

## PART FIVE

# Social Change in a Modern World

### TOPIC 14

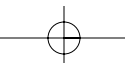
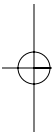
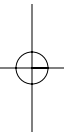
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## TOPIC 14

# Population and Ecology

THE FUTURE OF THE PLANET AND OUR LIVES ARE TIED to the macrosocial effects of population and the distribution of population in emerging and developed nations. The social and environmental ecology of urban areas brings focus to the sociological forces that will write the future of entire continents and ultimately the world. While it is true that the dramatic world population growth of the 1960s and 1970s has slowed, what will 12 billion living persons mean to urban areas already impossibly choked by poor living conditions, widespread illness, and environmental pollution? Urbanization is now just as important as population alone, with its own tremendous impact on the environment.

The population of the world passed 6 billion living inhabitants a few years ago. Even with a slowing growth rate, it is estimated that somewhere in the next century we will almost double the population again. As developed nations reach zero-population growth or have negative growth rates, will the demand for certain types of labor and requirements in their economies mean greater immigration from growing, developing nations where the economies cannot find jobs for residents? Examples of these events can be found in Europe and North America already. Such events may result in even greater diversity in receiving countries and help to ease the crises in poorer nations. As Malthus's "dismal thesis" regarding the population's ability to outstrip subsistence (food and resources) fades into insignificance, how will the enormous economic disparity between the world's countries influence the future?

Cities, regions, entire nations, and even the world must contend with changes in the environment. Ecological disaster can come from social, economic, and natural phenomena and thereby change life for small and large numbers of people. Contaminated water supplies from agricultural “runoff” might mean serious health problems for an area. Deforestation in the rain forests could result in worldwide changes in the climate. Global warming, as evidence mounts for its existence, may change the water level in the oceans, just as acid rain from upwind pollutants destroys natural habitat for more circumscribed populations. The world has been made “smaller” with the dynamics of transportation, communication, and globalization. We begin to realize that oceans and mountains and international borders are less important than in the past, and all of us live in a vast web of interconnections often determined by macrolevel events, which have examples in our own backyards.

Population and ecology are part and parcel of a key future determinant of life—the politics of consumption. In the world of nations, there are a few very rich, a few in the middle, and many at the bottom of the global stratification system. How will we decide who is to give, who is to support, who is to repay, and who is to have autonomy? Are we on the verge of a “new world order”? Because of the extreme inequalities, where people in many countries live on less than \$200 a year and a few countries have per capita incomes 100 times that much, the political processes in the near future must address population, world government, consumption, and economic inequality for the entire planet. This is a monumental task when individual nations can rarely find the ability to do such things for themselves.

The three selections in Topic 14: Population and Ecology present, first, an analysis of how Hurricane Katrina set the stage for secondary storms of “wilding” from the nation’s capital to local neighborhoods; second, a micro look at the social ecology of an urban skid row; and, third, a clear explanation of how human population and its effects are bringing catastrophic pollution to a complex and intricate eco-system. In “Katrina: The Perfect Wilding Storm,” Charles Derber shows how social breakdown occurs in the aftermath of a hurricane and releases people from controls that are hidden by conformity. John Bardo, Jeff Riemer, Ron Matson, and Bob Knapp elaborate our understanding of “social ecology” as they map the interrelated dimensions of skid row. Milton Saier, in “Pollution,” has us confront the impending dangers brought on by overpopulation and what this might mean for the future of humankind.

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CHARLES DERBER

## Katrina: The Perfect Wilding Storm

As we move into the new century, the crises of greed and violence that motivated my desire to write this book have deepened. The most sensational news stories of the 1990s were about individual wilding by O. J. Simpson and Tonya Harding. But the most dramatic stories in the first few years of the twenty-first century have been about Enron, the Catholic Church scandal, the political “culture of corruption,” terrorism and torture, and America’s war in Iraq. Greed and violence remain epidemic among individuals, but it is wilding by giant institutions in the economy, the government, and civil society that is now making headlines.

On September 29, 2005, the New Orleans Police Department announced that it was investigating 12 of its officers for looting during Hurricane Katrina. Osman Khan owns the hotel where several officers were staying during the storm. “They’d leave nine or 10 at night and come back 4:30 in the morning,” said Kahn of the officers. They were carrying “everything from Adidas shoes to Rolex watches.” A hotel staff member, Perry Emery, brought towels into the officers’ rooms and saw “Jewelry, generators, fans.” Kahn said he saw police take one generator from Tulane University Hospital, which was trying to save dying patients. Emery saw other booty: “One time they came back with a bunch of weapons.”<sup>1</sup>

Erlaine McLaurin told CNN that she and her father saw two officers walk from their car into an apartment building on their block and then come out loaded with stolen goods. “They done fill up the white car,

the police car,” she said. “He got a four pack of soda, a microwave, CD player. . . . I know everybody that lives here. Ain’t no cops live here.” Another resident saw police kick in a door of a Garden District home in a different area of the city. “They got police escorts coming in here, breaking in houses and taking the stuff.”<sup>2</sup> A *Times-Picayune* journalist was one of several witnesses who saw police steal items off the shelves of a Lower Garden District Wal-Mart that they were supposed to be guarding.<sup>3</sup>

When police openly loot homes or stores they are sworn to protect, it suggests a collapse of civil society. Hurricane Katrina, a massive hurricane that smashed the Gulf Coast on August 29, 2005, is called a “natural disaster,” but the term is misleading when viewed from a sociological perspective. Yes, it was one of the worst weather storms to hit the United States. But Katrina, sociologically speaking, was a perfect storm of wilding. It concentrated all the types of wilding in a single epic event. Political wilders failed to prevent the flooding in the first place. Corporate wilders made a killing off the mayhem following the storm. Individual wilders—from police to ordinary citizens—used the tragedy to get some additional pocket change and conveniences.

Katrina opened a window that had long been shut, one that allowed ordinary Americans to see the core of societal wilding rotting the fabric of our nation. Fortunately, it also has pointed the way to how we might move in a new direction and curb the wilding epidemic. In this chapter, we reflect on Katrina as a tragic monument to the different varieties of wilding in America and how Katrina reflects the old Sicilian adage “A fish rots from the head first.”

## Individual Wilding

Stories of personal wilding rocked America from the first day of flooding in New Orleans. We heard of snipers shooting at medevac helicopters as they tried to rescue critically ill patients from hospitals. We saw footage of looters breaking into stores and carrying out television sets and cartons of liquor. We heard shocking reports of rape, child molestation, torture, and murder inside the New Orleans Superdome, as thousands of abandoned residents tried to survive in barbaric conditions.

A month after the storm, new reports suggested that many of these stories were false. A new picture, of a large majority of the abandoned poor coming together to help and often save each other, began to

emerge. All this, as I show later, suggests that the original reports of wilding on the streets reflected mainly media wilding and the national ingrained habit of “blaming the victim.”

Nonetheless, some residents did exploit the chaotic, desperate situation to cherry-pick DVDs, televisions, computers, and other items from deserted stores or offices. A major target was a New Orleans Wal-Mart, where police joined residents in a frenzy of looting, carting off not only essential food and water but also computers and DVD players. The gun section of the Wal-Mart was cleaned out. There were also credible reports of a nursing home bus being carjacked, of liquor stores being broken into, and of car batteries and stereos being stolen.<sup>4</sup>

Some credible eyewitness reports of wilding in the Superdome came from vacationing British students who took shelter there. Jamie Trout, 22, kept a diary, writing, “It was something like Lord of the Flies—one minute everything calm, the next it descends into chaos.” In one entry, he reports that “a man has been arrested for raping a seven year old in the toilet, this place is hell, I feel sick.” Seeing guns, crack cocaine, and threats of violence, the students became so terrified that they formed a cordon with the young women inside and the young men on the outside, using chairs as a protective ring. Zoe Smith, 21, said, “We were absolutely terrified, the situation has descended into chaos.”<sup>5</sup>

A month after Katrina, Judy Benetiz, director of the Louisiana Foundation against Sexual Assault, reported that individual women, who had been too afraid earlier, were coming to medical centers to report being raped. At this writing, the numbers and details have not been officially confirmed, and tales of the rapes of two young girls in the Superdome’s women’s restroom have been officially repudiated. But Benetiz says that individual women are slowly coming forward to report being raped or seeing rapes. Other witnesses filed reports with the police and media. Charmaine Neville, a New Orleans singer and songwriter, told WAFB-TV that she had reported to New Orleans police that “a lot of us women had been raped down there by guys who had come . . . into the neighborhood where we were.”<sup>6</sup>

Regarding snipers, one man, Wendell Bailey, 20, was indicted on October 8 by a federal grand jury on the charge of firing out of his New Orleans apartment window at a military rescue helicopter during the storm. Police found two revolvers and a box of ammunition under his bed. No motive for the sniping was established; it was apparently a form of expressive wilding for pleasure or revenge.<sup>7</sup> . . .

## Corporate Wilding

On September 27, 2005, New Jersey became the first state to sue oil companies for price gouging in the wake of Katrina. A few weeks earlier, New Jersey drivers had reported sudden spikes of oil prices up to \$3.16 a gallon, the highest ever in the state. New Jersey sued Hess, Sunoco, and Motiva Shell, as well as several gas stations, with violating its motor fuels and consumer fraud laws. New Jersey attorney general Peter C. Harvey said the oil companies were involved in “artificial inflation and economic exploitation.” He added that there were other “unconscionable practices” that involved charging consumers’ credit cards for more gas than they had received and filling tanks with low-octane gas while charging high-octane prices, but the price gouging was the corporate wilding that captured consumers’ attention.<sup>8</sup>

All over the country, thousands of motorists called better business bureaus and special government hotlines to report price gouging, often in emergency situations just after the storm. In Alabama alone, a special hotline for price gouging got 890 calls in the few days immediately following the storm, complaining of unjustified price spikes. The Mississippi attorney general’s office received more than 7,000 such calls on its own hotline. This led to attorney generals from more than 30 states conferring on September 1 to coordinate a national antigouging effort.<sup>9</sup>

Tennessee was among the first of several states to file suits against gas station owners, such as Tip Top Mart of Chattanooga, which had allegedly charged more than \$5 a gallon after the storm. These practices understandably led many consumers to see gas station owners as the main culprits. But investigators in states such as Florida believe that it was the oil companies and suppliers that artificially had hiked the prices, leaving many stations no choice but to raise their own prices at the pump.<sup>10</sup>

New Mexico governor Bill Richardson called a special session of his state legislature after the storm to deal with price gouging by the oil companies. In an interview with Richardson, journalist Juan Gonzales noted that, right after the storm hit, Shell had put a notice on its Web site warning consumers of price gouging and asking them to report any stations that they suspected of doing it. But Shell, as Gonzales noted, with the highest profits of any corporation in the world, raised its prices to wholesalers six times in the 10 days following the hurricane. In the third quarter of 2005, following the storm,



Exxon, the biggest U.S. oil company, reported one of the highest corporate quarterly profits in American history of \$10 billion, representing a per-minute profit of \$74,789 during the quarter. Royal Dutch Shell reported its own record profit of almost \$9 billion, and all S&P 500 U.S. oil and gas companies reported an astonishing 62 percent rise in quarterly profits totaling \$25.9 billion, leading a corporate-friendly Republican Congress to summon the heads of the five largest oil giants and interrogate them about oil profiteering.<sup>11</sup> Richardson, a former energy secretary in the Clinton administration, noted that “there’s an unexplained trend between the price of gasoline at the pump and the price of crude. In other words, wholesale prices have nearly tripled. So the increase in prices at the pump and gasoline, what consumers are paying, is disproportionately high.” He said that the “increase is so high” that he and other governors were asking for a more formal investigation by the president and Congress into corporate oil price gouging.<sup>12</sup>

While the oil companies were major wilders, there were wilding plums for a huge range of other giant companies, especially those involved in reconstruction efforts and with useful political connections. Within a month of the storm, the *New York Times* found that 80 percent of the \$1.5 billion in relief and rebuilding contracts had been awarded in no-bid or very limited bidding arrangements, mainly to huge, politically connected corporations such as Halliburton and Bechtel. . . .

## Political Wilding

Political wilding literally created the New Orleans disaster, with former and current administrations failing to fund reconstruction of the levees that would have prevented flooding by a massive hurricane, as well as creating crony appointments incapable of responding to the disaster that they knew was coming. Political wilding after the storm delayed and bungled the governmental response, leading to the tragic loss of life and property that beset millions of mainly black and poor residents. The wilding of an emerging system of “disaster capitalism” allowed the government and its corporate allies to eliminate worker and environmental protections and make astounding profits, all in the name of compassionate conservatism and rebuilding America. The sordid actions of government, to enrich politicians and corporations at the

expense of needy citizens, highlights American wilding as an epidemic starting at the top leadership of the nation, in the White House and on Capitol Hill.

On September 1, 2005, President Bush said on *Good Morning America*, “I don’t think anyone anticipated breach of the levees.” But a FEMA report before September 11, 2001, explicitly named a hurricane disaster in New Orleans as one of the three most likely catastrophes in the United States, along with a San Francisco earthquake and a terrorist attack on New York City. In 2002, FEMA director Joe Allbaugh, a close Bush confidant, ordered a simulation of a New Orleans hurricane that envisioned “that some part of the levee would fail. . . . The water will flow through the city.” Local emergency officials did their own studies. Emergency coordinator Walter Maestri in Jefferson Parish, in New Orleans, announced in September 2002 that a widely publicized simulation of a massive storm led them to “change the name of that storm from Delaney to K-Y-A-G-B—kiss your ass goodbye—because anybody who was here as that category five storm came across was gone.”<sup>13</sup>

Federal and local officials have known at least since 1995, when a hard rain flooded New Orleans and killed six people, that the levees had to be strengthened. In 1995, Congress funded the Southeast Louisiana Urban Flood Control Project (SELA) to help rebuild the levees, and it allocated \$430 million over the next decade to the project. As early as October 2001, though, the New Orleans *Times-Picayune* reported that “federal officials are postponing new projects . . . of SELA,” endangering the city. Modest spending on the program continued until 2003, when the Bush administration cut off most of its funding. In June 2004, with the levees dangerously weakening, the Army Corps of Engineers project manager, Al Naomi, pleaded for \$2 million more from Washington, telling the *Times-Picayune* that “the levees are sinking. Everything is sinking, and if we don’t get the money fast enough to raise them,” he said prophetically, disaster loomed. “The problem that we have isn’t that the levee is low but that the federal funds have dried up so that we can’t raise them.”<sup>14</sup> The Army Corps of Engineers, responsible for a multiyear project to fix the levees, saw its budget cut for the New Orleans Hurricane project repeatedly by the Bush administration:

Fiscal year 2004: Army Corps request: \$11 million; Bush budget: \$3 million

Fiscal year 2005: Army Corps request: \$22.5 million; Bush budget: \$3.5 million<sup>15</sup>

For fiscal year 2006, Bush proposed \$3 million, a precipitous cut after the intense Florida hurricane season and when the Corps of Engineers, New Orleans officials, and others were clamoring for funding for a \$15-million project for Lake Pontchartrain, the Corps of Engineers was seeking \$35 million for new levee construction, and further studies were recommending how to rebuild the levees to protect against the worst hurricanes. A study released eight weeks after the storm by three different teams of independent engineers revealed that design failures by the Corps of Engineers—with the concrete pilings not dug deep enough to withstand even a Category 3 storm surge—were responsible for major levee breaches during Katrina. The catastrophe in New Orleans, that the local New Orleans media and citizens had warned about so many times, would have been prevented had the design flaws been fixed.<sup>16</sup> . . .

What CNN called “The Big Disconnect”—between what the government was saying and what was happening on the ground—illustrated political wilding of disinformation, incompetence, and abandonment. [Michael] Brown said, “I have just learned today . . . that we are in the process of evacuating hospitals, that those are going very well,” while CNN’s medical correspondent, Dr. Sanjay Gupta, was saying, “It’s gruesome . . . when patients die in the hospital, there is no place to put them, so they’re in the stairwells. It is one of the most unbelievable situations I’ve seen as a doctor, certainly as a journalist as well. There is no electricity. There is no water. There’s over 200 patients still here remaining.”<sup>17</sup> . . .

## Societal Wilding

A picture is worth a thousand words. And the pictures that we Americans kept viewing on our TV screens during the Katrina crisis seared our brains: desperate people walking down the interstate from New Orleans like refugees from a third world country with only their shirts on their backs; dead bodies floating in the toxic water of the flooded city; armed bands roaming and looting deserted streets; people begging for police protection at the Superdome and crying out for food and water at the Convention Center.

The faces were black and poor. We had not seen these faces—featured on national TV—for years. The shame of black, urban poverty is a harsh truth of big-city life all over the United States. But most

Americans had forgotten about the urban poor, something that is not an accident, but a design of the politicians and the media.

Katrina exposed that the emperor had no clothes. After years of discussion of the magic of the free market—how it lifts all boats—Katrina woke Americans up to the wilding at the center of our society. We remain a society segregated by race and class, with 40 million poor people and millions more teetering on the edge. The problem has intensified by virtue of deliberate policies carried out by ruling elites who had promised an SUV in every garage and a return to traditional moral values.

Senator Barack Obama of Illinois (D) observed, “I hope we realize that the people of New Orleans weren’t just abandoned during the hurricane. They were abandoned long ago—to murder and mayhem in the streets, to substandard schools, to dilapidated housing, to inadequate health care, to a pervasive sense of hopelessness.”<sup>18</sup>

What Obama didn’t say was that both political parties had abandoned the poor over the last several decades in order to serve their corporate patrons—and that this abandonment is the dominant systemic wilding of our current order. During the New Deal, Franklin Roosevelt challenged the failed corporate regime of the 1920s, mobilizing workers, family farmers, and the poor to recapture government from corporations and helping to create jobs and social welfare for all. But by 1980, in the name of compassionate conservatism, the New Right elected President Reagan with the intent of dismantling the New Deal and restoring government to corporate ownership.<sup>19</sup>

The new corporate regime systemically set about smashing unions, weakening environmental rules, cutting social spending, ending welfare, and siphoning off billions of dollars to “corporate welfare,” while dramatically cutting the taxes of the rich. This deliberate “reverse Robin Hood” policy has had predictable effects nakedly exposed in Katrina. Poverty in America is now increasing. The gap between rich and poor is skyrocketing. The plight of urban African-Americans is worsening. All of this was happening before Katrina but went largely unseen, as Americans became more geographically and economically separated by race and class.<sup>20</sup>

The promise of Katrina is that it opened, at least for a short period, a new window to see through the blinders that have been carefully constructed by ruling elites. The immediacy of the tragedy, the tortured faces of the urban poor, the abandonment and destruction of “the least among us” have the potential to dramatically change the conversation

in America. It is no longer as easy to deny the terror of poverty or America's current segregation by race and class, a new American apartheid. As *Newsweek's* Jonathan Alter writes, Katrina created a change: "For the moment at least, Americans are ready to fix their restless gaze on enduring problems of poverty, race and class that have escaped their attention. . . this disaster may offer a chance to start a skirmish, or at least make Washington think harder why part of the richest country on earth looks like the Third World." Sociologist Andrew Cherlin said of Katrina that "this was a case where the poor were clearly not at fault. It was a reminder that we have a moral obligation to provide every American with a decent life."<sup>21</sup>

But we still lack political leaders and media analysts capable of explaining why this systemic wilding has occurred and how it can change. The Bush administration and Republican congressional leaders have added insult to injury by using the storm to push through the punitive "disaster capitalism" that will intensify the problems of the poor and perhaps ethnically cleanse New Orleans. Indeed, one of the most chilling forms of wilding during the reconstruction was the decision by Congress to pay for rebuilding by dramatically cutting social programs—in the Gulf Coast and around the nation. We were left with the absurdity of cutting antipoverty programs—for education, health care, and social welfare—in the name of helping the poor.

Even white, affluent residents are feeling abandoned, wondering angrily whether any kind of viable city will be rebuilt. On the day before Thanksgiving, November 23, 2005, 12 weeks after the storm, John Biguenet, a novelist and New Orleans resident, wrote that that he does not have much to feel thankful about. "On my way every day to where we used to live," he laments,

*I drive through a city I love that lies in ruins. The park that lines one of the boulevards I follow home is now a solid wall of debris 20 feet high. On the other side of the street, desolate houses destroyed by the flood gape back with shattered windows, open doors and ragged holes in rooftops kicked out by families trapped in their attics when the water rose . . . everything is covered in a pall of gray dust, as if all the color of this once vibrant city has been leached out.*

Biguenet added that only "fifteen percent or so of residents have returned. Most people can't come home . . . half the houses in New Orleans are still not reconnected to the city sewer system and as many still lack natural gas for heating and cooking, 40% have no electricity

and a quarter of the city is without drinkable water.” Beyond the wilding of corporate reconstruction lies the wilding of complete abandonment of New Orleans, and it is still unclear which will triumph.<sup>22</sup>

Only new social movements will bring sane analysis and solutions to the wilding epidemic. Memories of Katrina may yet catalyze them and build support among the public. The role of sociologists is to help build awareness of race and class wilding systems, and to condemn them in forthright terms while offering a new direction.

## Katrina’s Lessons

While Katrina was a perfect wilding storm, it also demonstrated why there is hope. It showed that while wilding has taken over Washington and our nation’s elites, it has not yet swallowed up the rest of our society. Remember first, that much of the looting and other personal wilding originally reported by the media during the storm proved to be false. While it is true that many residents broke into grocery stores, Wal-Marts, or pharmacies, the majority did it to get the food, water, and medicine to help their families and neighbors survive. Rather than participating in a wilding frenzy, most residents exhibited remarkable solidarity, risking their own homes and lives to help others survive.

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## STUDY QUESTIONS

1. Explain what is meant by the concept of "wilding."
2. Based on our experience with Hurricane Katrina, where does "wilding" occur in the social environment?

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## The Social Ecology of Skid Row

### Introduction

Since the early days of the Chicago School, human ecologists, urban sociologists, and deviance specialists have emphasized social structures and life-styles of inhabitants in the “zone in transition,” or “moral zone” located near U.S. central business districts. Classic studies such as Zorbaugh’s *Gold Coast and the Slum* (1929), Reckless’ “Distribution of Commercialized Vice in Chicago” (1926), Thrasher’s *The Gang* (1929), Anderson’s *The Hobo* (1923), and Cressey’s *The Taxi Dancehall* (1932) all portray the deviant aspects of life in the run-down central city slums. More recent studies, such as Suttles’ *Social Order of the Slum* (1967), Rainwater’s *Behind Ghetto Walls* (1970), Gans’ *The Urban Villagers* (1962), and Liebow’s *Tally’s Corner* (1967), have stressed the significance of slum life as an adaptation to social structural conditions. The poor and other inhabitants of central city slums are seen not within a pejorative, deviance framework but more in relation to their adaptations to such situations as economic and social marginality, discrimination, and harassment by legal authorities such as the justice system or urban renewal.

This paper reports the results of an application of a sociological-ecological approach to a study of an urban skid row area. Specifically a sociocultural ecological model is applied to the problem of possibly relocating homeless men who inhabit a blighted area immediately adjacent to a midwestern city’s central business district.



## Defining Skid Row

Sociological studies have generally employed one of two orientations in defining the concept of skid row: it is seen either as a natural area, in the ecological sense, or as a style of life, without geographic boundaries, typical of certain deviant groups.

Ecologically, skid row areas have been typically portrayed as bounded neighborhoods that provide needed institutional services and facilities to inhabitants. Bahr (1973) suggests that cheap hotels and lodging houses, gospel missions, and bars are three necessary elements that “when they appear in close proximity, indelibly mark a neighborhood as a skid row” (p. 123). Other supplementary institutions mentioned by Bahr include the following:

*restaurants, liquor stores, secondhand stores and thrift shops, pawnshops, junk yards, public parks, barber colleges, all night movies, public libraries, banks . . . hospitals, . . . and small grocery stores. (p. 148)*

When agents of social control concern themselves with a skid row area they typically focus on these facilities and their run-down condition. Wiseman (1970) offers a listing of common terms used by professionals to describe the condition of these facilities: “below code,” “deteriorated property,” “dilapidated structures,” “blighted zone,” “detrimental land use,” and “firetraps” (p. 5).

These unattractive physical conditions are easily linked to the essential character of the inhabitants. According to Wiseman (1970),

*studies that speak of stench, degrading social conditions, and urban blight also describe . . . the residents as depressed, down and out, apathetic, mentally and physically ill, the dregs of society, having a dependency problem, lacking in religious belief, needing counseling and psychic support, needing rehabilitation, requiring institutional care, discouraged and frustrated. (p. 6)*

Culturally, skid row has been portrayed as a unique urban subcommunity. Wallace (1965) defines skid row as “an isolated and deviant subcultural community expressing the features of a distinct and recognizable way of life” (p. 96). The proponents of the approach suggest that skid row members are trapped in their life-style by virtue of being stigmatized by outsiders (and themselves) as undesirable. To use Goffman’s (1963) term they are a “discredited” community.

Blumberg, Shipley, and Moor (1971) suggest that urban areas not referred to as skid row also harbor persons with the same social characteristics. They suggest that skid row is really a human condition and not a place. Similarly, Spradley (1970) argues that “the institutions which seek to control and punish these men for living as urban nomads actually draw them into this world and keep them there” (p. 253). Bahr (1973) also argues this way when he suggests that

*the primary problem of the skid row man is not alcoholism. Nor is it advanced age, physical disability and moral inferiority. Instead, the primary problem is that the combined weight of stigmatization which accompanies many different kinds of human defectiveness is focused upon a few men in a distinctive neighborhood. (p. 287)*

In both of these definitions it is clear that the residents of skid row are considered deviant. In the former skid row is a locale; in the latter it is a way of life. In this study skid row is defined as the nexus of these two traditional positions: a geographical area, a natural area where the residents exhibit a life-style that is defined as deviant by the dominant society. What is highlighted in the literature on skid row renewal is a perception of skid row members as objectionable persons who need to be rehabilitated (Vander Kooi, 1973).

## Methods

This research was conducted in a middle-sized midwestern city, with a population of approximately 250,000. Skid row in this city is located immediately east of the downtown along a three-block section of the major east-west thoroughfare. The city’s urban renewal agency and the local downtown development corporation had decided to rehabilitate this section by upgrading the businesses and buildings on the north side of the street and constructing a park, a convention center, and major hotel on the south side. In addition, an old hotel, which at the time housed transients, was to be upgraded as a support facility for the convention center. (At the time these data were collected only the park had been constructed, and a building previously used by the Salvation Army had been acquired.)

A team of sociologists was hired by the urban renewal agency to determine (1) the nature of the population on skid row, (2) where skid row members might be relocated, (3) probable areas to which skid row residents would gravitate in the event of nonrelocation, and (4) ways in

which this relocation could be implemented. The research design used to determine probable outcomes of renovation of this area included both fieldwork and ecological analyses.

Life-style data were generated using standard field research techniques including informal semistructured interviews and observation. Interview schedules were devised and committed to memory by field interviewers. Respondents interviewed included a number of transients, Salvation Army employees, residents, shopkeepers, and police, as well as public and private social service workers. Field notes were not usually taken during the interview in an effort to minimize expected difficulties in obtaining responses but were completed immediately following each interview period. Observations were conducted in and around the skid row area to determine space utilization and locational structure and to obtain a feel for the *geist* (spirit) of the area. Observational data were also noted immediately following observation periods.

Observations and interviews centered on the following:

1. the life patterns of the various groups living around the skid row area;
2. the services needed by and the services provided to these groups;
3. the locational needs of the individuals based on their own life-styles;
4. the responses of these persons to dislocation;
5. the likely ways in which successful relocation of the target population might be conducted; and
6. an estimation of the size of the target population in the skid row area.

Most observations were made in the early spring, and it is therefore probable that perceptions of the size of the population may have been affected by the recency of the winter months. Additionally, it had been a hard winter so movement of the population may have been suppressed.

As a means of testing the validity of the field research design several teams of researchers collected data independently. On completion of the fieldwork, each team was debriefed and their conclusions compared for consistency. Results obtained revealed no major inconsistencies or issues of conflict, so results were accepted as valid.

The ecological analysis portion of this research involved close examination of land use patterns (Firey, 1937; Jonassen, 1949; Michelson, 1976; Seeley, 1956; Jacobs, 1961; Young and Willmott, 1957; Gans, 1962, 1967) in the central area of the city; this area covered approximately 20 square miles.

Individual plot maps were obtained for the targeted area and were analyzed for specific land use patterns and location relative to significant

ecological structures typifying the skid row area. All locations not possessing ecological characteristics similar to the skid row area were eliminated; remaining locations were retained for further analysis as potential sites for skid row relocation.

Using the plot maps of the skid row area, the ecological territory of the local transient group was mapped according to location of significant institutions. Remaining areas were then compared by apparent structure, by plot, and by site visit to determine possible alternative locations. Finally, areas were analyzed according to sociodemographic and ecological structure-specific variables to ensure comparability.

## Findings

Data generated during field research revealed that skid row is the habitat for many significant groups and organizations, and each group plays a significant role in skid row's functioning. The most important of these identifiable clusters of people and organizations are merchants, police, service organizations, and the skid row residents.

### *Merchants*

Merchants (operators of pawnshops, taverns, liquor stores, clothing stores, restaurants, hotels, etc.) on skid row do a limited business with persons in the skid row population. The liquor store, secondhand clothing stores, and taverns in the area do the most business. In general, the merchants expressed a tolerant acceptance of the members of the local population saying that "they don't cause much trouble." Any trouble is easily handled by a call to the police.

Merchants' estimations of the skid row population's size range from 10 to 200. Most merchants believed renewal of the area would encourage the local population to stay and increase the likelihood that more like them would come to the city. One merchant, when asked if the transients were leaving the area, responded, "Why should they? Urban renewal came in and built them nice benches to lie on. They built a beautiful park for them to sleep in."

Merchants in the area were also concerned about the new, period, old-fashioned street lamps, which provide far less light than the modern, high-intensity ones that they replaced. One merchant had his front window broken and merchandise stolen the first night the new lights were used.

In general, the merchants were tolerant of the skid row residents, were skeptical of the consequences urban renewal would have on the area, and did not think that the skid row members would relocate or that their numbers would decline.

### *Police*

The police officers who worked the skid row area were tolerant of the local population. Police tended to view the members more as an eyesore than a real problem. Keeping the peace rather than enforcing the law appeared to be their approach (see Bittner, 1967).

The police gave estimates of the total population on the street (about 100) similar to those given by the merchants. They also thought it unlikely that the skid row residents would move and thought that they needed very little to survive on the street. The police were not aware of any movement by residents to other parts of the city because of changes in the area.

All the officers contended that young people are more of a problem in the area than the residents. (Teenagers tend to use this area for their local weekend “dragging” and drinking sprees.) The police expect that as the area becomes renovated there will be more trouble and more calls to make. Calls in the area made by the police were usually of the nuisance type or involved only minor problems. One officer thought that any attempt to improve the area would achieve only cosmetic results and not involve any real change in social structure.

### *Service Organizations*

The main organizations in the skid row area that provide some service to transients include the mission, the detoxification center, and a day labor personnel recruitment office.

The mission does not cater to the hard-core problem drinkers. Rather it provides clothing, food, shelter, and religious education to persons passing through the city and to a few poor men in need of food at the end of each month who have overextended their social security or other pension checks. On average, about 15 persons sleep in the mission each night.

The detoxification center provides food and shelter for problem drinkers, and it is the major service facility for the hard-core members of the skid row area. The center handles between 18 and 25 persons a night with highest attendance during the last two weeks of the month.

The personnel office offers temporary work opportunities to the residents. Day labor provides an opportunity for residents to quickly obtain a small amount of money; current policy allows a worker to draw \$8 at the end of the day against his paycheck thus allowing some money for a drink, a little food, and possibly a room. Hard-core skid row residents rarely use the personnel office; it is mainly used by transients who also make their homes on skid row for the short period they are in town.

In general, the various service organizations in the skid row area believed that the skid row population was not going to relocate because of urban renewal efforts and portrayed the residents as a collection of various diverse subgroups.

## A Taxonomy of the Skid Row Population

Our research suggests that the population of this skid row area is composed of two major groupings: locals and true transients. The local group, however, can be divided into several significant subcategories.

### *Locals*

The locals were the more stable members of the area. The size of the total group varied with the time of year, available work, and the extent of their individual life problems. This group is best understood by focusing on the four major subgroups making up the larger group.

#### **Young Locals**

The young locals numbered approximately 70–100 persons at any one time. They ranged in age from 20 to 40 years, typically had drinking problems, worked intermittently, lived in cheap housing in the area, and would, given prevailing circumstances, either become more or less a part of the skid row subculture. Their age gave them some flexibility to control their fate. However, it is this group that would eventually become the hard-core local group.

#### **Old Hard-Core Locals**

This was the focal group in the skid row area. Many of the members had lived in this area for most of their lives and some had relatives in the city or nearby towns. They numbered only 10–15 persons but were highly visible because they lived on the street. All had serious drinking

problems. In addition, they were ill, extremely poor, and old. Most were older than 60, and some were in their 70s.

### **Intermittent Older Locals**

This group strayed in and out of the core local population. Although older, some members were still mobile and traveled around the country usually by riding freight trains or hitch hiking. They still considered this skid row area their home territory and had strong friendships with the hard-core locals. (Some even wrote letters in care of general delivery when traveling.) This subgroup numbered from 15 to 20 persons. They were characterized by serious drinking problems and poor health. These men received some money from social security and pensions, and they became highly visible through living on the street when in town.

### **Intermittent Locals**

This group fell in between the local and transient. They spent more than a few days in the city, and some would try to set down roots. Numbering from 20 to 40, they usually had drinking problems, lived in cheap housing, were poor and relatively young, but were also relatively mobile.

### *Transients*

This group lived only a short time in the city; they were just “passing through.” They would avail themselves of the local facilities for a short period and then leave. This group often included families (husband and wife with children). Transients were usually poor but also included some of the middle-class youth who were hitchhiking and backpacking across the country. This was the least stable of the groups in skid row.

## **Salvation Army Resident Center**

Although the Salvation Army had been relocated to an area several miles away on the northern edge of the city it had played an important role in skid row life. At the time of the study the center provided long-term housing and meals for persons who conformed to the program. To fit into the program was to stay sober and typically to work for the Salvation Army in some capacity. A common job was to work on the trucks or on the material docks. The level of group solidarity was quite high, and the residents clearly distinguished between themselves and

the derelicts, as well as between themselves and transients. Transients were persons in transit, whose stay at the center was usually very brief.

The SA bus took residents to their job sites each morning and returned them to the center in time for the evening meal. The returning bus might also bring transients to the center. The number of such transients fluctuated, peaking during bad weather, with minor peaks occurring on weekends. During midweek in good weather, only one transient might be among the returning residents; on a chilly Friday, as many as 15 transients might come to the center. Clearly, the transient group (an entity distinct from the skid row derelicts) represented a minority among center residents, a group as large as 50 persons. The center was not highly regimented, so no one seemed to know exactly how many beds were occupied at any given time. There was also an outflow from the center, again depending on weather, job availability, and idiosyncratic factors.

In sum, the center met the needs of a fairly large and diverse group of persons for whom it was home. There was a certain pride in being a member of the center family. This pride stemmed in part from the resident's awareness of fitting the program. (To get drunk was to risk expulsion from the program.) There were complaints expressed by some, but no one problem was severe enough to produce flight from the center. These persons might have disaffiliated from contemporary society, but most had clearly (and somewhat contentedly) affiliated with the Salvation Army program. So, although previous relationship to skid row was altered by urban renewal, the Salvation Army program relocated its constituent population and maintained its major functions.

## Ecological Structure of Skid Row

The primary territory inhabited by the skid row residents spanned a six-block area adjacent to the central business district and along a major east-west thoroughfare. The most significant characteristics of this area included (1) a liquor store on a corner of the main street, (2) a detoxification center on the northern edge of the area, (3) alleys honeycombing the area, (4) a "drinking tree" at a railroad overpass and main street, and (5) an alley on the south side of the main street and a large hotel.

Locals spent most of their time near the main street in the alleys, on the park benches, and by the drinking tree. Those people, many of whom did not have rooms, slept in doorways, alleys, behind buildings,



under loading docks, or in abandoned warehouses. The remainder of the territory was traversed to reach the detoxification center and a local food store.

For the locals, skid row was a relatively compact area encompassing only a few square blocks. It provided shelter, liquor, access to food, and, the very important factor, easy access to downtown. For the transients who inhabited the skid row area, its territory was not so circumscribed. Transients found skid row a convenient place to find cheap lodging, and it also provided easy access to day labor in the center city. Ecologically, it was the caliber of the hotels in the area and the nearness to the center city that were significant. Use of space other than hotels and center city did not appear as consistent for transients as for locals. This resulted from two conditions: (1) transients' life-styles did not permit them to be as committed to a particular area and (2) location in skid row was more a matter of convenience than design. Because transients resided in the city for only a short time they did not establish the ties to the skid row manifested by locals. Transients sought out skid row because its location provided them with access to the center city, which supported their life-style, and low-cost lodging.

## Discussion

The data presented above suggest that life-style diversity and differences in territoriality among skid row residents would result in several diverse movements of people if urban renewal were to occur as planned. First, upgrading or demolition of cheap accommodations in skid row would probably remove most transients from the area. They would either leave the city or seek lodging in another location. (Other transients moving through the city after renewal would also have to seek lodging elsewhere in low-cost accommodation.) Locals, conversely, because of their ties to the locale and because of their use of specific facilities in skid row (e.g. the liquor store, a specific food market, detoxification center, the drinking tree, the park benches, and the railroad overpass) were found to more likely hold on to the skid row locale.

We find that a socioculture ecological model can provide important insights into the probable effects of urban renewal of a skid row area. Applying this model to a particular skid row has shown a possible explanation for apparently conflicting findings in previous research on skid row renewal. Vander Kooi (1973) argues that skid row renewal

results in the dispersion of the population; Bloomberg and co-workers (1978) show that it is possible for skid row to relocate. What this current study suggests is that the probable outcomes of skid row renewal depend on several factors including (1) the nature of the renewal project, (2) its location relative to the territory defined and used by skid row residents, (3) the types of people who inhabit skid row and the diversity of their life-styles and territorial definitions, and (4) the availability of areas likely to become skid rows in other parts of the city.

It would be expected, for instance, that if most skid row residents consisted of a diverse and amorphous grouping of transients with little affinity for the specific territory they occupied, renewal would result in their dispersion to other low-rent areas. On the other hand, local populations who are tied to the skid row neighborhood would probably not relocate or would move only a short distance depending upon the degree to which urban renewal disrupted their territory. Only if their entire territory were renewed and no new skid row areas existed, would it be likely for locals to scatter rather than relocate. Because their use of space can be seen as being governed both by the location of institutions and sentimental attachment to a local area and certain people, dispersion would not be a likely outcome.

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## STUDY QUESTIONS

1. What do the authors mean by "social ecology"? List some of the parts of this ecology.
2. What types of residents live on skid row? Is transience a social problem? Why or why not?

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**MILTON SAIER**

## Pollution

Crops flourish in a silent season,  
and pelican mothers weep noiselessly,  
waiting at the bus stop with raw throats—they weep  
for dodo birds and progeny lost  
as we, a prolific species, sit down to the  
neverending feast.

Pollutants are harmful chemical or physical substances released into the atmosphere, a water source, the soil or a component of the biosphere. When a new chemical compound is developed and produced in large amounts for commercial or medical purposes, immediate benefits to mankind often result. However, side effects that may not be evident for years or even decades after their introduction may be unfortunate consequences. These side effects may alter human behavior or physiology, but more often their adverse effects are first detected by disruption of a component in the ecosystem. One species will be primarily affected, and this will have a domino effect on many others, up and down the food chain. As a result, massive death of many organismal types, from microorganisms to large plants and animals will occur. In this essay I cite a few well-documented examples out of thousands of similar cases where pollution has had a dramatic effect on our lives and our planet.

### Particle Pollutants

"They're so small you can't see 'em,  
But when you wheeze and sneeze, it may be 'em."

The results of a recent UCLA–USC-based study, published in the journal, *Environmental Health Perspectives*, showed that microscopic

airborne particles disrupt cellular processes, harming the human body. These particles are normally present in dust and smoke, but they are most prevalent in the exhaust that results from the burning of fossil fuels. They are so small, that over 10,000 can fit on the head of a pin! Because of their inert nature, they can bypass the body's normal defense mechanisms.

These particles not only penetrate the lungs and bloodstream, they are also found deep inside the cellular organelles of our body tissues, causing oxidative stress and damage, for example, to the powerhouse of the cell, the mitochondrion. The presence of these particles shortens life span and leads to common pathologies such as cancer and heart failure. In less dramatic cases, they reduced lung function. Their presence is believed to be responsible for cases of asthma in hundreds of thousands of people in the LA area alone.

Associated respiratory problems have led to school absences and hospital admissions. In fact, the Los Angeles basin proved to be one of the worst places in the nation for particle pollution. However, throughout U.S. urban communities where traffic and industry are prevalent, the consequences of particle pollution have been documented. It seems clear that a major fraction of the U.S. population suffers some adverse consequence of particle pollution.

## Toxins

"Lacewings and ladybirds, mind where you roam,  
The plants are all poisoned that once were your home.  
They've spliced in a toxin to kill off the pests.  
Now friendly bug-eaters will die like the rest."

The bodies of Americans carry an array of toxins derived from plastics, cosmetics, food additives, and even pesticides banned decades ago. Importantly, fetuses, infants and young children contain much higher levels than do adults. Researchers believe that these pollutants can permanently alter a child's intelligence, memory, motor skills, behavior, and immune system. Organophosphate pesticides, for example, present in bug bombs and lawn sprays, have been shown to cause abnormal brain development, and many of these compounds are present in children's brains at more than twice the levels found in adults! Since children eat, drink and breathe three times as much as adults on a weight basis, these statistics are not entirely unexpected.

Although DDT was banned for use as a pesticide back in the 1970s, it can still be found in the bodies of American children. This long-lasting compound remains unaltered for decades in the soil, from which it can be accumulated by plants, and then concentrated by grazing animals. Since DDT and other poisons have been found to increase the incidence of cancer in adults, the danger to young children may be of major concern.

The problem of chemical pollution has recently been elevated to a new level of concern as a result of genetic engineering. Genetically modified plant crops are already being used to provide food for the burgeoning human population, currently increasing at the incredible rate of 250,000 people per day. To counteract the costly effects of pests on crops, genes encoding pesticides have been introduced. At a recent meeting of entomologists, it was noted that some genetically engineered crops exude 10–20 times the amounts of toxins contained in conventional bug sprays. These chemicals kill beneficial insects such as bees and ladybugs and inhibit the growth of beneficial soil microorganisms, such as those that provide natural nitrogen fertilizer by fixing nitrogen in root nodules of alfalfa, peas and beans. Finally, these toxic agents harm the insect-eating birds that were the traditional sources of pest control before mankind decided to “improve” upon Nature.

Some environmental chemicals have been shown to mimic the normal hormonal responses of the human body, causing suppressed immunity, inhibited brain development and feminization of boys. Comparable effects have been documented in wild animal populations. It seems likely that such chemicals will prove to affect a major part of the biosphere upon which we depend. The prospects are ominous to say the least.

## DDT and the California Pelican

“A wondrous bird is the pelican,  
His beak holds more than his belican.  
He can take in his beak,  
Enough food for a week!  
I'll be damned if I know how the helican!”

—Dixon L. Merritt

I remember as a boy watching the spectacular California pelicans dive for fish, marveling at their remarkable eyesight and skill. In fact, these pelicans provided our family with endless amusement as we

watched the ever-changing show they would put on for us. Then in the early 1970s, these remarkable birds disappeared. For years not a single pelican was sighted in the Monterey Bay. At first, we had no idea why.

The brown pelican breeds in large colonies in a few choice locations on the Channel Islands in Southern California, along the Baja peninsula and in the Gulf of California, Mexico. During the summer months, they fly northward from their breeding grounds as far as Vancouver, Canada. These impressive birds, with silvery coloration, massive bills and unparalleled throat pouches, are the only species of pelican that dives frequently for its prey. Its primary source of nutrition is small surface schooling fish such as anchovies and sardines.

Because the species nests in large colonies on small-island breeding sites called rookeries, the brown pelican has in the past been the target of egg hunters who raided the rookeries by boat. They were also hunted throughout the 19th and 20th centuries for their feathers. Still worse, fishermen who erroneously thought them to be competitors for commercially valuable fish slaughtered thousands. As a result, by 1970, brown pelican populations along the coast had been reduced to less than 20% of their normal numbers.

Losses due to exploitation were dwarfed by the dramatic tragedy that befell these birds during the early 1970s when they essentially disappeared from the California coast. Pesticides such as DDT and endrin were then used to kill mosquitoes and other insects, and unknown to those of us who used DDT, it interferes with the process of calcium deposition, necessary for the formation of eggshells. Pelican eggs became too thin and brittle to allow the parents to successfully incubate their clutch.

The disappearance of the California pelican was researched, revealing that DDT runoff into streams that emptied into the oceans was responsible. Pesticide “biomagnification” resulted because non-lethal doses are ingested and concentrated by the fish that the pelicans consume. Many birds died due to the accumulation of lethal doses, but the problem of eggshell thinning resulted in almost complete reproductive failure. On Anacapa Island off the California coast, in one year, only a single fledgling survived out of 552 nesting pairs. The number of pairs at this site had exceeded 10,000 prior to human exploitation and the use of DDT.

In 1972, the cause of the tremendous reduction in the pelican population became recognized, and DDT as well as other related pesticides were banned by the U.S. Environmental Protection Agency. Gradually

the brown pelican, which had remained viable off the Baja coast, returned to California. Since then, numbers have significantly increased, and with the help of naturalists, old breeding and nesting sites have been recovered. In 1997, about 4,000 breeding pairs on West Anacapa Island were identified. The crisis induced by DDT was over for the pelican, but the full extent of damage to these and many other species will never be fully comprehended.

## Atrazine and Frogs

"Frog, he goes a wootin',  
But she says: no cooin', nothing doin'."

Atrazine is a stable chemical herbicide used in countries that produce corn. In the U.S., atrazine is the most widely used weed killer. The production and sale of this one compound results in multibillion-dollar profits for the herbicide industry. This compound has been detected in the oceans and fresh waters of countries distant from those that use it, showing that it is stable enough to circle the globe. It exerts measurable effects on wildlife virtually everywhere on Earth.

Recent studies conducted in the laboratory of Tyrone Hayes at the University of California, Berkeley, linked the presence of very low levels of atrazine to developmental abnormalities in both experimental and wild populations of frogs. Specifically, Hayes' studies showed that the compound turns nearly half of the exposed male frogs into transsexual hermaphrodites. Some male frogs develop multiple sex organs, while others have both ovaries and testes, a characteristic of the hermaphrodite. A majority of exposed frogs also showed shrunken larynxes, a crippling handicap for a frog wishing to call to and then mate a female. It is probable that these effects are at least in part responsible for the huge decline in amphibian populations worldwide.

History tells us that research conducted by scientists who are paid to get a specific answer is not likely to be reliable. For example, the tobacco industry conducted research "proving" that smoking cigarettes is not harmful to human health. As we all know, however, extensive research conducted by impartial workers has revealed that it is so harmful that it cuts an average of 20 years off a person's life! Thus, although Hayes' conclusions have been challenged in studies funded by the major producer of atrazine, Syngenta, the results of Hayes' challenges can probably be discounted.



The amounts of atrazine that cause measurable effects on frog sexuality proved to be more than 30-fold *lower* than the “safe level” amount set by the Environmental Protection Agency for our drinking water. Could the compound also affect humans? Possible effects on human sexuality and fertility should be considered. Dramatic decreases in human male fertility in the U.S. over the past few decades are well documented. Moreover, puzzling rises in premature human birth over the past 20 years is also documented. Is there a connection with atrazine? One study revealed that male workers at a Louisiana plant where atrazine is made exhibited incidents of prostate cancer nearly 10 times that observed for the average male Louisianan.

In light of these findings and possibilities, one might assume that the use of this herbicide would be strictly prohibited. In fact, this is the case in most European countries. However, in the U.S. and most third world countries, no such regulation is in effect. The levels of atrazine worldwide continue to increase at an alarming rate.

## Agriculture and Coral

“A fish who seeks a reef,  
In brief, is in for grief.”

Coral reefs are the major breeding grounds for innumerable species of fish and shellfish. As the human population has grown, first with the advent of agriculture, and later with the industrial revolution, the balance of nature in the oceans has been upset and then largely destroyed. At the end of the 20th century, it was conservatively estimated that one-third of the world’s coral reefs are dead, over one-third are sick and dying, and less than one-third remain healthy. This fact accounts only in part for declines in commercially important marine fish populations, which have been reduced to only a few percent of their pre-exploitation levels. One-third of all still surviving fish species worldwide are endangered. This is the largest percentage for any one type of animal.

Many studies have focused on the destruction of our coral reefs, leading to the conclusion that there are multiple causes. First, rising temperatures lead to “bleaching” which can result in coral death. Second, increasing concentrations of atmospheric CO<sub>2</sub> make the carbonate chemistry of the oceans less favorable for calcification, an essential process for coral development. Third, bacterial and viral

pathogens have been identified as primary causes of coral polyp death, but susceptibility to these microbial diseases may result secondarily from severe weakening of the organisms' defenses.

Recent studies have shown that a fourth major source of coral instability is related to agricultural practices that have been developed and expanded over the past couple of centuries. This conclusion does not target a specific pesticide or fertilizer, although these may contribute to the demise of the coral building polyps. Instead, it appears that increased sedimentation of particulate matter from continental material is a primary cause. Extensive use of agriculture accompanied by alternating periods of drought and heavy rainfall promote erosion that results in the periodic transportation of vast amounts of soil to the oceans. This sediment poses a hazard to reef building corals, first by decreasing access to light and second by interfering with normal feeding practices.

To document the importance of agriculture sedimentation, McCulloch and his coworkers developed methods for measuring the history of sedimentation on Australia's Great Barrier Reef. The results showed that sedimentation increased dramatically following European settlement and agricultural expansion in northeastern Australia.

Coral preserve the history of terrestrial sediment delivery as they build their skeletons of calcium and carbonate because they accidentally incorporate traces of other elements, depending on availability. Suspended sediments from river water, for example, contain barium, a calcium analogue. This gets incorporated into the long lasting coral skeleton in proportion to its concentration in the seawater. Since the skeletons grow at a rate of less than one inch per year, conditions over the ages can be determined and dated for the coral skeletal matter, just as the contents of the rings of a redwood tree can be used to estimate events that took place in its environment over the duration of its long life. Happily, however, a large mass of coral need not be destroyed in order to conduct the experiment.

Detailed studies have allowed quantitation of the amounts and types of sedimentation from 1750 to the present. Sediment levels increased dramatically, about 10-fold, after 1870, shortly following European settlement when both average and maximal barium levels increased. Domestic grazing and land clearance were considered to be the main culprits, increasing erosion. The use of independent research methods allowed confirmation of these conclusions.

The results of these long-term studies in Australia's Great Barrier Reef have been generalized to many other parts of the world. For example, in East Africa, the study of marine corals revealed a similar story of erosion prompted by colonial agricultural practices during the early 20th century. We therefore know that sedimentation has influenced the health and distribution of coral species worldwide.

Global warming is believed to increase the erratic nature of seasonal climate change. This means that erosion, marine sedimentation, and the consequent loss of healthy coral polyp life are likely to increase as human-produced greenhouse gases accumulate. The tragedy of man-promoted coral destruction thus provides one more example of how we are inadvertently disturbing the balance of nature through seemingly harmless activities meant only to sustain the human population.

Taken together we see that almost every aspect of man's activities, our agricultural practices, the burning of fossil fuels, destruction of the forests and wetlands, hunting and fishing, the use of chemicals that alter the balance of nature, the use of medicines that alleviate suffering and prolong life, all add to the global levels of pollution, endangering our delicate biosphere and altering the physiology and behavior of our own species. To me, it seems clear that none of these problems can be truly solved until we have dealt with the primary cause: a tremendously excessive human population. If we can find a rational solution to this problem, then the human race has a chance for long-term survival. If not, we will undoubtedly learn the hard way: through suffering, death and devastation.

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## STUDY QUESTIONS

1. What is the most important cause of the breakdown in our ecosystem at the human level?
2. What happens to our ecosystems as we lose species and polar ice caps?