



# A Geospatial Approach for Environmental Justice Reviews

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# Overview

- **Environmental Justice (EJ)**
- **Regulatory Drivers**
- **Minority and Low-Income Populations**
- **Impact Pathways**
- **Benefits of Using ArcGIS in EJ Analyses**

# What is Environmental Justice?

**Environmental Justice (EJ) is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.**



# What is Environmental Justice?

## A disproportionate health risk example:

- Childhood lead poisoning is a major preventable environmental health problem in the US.
- Children from all social and economic strata can be affected, although the children at greatest risk of lead exposure are those who live in older housing and are living in poverty.
- Some racial and ethnic groups (e.g., African-Americans and Mexican-Americans) are disproportionately affected by lead poisoning.

# What are the Regulatory Drivers?

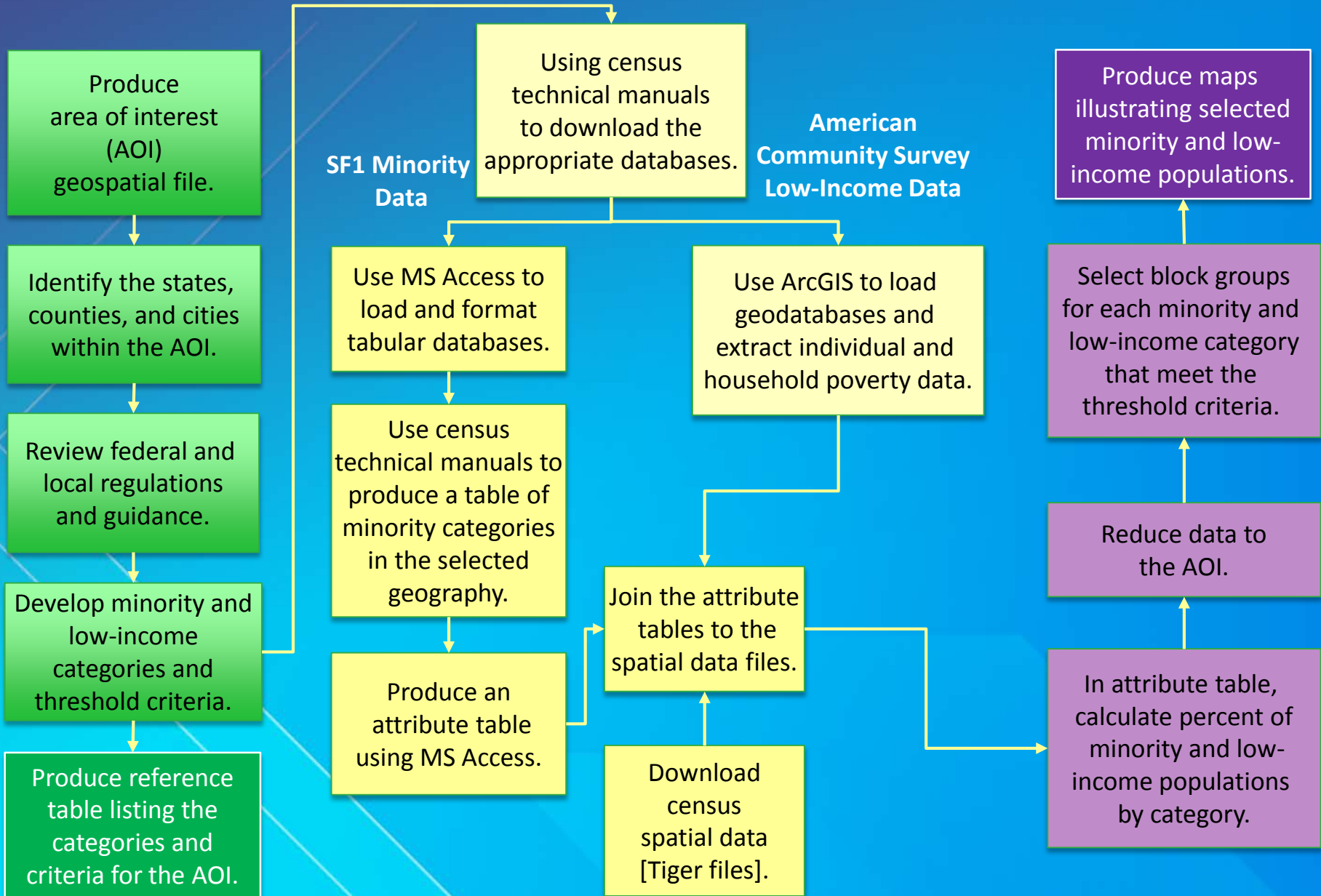
- ***Executive Order 12898***
  - An order directing each federal agency to consider EJ by identifying disproportionate and adverse health or environmental effects of its activities on minority and low-income populations.
- ***National Environmental Policy Act (40 CFR Parts 1500-1508)***
  - Under NEPA, a discussion of social and economic effects is warranted if they are related to the natural or physical effects, and the definition of “effects” includes economic and social factors.
  - Implementation of NEPA defines “effects” to include economic and social effects, whether direct, indirect, or cumulative.
- **All projects requiring a NEPA analysis must include EJ reviews.**

# Identifying Minority and Low-Income Populations

## Stage 1

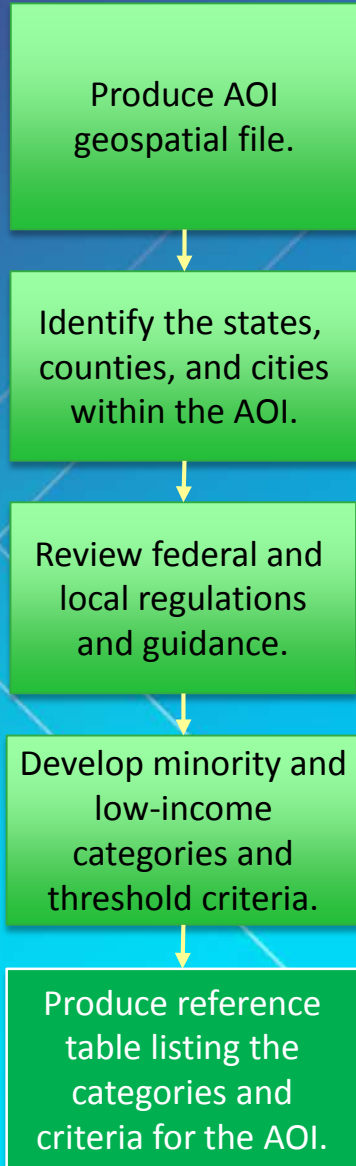
## Stage 2

## Stage 3



# Stage 1: Initial Research and Development of Criteria

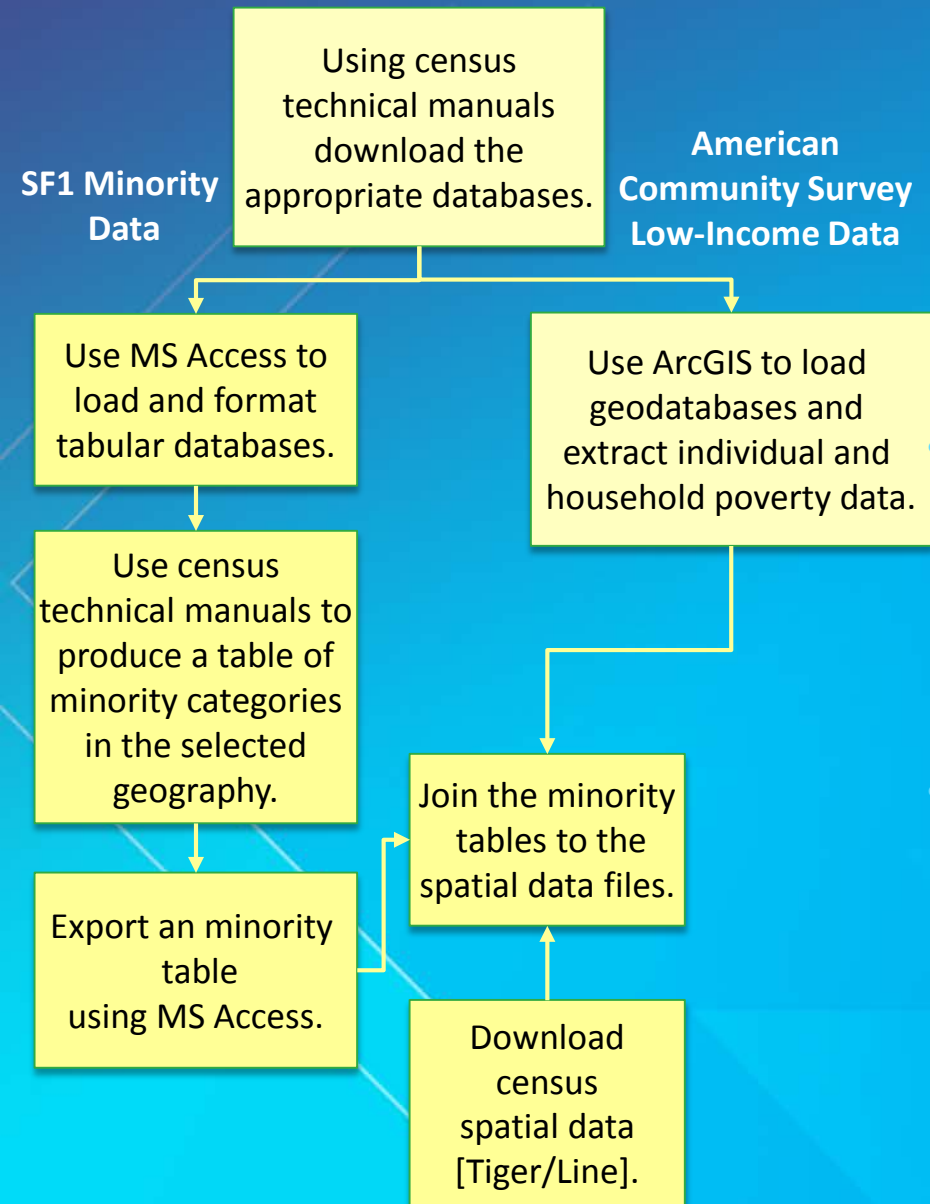
## Identify AOI and Minority / Low-Income Categories



- **Determine the AOI for the Proposed Project.**
  - Generally defined as the maximum extent of the project-related impacts.
- **Identify the States, Counties, and Cities within AOI**
  - Depending upon the size of the AOI, a geographic area of comparison will be selected.
  - This area is often the state or county the AOI is located within.
- **Review the EPA Guidance, Executive Order 12898, and Applicable City, County, or State Guidance.**
- **Based on these requirements:**
  - Develop minority (e.g. race and ethnicity) and low-income (e.g. individual and household) categories, and
  - Determine the minimum threshold criteria for the geographic area of comparison that will be used to identify minority and low-income populations.
- **Produce Reference Table**



# Stage 2: Create Minority and Low-Income Geospatial Data



- **Download US Census and American Community Survey (ACS) Data**

- Summary File (SF1) data is in a comma delineated format and the associated spatial data is in a Tiger/Line shapefile.
- ACS data is available as a geodatabase.

- **Use Microsoft Access to:**

- Format and organize SF1 data and extract minority population data.
- SF1 data contains many attributes that are not needed for this evaluation.

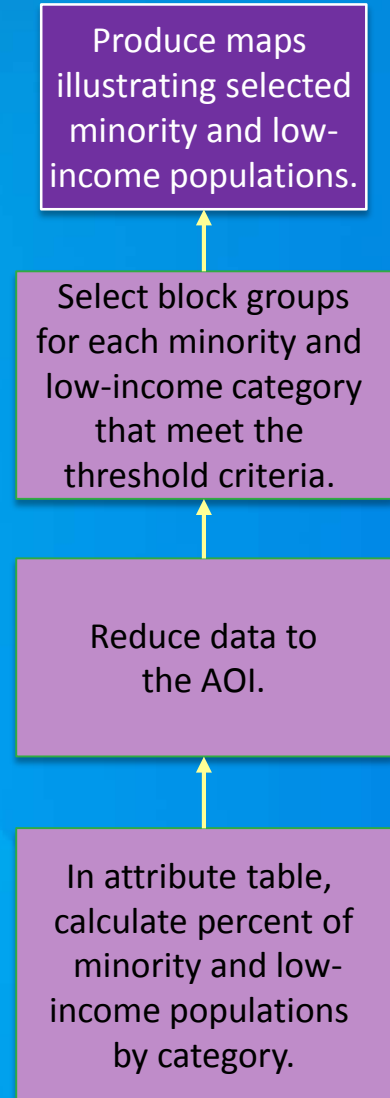
- **Use ArcGIS to:**

- Organize and extract ACS data.
- Join SF1 and Tiger/Line data.
- Assess minority and low-income data.



# Stage 3: Identifying Minority and Low-Income Populations

- **Calculate Percentage of Minority and Low-Income Populations**
  - For each minority and low-income category, calculate the percentage of that population for each block group.
- **Reduce Data to AOI**
  - The minority and low-income data is clipped to the AOI.
  - This will allow for an accurate block group count and comparison.
- **Select Block Groups that Meet the Threshold Criteria**
  - The percentage of each minority and low-income category for each block group is compared to the minimum threshold criteria (calculated in Step 1).
  - If the percentage in the block group, for any category, exceeds the minimum threshold criteria, then the block group is identified as a minority or low-income population.



# Process Example: Selecting Block Groups in ArcGIS

Table

SanBernardino\_tl\_2010\_06071\_bg10\_with\_SF1\_P3\_P4\_Data

COUNTYFP10	Total	P3_D002	P3_D003	P3_D004	P3_D005	P3_D006	P3_D007	P3_D008	P4_D002	P4_D003	PctBlack
071	2530	984	333							1563	13.162055
071	1431	511	251							902	17.540182
071	1434	695	34							1223	2.37099
071	812	389	135							379	16.625616
071	2511	1490	61							1967	2.429311
071	8744	3764	1739							5016	19.887923
071	8442	6429	575							1859	6.811182
071	954	773	35							114	3.668763
071	1268	1105	17							180	1.340694
071	2202	684	584							1006	26.521344
071	1733	594	508							618	29.313329
071	1730	619	245							810	14.16185
071	0	0	0							0	0
071	1116	530	168							667	15.053763
071	2786	969	651							1690	23.366834
071	1092	615	150							647	13.736264
071	1988	1038	215							1245	10.814889
071	1893	945	318							915	16.798732
071	1162	428	296							522	25.473322
071	2392	761	641							1343	26.797659
071	842	449	72							470	8.551069
071	1041	683	31							926	2.977906
071	1233	832	90							388	7.29927
071	1272	754	209							589	16.430818
071	1322	719	172							775	13.01059
071	3912	2014	592							1776	15.132924
071	1599	811	263							732	16.44778
071	1935	1106	213							1122	11.007752
071	2829	1591	469							1243	16.578296
071	1576	1106	15							633	0.951777
071	2037	746	55							421	2.700049
071	2182	1157	109							591	4.995417
071	1931	756	118	9	859	4	75	110	1460	471	6.110823
071	1937	895	110	11	626	1	184	110	1356	581	5.678885
071	1644	709	108	6	622	1	103	95	1223	421	6.569343
071	2536	885	118	4	1217	7	133	112	1088	570	5.826682

Select by Attributes

Enter a WHERE clause to select records in the table window.

Method : Create a new selection

"FID"  
"STATEFP10"  
"COUNTYFP10"  
"TRACTCE10"  
"BLKGRPCE10"

= <> Like  
> >= And  
< <= Or  
\_ % ( ) Not

Is Get Unique Values Go To:

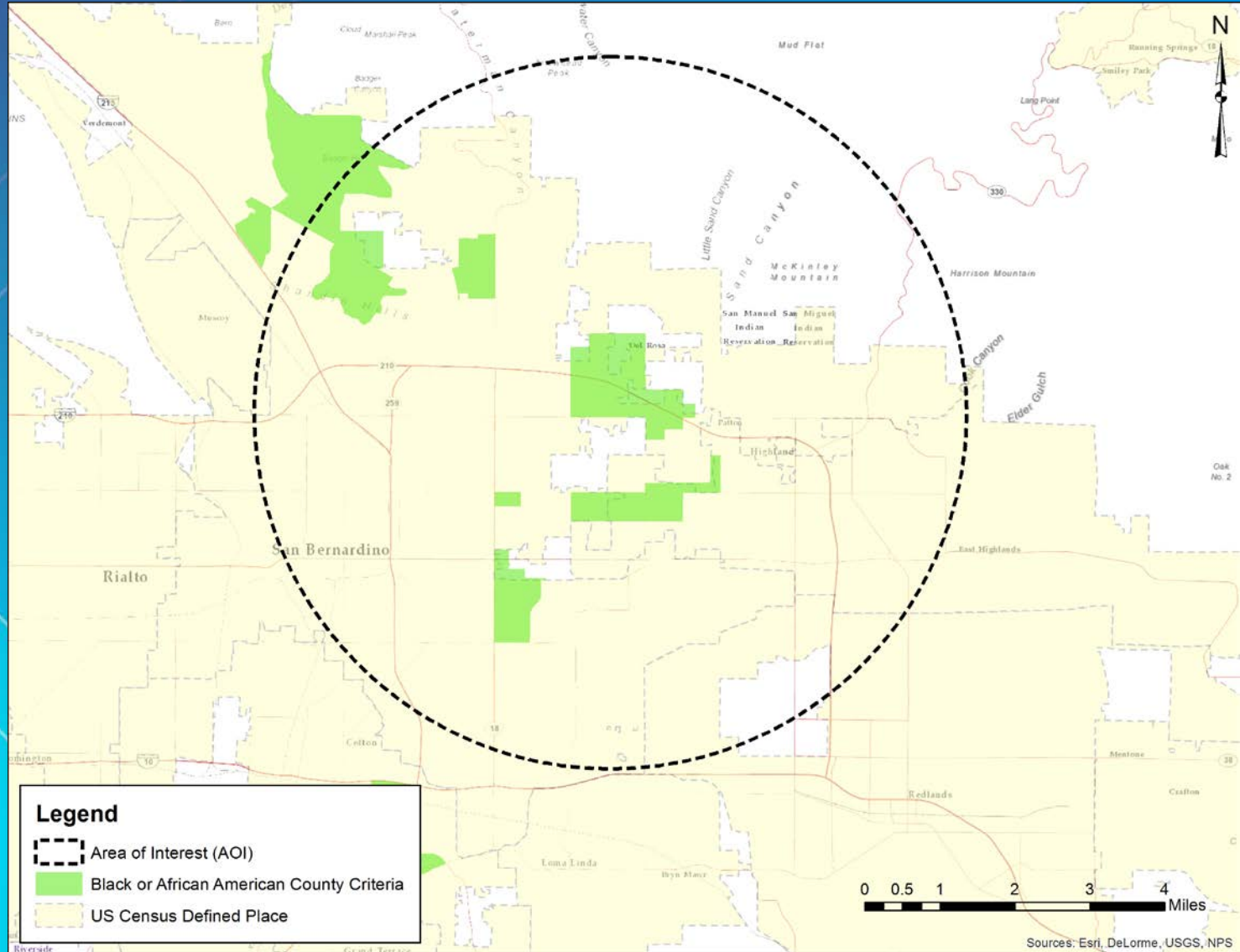
SELECT \* FROM  
("P3\_D003" / "Total" >= .1894 AND "COUNTYFP10" = '071') OR (  
"P3\_D003" / "Total" >= .1642 AND "COUNTYFP10" = '065')

Clear Verify Help Load... Save... Apply Close

SanBernardino\_tl\_2010\_06071\_bg10\_with\_SF1\_P3\_P4\_Data

(89 out of 1092 Selected)

# Example Result: Census Block Groups Identified as Containing Low-Income or Minority Populations



# Identifying Impact Pathways

- After the minority and low-income populations have been identified, a thorough evaluation of project impacts and their potential pathways to the identified populations is performed.
- Potential impact pathways can include:
  - Competition with in-migrating workforce for low cost housing and social services (e.g. schools, police, healthcare, etc.).
  - Decreased air quality due to machine emissions, increased traffic, etc.
  - Increased noise due to construction activities.
  - Construction-related impacts to natural resources or culturally significant lands.
- **Following this evaluation, potentially disproportionate, high, and adverse impact pathways are identified and prevention and mitigation measures can be determined.**

# Benefits of Using ArcGIS for EJ Analyses

- **Accurate**
  - Esri's ArcMap processes have been proven to produce accurate results.
- **Repeatable and Defendable**
  - The ArcGIS processes and use of publicly available U.S. Census Bureau data allow the regulating agency to replicate processes, effectively reducing questions and requests for additional information (RAIs).
- **Geographically Based Analysis**
  - Using GIS to integrate population and income data in geospatial formats allows geographers to quickly identify areas in the region to be further evaluated, reducing potential project impacts.



# Questions?

“It really boils down to this: that all life is interrelated. We are all caught in an inescapable network of mutuality, tied into a single garment of destiny. Whatever affects one destiny, affects all indirectly.”

Martin Luther King, Jr.