Remedial Priority System

Human Health Layers

Soil Exposure: Residential

March 2012

Human Health Layers

The Human Health Layers developed by the Department are:

- Water Media
  - Private Wells
  - Community Supply Wells
  - Non-Community Supply Wells
  - Surface Water Intakes
  - Surface Water Body (Surface Water Quality Standards)
  - Agricultural
- Soil Media
  - **Soil Exposure: Residential**
  - Soil Exposure: School / Day Care
- Vapor Media
  - Vapor Exposure: Residential
  - Vapor Exposure: School / Day Care

Soil Exposure: Residential Layer

Soil Exposure: Residential Layer ➔ derived Layer (a layer created by DEP) based on population and exposure duration.

- Mode of Exposure: People being exposed (Dermal / Ingestion / inhalation) to contaminated soil at or near the site
- Background:
  - USEPA's target distance limits was adapted to calculate the potential residential receptors
    - This procedure is described in the "Guidance for Performing Preliminary Assessments Under CERCLA"
  - RPS model sets three target distance limits from areas of known or suspected contamination:
    - 200 feet for the resident population threat
    - 1,700 feet for neighborhood threat
    - 1 mile for the regional threat

These target distances create concentric rings or "zones" from the site so that the target population can be weighted based on the different zones

Soil Exposure: Residential Layer

- Source Layer:
  - Land Use Layer
    - Basis for layer: identifies residential properties and the type of usage
- Cell Value:
  - Population served:
    - Cell values for each Land Use type are assigned based on estimated populations derived from with the 2000 census data
  - Exposure Period:
    - 5 year exposure period is used to account for a theoretical time between the contamination being identified and completion of the Remedial Investigation phase
      - ❖ The value assigned by the land use layer is multiplied by an exposure period of 5 years

Soil Exposure: Residential Layer

- Cell Values
  - Values based on an estimated population served and exposure duration

Land Use Type	Cell Value
Agricultural wetland, croplands, pastures, orchards, vineyards, horticulture, plantations, general agriculture	0.25
Residential, rural, single units	1
Residential, single units, low density	2.5
Mixed residential	6.25
Residential, single units, medium density	8
Residential, high density, multiple dwellings	15.5
Mixed urban or built up land	20

Soil Exposure: Residential Layer

- Applying the Target Distances Limits

- "zones" from the site so that the target population can be weighted based on the different zones :

Human Health Layers – Soil Exposure: Residential Layer		
Zone	Distance from site boundary	Weighting Factor
Site Zone	0-200 feet	1
Neighborhood Zone	200 to 1,700 feet	0.01
Regional Zone	1,700 to 5280 feet	0.001

Soil Exposure: Residential Layer

- The following is the method used to create the Soil Exposure: Residential Layer

Soil Exposure: Residential Layer

Value for Soil Exposure: Residential Layer

Site Zone (0-200 ft)

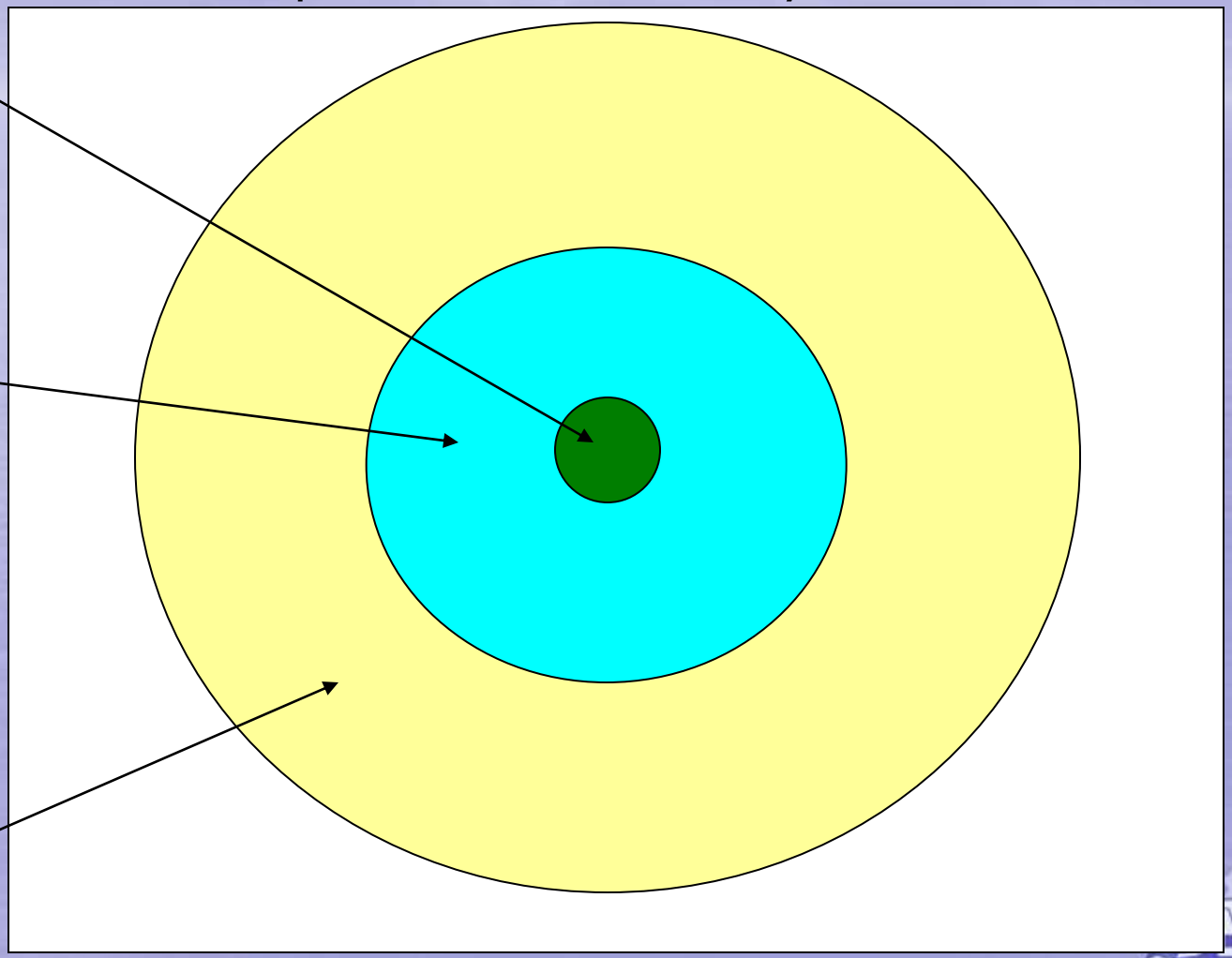
Multiply by 1

Neighborhood Zone (200-1700 feet)

Multiply by 0.01

Regional Zone (1700-5280 feet)

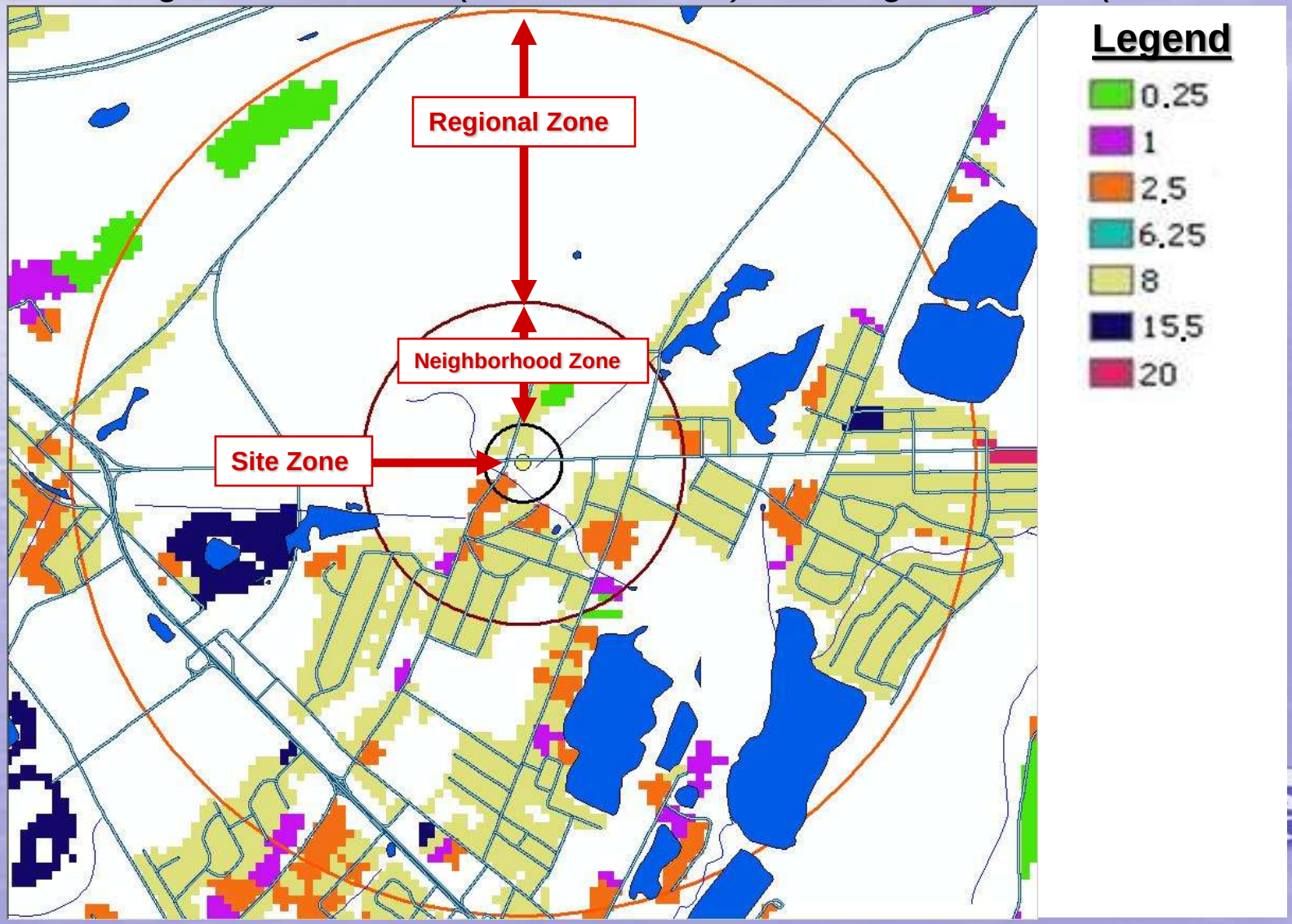
Multiply by 0.001



Residential value = Site Zone + (Neighborhood zone x 0.001) + (Regional Zone x 0.0001)

Soil Exposure: Residential Layer

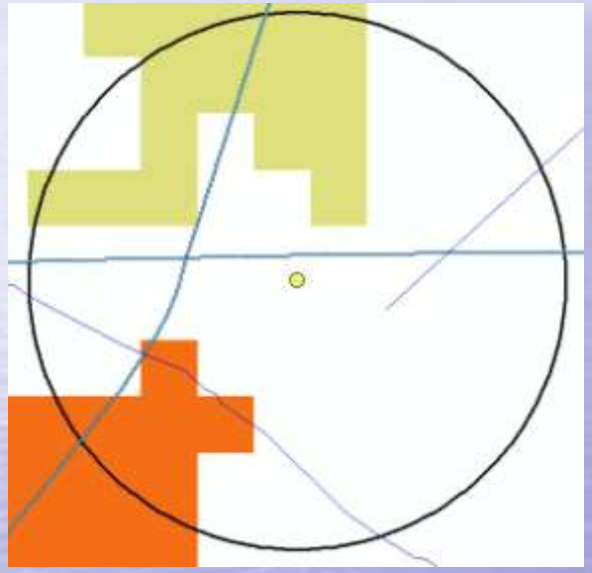
Calculate Receptors - Step 1: *Create three zones: Site Zone (0-200 feet), Neighborhood Zone (200- 1700 feet) and Regional Zone (1700-5280 feet)*



Soil Exposure: Residential Layer

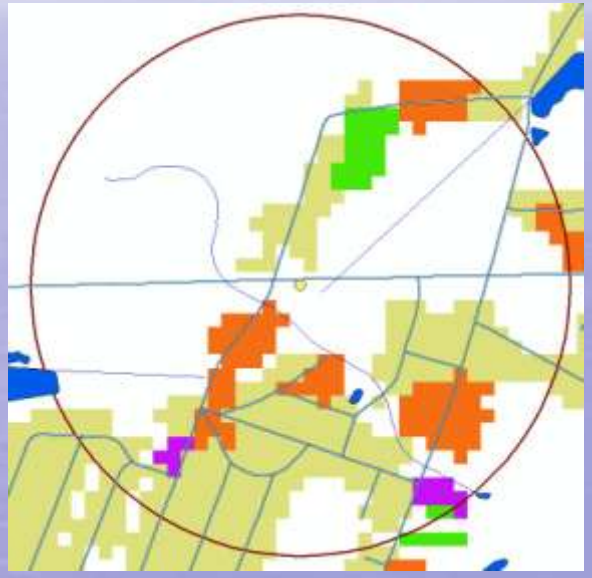
Calculate Receptors - Step 2: Calculate population in the three Extent Areas

Site Extent Area
Radius 200 ft buffer



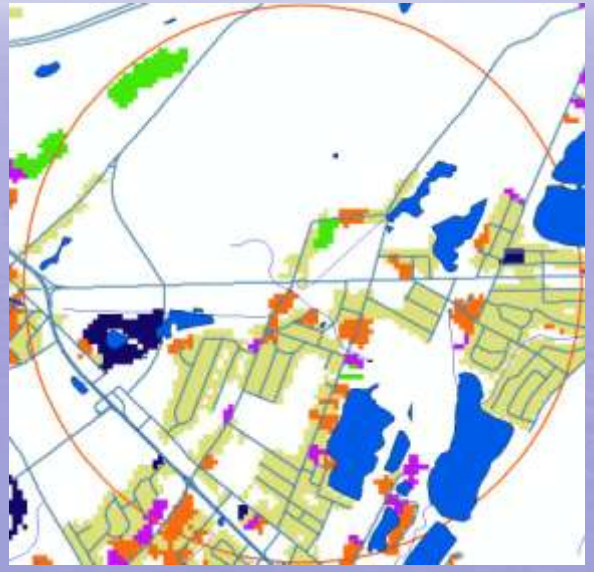
Population = 103

Neighborhood Extent Area
Radius 1700 ft

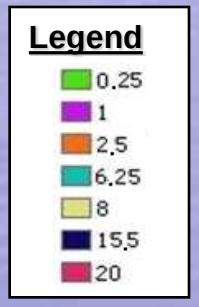


Population = 2,554
Scale Factor = 0.01

Regional Extent Area
Radius 5280 ft



Population = 17,368
Scale Factor = 0.001



Calculate Receptors - Step 3: Calculate Final Score

Residential value = Site Zone + (Neighborhood zone x 0.01) + (Regional Zone x 0.001)

Residential value = 103 + (2,554 X 0.01) + (17,368 X 0.001)

Residential value = 146

Soil Exposure: Residential Layer

- A Soil Exposure: Residential Layer is created for the entire state

- The following is the layer used to calculate the Soil Exposure: Residential Receptor Layer Score

Soil Exposure: Residential Layer