Diego to external visitors. Some of their ongoing efforts include:

- Promotional offices in cities like Minneapolis and Chicago.
- Infomercials on television emphasizing the cultural diversity, weather, and attractions.
- Local hotel promotion in foreign countries using hotel personnel.

One of CONVIS' major new marketing strategies is to change San Diego's image of "sand, sea, and surf." Their research found that most tourists are traveling for different reasons than before, and that many people want an enriching, interactive experience at their destination. There is also an effort by CONVIS to get the San Diego Convention Center enlarged in order to attract larger

conventions in the future; and with NAFTA making it easier to interact on both sides of the border, organizations from both countries will have more opportunities to come together.

Policymakers are also studying some controversial proposals, including a possible new international airport at Mira Mar Naval Air Station and the possibility of constructing a binational trolley that would travel from San Diego into Tijuana.

### 7.5.2 Tijuana

Tijuana's Secretaría de Turismo has a number of new policy options to supplement their ongoing promotional efforts. For example, they plan to improve tourist infrastructure including building bathrooms, fenced parking lots, and small information booths on the way to tourist destinations such as Rosarito and Playas de Tijuana. There are plans to build marinas and golf courses to attract tourists' dollars.

Tijuana and other Baja California municipalities want to increase the duration of visitor stays to more than its current seven hours. Like San Diego, Tijuana also wants to improve the image of their city so that it is not viewed negatively. Guillermo Salomón Miranda, Director of Secretaría de Seguridad Pública Municipal, plans to implement a program to incorporate police officers on bicycles on Avenida Revolución and Zona Río. He also plans to utilize bilingual police in the principal tourist areas so that tourists will feel more at ease.

## 7.6 Bibliography

1. Beel Susan. "Largest Area Tourists Attractions," *San Diego Business Journal*. 12 July 1993.
2. Bringas, Nora L. and Jorge Carrillo V. (eds). *Grupos de Visitantes y Actividades Turísticas en Tijuana*. Tijuana: El Colegio de la Frontera Norte, 1991.
3. Comité de Planeación Para el Desarrollo Municipal (COPLADEM). *Plan de Desarrollo Municipal, 1993-1995*. Tijuana, 1993.

4. Comité de Planeación Para el Desarrollo (COPLADE), Sub-Comité Sectorial de Turismo. *Planeación Estratégica*. Mexicali. Agosto 1994.
5. Comité de Turismo y Convenciones de Tijuana (COTUCO). *Perfil Turista Extranjero*, 1993. Tijuana, 1993.
6. ———. *Perfil Turista Extranjero, Primavera 1994*. Tijuana, 1994.
7. Fry, Earl H. "Thinking Globally is Fruitful Locally," *The San Diego Union Tribune*. 3 July 1994.
8. Greater San Diego Chamber of Commerce. "San Diego's Visitor Industry is Region's Third Largest Industry," *Economic Bulletin*. Vol. 42, No. 4, 1994.
9. ———. "Visitor Industry," *Economic Bulletin*, Vol. 41, No. 4, 1994.
10. International Marketing/Promotion Associates, Inc. *Program of Public Relations and Media Coordination*. Prepared for Comité de Turismo y Convenciones de Rosarito Fondo Mixto. San Diego: IMPA, 1994.
11. Poder Ejecutivo Federal. *Programa Nacional de Turismo 1984-1988*. México, D.F.: Poder Ejecutivo Federal, 1984.
12. Secretaría de Desarrollo Económico. *Un Nuevo Horizonte*. Mexicali: Gobierno del Estado de Baja California, 1993.
13. Secretaría de Turismo de Baja California. *Perfil Turístico del Visitante Extranjero, Otoño de 1991*. Tijuana: Secretaría de Turismo Baja California, 1991.
14. ———. *The Official Guide to Tourism Services in Baja California, México*. San Diego: TCS Publishing Inc., 1993.
15. ———. *Estadísticas Turismo* (cuarta edición). Tijuana: Secretaría de Turismo de Baja California, 1994.
16. *San Diego Business Journal*. "1992 Visitor Industry Summary," *San Diego Business Journal*. 25 January 1993.
17. San Diego Convention and Visitors Bureau (CONVIS). *San Diego Convention & Visitor Bureau Profile*. San Diego: SANDAG, 1994a.
18. ———. *General Facts On San Diego Visitor Industry*. San Diego: SANDAG, 1994b.
19. San Diego Dialogue. *Who Crosses The Border: A View of the San Diego/Tijuana Metropolitan Region*. San Diego: Regents of the University of California, 1994.
20. San Diego Economic Development Corporation. "Quality of Life," *San Diego Book of Facts*. San Diego: SDEDC, 1993.
21. Sutherland, Billie. "Ray of Hope for Tourism, but Just a Small Ray," *San Diego Business Journal*. 3 January 1994.

# CHAPTER 8: HUMAN RESOURCES

by

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## 8.1 Introduction to Regional Labor Force Issues

The asymmetry of the San Diego and Tijuana economic environments means that fundamental human resource issues vary by location. North of the border, issues such as the school-to-work transition and the reintegration of highly skilled aerospace workers into the local economy are important. South of the border, high turnover rates in the maquiladora assembly industry, high rates of participation in the informal economy and consequent underemployment, and the influx of labor from the interior all stand out as important concerns. Even with these asymmetries, however, there are shared concerns. Among the problems faced by both metropolitan areas are the impacts of migration and questions about the most efficient way to upgrade labor skills in order to raise the regional standard of living.

## 8.2 The Labor Force by Sector of the Economy

The employed population in the municipality of Tijuana is estimated by the Mexican census to number 261,526. The distribution of the labor force is concentrated in commerce, with industry a distant second (see Table 1). The unemployment rate for Tijuana

in February 1994 was as low as 1.4 percent, implying that there is adequate demand for labor, if one believes the unemployment rate statistic.

San Diego's labor force, as of June 1994, was 1,194,600 and the unemployment rate was 7.4 percent. Greater detail is available on the distribution of employment by sector for the economy in San Diego. Table 2 shows the distribution of employment north of the border. Assuming that the designation for "Industry" in Tijuana includes manufacturing, construction, and the group composed of transportation, communications, and utilities, San Diego's share of employment in this sector is approximately half that of Tijuana's, or about 19.3 percent of the labor force.

**Table 1**  
**Tijuana Employment, 1990**

	Number	Percent
<b>Total Employment</b>	<b>261,526</b>	
Service/Commerce	147,706	56.5
Industry	99,486	38.0
Agriculture/Fishing/Mining	4,080	1.6
Not Specified	10,254	3.9

Source: Eleventh General Census of Population and Housing of the Republic of Mexico, 1990.

**Table 2**  
**San Diego Employment**  
**1992**

	Number	Percent
<b>Total Employment</b>	<b>1,178,958</b>	
Agriculture/Mining	18,604	1.6
Construction	58,231	4.9
Manufacturing	131,587	11.2
Trans./Comm./Utilities	37,830	3.2
Wholesale Trade	47,268	4.0
Retail Trade	194,156	16.5
Finance/Ins./Real Estate	73,881	6.3
Services	332,942	28.2
Government	179,200	15.2
Military	105,259	8.9

### 8.3 Measures of Human Capital

The population (1990) of Tijuana aged 15 years or older is 477,822. Of this group, 6.7 percent have had no schooling and another 15.5 percent did not complete grade school. Grade school was completed by 21.5 percent and 54.3 percent went beyond grade school (see Table 3).

**Table 3**  
**Education Levels of Tijuana**  
**Workers, 1988**

Education Level	All Workers		Maquila Workers	
	#	%	#	%
Elementary	107,500	41.	17,511	38.
w/Technical	1,281	0.5		
Secondary	67,971	26.	17,292	38.
w/Technical	10,854	4.	1,360	3.
Preparatory	26,344	10.	2,851	6.
Technical	3,445	1.	723	2.
Normal	4,252	2.		
Professional	23,530	9.	5,101	11.
Graduate	321	0.1		
No Schooling	12,635	5.	376	0.8
Not Available	5,345	2.	598	1.
<b>Total</b>	<b>263,478</b>		<b>45,812</b>	

**Table 4**  
**Education of San Diego**  
**Workers, 1990**

Educational Attainment	Number	Percent
Less Than High School	170,817	14.9
High School Graduate	235,945	20.6
Some College	331,406	28.9
College Graduate	409,202	35.7
<b>Total</b>	<b>1,147,370</b>	

By contrast, San Diego's average education goes beyond high school and almost 86 percent of the population graduated from high school. Of the employed population, 36 percent has at least a bachelor's degree, 29 percent has some college education, and 21 percent finished high school. Only 15 percent of the 170,817 employees have less than a high school education (see Table 4).

### 8.4 Migration

The issue of migration is important to both Tijuana and San Diego. Just over half the population of Tijuana is native born. According to the SANDAG publication *INFO* (May-June 1992), "Nearly 45 percent were born in other Mexican states. Nearly 20 percent of the population of Tijuana was living outside Baja California in 1985" (see Table 5).

**Table 5**  
**Immigration to Tijuana**

Population, 1990:	747,381
Living Outside BC in 1985:	144,615
Percent:	19.30

On the other hand, "Mexico accounted for, by far, the most immigrants to San Diego since 1986. San Diego accounted for 6.0 percent of all new Mexican immigrants to the U.S. in 1992" (Greater San Diego Chamber of Commerce, March 1994). Furthermore, San Diego accounted for the largest number of

legal entries into the country and is the site of a very large share of illegal entries as well. The Border Patrol makes approximately 50,000 apprehensions of undocumented immigrants monthly in the San Diego sector (see Table 6), and estimates that between 50,000 and 100,000 more escape detection each month.

**Table 6**  
**Border Crossings - Pacific**  
**Ocean to Otay Mountains**  
**August 1992**

	Number	Percent
<b>Crossings Resulting in:</b>		
Legal Admissions to U.S.	5,931,791	97.46
Denied Admission or Arrested at Port of Entry	9,056	0.15
Apprehended by Border Patrol	48,381	0.79
Estimated Illegal Crossings Escaping Detection	96,762	1.60
<b>Total</b>	<b>6,085,990</b>	<b>100.00</b>

According to the Immigration and Naturalization Service (INS), there were nearly 56 million border crossings recorded in San Diego during 1992, making the San Diego-Tijuana border crossing the busiest in the world (Greater San Diego Chamber of Commerce, March 1994). San Diego Dialogue reports that 96 percent of all the crossings at the San Ysidro and Otay Mesa border were made by residents of San Diego and Tijuana (San Diego Dialogue, 1994). Forty percent of the people who cross to the United States do so for shopping and social reasons, and 24 percent cross because of work related reasons. These workers earn an estimated \$650 million a year in wage and salary income. Tijuana residents spend an estimated 2.8 billion dollars in the United States annually and are an important asset to the San Diego economy, paying over \$100 million a year in sales taxes on their goods purchased in San Diego.

Another aspect of migration that affects the San Diego-Tijuana region is the issue of local and state services used by undocumented workers that migrate to San Diego. The Governor of California, Pete Wilson, stated that "...children born from illegal aliens will absorb \$3 billion in state and local services in four programs this year: about \$1.1 billion in education, \$950 million in health care, and nearly \$500 million each in welfare and prison costs" (*The Los Angeles Times*, November 21, 1993). Many critics say that Wilson's numbers ignore the economic activity and tax revenue generated by illegal immigrants and that these immigrants take low wage personal service jobs, agricultural jobs, and tourism jobs, which are vital to the U.S. economy.

There are numerous contending studies of the local costs and benefits that undocumented migrants generate. Most studies have tried to determine whether costs or benefits are greater. Generally speaking, these studies are suspect due to the methodological difficulties of such measurements given that we do not know accurately the number of undocumented persons living in San Diego County. These studies are also suspect due to the fact that they usually produce a result that is consistent with the political orientation of the persons or groups conducting the study. In any case, much of the debate over undocumented migrants in California and San Diego is a result of the internal political dynamics of the regions and has little to do with economic impacts. This is not to deny that economic impacts exist. Historically, the problem has often been described in terms of the benefits that are accrued by the nation as a whole, versus the costs that are incurred by the local areas where undocumented immigrants reside. The lack of one-to-one correspondence in the diffusion of costs and benefits generates conflict between local areas and states on the one hand and the federal government on the other. As well, there is suspicion in California and elsewhere that Mexican authorities

are not entirely interested in solving the problem of migration since it acts as a sort of safety valve to reduce political tension inside Mexico.

From Mexico's point of view, there is great concern about the treatment of its citizens when they enter the United States, legally or otherwise. Also, there is frustration over the apparent failure of political forces in California and elsewhere to openly acknowledge the fact that Mexican labor is wanted and needed by the economy of the United States. A frank admission of the role of Mexican labor in the proper functioning of the San Diego and California economies would probably help reduce bilateral tensions and to begin a dialogue over solutions.

As noted above, the vast majority of people crossing the border do so legally. A major group of people who regularly cross are often referred to as "transmigrants." This group gets the best of both worlds by working in San Diego and living in Tijuana, thereby increasing their standard of living beyond what it could be under alternative arrangements. We have four groups of these people which are composed as follows:

- U.S. citizens residing in Tijuana. This group is composed mainly of U.S. citizens with Mexican ancestry; in some cases these citizens have never lived in the United States.
- Mexican "commuters" with a special migratory situation. Even though they are migrants to the United States, they have the right to reside in Mexico.
- Mexicans that have a permit to visit the United States for a limited and specified time. Tourists, students or business people are awarded a local nonresidence passport, which does not include the right to work in the U.S.
- The rest of the transmigrants, being the minority, cross the border without a permit.

## 8.5 Tijuana: Maquila Turnover Rates

"Of Mexico's nearly 1,800 maquiladoras, about 90 percent are totally or majority-owned by U.S.-based corporations" (*San Diego Business Journal*, 1990). However, in the mid-1980s Japan started investing heavily in the maquiladora industry, and is now the second largest foreign investor in the industry. "San Diego benefits from the maquiladora industry in many respects. The first reason is the accessibility of being next door. There is more control. Secondly, they allow U.S. companies significant savings in production costs" (*Economic Bulletin*, August 1994). In the city of Tijuana, there are approximately 529 maquiladoras, with 81,599 employees. Tijuana contains 24 percent of the maquiladoras nationwide. Furthermore, according to Migdal (1992), "...42 percent of those plants have affiliate companies in San Diego."

A major problem of the maquiladora industry is the high labor turnover. One of the reasons is that the firms are mostly owned by foreign investors. Therefore, the managers are confronted with a culture that works differently than their own. According to Stephen Jenner, of SDSU's Institute for Regional Studies of the Californias, up to a third of the variations in management style within maquilas could be accounted for by national or cultural influences. Americans and Mexicans work differently, with the former tending towards a job orientation and the latter more relationship oriented. Therefore, it is more important in the context of maquilas to build good relationships.

A study by Jorge Carrillo and Jorge Santibañez offers the following specific reasons for the high labor turnover in the maquiladoras:

- Low wages and poor benefits.
- Work is boring and tiresome.
- There is a high demand for workers relative to the supply.



- Workers are often migrants and sometimes they do not find affordable housing.
- Workers are not taken into consideration when decisions are made.
- The environment in the workplace is unpleasant.

Professor Gustavo Muñoz of UABC gives the following suggestions for reducing labor turnover in the maquilas:

- Keep workers informed of their benefits.
- Be informed of the relationships between workers and supervisors.
- Be concerned about working conditions.
- Give raises when warranted, either in position or salary.
- Inform the employee of the functions of the maquila.
- Build employee trust in the company and its leaders.
- Give new employees an orientation.
- Invest in better training programs for workers and supervisors.
- Insure that wages and benefits are competitive.
- Maximize the employees talent and potential.

High labor turnover results in unnecessary expenditures for the companies, particularly in the area of labor training expenses. As a result, it is difficult to build an experienced labor force. As managers become more aware of the problems, however, there are indications that the situation is improving. In 1980, the monthly labor turnover was 20 percent while today the monthly turnover is 9.54 percent.

## 8.6 Issues in San Diego

### 8.6.1 Recession and Defense Conversion

San Diego's economy relies greatly on the military and defense contracts. World War II transformed the small town into a large city

as "...manufacturing businesses geared up for wartime production, and tens of thousands of people moved into the area in search of economic opportunities" (*INFO*, January-February 1994). The region grew at a rapid average annual rate of 8.7 percent between 1950 and 1960. Over the past 25 years, the region's average annual population growth rate was nearly twice that of the state and four times the nation's. The decade of the eighties was characterized by expanded job opportunities and an average annual population increase of almost 65,000 people. Between 1980 and 1990, the region's population increased 34 percent and in 1990 reached 2.5 million. The current recession and military cutbacks have severely reduced the region's ability to create new jobs, are reducing the size of the manufacturing sector, and are creating a lower standard of living for more residents (*INFO*, January-February 1994).

For the last 50 years, much of the manufacturing employment base was related to defense industry expenditures. Military payroll jobs and jobs supporting military procurement contracts brought millions of dollars into the region. After World War II, aircraft industry employment dropped 90 percent, but during the Korean War the region's manufacturing base expanded again. The Vietnam War caused the region to experience a significant boom in aerospace, and lastly, the Cold War buildup of the 1980s dramatically increased regional employment in defense related industries.

### 8.6.2 Projections of Job Growth

After relying on federal defense dollars for over half a century, the region experienced a significant loss of employment with defense cuts. More than 75,000 wage and salary jobs were lost between mid- 1990 and the end of 1993. Nearly one third of these were higher paying manufacturing related jobs. SANDAG estimates that only about ten percent of all the jobs created through 2015 will be high paying jobs in the areas of construction,

manufacturing, transportation, communication, and utilities. What is extremely devastating is that 60 percent will be in the lower paying sectors of services, wholesale trade, and retail trade. Chart 1 shows the SANDAG projections (*INFO*, January-February 1994).

Another set of job growth forecasts was accomplished through the California Cooperative Occupational Information System (CCOIS) by the State of California Employment Development Department (EDD). Their projection is for a seven year period, from 1990 to 1997. According to these projections, there will be a 10.7 percent growth in employment, equivalent to roughly 106,200 jobs. However, this amount represents only one-fourth of the percentage growth that followed the 1981-1982 recession. For the seven year period, 1983-1990, the number of jobs created was 315,100. The EDD forecasts that the manufacturing sector will experience a decrease of 0.3 percent. Most of the reduction will occur in the high-tech/aerospace firms, primary fabricated metals, and the like. The greatest employment growth will be in the service sector, with an estimated increase of 18.6 percent. This trend will be followed by the retail and wholesale trade, with a 16.8

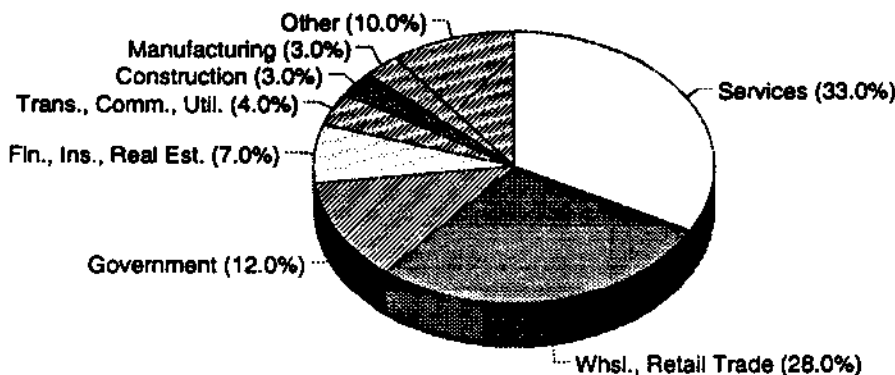
percent increase. The smallest percentage growth will be experienced in the transportation and public utilities industry division with a 3.8 percent.

Forecasts are always subject to being proven wrong. Still, there is a remarkable degree of agreement between the SANDAG and EDD forecasts. Clearly, a major task of the San Diego region is to restore job growth in its high wage sectors. A significant challenge is for the region to find productive uses for the work force that has been laid off as a result of the end of the Cold War. A major consideration for both Tijuana and San Diego is to establish institutions for altering and raising the skills of the labor force. SANDAG has proposed to accomplish these goals through two general courses of action:

- Ensure a more productive labor force by properly educating, training, and preparing new entrants into the work force.
- Encourage the expansion and retention of high value-added jobs in industries that require an educated, trained, and skilled labor force.

### Chart 1

## Job Creation in San Diego, 1990-2015



different from each other, however, and it is worth discussing the basics.

### 8.7.1 Secondary and Higher Education in Tijuana

The following types of institutions are included in the discussion of Tijuana: universities (public or private), high schools, and junior highs with training programs. They are all interrelated with the secretariat of labor and social planning, and industrial, commercial, and services associations.

#### *Universities*

In Tijuana there are five main universities:

- Universidad Autónoma de Baja California (UABC)
- Instituto Tecnológico Regional de Tijuana (ITRT)
- Centro de Enseñanza Técnica y Superior (CETYS)
- Universidad Iberoamericana (IBERO)
- El Colegio de la Frontera Norte (COLEF)

UABC is a state university. The careers offered at the Tijuana campus include tourism, health, business administration, accounting, humanities, biochemistry, among others. In addition, there are campuses in Mexicali, Tecate, and Ensenada. ITRT is a federal institution, offering careers in engineering and architecture. They are developing administrative careers. CETYS is a private institution, which is self-supportive through tuition fees and donations from the private sector. The careers offered focus on computer-oriented business administration, engineering, and behavioral sciences. IBERO is also a private institution whose funding is similar to CETYS. It is directed by Jesuits. The careers offered are focused on design and international commerce. COLEF is a federal institution which admits only postgraduate students. It has master's programs in economics, demography, and history, and has begun a doctorate in social science. The faculty and researchers

at COLEF are a source of much of the best information on regional forces and trends.

#### *High Schools*

High schools in Tijuana give students the opportunity to obtain a high school degree and to become a professional technician. All of the high schools receive federal funds.

CONALEP has two locations in Tijuana and approximately 1,200 students. There are about 200 students that work full-time and attend classes during the weekend. The courses offered are business administration, tourism, culinary arts, carpentry, welding, and other trades. Students have the option of obtaining a high school degree or of becoming a professional technician. It is commonplace to have a new career offered at the beginning of a new semester since the school tries to respond to solicitations from the private sector for particular types of technicians. Training courses are also offered by the state government at these locations. The courses usually take 30, 60, or 90 days and are free. Forty-five percent of the people who take the courses are migrants. CECATI is a center that offers training which is determined by inquiring what fields businesses are looking for. CEBATYS has six locations and approximately 4,000 students. The only way in which it differs from CONALEP is that it requires that you receive your high school degree. CETYS has two locations. It specializes in electronics.

#### *Junior Highs*

There are two different programs in junior high schools, the specialized and the general. There are two schools with branch campuses. Both schools are public and are funded by the federal government. Within the specialized fields, there are six locations and 7,000 students. The courses offered range from agriculture and electronics to auto mechanics. Training is for eight hours per week for three years. The general pro-

gram offers basically the same fields except that their training hours are given for three hours per week. There are six locations and the student body is 6,800. Students in junior high usually start working at the age of 16, most often because their income is greatly needed at home.

## 8.7.2 Higher Education and Job Training in San Diego

### *Higher Education*

San Diego has an extensive educational system. It includes 36 colleges and universities, five community college districts, and 250 private post-secondary schools.

During the fiscal year of 1992 the state of California designated over \$440 million in direct support for higher education. This was supplemented by the state lottery revenues, private foundations, and government research grants.

Along with the six universities in the San Diego region, the community colleges enroll over 150,000 full and part-time students. Four-year and graduate institutions include:

- University of California, San Diego (UCSD)
- San Diego State University (SDSU)
- University of San Diego (USD)
- California State University, San Marcos (CSUSM)
- United States International University (USIU)
- National University
- Point Loma Nazarene College
- California Western School of Law
- California School of Professional Psychology

UCSD has five colleges with undergraduate and graduate programs across a wide array of disciplines. UCSD is internationally recognized for excellence in research and education. SDSU had an enrollment of 30,369

full- and part-time students in 1992, making it the largest of the universities within its system. The campus has eight colleges and over 76 fields of study. California State University, San Marcos is the newest campus in the California State University system. It had an enrollment of 2,000 in the fall of 1993. CSUSM is currently trying to expand its offering and the size of its student body, but is experiencing some difficulty in growing as a result of the California recession and the poor condition of the state budget. The University of San Diego (USD) is a private Roman Catholic institution. Its colleges include the College of Arts and Sciences, School of Education, and the School of Nursing and Allied Health Services. Its enrollment for the fall of 1992 was of 6,083 students. United States International University (USIU) has schools of business and management, education, human behavior, performing and visual arts, international and intercultural studies, English, and math. It has an enrollment of 1,148. National University has nine campuses throughout San Diego. In the fall of 1993 it had a total enrollment of 8,788. This independent nonprofit institution offers associate, bachelor, master, and doctorate degrees in computer science and technical studies, education, management and business, and law. Point Loma Nazarene College (PLNC) is a liberal arts college with an enrollment of 2,400 students in 65 majors. California Western School of Law offers a jurisdoctor degree enrolling approximately 600 students each year. California School of Professional Psychology (CSPP) offers a doctorate in clinical psychology and had an enrollment of 600 during the fall of 1992.

In addition to the above universities, San Diego has seven community colleges, each of which offer a two year associate of arts degree and numerous certification programs in technical and paraprofessional fields. The community colleges enrolled 117,925 students in 1992. These institutions fill an important gap in the link from high school to job site, and provide the means by which many

older students are enabled to seek retraining for new careers.

### **Job Training**

San Diego is faced with ways in which to retrain people affected by the defense cuts plus aid the rest of the unemployed population. The San Diego Consortium and Private Industry Council offers free job training and placement programs that are conducted by over 40 organizations located throughout San Diego County. These programs are open to San Diego residents who are unemployed, low income, or face serious barriers to employment such as having criminal records, being homeless, refugees, school dropouts, single parents, and so forth. The training programs include assessment, skills training, work preparedness training, and supportive services.

The impact of the end of the Cold War led to the creation of the San Diego Technology Council in February 1994 by Mayor Susan Golding. This council combines the resources of experts in areas of high technology, defense conversion, labor training, academia, finance, and world trade, to help laid off defense workers compete in the global economy. In addition, the following groups have programs to aid San Diego businesses and workers that were affected by the defense cuts:

- Center for Applied Competitive Technologies
- San Diego Supercomputer Center
- UCSD Extension and CONNECT
- Southwestern College Small Business Development and International Trade Center
- San Diego Economic Development Corporation
- Federal Lab Consortium
- California Small Business Assistance Network
- Regional Technology Alliance

The Center for Applied Competitive Technologies focuses on educational/training opportunities and technology transfer instruction to facilitate process improvements and advanced manufacturing technology needs. The San Diego Supercomputer Center assists in complex computational formulae, graphics, software development, and sophisticated visualization techniques. The UCSD/Extension and CONNECT assist in funding and marketing high tech companies, transferring technology from defense to commercial uses and courses in conversion management or computer, engineering, and environmental technologies. The Southwestern College Small Business Development and International Trade Center receives funds from the U.S. Small Business Administration to help small businesses overcome technical problems of administration and marketing. San Diego Economic Development Corporation assists in business expansion, site location, and permits assistance for local high technology-oriented firms. The Federal Lab Consortium assists in inquiries about technology licenses and related agreements. The California Small Business Assistance Network assists in on-line information and databases on sources of capital for small to medium defense-dependent companies. Furthermore, it aids in high technology start-up companies interested in defense conversion, marketing assistance, distribution channels and business and technology information nationwide. The Regional Technology Alliance assists firms in the location of available defense conversion funds.

## **8.8 Bibliography**

1. California Employment Development Department, Labor Market Information Division. *Civilian Labor Force, Employment, and Unemployment*. 1994.
2. ———. *Projections of Employment 1990-1995 by Industry and Occupation*. Employment Development Department. 1993.
3. Carrillo, Jorge V. and Santibañez, Jorge R. *Rotación de Personal en las Maquiladoras de Exportación en Tijuana*. El Colegio de la Frontera (COLEF), 1993.

4. COPLADE. *Plan Emergente del Empleo e Inversión. Pacto por Baja California*. 9 de Mayo de 1994.
5. Dirección del Trabajo y Previsión Social. *Perfil Laboral: Revista de la Dirección del Trabajo y Previsión Social del Estado de Baja California*. Año IV, Núm. 14, 25 de Agosto de 1993.
6. Greater San Diego Chamber of Commerce. *Economic Bulletin*. March 1994.
7. ———. *Economic Bulletin*. Vol. 42, No. 8, August 1994.
8. INEGI. *Avance de Información Económica*. Aguascalientes, 1994.
9. ———. *Información Estadística del Sector Salud y Seguridad Social*. Cuaderno Núm. 10, Aguascalientes, 1994.
10. ———. *Resultados Definitivos—XI Censo General de Población y Vivienda*. INEGI, Mexicali, 1990.
11. *The Los Angeles Times*. "Data Sheds Heat, Little Light, on Immigration Debate," 21 November 1993.
12. Migdal, Andrea E. *Nafta and San Diego Impact of the North American Free Trade Agreement on San Diego Business*. Southwestern College, 1992.
13. SANDAG/Sourcepoint. "Baja California Demographic Profile," *INFO*. May-June 1992.
14. ———. "1990 Census Detailed Characteristics," *INFO*. July-August 1992.
15. ———. "Trends and Comparisons in Economic Indicators," *INFO*. May-June, 1993.
16. ———. "January 1, 1993 Population and Housing Estimates," *INFO*. July-August 1993.
17. ———. "Employment Average Wage/ Salary and Payroll by Industry," *INFO*. September-October 1993.
18. ———. "A look At San Diego's Future. The Series 8 Regionwide 1 Forecast 1900-2015," *INFO*. January-February 1994.
19. ———. "Regional Employment Inventory Annual Change in Population and Employment. San Diego Region," *INFO*. March-April 1994.
20. SANDAG and Secretaría de Desarrollo Económico Baja California. *The Bridge. Baja California Regional Industrial Development Guide*. Second Edition. June 1992.
21. *San Diego Business Journal*. "Maquiladora. A guide to Binational Manufacturing in the San Diego-Tijuana Mexico Area." 1990-1991. San Diego.
22. The San Diego Dialogue. *Who Crosses The Border: A View of the San Diego/Tijuana Metropolitan Region*. Regents of the University of California. 1994.
23. San Diego Economic Development Corporation. *San Diego Book of Facts*. 1993-1994 Edition.
24. U.S. Department of Commerce. *Census of Population and Housing 1990*. Bureau of the Census, Summary Tape File 3A.

# CHAPTER 9: MANUFACTURING

*by*

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## **9.1 Shared Issues in Tijuana and San Diego**

### **9.1.1 Water Supply**

San Diego and Tijuana share a semi-arid climate with limited local water resources. Both are critically dependent upon water imported from outside the region. Less than five percent of San Diego's water is obtained locally, while more than 95 percent must be imported from as far away as 600 miles. Water transported to San Diego is also relatively expensive due to the added cost of pumping it. Imported water costs San Diego between \$300 and \$500 per acre foot. In other California counties such as nearby Imperial County, water costs only \$40 per acre foot. In the Central Valley, Federal government subsidies reduce costs to as little as \$10 per acre foot.

### **9.1.2 Hazardous Waste**

There are three ways to dispose of hazardous waste along the northern border of Mexico: bury it in the ground; recycle it; or export it to the United States, as in the case of maquiladoras. Some hazardous waste, such as solvents, are recycled by local, regional, and some national companies or by the maquiladora itself. Under the terms of the maquiladora scheme and Annex III of the Treaty of La Paz of 1983, all residual by-

products from raw materials exported by the U.S. to Mexican maquiladoras must be returned to the U.S. or recycled in Mexico. In the last few years, SEDESOL and the EPA have come across several cases concerning the illegal transport and storage of hazardous waste. Increased enforcement of the above mentioned rule has caused an enormous increase in the return to the United States of the hazardous wastes produced by U.S.-owned maquilas. By some estimates, between 1990 and 1993 waste return increased from less than 50 tons annually to more than 2,000 tons.

San Diego companies must export their hazardous waste outside of the county and even outside of the state. The production processes of the industries often result in by-products which are classified as either hazardous waste or low level radioactive waste. Although these by-products can be disposed of safely in the correct type of facility, they cannot be dumped in the region's existing landfills. The problems associated with hazardous and low radiation waste disposal are some of the biggest stumbling blocks to providing an environment suitable to attract high tech, high value added businesses which in turn create high paying jobs for the region's residents.

San Diego hospitals, clinics and biotech companies generate low level radioactive materials as part to their daily operations.

These businesses need a waste disposal site. Ward Valley is of critical importance since it is the only potential California site for storage of low level hazardous waste. Soon, companies will be forced to use multiple sites and costly on-site storage. If California does not permit a disposal site, biotech companies will find it more difficult to expand these kinds of operations in San Diego.

### 9.1.3 Bureaucracy and Regulations

Businesses in Tijuana and San Diego often identify government bureaucracy and regulations as an obstacle for doing business. To address this problem, agencies and organizations in San Diego and Tijuana have established "One Stop Shopping" support services to assist companies through bureaucratic and regulatory mazes.

Mexico has implemented a "one stop window" which was designed to help small companies by simplifying and in some cases eliminating bureaucratic hoop jumping. Utilizing this one stop window, businesses can petition various agencies for required permits by filling out one form. This obviates the need to wait in line at the different agencies. The following is a list of agencies participating in this program:

- Secretariat of Foreign Relations
- State Governments and Mexico City
- The Programming and Budget Secretariat
- State Secretariats of Public Credit
- Urban Development and Ecology Secretariat
- Health Secretariat
- Secretariat of Trade and Industrial Promotion (SECOFI)
- Secretariat of Work and Social Provision
- Secretariat of Agriculture and Hydraulic Resources
- Public Education Secretariat
- Mexican Institute of Social Security
- NAFINSA

### • CANACINTRA

The Economic Development Corporation (EDC) in San Diego has established the One Stop Early Assistance Program which provides a forum whereby permit issuing authorities from all levels of government meet with business people to clarify plans, costs and regulatory options on projects before plans are submitted to the appropriate regulatory agency.

### 9.1.4 NAFTA—Rules of Origin

Manufacturers who export within the NAFTA block must insure that their products satisfy the rules of origin requirements in order to benefit from NAFTA's preferential tariff scheme. Essentially, the rules of origin are the methods used for determining whether a given product qualifies for preferential treatment under NAFTA.

## 9.2 Issues in Tijuana

Table 1 provides a snapshot of the principal characteristics of the manufacturing industry of Tijuana. The very large share of total value added which originates in the "Metal Products, Machinery and Equipment" category reflects the overwhelming importance of the maquiladora industry in overall manufacturing. Table 2 reflects the fact that the number of employees at maquiladoras is increasing while the number of maquiladoras is decreasing.

### 9.2.1 CANACINTRA

By law, industries in Mexico must join CANACINTRA, the national chamber of industry. According to Roberto Reyes of the Tijuana branch of CANACINTRA and UABC, there are 1,132 members in the Tijuana Chapter. Among these members, there are 636 micro-manufacturers, 342 small companies, and 64 large companies. CANACINTRA reports that the areas of industry of greatest importance to Tijuana are electron-



ics, textile goods, furniture, and plastics, although others have claimed that there is no significant textile industry in Tijuana or Baja California. CANACINTRA is primarily an advocacy organization for Mexican industries and lacks the resources necessary to maintain a good database of local enterprises.

### 9.2.2 Mexican Suppliers

Problems currently facing suppliers to the maquiladora industry are:

- *Market:* No permanent programs exist to help in the development of national suppliers. There is insufficient data on the input

**Table 1**

## Principal Characteristics of the Manufacturing Industry in Tijuana, 1988

Subsector	Number of Firms	Employed	Value of Industrial Production	Value Added
<b>Total</b>	<b>1,029</b>	<b>41,872</b>	<b>1,288,567</b>	<b>579,572</b>
Food Products, Beverages, and Tobacco	268	4,532	313,850	70,889
Textiles, Clothing, and Leather Industry	126	2,822	61,571	16,569
Wood Industry and Wood Products, including Furniture	106	6,883	120,420	47,253
Paper and Paper Products, Printing and Publishing	94	1,375	37,112	12,633
Chemical Substances, Products Derived from Petroleum and Carbon	43	2,385	150,326	55,974
Mineral Products without Metals (Excluding Derivatives from Petroleum and Carbon)	110	954	36,374	15,488
Basic Metal Industries	**	325	3,893	1,188
Metal Products, Machinery and Equipment	259	22,067	561,742	357,498
Other Manufacturing Industries	**	529	3,266	2,077

\*\* To keep confidentiality, this data has been omitted because the numbers were too small.

Note: The values are in thousands of nuevos pesos. The totals of the values may not coincide because of rounding.

Source: Censos Industriales XIII 1989, INEGI

**Table 2**  
**Maquiladora Industry of Tijuana**

Year	Number of Firms*	Personnel*	Value Added#
1993	565	81,690	2,542,843
1994	510	82,964	669,374

Note: Preliminary figures.

\* At the end of the period; the period is December for 1993; the period is March for 1994.

# In thousands of nuevos pesos; data for 1994 is through March.

Source: INEGI.

requirements of the maquiladora industry. National suppliers lack information about international standards, procedures, measures, and prices.

- *Financing:* Interest rates are not competitive. Assistance programs are not well-known by small scale local manufacturers.
- *Suppliers Qualification:* The supplier qualification process is time consuming and expensive.
- *Marketing:* Maquiladoras do not have decision capacity to make direct purchases from local suppliers. National suppliers lack marketing strategy information such as market research, advertising and promotion. The suppliers do not have the security of long term contracts.
- *Technological Development and Training:* The suppliers do not have capacity to adapt their processes to demands of the maquiladora industry. Their design capacity is inadequate. Quality control is also deficient.
- *Economies of Scale:* The productive scale of the suppliers is insufficient to become a permanent supplier of the maquiladora industry.
- *Customs Procedures:* Companies often face the delays in customs and in the return of the VAT.

Despite these problems, several institutions have begun promoting Mexican suppliers and helping them become more competi-

tive. The National Bank of Foreign Trade (BANCOMEXT) tries to link entrepreneurs with foreign and domestic trade opportunities. Several institutions have been created to promote the modernization of industry, especially micro-, small- and medium-sized companies. They also sponsor events such as INTEREXPORT MAQUILADORA in conjunction with the National Council of Industry Export Maquiladora (CNIME). At these events, suppliers exhibit manufactured products, technology, and services that cater to the maquiladora industry. International and national buyers have the opportunity to become familiar with domestic suppliers to Mexico's maquiladora industry. A similar event is EXPOINSUMOS 94, which is designed to promote suppliers for the maquiladora and export industries of Baja California.

### 9.2.3 The Maquiladora Concept

The maquiladora concept is required to disappear under the phase-in of NAFTA. By the year 2001, maquiladoras will be able to sell to the domestic market without limitation. Between 1994 and 2001, maquiladoras will be entitled to sell a portion of the previous year's production to the Mexican market in accordance with Table 3. Export registry requirements will also be eliminated.

**Table 3**  
**Percentage of Sales Allowed without a Special Permit**

1994	55% of the total value of the annual exports in 1993
1995	60% of the total value of the annual exports in 1994
1996	65% of the total value of the annual exports in 1995
1997	70% of the total value of the annual exports in 1996
1998	75% of the total value of the annual exports in 1997
1999	80% of the total value of the annual exports in 1998
2000	85% of the total value of the annual exports in 1999
2001	100% of the total value of the annual exports in 2000

At the same time, SECOFI will require a reporting of all sales to the domestic market.

As a result of NAFTA, the maquiladora, as we know it today, will no longer exist. Moreover, between now and 2001, some maquiladoras will have a comparative disadvantage to other companies operating outside the maquiladora scheme because of the limitation placed on sales to the domestic market of Mexico during that period.

### 9.2.4 Wages

In Mexico, daily minimum wages vary according to the geographical area of employment. Geographical areas are classified in one of three ways:

- *Geographical Area A:* This area includes, among others, Baja California, Baja California Sur, the Federal District, and the State of Mexico, and has a daily minimum wage of N\$15.27.
- *Geographical Area B:* This area includes, among others, Guadalajara and Monterrey, and has a daily minimum wage of N\$14.19.
- *Geographical Area C:* This area includes, among others, Chiapas and Oaxaca, and has a daily minimum wage of N\$12.89.

The average daily wage for a maquiladora worker in Tijuana is N\$35.50.

### 9.2.5 Labor Unions

In 1925, the Mexican Regional Confederation of Workers (CROM) was established in Tijuana, followed by the Workers Confederation of Mexico (CTM) in 1937, and the Revolutionary Confederation of Workers and Peasants (CROC) in 1952. The CROM initially played a marginal role, but in the beginning of the 1980s it became the major union organization of Tijuana maquiladora workers. That aside, traditional labor unions have grown weaker.

### 9.2.6 Mexico's Foreign Investment Law

On December 27, 1993, Mexico adopted a new Foreign Investment Law (FIL). The FIL divides industries into four different classifications.

- Industries reserved for the Government.
- Industries reserved for Mexicans or Mexican corporations which exclude foreigners.
- Industries wherein foreign participation is limited to certain percentages (i.e., 10%, 25%, 30% and 49%).
- Industries wherein foreign participation is permitted to exceed 49 percent upon authorization from Mexico's Foreign Investment Commission.

In all, 59 industries or sub-industries come under these restrictions.

The Mexican Constitution prohibits foreigners from owning real property 100 km. from the border or 50 km. from the coastline (this area is referred to as the "restricted zone" or "forbidden zone"). However, the FIL provides that in some instances a Mexican corporation owned in majority by a foreigner may own land in the forbidden zone as long as the land use is not for residential purposes. Under the Salinas administration, it has become common for foreigners to receive long term leases that in essence provide a close substitute for outright ownership.

### 9.2.7 Business Parks and Utilities

Tijuana has 38 business parks (see Table 4). The cost for services in Tijuana are as follows: (1) water is priced N\$4.22/m<sup>3</sup>; (2) gas is priced N\$1.76/m<sup>3</sup>; and (3) electricity is priced on a two-tiered system of residential rates which vary by usage level from N\$0.06309 to N\$0.15195 per KWH, and industrial use, which varies by high tension (N\$0.42967) or low tension (N\$0.51185). Infrastructure issues are discussed in more detail in Chapters 5 and 6.

**Table 4**  
**Industrial Areas in Tijuana**

	Name	Estimated Hectares	Estimated Marketable
1	Alamos		
2	Revolución		
3	Baja Mar		
4	California		
5	El Lago		
6	Garita de Otay		
7	Mini Parque Ind.		
8	Morelos		
9	Murua	9.62	0.00
10	Tecolotes		
11	PIT.		
12	TIP.		
13	Cd. Ind. Nueva Tijuana		
14	Secc. Dorada		
15	Arboledas	1.80	0.90
16	Barranquitas		
17	Bustamante		
18	Fundadores		
19	Insurgentes	3.25	0.00
20	Parque Gutiérrez		
21	Las Brisas 1ra. Secc.	1.0	0.00
22	Las Brisas 2da. Secc.		
23	Limón Los Pinos	8.60	1.85
24	Los Olivos		
25	La Ciénega		
26	Luna Park		
27	Martínez		
28	Centro Comercial Soler		
29	La Luna	1.0	0.00
30	Presidente Ind. Park		
31	FRISA/Aguila	4.70	2.57
32	Frontera Business Park		
33	La Mesa Ind. Park	34.00	19.670
34	IMAQ		
35	System-XXI		
36	P.I. Pacifico		
37	P.I. TECNOMEX	30.00	15.80
38	El Florido	133.00	48.00

**Table 5**  
**Value of Manufacturing Production, San Diego County**

Year	Value (thousands)	Annual Percent Change	
		Current Dollars	Constant Dollars*
1985	\$11,026,707	4.3	4.8
1986	\$12,175,389	10.4	13.7
1987	\$11,452,073	-5.9	-8.3
1988	\$12,619,512	10.2	6.0
1989	\$14,699,758	16.5	11.0
1990	\$16,485,32	12.1	8.3
1991	\$15,851,673	-3.8	-4.1
1992	\$15,228,915	-3.9	4.5
1993	\$15,208,113	-0.1	-1.6

\*Adjusted for inflation with the U.S. Producer Price Index; base year is 1980.

Source: Economic Research Bureau of the Greater San Diego Chamber of Commerce

**Table 6**  
**Value of Manufactured Products**  
**San Diego County, Thousands**

SIC	Manufactured Product	1988	1989	1990	1991	1992#	1993
37	Aerospace/Transportation/ Shipbuilding	\$3,089,002	\$4,029,000	\$4,022,039	\$4,459,000	\$3,634,105	\$3,110,982
35	Machinery, except electrical	1,851,570	1,885,840	1,827,059	2,146,500	2,232,440	2,633,123
36	Electronics/Electical Machinery	2,549,803	1,911,120	2,836,457	1,999,800	2,409,750	2,278,191
38	Instruments	1,121,791	2,225,000	1,997,960	1,601,600	1,769,961	1,900,021
26/27	Paper, Printing, Publishing	1,073,805	1,116,490	1,420,128	1,564,191	1,173,000	1,200,323
33/34	Primary/Fabricated Metals	542,815*	614,851	679,419	762,160	686,077	640,050
20	Food	399,199	637,500	940,198	795,500	658,000	637,740
28	Chemicals	212,812	317,792	440,485	522,326	510,872	514,710
22/23	Apparel/Textiles	170,601	244,419	323,267	358,160	428,000	433,500
24/25	Lumber, Wood, & Furniture	331,956	387,087	470,587	328,000	318,614	402,500
30	Rubber/Plastics	225,215	239,485	353,846	252,000	328,096	334,125
32	Stone, Clay, & Glass	310,093	386,877	326,922	290,413	360,000	332,200
392	Miscellaneous	740,850*	704,296	846,955	772,023	720,000	790,648
TOTAL (millions)		12,619	14,670	16,485	15,852	15,229	15,208

SIC = Standard Industrial Classification. SIC defines industries in accordance with composition of the economy and encompasses the entire field of economic activities.

# Includes SIC major groups 21, 29, 31.

\* Primary metals are included with fabricated metals beginning in 1989, previously included with miscellaneous.

# 1992 figures are revised

Source: Economic Research Bureau of the Greater San Diego Chamber of Commerce

### 9.3 Issues in San Diego

The dollar value of San Diego's manufacturing output fell during 1993 for the third year in a row, according to the Economic Research Bureau of the Greater San Diego Chamber of Commerce (see Table 5). Nonetheless, manufacturing remains San Diego's largest economic sector bringing more dollars into the region than any other industry.

Manufacturing accounted for about one-fourth of San Diego's gross regional product (GRP), estimated at \$62.9 billion in 1993.

In relative terms, manufacturing peaked in 1984 at 30.7 percent of San Diego's total economy. The 24.7 percent contribution by manufacturing to the GRP in 1993 is the smallest for San Diego since the post-Vietnam War era in 1976. San Diego's three-year slump

**Table 7**  
**Exports from San Diego Industries**

Industry	1987	1991	1992	1993	Percent Change	
	(thousands)				1993/1992	1993/1987
Total San Diego Exports	\$1,623,828	\$3,509,756	\$4,405,337	\$4,357,840	-1.1	168.4
Agricultural & livestock products	\$7,729	\$16,985	\$19,775	\$24,529	24.0	217.4
Manufacturers	\$1,585,527	\$3,435,135	\$4,312,701	\$4,262,016	-1.2	168.8
Food Products	51,613	104,224	195,530	193,304	-1.1	274.5
Textile Mill Products	5,253	9,549	15,365	16,023	4.3	205.0
Apparel & Related Products	10,459	37,484	64,910	97,677	50.5	833.9
Lumber & Wood Products	46,170	134,825	162,890	169,487	4.0	267.1
Furniture & Fixtures	3,877	16,720	18,216	23,231	27.5	499.2
Paper & Allied Products	66,036	160,678	89,090	85,046	-4.5	28.8
Printing, Publishing, Allied Products	12,859	37,350	58,848	64,662	9.9	402.9
Chemicals & Allied Products	48,319	118,235	169,413	182,938	8.0	278.6
Petroleum Refining, Related Products	2,049	2,955	9,310	11,080	19.0	440.8
Rubber, Plastics Products	38,972	96,703	141,423	158,350	12.0	306.3
Leather & Leather Products	5,268	11,917	12,727	12,034	-5.4	128.4
Stone, Clay, Glass, Concrete	19,871	37,634	64,138	29,275	-54.4	47.3
Primary Metal Products	25,857	69,245	126,646	129,879	2.6	402.3
Fabricated Metal Products	34,819	114,283	145,350	162,038	11.5	365.4
Machinery, except Electrical	436,695	637,899	814,174	874,001	7.3	100.1
Electrical/Electronic Machinery	456,281	997,922	1,235,028	1,129,106	-8.6	147.5
Transportation Equipment	84,869	295,062	323,791	238,695	-26.3	181.3
Scientific & Other Instruments	171,667	430,021	518,250	507,774	-2.0	195.8
Miscellaneous Manufacturing	35,862	105,960	121,604	146,824	20.7	309.4
Manufactured Commodities not identified by Kind	28,731	16,469	25,999	30,594	17.7	6.5
Other Commodities	\$30,571	\$57,636	\$72,862	\$71,295	-2.2	133.2

Note: Data shows exports sold from San Diego by exporters of record. The location from which exports are sold is not always the same location where the goods are produced.

Source: Exporter Location Series (available only for 1987 and 1991-1993), Census Bureau, U.S. Department of Commerce; Economic Research Bureau, Greater San Diego Chamber of Commerce.

has been more severe than that of the nation as a whole.

Despite San Diego's recent downturn, local manufacturing grew at a much faster pace over the past decade than in the rest of the United States. The five top manufacturing sectors are: aerospace, shipbuilding, and other transportation at \$3.1 billion; machinery, except electrical, at \$2.6 billion; electronic and electrical machinery at \$2.3 billion; instruments at \$1.9 billion; and paper, printing, and publishing at \$1.2 billion. These sectors have the greatest financial impact on the San Diego economy (see Table 6).

Although total employment fell in the past three years, San Diego's manufacturing employment remains much higher than a decade ago. During the 1990s, however, San Diego has struggled to retain manufacturing employment as the federal government continues to shrink its defense expenditures. Technological advancements and automation are causing the nation's manufacturing employment to decline in that the same productivity requires fewer workers. The loss of U.S. manufacturing jobs are also attributed to factories moving outside the United States to countries where labor rates are a fraction of the U.S. rates. Mexico benefited from this trend in manufacturing employment.

San Diego has a rich technological capacity which benefits from a highly sophisticated and educated work force. Tijuana and northern Baja California, on the other hand, have a good environment for manufacturing but presently lack the technological capacity for higher value-added production. Future advancements in Tijuana and Baja California will depend in large part on the investment of funds in new plants and equipment.

Manufacturing plays a vital role in the international trade of San Diego as the city and county attempt to become a major gateway to the Pacific Rim (see Table 7). About 48 percent of San Diego's electronic/electrical machinery was exported. Forty-five percent of

lumber, wood and furniture was exported as well. Other high percentages of locally manufactured products exported included instruments, rubber and plastic goods, and primary and fabricated metals.

### 9.3.1 Defense Downsizing and Conversion

The defense industry accounts for over 14 percent of the total personal income in the region. Also, the defense industry is second only to manufacturing in bringing outside money into the local economy. Nearly one-quarter of local manufacturing is defense related. California has been dramatically impacted by federal defense downsizing. In 1993, Congress passed the Defense Authorization Act which created the Technology Reinvestment Project (TRP) that allocates funds to individual firms and consortia to aid in the expansion of quality employment opportunities in high-tech and dual-use industries. Federal funds are disbursed on the condition that the business contribute half of the required capital. The state of California responded by creating the Defense Conversion Matching Grant Program to help businesses come up with their share. This matching scheme means that businesses need only to produce one quarter of the required capital since the state matches the quarter with another quarter which adds up to the one half required by the federal act.

The City of San Diego has successfully competed for several state and federal economic adjustment grants that will infuse millions of dollars into the local economy. For example, the U.S. Department of Commerce's Economic Development Administration awarded grants totaling \$5.78 million.

Closely tied to the defense industry is the aerospace industry. Aerospace employment in the United States is concentrated in the nine western states, with Washington and California leading in the employment in this industry. During the 1991 recession, employment in aerospace fell by nine percent and currently accounts for 44 percent of the U.S.

**Table 8**  
**Industrial Parks in San Diego**

Name	Acres	Marketable Area	Location
Luck Industrial Park	1,110	172	Sorrento Mesa
Rancho del Oro Tech. Park	812	160	Oceanside
Pomorado Business Park	660	180	South Poway
Rancho Bernardo Ind. Park	636	14	I-15 Corridor
South Vista Industrial Park	600		Vista
Carlsbad Oak East	600	11	Carlsbad
Oak Ridge Business Center	568	210	Vista
Carlsbad Research Center	560	192	Carlsbad
Otay International Center	449	45	Otay Mesa
Parkway Business Center	409	248	I-15 Corridor
Scripps Ranch Bus. Center	365	65	Scripps Ranch/I-15 Corridor
Carlsbad Airport Center	333	100	Carlsbad
Stonecrest Business Park	318	0	Kearny Mesa
De la Fuente Business Park	312	210	Otay Mesa
Torrey Pines Solence Park Units I, II, III	260	2.50	Torrey Pines Mesa
Eastlake Business Center	250	110	South Bay
Southgate Tech. Center	233	190	Golden Triangle
4-8 Ranch Business Park	225	41	North County
Poway Tech. Center East & West	200	50	Poway/Miramar
Carmel Mountain Ranch Business Park	189	9	I-15 Corridor
Campus Pt. Industrial Park	180	0	Golden Triangle
Alfred/Coffins Corp. Center	167	64	Kearny Mesa/Golden Tri.
Brown Field Business Park	180	82	Otay Mesa
International Business Center	136	66	Otay Mesa
Wazteridge Corp. Park	125	40	Sorrento Mesa

Source: See Table 4.

total. In San Diego, local aerospace employment has fallen by 13 percent, equivalent to the percentage for the state of California.

### 9.3.2 High Technology and Biotech

San Diego's technology industries lost nearly 7,750 jobs during 1993. The job loss was primarily among San Diego's aerospace and defense-related industries, which historically dominated the region's high-technology industries. The areas hardest hit by the

economic recession continue to be firms with close association to the Defense Department. By 1993, 25 percent of aerospace and defense employment had evaporated, probably for good.

Other areas of the local manufacturing scene remain strong, however. According to the 1992 annual biotechnology report by Ernst & Young, San Diego ranks fourth in the nation in the number of companies located here, with 106. Nearly one-half of the nation's biotech companies are located in the



San Francisco Bay area, the New England area, the Mid-Atlantic region, and San Diego. Because most of San Diego's biotech businesses are young companies, primarily involved in research and development rather than production and selling, San Diego's ranking for product sales and total revenues is lower.

The biotech and biomedical industries employed nearly 20,000 San Diegans in 1993. In the next 12 months, over 1,600 new hires were projected. The majority of new hires for San Diego's biotech community will likely come from local colleges and universities.

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### Table 9

## The New Institutions for Mexican Industrial Competitiveness

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#### Metrología and Industrial Property

Centro Nacional de Metrología (CENAM)

Instituto Mexicano de la Propiedad Industrial (IMPI)

#### Quality and Certification

Sociedad Mexicana de Normalización y Certificación, S.C. (NORMEX)

Calidad Mexicana Certificada, A.C. (CALMECAC)

Asociación Nacional de Normalización y Certificación del Sector Eléctrico, A.C. (ANCE)

Instituto Mexicano de Normalización y Certificación, A.C. (IMNC)

Premio Nacional de Calidad

#### Promotion of Technological Innovation

Unidad de Transferencia de Tecnología (UTT)

Fideicomiso para el Desarrollo de la Industria Mexicana (FIDEIM)

Fundación Mexicana para la Innovación y Transferencia de Tecnología en la Pequeña y Mediana Empresa, A.C.

Source: *El Mexicano*, Tijuana, Baja California, August 10, 1994.

### 9.3.3 Business Parks, Utilities, and Enterprise Zones in San Diego

San Diego does not fare well when compared to the other top 20 metro regions of the U.S. with respect to utility resources. San Diego has the highest electricity rates although, because of mild climate, not as much energy may be consumed per capita. Also, San Diego's main airport, Lindbergh Field, is expected to reach capacity by the year 2000.

Linked to business parks in San Diego are enterprise zones. (For a list of the business parks in San Diego, see Table 8.) Enterprise zones are designated areas where businesses can receive state tax credits for employee wages and equipment purchases; no-cost job referral services; state of California contract preferences; state sales leads and local permitting assistance. California has designated two enterprise zones in San Diego: the Southeast San Diego/ Barrio Logan Enterprise Zone and the San Ysidro/Otay Mesa Enterprise Zone. The San Ysidro/Otay Mesa (Border) Enterprise Zone, after just over a year in existence, has lured more than a dozen new businesses to San Diego and facilitated the expansion of more than 20 businesses operating within the zone. This has contributed to the creation of 200 new San Diego jobs. For details on Enterprise Zones call the Southeast San Diego/ Barrio Logan Enterprise Zone at (619) 236-6821 or the San Ysidro/Otay Mesa Enterprise Zone at (619) 236-600.

### 9.4 Binational Cooperation

The City of Tijuana and the City of San Diego have a letter of agreement in the field of binational planning and coordination. The two cities have agreed to cooperate in 11 areas including four which directly bear on the manufacturing industry, i.e., economic development, water and sewage systems, waste disposal and recycling, and environmental protection.

## 9.5 Current Actions and Ongoing Efforts

Support services in the areas of high technology, defense conversion, labor training and development, academic research, finance and world trade are provided by the High Technology Resource Center, which has contacts with the following organizations: the Center for Applied Competitive Technologies, contact Joan Stepsis at (619) 230-2080; San Diego Supercomputer Center, contact Stephanie Sides at (619) 534-5131; UCSD Extensions and CONNECT, contact Abigail Barrow at (619) 534-3435; San Diego Consortium & Private Industry Council, contact Paul Downey at (619) 238-1445; Federal Lab Consortium, contact Diana Jackson at (619) 272-9452; California Small Business Assistance Network, contact Jay Creutz at (619) 458-2603; and the Certified Development Corporation (CDC) Small Business and Finance Corp., contact Art Goodman at (619) 291-3594.

## 9.6 Policy Options

### 9.6.1 Tijuana

The Mexican government is taking positive steps to bolster the competitiveness of their domestic industries and have established various agencies to assist businesses with the following: Industrial Property, Quality and Certification, and the Promotion of Technological Innovation (see Table 9).

### 9.6.2 San Diego

Of all the jobs that were created between 1965 and 1990, half were created in the domestic wholesale/retail trade and service sectors. Manufacturing and construction jobs made up 17 percent of new jobs. It is estimated that in the next 25 years, 61 percent of the jobs created will be in the trade and service sectors. Manufacturing and construction will account for only six percent of total job creation (see Chart 1, Chapter 8).

Some argue that if San Diego's high-tech manufacturing continues to decline, the county's R&D activities will lose momentum as well. In today's cutting edge manufacturing facilities, the production process is an essential laboratory for R&D. In order to stem the decline in local manufacturing employment, it may be necessary to consider public policies that encourage the manufacturing sector the way the visitor industry has been encouraged.

## 9.7 Bibliography

1. Carrillo V., Jorge y Ramírez, Miguel Angel. "Maquiladoras en la Frontera Norte: Opinión sobre los Sindicatos." *Frontera Norte*, Vol. 2, Núm. 4, Julio-Diciembre 1990.
2. City of San Diego. *Economic Developments*. City of San Diego, July-August 1994.
3. ———. *Economic Developments*, City of San Diego, April-May 1994.
4. ———. "Economic Conversion Activities." *Economic Developments*, City of San Diego, (no date).
5. ———. "Enterprise Zones." *Economic Developments*, City of San Diego, (no date).
6. ———. "SC Technology Council Contacts and Informational Resources." *Economic Developments*, (no date).
7. de la O, María Eugenia y Quintero, Cirila. "Sindicalismo y Contracción en las Maquiladoras Fronterizas." *Frontera Norte*, Núm. 8, COLEF, Julio-Diciembre 1992.
8. *Diario Oficial de la Federación*. México, Segunda Sección, Lunes 13 de Diciembre de 1993, pp. 2-3.
9. Economic Development Corporation. *San Diego Book of Facts 1993-94 Edition*. San Diego Economic Development Corporation, 1993.
10. Gómez Topete, Gonzalo y García Repper, Andrés. "Comments on the Changes to the Decree of the Maquiladora Industry Association." *Industria Maquiladora*, Marzo 1994, pp. 3-8.
11. Greater San Diego Chamber of Commerce, *Economic Bulletin*, Vol. 41, No. 12, December 1993.
12. ———. "San Diego Ranks as the Nation's Fourth Largest Biotechnical Center." *Economic Bulletin*, April 1994.
13. "La nuevas instituciones para la competitividad de la Industria Mexicana." *El Mexicano*, Tijuana, B.C., Sección A, 10 de Agosto de 1994, p. 9.
14. Marín, Lilia. "To Buy More from Mexico: National Program of Supplies to the Maquiladora Industry." *Industria Maquiladora*, La Industria Maquiladora, Zona Costa de B.C., Núm. 17, Julio 1994.

15. SANDAG/Source Point. "Baja California Demographic Profile." *INFO*, San Diego Association of Governments, May-June 1992.
16. ———. *INFO*, San Diego Association of Governments, September-October 1993.
17. ———. "A Look at San Diego's Future." *INFO*, San Diego Association of Governments, January-February 1994.
18. SANDAG. *Draft Regional Economic Prosperity Strategy*, San Diego Association of Governments, 1993.
19. ———. *Evaluating Economic Prosperity in the San Diego Region*. San Diego Association of Governments, 1992.
20. Secretaría de Comercio y Fomento Industrial. "Todos los trámites en un solo lugar—Apoyos y Facilidades que otorga la Ventanilla Unica." Secretaría de Comercio y Fomento Industrial, México, 1994.
21. Secretaría de Desarrollo Urbano y Ecología (SE-DUE). *Plan Integral Ambiental Fronterizo: Primer Etapa 1992/1994—Resumen*. Secretaría de Desarrollo Urbano y Ecología, México, 1992.
22. Secretaría de Desarrollo Económico, Gobierno del Estado de Baja California. *Estadísticas Básicas de Baja California*. Núm. 32, Junio 1994.

# CHAPTER 10: ENVIRONMENTAL ISSUES

*by*

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## 10.1 Introduction

The international border between Mexico and the United States of America extends for nearly 3,200 kilometers from the Pacific Ocean to the Gulf of Mexico. Six Mexican states and four U.S. states adjoin the border. Approximately nine million people in 15 "sister cities" live within the border area, which includes the region within 100 kilometers of each side of the international boundary. Due to a rapidly increasing population mainly from the interior of Mexico, and a rising industrialization in the border region, many border cities have to deal with urgent environmental problems such as wastewater treatment, water supply, solid waste infrastructure, and air pollution control.

The purpose of this article is to summarize ongoing efforts in the border area and the impact of political agreements and institutions on environmental border issues. Section 2 details the background for U.S.-Mexican environmental co-operation. It also explains the general impact of the border environmental plan and the consequences of supplemental agreements following the North American Free Trade Agreement (NAFTA). Sections 3 and 4 investigate local environmental problems in the San Diego-Tijuana region and examine some of the suggestions and solutions

to further improve the quality of life in the region.

## 10.2 Background

The first formal efforts between Mexico and the United States to protect and improve the environment in the border area was in 1983 with the adoption of the U.S.-Mexico Border Environmental Agreement, also known as the "La Paz Agreement." Although no mandatory obligations were signed, the agreement outlines the primary objectives of common border environmental cooperation and sets a standard for further meetings and agreements between the two countries. The 1983 La Paz agreement declares a commitment by both countries to, among others:

- Cooperate in the field of environmental protection (Art. 1).
- Undertake actions to prevent, reduce, and eliminate sources of pollution (Art. 2).
- Coordinate efforts in terms of national laws, regulations, and policies.
- Designate national coordinator to coordinate and monitor the implementation of the agreement.

## 10.3 The Border Environmental Plan of 1992

The most serious environmental concerns along the border are related to the concentrations of people and industries in the large sister cities. Problems of congestion, uncontrolled urban development, lack of sanitation facilities and paved roads, inadequate water supply and wastewater treatment, have grown significantly on both sides of the border in the last decade.

On November 27, 1990, government officials from Mexico and the United States met in Monterrey, Mexico to discuss a variety of issues affecting both countries. They "instructed the authorities responsible for environmental affairs in their countries to prepare a comprehensive plan designed to periodically examine ways and means to reinforce border cooperation...with a view to solving the problems of our , soil and water quality and of hazardous wastes" (EPA, 1992).

This plan presents the first stage of a binational border environmental protection program. It was prepared jointly by Mexico's Secretaría de Desarrollo Urbano y Ecología (SEDUE), and the U.S. Environmental Protection Agency, to be implemented jointly as well. The SEDUE/ EPA work groups were established in response to the 1983 La Paz Agreement to develop communication procedures for dealing with the principal environmental issues affecting the border area.

Additional support came from the International Boundary and Water Commission (IBWC), a binational agency founded in 1944 which originally worked on binational water sanitation projects along the border.

### 10.3.1 Purpose of the Border Environmental Plan

The purpose of the Border Environmental Plan is to strengthen the basis for continuing cooperation between Mexico and the United

States in improving the border area. In its first stage, 1992-1994, the plan tries to point out the most serious environmental problems now existing or emerging as judged by SEDUE, EPA, IBWC, and the border states. According to those institutions, the first stage of the Border Environmental Plan:

- Outlines the environmental characteristics and describes the present status of significant environmental issues in the border area.
- Summarizes the cooperative environmental accomplishments achieved to date in the border area by binational, national, state and local environmental agencies.
- Articulates the commitments of all environmental agencies, both Mexican and U.S., to work cooperatively to better understand environmental issues in the border area and to establish priorities and develop mechanisms for implementing solutions.
- Sets out implementation plans to mobilize the cooperative efforts of government at all levels and to involve the private sector as well in seeking solutions to the border area's priority environmental problems.
- Sets out general provisions on implementation and a funding plan to help make the border environmental plan fully effective.

With regards to the ratification of the North American Free Trade Agreement, the border plan can definitely not be considered final or complete, rather it is still a work in progress. Nevertheless, in order to fulfill the plans demands, Mexico has agreed to invest at least 460 million dollars over the next three years in environmental projects (92-94) and the U.S. budget for border area projects for 1993 was \$179 million.

However, the plan's success will depend on the efforts of many people. Everyone who lives and works in the border area must be involved; border state and local governments, the IBWC, nongovernment organizations, and educational institutions all have important roles to play. So far, probably the most important aspect of the Border Environ-

mental Plan is the idea of a cross-border cooperation based on the belief that the plan is going to help both Mexico and the United States to achieve long-term protection of human health and national ecosystems in the border area.

The plan consists of four main objectives for the border area:

- To strengthen enforcement of existing laws.
- To reduce pollution through new initiatives.
- To increase cooperative planning, training, and education.
- To improve understanding of the border environment.

### 10.3.2 Estimated Capital Requirements for Environmental Infrastructure Projects

There have been a number of efforts made recently to estimate the capital requirements for environmental infrastructure needs along the U.S.- Mexico border. Significantly large differences in various estimates of the cost for border cleanup have made it more difficult to set up an appropriate finance plan for environmental border problems. In September of 1992, the United States Army Corps of Engineers issued a "Design and Cost Estimate Report" which indicated that \$2.5 billion for construction was needed for two border wastewater treatment facilities in Mexico under the study by the IBWC. (This estimate did not include the cost of the international wastewater treatment plant which broke ground in July.) Analysis of environmental infrastructure requirements and financing gaps on the United States-Mexico border estimated that a total of \$6.5 billion were needed for wastewater treatment, water supplies and solid waste handling and disposal facilities. Finally, in the summer of 1993 a group of nongovernmental organizations estimated \$7.6 billion for the border environmental infrastructure needs (EPA, 1994.)

## 10.4 New Institutions under NAFTA

Through the ratification of the North American Free Trade Agreement and its environmental side agreements, the awareness of the environmental problems on the border area became significantly upgraded. Despite the fact that NAFTA is primarily an economic trade agreement, Mexico, the United States and Canada agreed to establish the bilateral Border Environmental Cooperation Commission (BECC) and the North American Development Bank (NADBANK). The goal of the new BECC-NADBANK agreement is to create a new environmental infrastructure, to use it as a facilitator to bring together a mix of funding from the federal, state, local, and private sector. The BECC and NADBANK are to function in accordance with the provisions listed below.

### 10.4.1 The Border Environmental Cooperation Commission (BECC)

The purpose of the BECC is to help preserve, protect, and enhance the environment of the border region in order to advance the well-being of the people, in both the United States and Mexico. BECC will assist states and localities and other public entities and private investors in:

- Coordinating environmental infrastructure projects in the border region.
- Preparing, developing, implementing, and overseeing environmental infrastructure projects in the border region, including the design and technical aspects of such projects.
- Analyzing the final feasibility and the environmental aspects, or both, of environmental infrastructure projects in the border region.
- Evaluating social and economic benefits of environmental infrastructure projects in the border region.
- Organizing, developing, and arranging public and private financing for environmental infrastructure projects in the border region.

In addition, the BECC will certify applications for financing to be submitted to NAD-BANK for environmental infrastructure projects in the border region. The BECC is going to work with the state and local communities to put together suitable solutions for environmental problems in the border region. The BECC will then present these projects to NADBANK or other financial institutions. To be eligible for funding, projects must meet the relevant environmental laws. The main financial sources for the BECC are supposed to come from its sister institution, the NADBANK, plus direct government support, such as grants, loans, and guarantees from the private sector.

The BECC will have a binational board of directors. Mexico and the United States will each have five members on the board. Two of the five U.S. board members are United States officials—the administrator of the EPA and the commissioner of the IBWC—and thus only three positions are available to other specialists.

Although local politicians failed to convince the executive commission to site BECC in San Diego (it is now positioned in Ciudad Juárez, Mexico), they were at least able to secure that President Clinton appoint a local San Diegan to the board of the BECC. The appointee is Pete Silva, currently Deputy Director of the City of San Diego's Water Utilities Division. Prior to his current position, he spent five years with the City's Clean Water Program and four years on the board of IBWC, San Diego office.

#### 10.4.2 North American Development Bank (NADBANK)

The purposes of the NADBANK are:

- To finance environmental infrastructure projects certified by BECC.
- To finance community adjustment and investment endorsed by the U.S. in support of NAFTA.
- To finance community adjustment and investment endorsed by Mexico in support of NAFTA.
- To promote public and private capital contributing to its purposes.
- To encourage private investment in projects, enterprises, and activities contributing to its purposes and to supplement private investment when private capital is not available.
- To provide technical and other assistance for the financing and coordination with BECC.

On May 16, 1994, the governments of the United States and Mexico announced the members of the board of NADBANK, six representatives from the U.S. and Mexico. The main tasks of the Board are to establish the board's policies, supervision of NADBANK operations, and the approval of its budget and all lending and guarantee operations.

The NADBANK's authorized capital stock of \$3 billion is divided into \$450 million paid in capital and \$2.5 billion callable capital, both of which is contributed equally by the United States and Mexico. NADBANK is expected to promote \$2-3 billion in financing for environmental projects. Both sides hope to achieve a maximum level of private investment and participation from border localities. The EPA estimates that about \$8 billion will be available for United States-Mexico border environmental infrastructure financing during the next 10 years. Not included is the anticipated \$2 billion from NADBANK; there is another \$2 billion from new joint financing mechanisms which will be available, \$600 million is anticipated from private sources and \$1.4 billion in grant funds (\$700 from each country). Two billion in funds will be available from the World Bank over the next four years to support border environmental activities. These funds will be mostly granted to Mexico. This will cause controversy because it is expected that fewer funds will be available for the less developed re-

gions of Mexico. In addition, two billion should be granted from the U.S. side from existing sources, including state and federal grants/loans, state funds, and state and local tax exemptions bonds.

## 10.5 Shared Issues in the San Diego-Tijuana Region

The San Diego-Tijuana region faces the same environmental problems of every major city. San Diego has emerged as the sixth largest U.S. city with about 2.5 million people. Adding Tijuana's population of about 750,000 (1990 census) makes the region greater than 3 million. Much of the population was added in the 1980s, compounding every environmental issue as population growth overwhelmed the growth of infrastructure. Most significant are issues of water supply, wastewater treatment, hazardous waste disposal, and landfills.

In addition, the San Diego-Tijuana region contains a large number of endangered species. Some, such as the Torrey pine, are so unique that they only exist in Southern California and/or Baja California. As a consequence, wildlife and habitat conservation has become a significant concern for the city's planning and development commissions.

Despite the creation of environmental agencies like the EPA and SEDESOL (previously SEDUE), the presence of an international boundary complicates all environmental planning efforts. Negotiations between the two cities often stagnate due to financial burdens, laws, a lack of harmonization in regulations, and the language barrier. Coordinating common efforts remains the most important challenge the San Diego-Tijuana region faces in the next decade. The analysis of San Diego-Tijuana environmental issues is divided into the subjects of water, waste treatment and disposal, habitat conservation, air pollution and hazardous/toxic waste.

### 10.5.1 Water

Fresh water has been an issue of great significance in Southern California. Decreasing aquifer levels and few storage facilities brought up discussions of building a new dam in the Pamo Valley, North County. However, the end of the drought and pressure from local environmental groups abandoned the implementation of the project. The San Diego-Tijuana region would benefit greatly from an expansion of water markets in California. Currently, cities are prevented from purchasing existing water at market prices from farmers in the Central Valley by federal regulations. This problem is long term and its outcome is uncertain. Yet, it seems likely that as water shortages in California grow, the increasing political weight of cities will lead to a reform of existing federal regulations.

Tijuana's problem is more basic. The city currently lacks the ability to deliver potable water to large numbers of inhabitants. This is a result of rapid population growth and the expense of building water delivery systems in the difficult terrain of Tijuana, and where homes and neighborhoods have already been constructed by squatters.

### 10.5.2 Waste Treatment

A study by the Natural Resources Defense Council, a U.S. nongovernment environmental group based in Washington, D.C., showed that spilled sewage and pollutants washed from streets and yards caused 727 closures of San Diego County beaches last year—more than any other county in the United States. Most of the closures occurred in the southernmost part of the county on the U.S.-Mexico border.

Transboundary sewage flows in the San Diego-Tijuana area have been a serious issue for decades. Over the years, the infrastructure in Tijuana has been unable to handle the rising urban population in the city. Recently, San Diego also faced significant difficulties



with its wastewater treatment infrastructure. Both cities are now experiencing numerous breakdowns in their pumping facilities and in the collector systems. These sewage flows have caused quarantines of beaches along the south San Diego coast and have negatively impacted the Tijuana estuary.

In response, the governments of Mexico and the United States have agreed through the IBWC to an International Wastewater Treatment Plant and ocean outfall constructed in the United States. The plan was approved in July 1994, and Vice President Al Gore laid the foundation on July 15. Completion of the plant is scheduled for 1996 and the total construction costs are estimated at \$260 million. The wastewater treatment plant will have a capacity of 25 million gallons a day (mgd), with an option for a maximum expansion of up to 100 mgd. Discharge of treated effluent to the ocean will be through a pipeline consisting of two segments; the South Bay land outfall and the South Bay ocean outfall for ultimate discharge into the Pacific Ocean. The outfall will be designed to carry an average daily flow of 132 mgd. The average point of discharge will be about 18,700 feet (5.7 km.) offshore at a depth of 93 feet (28 meters).

The construction cost of the International Wastewater Treatment Plant will be shared by the U.S. and Mexico. The construction of the outfall will be paid by both the federal government and the City of San Diego. Additionally, as agreed upon in a IBWC memorandum, Mexico will make significant improvements to its wastewater system.

Finally, the new wastewater treatment plant, in conjunction with the improvements completed and planned by Mexico, will control the flow of effluent that would otherwise end up in the United States via the Tijuana River from Tijuana. However, the Sierra Club, one of the United States' most powerful environmental groups, has filed a lawsuit against the IBWC and EPA to enforce reconsideration of the plant. Executive Officer Lori

Saldana from the Sierra Club, argues that the treatment plant would not be able to filter out heavy metals and other toxins, such as pesticides. In addition, critics charge that the plant's design was based on incorrect estimates of how much Mexican sewage needs to be treated. Arguments are that estimates were based on Mexican pump stations that had allegedly been run under capacity to save money on electricity. By completion of this report, no additional information about the lawsuit was available. It seems likely, however, that the plant will be built in accordance to the original construction.

### 10.5.3 Habitat Conservation

Though San Diego and Tijuana are not very lush, San Diego contains the largest number of endangered species in the United States. No less than 24 plant and animal species are listed or proposed for listing as endangered by the federal or state government. Taking into account that San Diego is one of the fastest growing areas in the U.S., confrontations between habitat conservation planners and community expansion projects seem inevitable. Nevertheless, San Diego is now considered a national role model for its efforts to unite diverse local interests.

Work is currently underway on three different habitat conservation programs coordinated by the San Diego Association of Governments (SANDAG). SANDAG is using high technology mapping techniques to create a system of classification of habitats. The zones are evaluated as very high, high, medium, or low quality habitat. The final goal of this classification is to establish continuous habitat preserves where animals and plants have sufficient space to thrive. Planning teams would then be able to identify high quality vegetation zones that need to be preserved for wildlife. They could also provide quick and inexpensive information to developers, thereby lessening the environmental assessment costs of private projects. In addition, with this classification, SAN-

DAG would be able to implement a "gap analysis" technique to identify areas that are at risk of development. With these efforts, San Diego could design a fully connected preserve system of very high quality habitat areas and, at the same time, reduce the costs of development by providing information very early in a project's life.

#### 10.5.4 Air Pollution

The San Diego County Air Pollution Control District (APCD) monitored the air quality along the border for five years during the mid-70s. The only impact of any measurable significance was particulates (dust). No other pollutant levels were significant.

With the increase in population and traffic on both sides of the border, along with the expanding maquiladora industry, the situation is currently changing. The primary causes of air pollution are:

- Stationary sources (cement factories, chemical factories, the thermo-electric power plant in Rosarito)
- Vehicular fleets
- Open burning and use of waste for fuel
- Unpaved streets

The example of air pollution from cars and trucks indicates the need for binational cooperation and a common effort to reduce environmental pollution. Cars registered in California are required to be smog certified, whereas cars registered in Mexico often still use leaded fuel. Mexican cars crossing the border into the United States only count for one percent of the vehicular fleet but cause an estimated 12 percent of the pollution.

Another air pollutant comes from the lack of paved streets in Tijuana. Almost two-thirds of Tijuana's roads are unpaved, causing dirt particles to spread into the air. In many respects, this is another result of population growth, outstripping local resources for urban amenities.

In the warm months between June and November, the San Diego/Tijuana basin is very susceptible to smog. Smog levels increase when hot desert air prevents cooler coastal air from rising. When smog levels reach a number of 84 on the pollution standards index (PSI), the state's standards for unhealthy air is exceeded. In 1993, the number of days exceeding the standard was 90. The biggest air pollutant in the San Diego-Tijuana region is the thermo electric plant in Rosarito, Mexico. However, due to the prevailing wind conditions in the region, there are only a few days during the year when San Diego receives air pollution from Tijuana. Both cities suffer tremendously from Santa Ana winds blowing smog from the Los Angeles metropolitan area into the San Diego-Tijuana region.

Under the Border Environmental Plan, the San Diego County Air Pollution Control District (APCD), the California Air Resources Board (ARB), and EPA agreed to assist the Mexican Institute for Ecology (INE) in establishing an air monitoring station at Tijuana's Instituto Tecnológico Regional (ITRT) in 1992. Data from the ITRT should be available by the end of 1994. The common goal is to monitor air quality on both sides of the border for a period of two years. This would establish a starting point to measure air quality and trends.

#### 10.6 Issues in Tijuana

During the 1980s and early 1990s, Mexico's border cities grew extremely rapidly. With the restrictions of the hilly topography, it is very difficult to provide the population with water, sewage, highways, electricity, and urban transportation. Consequently, there are grave problems due to the lack of public services and urban amenities. In the last five years, Mexico has increased funds appropriated or destined for environmental protection purposes by 600 percent. New environmental laws and regulations were created and implemented in the last year; some of

them so strict that they could meet with EPA standards or even surpass them.

### 10.6.1 Population and the Environment

The uncontrolled growth of the city of Tijuana, in conjunction with environmental problems, affects economic growth and development in the border region. Mexico is trying to allocate more funds to environmental protection projects and infrastructure development because these two aspects are milestones on the way to a prosperous economy in Mexico's border region.

In the last decade, migrants from other countries and from the southern parts of Mexico occupied large portions of land creating migrant camps that grew into *colonias*. These are the neighborhoods most lacking in public services and decent shelter for its residents. Many of these neighborhoods were severely flooded in 1993.

The newest urban growth of Tijuana is concentrated on Otay Mesa, but when that part of the city is fully developed the municipality hopes to expand urbanization to the southeast part of the city in the areas of El Florido and Cerro Colorado. This area is considered a land reserve for Tijuana.

### 10.6.2 Sewage in Tijuana

Tijuana has always had the problem of untreated water (sewage) going into the ocean. For most of Tijuana's history, it has been a point of conflict between the governments of Mexico and the United States. The Census Bureau indicated that only 64 percent of the population of Tijuana has a functioning sewage system. COLEF studies indicate that deficits in sewage systems in Mexican cities along the border region are 13.1 percent below the national average.

Social inequalities compound the sewage and water problems. Public services are implemented in a way that favors wealthy neighborhoods. High and middle income

neighborhoods count on sewage systems but lower income colonias in the border region have only a 36.8 percent rate of coverage with sewerage facilities. Nevertheless, additional facilities are in planning and others are still working on a general framework for wastewater treatment.

The frequent spills of sewage in Tijuana illustrate the lack of sewage lines to existing treatment facilities. Although Tijuana puts efforts into replacing old sewage systems with new ones, the financial burden hinders many development projects. Funds for less developed *colonias* are often guaranteed from credit institutions like the Inter-American Development Bank or Banobras.

CESPTT (Comisión Estatal de Servicios Públicos Tijuana, Tecate) has estimated that the volume of sewage water that needs to be treated within the next decade will be around 1,450 l/s (liters per second). While current capacities can only handle 1,100 l/s, the rest will flow untreated into the Tijuana River.

An additional problem to sewage spills is residue water from industrial parks that is dumped in the city's sewage system, increasing the health risks for the inhabitants and thus reducing their quality of life.

### 10.6.3 Air Quality

Green areas in Tijuana (private and public) account for approximately 1,345,000 square meters including Parque Morelos, which is directly controlled by the municipality. These "lungs of the city" account for 904,430 square meters, representing 34 public parks, and including the more known Amistad and Teniente Guerrero parks. The deficit per person is enormous if we take into account that the acceptable level would be eight square meters per person while Tijuana provides only about two square meters per person (*Plan de Desarrollo Municipal 1992-1995*).

Tijuana only has one monitoring station for air quality. Measurements, therefore,

become very difficult and sources of emissions are not easy to identify and to measure. This, again, underlines the importance of a binational cooperation to examine the region's problems rather than problems of the two counties or municipalities, respectively.

#### 10.6.4 SEDESOL

SEDESOL is Mexico's counterpart to the EPA. In recent years, it has significantly increased its enforcement of environmental regulations, partly, no doubt as a means of increasing U.S. support for the passage of the NAFTA. Although enforcement has become stricter, companies and firms that cannot comply with the existing laws can sometimes qualify for special authorization to exceed those limits. In general, all toxic waste problems are handled by SEDESOL.

SEDESOL can use both administrative and criminal sanctions for noncompliance. Again, as with all laws, enforcement can be problematic. Nevertheless, the clear trend since 1990 is for increased sanctions and enforcement. For example, one of SEDESOL's responsibility is to insure that all hazardous waste used by the maquiladora industry is logged on a manifest and eventually returned to the country of origin. Between 1990 and 1993, the return of wastes to the United States from maquila plants along the entire border grew from less than 50 tons to over 2,000.

### 10.7 The Municipal Development Plan for 1992-1995

Decentralization in the Mexican system of government means that more and more decision making is being left to the states and municipalities. In 1988, the "Ley General de Equilibrio Ecológico y Protección del Medio Ambiente" was created to assign problems to federal, state, or local levels and to give more power of action to states and municipalities. Baja California has pioneered the shifting of authority from federal to the state and city levels, and probably leads most of the other

states of the nation. A new state law of 1992 places water emissions under state control. The State Ecology Agency has published a series of regulations and begun to seriously enforce them. One indicator of increasing success is that the number of persons who have attained certification as environmental auditors has grown dramatically, as has the number of companies (both Mexican and U.S. based) who are selling environmental services such as hazardous waste collection.

In the past, Tijuana has been able to grow without subjecting itself to planning regulations. This has changed, and new developments are subject to review by planning authorities to the extent that, for the first time in the city's history, some new projects have not been approved.

Another sign of growing local authority is that although hazardous waste disposal remains a federal concern, the new responsibilities given to the municipality include:

- Prevention and control of environmental emergencies.
- Designation to state congresses the areas to be protected by law.
- Establishment and operation of emission control systems.

The municipality of Tijuana has several basic objectives in the area of the environment. As with all good intentions, only time will tell if they are carried out. The objectives are to:

- Create a unit or department inside the municipality with the power to enforce ecological law.
- Establish immediately a program to deal with environmental protection in coordination with other levels of government, private sectors, and other sectors of society.
- Promote treaties between San Diego and Tijuana.
- Design appropriate preservation policy to prevent alteration of ecosystems, and maintain biodiversity and conditions that can

promote evolution and continuity to natural processes.

## 10.8 Bibliography

1. Acuerdo entre el Gobierno de los Estados Unidos Mexicanos y el Gobierno de los Estados Unidos de América sobre el Establecimiento de la Comisión de Cooperación Ecológica Fronteriza y el Banco de Desarrollo de América del Norte.
2. CEEM. *Modelo de Reglamentos Municipales*. Centro Estatal de Estudios Municipales de Baja California, Mexicali, Baja California, Mayo de 1990 (Secretario General).
3. City of San Diego Waste Management Department, Interview with: Ann Sasake, 4950 Murphy Canyon Rd. Suite 201, San Diego, Ca. 92123, Tel 619-492-5010.
4. Clement, Norris and Eduardo Zepeda Miramontes (eds.). *San Diego-Tijuana in Transition: A Regional Analysis*, Institute for Regional Studies of the Californias, San Diego State University, 1993.
5. Clinton G. Metzner, Jr. *Water Quality Issues of the San Diego-Tijuana Border Region*. Institute for Regional Studies of the Californias, San Diego State University, San Diego, Ca. 92182-0435, 1989.
6. Congress of the United States, Rep. Shenk's Office. "1994: Congresswoman Schenk announces appointment of Pete Silva to the BECC."
7. *Eco Registros, Un manual simplificado que nos describe como registrar las descargas de aguas residuales y las emisiones a la atmósfera en Baja California*.
8. Environmental Protection Agency. *EPA Activities on the U.S.-Mexico Border*. U.S. GPO, Washington, D.C., 1994.
9. ———. *EPA Integrated Environmental Plan for the Mexican-U.S. Border Area*. U.S. GPO, Washington, D.C., 1992.
11. ———. *Summary Environmental Plan for the Mexican-U.S. Border Area, First Stage: 1992-1994*. U.S. GPO, Washington, D.C., 1992.
12. Fairbank, Janet. "Room to Roam." San Diego Association of Governments (SANDAG), 1994.
13. Guillén López, Tonatiuh. "Servicios Públicos y Marginidad Social en la Frontera Norte." *Frontera Norte*, COLEF, 5.
14. International Boundary and Water Commission (IBWC). 1978 minutes (No. 259), 1979 minutes (nos. 260 and 261).
15. *NAFTA supplemental agreements and additional documents*, U.S. GPO, House Document 103-160, 1993.
16. *Periódico Oficial del Estado de Baja California*, Mexicali, Baja California, 27 de Noviembre de 1992, Núm. 38.
17. *Plan de Desarrollo Municipal, Tijuana 1992-1995*. California Graphics, Tijuana, Baja California, Mexico.
18. *San Diego Business Journal*. "Questions, Answers on Hazardous Waste." 26 June 1994.
19. ———. "Gore's Support Sought in Sewage Plant Lawsuit." 27 June 1994.
20. *The San Diego Union-Tribune*. "Smog Checks Eyed for Vehicles of Job Commuters from Mexico." 4 June 1994.
21. ———. "Border Sewage Plant Scheduled for July 15 Start of Construction." 17 June 1994.
22. ———. "County Led Nation in Foul Beach Closures." 4 July 1994.
23. *San Diego Weekly News*. "Summer Smog Season Begins." 12 June 1994.
24. U.S. and Mexican Governments. *1983 La Paz Agreement*, U.S. GPO, Washington, D.C., 1984.