

Native American Reservations and Toxic Wastes, 2000-2008

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Native Americans

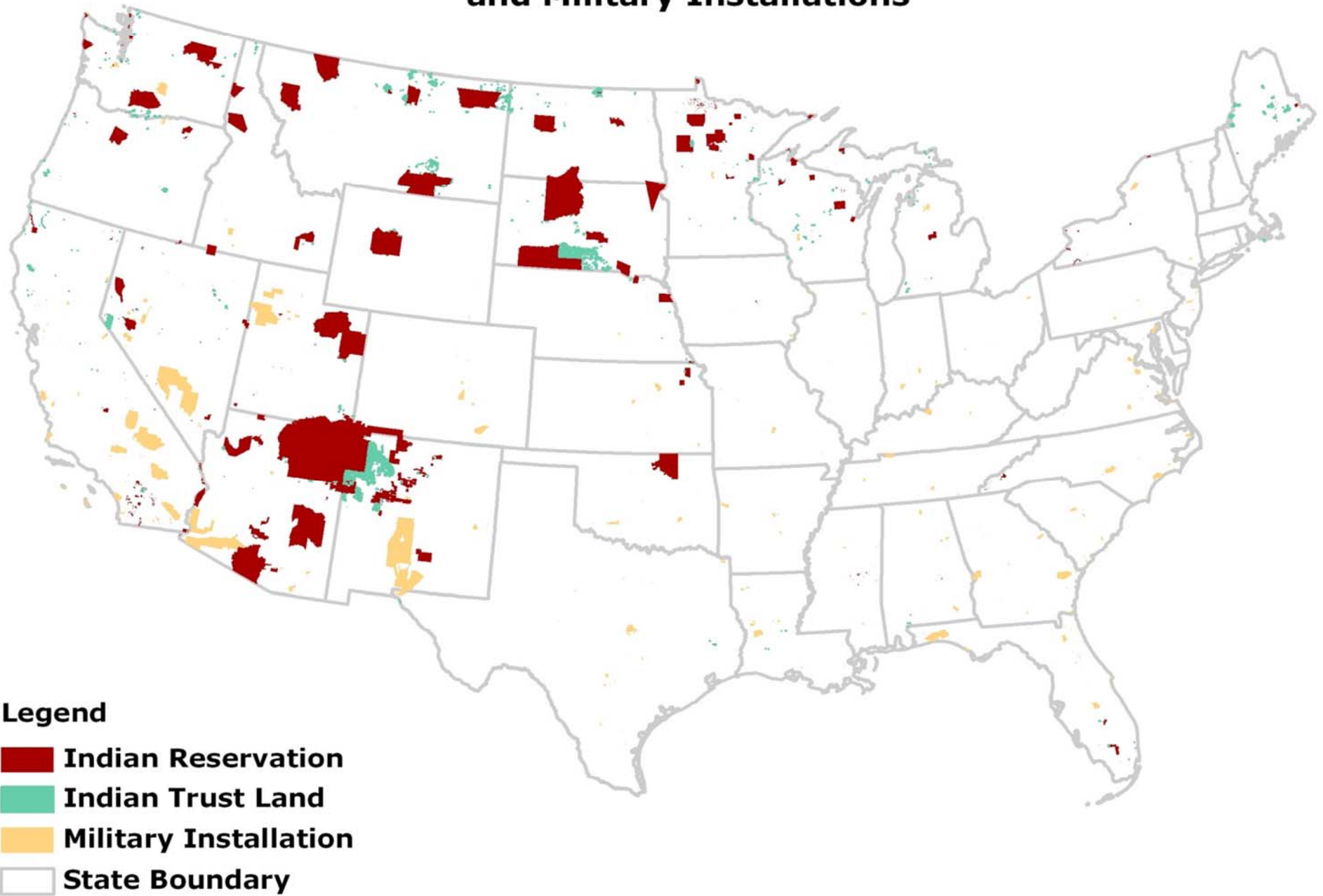
According to 2008 US Census Bureau's projections:

- 3.08 million people are Native Americans alone
- 4.86 million include other races
- The federal government recognizes 564 tribes, each having government-to-government sovereignty

Native Americans

- 34% of Native Americans reside on 326 reservations; 66% reside in urban areas
- These reservations are located on 56.2 million mostly rural acres.
- The largest reservation is the 16 million-acre Navajo Nation Reservation located in Arizona, New Mexico, and Utah.
- The smallest is a 1.32-acre parcel in California where the Pit River Tribe's cemetery is located. Many of the smaller reservations are less than 1,000 acres

Figure 1. Indian Reservations, Indian Trust Lands, and Military Installations



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Two theoretical themes underlie our study:

(1) Hooks and Smith (2004)... **“treadmill of destruction.”** Geographical and temporal patterns of industrialization, suburbanization, militarism, migration, in addition to segregation policies historically defined injustices against Native Americans.

“...militarism generated the environmental dangers, and [political] coercion dictated the location of the reservations.”

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(2) Hazards-of-place model of vulnerability

proposes that hazard potential is the product of an interaction between risk and risk mitigation. It culminates with biophysical and social vulnerabilities to a hazard defining the overall “vulnerability of place” (Cutter et al 2003).

Native American reservations and communities located on trust lands suffer from vulnerability of place.

Data Sources and Methods

Geographical shape files of Native American reservations (MAF/TIGER Feature Class code G2101) and land trusts (code G2102), and US military installations (code K2110) from the National Atlas of the United States (<http://www.nationalatlas.gov/metadata/fedlanp020.faq.html>).

Demographic data from US Census Bureau 's Summary File 3 of its 2000 Census of Population and Housing and geo-boundaries of states, counties and census tracts in its 2009 Topologically Integrated Geographic Encoding and Referencing (TIGER) system (<http://www.census.gov/geo/www/tiger/>).

The United States had 65,443 tracts in the 2000 census.

Table 1. Socio-Economic Conditions of 2000 US Census Tracts with Toxic Chemical Waste Releases on Native American Reservations, Trust Lands, and US Military Installations, 2000-2008.

Native American GeoCategories^a	2000 Census Tracts	Total Population	Land Area (acres)
Not in Study Areas (0)	40,993	172,464,537	920,348
Not in Study Areas (1)	13,519	61,481,297	467,340
Reservations (0)	1,666	6,773,427	279,003
Reservations (1)	603	2,705,300	136,306
Trust lands (0)	202	804,899	20,467
Trust lands (1)	99	401,091	7,840
Military installations (0)	4,575	20,297,051	213,086
Military installations (1)	1,842	8,931,345	132,441
Res. - trust land adj. (0)	722	2,355,823	286,738
Res. - trust land adj. (1)	213	983,763	93,205
Res. - mil. adj. (0)	471	2,014,868	541,543
Res. - mil. adj. (1)	205	991,025	153,016
Trust lands - mil. adj. (0)	25	91,133	7,272
Trust lands - mil. adj. (1)	17	61,720	2,639
Res.- trust land - mil. adj. (0)	185	638,854	133,090
Res.- trust land - mil. adj. (1)	106	425,773	143,104
TOTAL	65,443	281,421,906	3,537,438

a. One indicates the present of at least on facility that reported on- and off-site toxic chemical releases to the Toxics Release Inventory. Zero indicates that tracts had no facilities that reported releases.

Table 1. Socio-Economic Conditions of 2000 US Census Tracts with Toxic Chemical Waste Releases on Native American Reservations, Trust Lands, and US Military Installations, 2000-2008.

Native American GeoCategories^a	Population Density	Percent Poverty	Median Family Income (\$)	Percent Unemployed	Percent Not High School Graduate
Not in Study Areas (0)	187.39	9.16	51,817	5.81	19.19
Not in Study Areas (1)	131.56	9.44	47,088	5.55	22.00
Reservations (0)	24.28	8.71	48,145	6.10	17.32
Reservations (1)	19.85	8.81	45,506	6.10	18.75
Trust lands (0)	39.33	9.09	46,675	5.86	19.23
Trust lands (1)	51.16	8.84	44,260	5.92	19.76
Military installations (0)	95.25	8.14	51,802	5.14	16.70
Military installations (1)	67.44	9.05	47,111	5.25	19.74
Res. - trust land adj. (0)	8.22	11.46	42,201	7.35	19.69
Res. - trust land adj. (1)	10.55	10.09	43,963	6.67	20.84
Res. - mil. adj. (0)	3.72	9.96	47,993	6.97	19.30
Res. - mil. adj. (1)	6.48	10.57	43,561	6.77	20.87
Trust lands - mil. adj. (0)	12.53	7.40	43,305	5.22	16.21
Trust lands - mil. adj. (1)	23.39	11.25	41,287	5.98	21.67
Res.- trust land - mil. adj. (0)	4.80	10.21	42,629	6.38	17.91
Res.- trust land - mil. adj. (1)	2.98	9.12	42,612	6.95	19.54
TOTAL	76.56	9.46	45,622	6.13	19.29

a. One indicates the present of at least on facility that reported on- and off-site toxic chemical releases to the Toxics Release Inventory. Zero indicates that tracts had no facilities that reported releases.

Table 2a. General Linear Models of Socioeconomic Characteristics and Selected Pairwise Comparisons among Geo-categories of Native American Reservation, Trust Lands, and US Military Installations with and without Toxic Chemical Waste Facilities.

Characteristics	Mean	R-Squared	F Value	Pr >F	Model/ Total DF
Population density	5,293.7	.0441	200.80	.0001	15/65308
Percent impoverished	10.5	.0028	12.25	.0001	15/64881
Median family income	51,152.3	.0196	87.43	.0001	15/65442
Pct. unemployed	6.6	.0031	13.43	.0001	15/64994
Pct. high school graduate	29.1	.0463	210.41	.0001	15/65074

Do tracts with toxic waste facilities differ from those without such facilities?

As shown in Table 2a, the F values of all five GLM models were statistically significant, thus permitting pairwise comparisons of the 16 GeoCats.

We tested a total of 600 comparisons, among which 127 were statistically significant across all of the models. The most relevant comparisons are reported next.

Table 2b. Selected t-test Results for Geo-categorical Comparisons of Census Tracts with (1) and without (0) Facilities That Reported Toxic Waste Releases to the TRI Program.

Not in study areas (0) v. Reservations (0)	A	--	C	--	E
Not in study areas (0) v. Trust lands (0)	A	--	C	--	E
Not in study areas (0) v. Military installations (0)	A	B	--	D	--
Not in study areas (0) v. Reservations-trust lands adjacent (0)	A	B	C	D	E
Not in study areas (0) v. Reservations-military adjacent (0)	A	--	C	--	--
Not in study areas (0) v. Trust lands-military adjacent (0)	--	--	--	--	E
Not in study areas (0) v. Reservation-trust lands-military adj. (0)	A	--	C	--	E

a. Tukey-Kramer test for Type 1 error with alpha = .05.

b. Statistically significant for: A = population density; B = percent impoverished; C = median family income; D = percent unemployed; and E = percent non high school graduate.

Table 2b. Selected t-test Results for Geo-categorical Comparisons of Census Tracts with (1) and without (0) Facilities That Reported Toxic Waste Releases to the TRI Program. (Cont.)

Not in study areas (0) v. Not in study areas (1)	A	--	C	--	E
Reservations (0) v. Reservations (1)	--	--	--	--	E
Trust lands (0) v. Trust lands (1)	--	--	--	--	--
Military installations (0) v. Military installations (1)	A	B	C	--	E
Res. - trust lands adj. (0) v. Res. - trust lands adj. (1)	--	--	--	--	--
Res. - military adj. (0) v. Res. - military adj. (1)	--	--	--	--	--
Trust lands - military adj. (0) v. Trust lands - military adj. (1)	--	--	--	--	--
Res. - trust lands - military adj. (0) v. Res. - trust lands- military adj. (1)	--	--	--	--	--

a. Tukey-Kramer test for Type 1 error with alpha = .05.

b. Statistically significant for: A = population density; B = percent impoverished; C = median family income; D = percent unemployed; and E = percent non high school graduate.

Table 2b. Selected t-test Results for Geo-categorical Comparisons of Census Tracts with (1) and without (0) Facilities That Reported Toxic Waste Releases to the TRI Program . (Cont.)

Reservations (1) v. Not in study areas (1)	--	B	--	--	--
Reservations (1) v. Trust lands (1)	--	--	--	--	--
Reservations (1) v. Military installations (1)	--	--	--	--	E
Reservations (1) v. Reservation-trust lands adjacent (1)	--	--	--	--	--
Reservations (1) v. Trust lands-military adjacent (1)	--	--	--	--	--
Reservations (1) v. Reservation-military adjacent (1)	--	--	--	--	--
Reservations (1) v. Reservation-trust lands-military adjacent (1)	--	--	--	--	--

a. Tukey-Kramer test for Type 1 error with alpha = .05.

b. Statistically significant for: A = population density; B = percent impoverished; C = median family income; D = percent unemployed; and E = percent non high school graduate.

Table 3. Toxic Chemical Releases on Native American Reservations, Trust Lands, and US Military Installations, 2000-2008.

GeoCategories	Census Tracts	Mean No. Facilities	-----Billions of Pounds-----		
			On-site Releases	Off-site Releases	Total Releases
Not in Study Areas	13,519	19,312	18.17	4.40	22.97
Reservations	603	731	3.28	.23	3.51
Trust lands	99	98	.04	.01	.05
Military installations	1,842	2,632	5.68	.34	6.02
Res. - trust land adj.	213	261	3.74	.07	3.81
Res. - military adj.	205	251	5.25	.11	5.36
Trust lands - mil. adj.	17	34	0.24	<.01	.25
Res.- trust land - mil. adj.	106	110	1.18	<.01	1.18
TOTAL	16,604	23,429	37.58	5.56	43.15

a. Each 2000 Census tract that had a facility which reported toxic chemical releases to the US Environmental Protections Agency's Toxics Release Inventory.

Source: US Environmental Protection Agency. 2009. Washington, DC: Toxics Release Inventory Program. <http://www.epa.gov/triexplorer/>.

Summary

- (1) Native American reservations and trust lands are located in rural areas with low populations densities.
- (2) Our findings supported other findings that Native Americans residing in non-facility and facility-tracts are more disadvantaged than the rest of the US population.
- (3) Results showed that differences exist between tracts with and without waste facilities, but only for the rest of the nation and for non-adjacent military installations. There were no statistical differences between tracts on the 5 geo-categories of Native American lands. In other words, reservations and trust lands have poorer socioeconomic conditions regardless of the presence toxic waste facilities.

Summary

(4) Although we did not assess the health risks and impacts caused by exposure to toxic wastes, our findings indicated for the majority of this decade the ubiquity of toxic chemical waste nationally and on Native American lands and military installations.

- 1 in every 4 census tracts in the United States has at least one toxic release facility.
- About 1 in every 8 tracts with facilities is located on reservations, trust lands and adjacent-only military installations.
- Facilities located in these tracts released almost 1/3 of the toxic chemical wastes in the US, or 345 pounds per Native American living in the US.
- Tracts defined by military installations adjacent to Native American lands were involved in 18.3 percent of these on and off-site releases.