Remedial Priority System

Human Health Layers
Community Supply Wells

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

Community Supply Wells Layer

Community Supply Wells Layer → derived Layer (a layer created by DEP) based on population and exposure duration

- **Mode of Exposure:** People drinking (Ingestion / Dermal) contaminated ground water from a Non-Community Supply Well

- Background:

  - **Public Community Water Supply Well**: A Well that supplies water to a public community water system, which provides water for human consumption through pipes or other constructed conveyances. A public community water system serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

  - **Well Head Protection Area**: A Well Head Protection Area (WHPA) is the area from which a well draws its water within a specific time frame. WHPAs are an integral part of the Well Head Protection Program, which was created pursuant to the 1986 Federal Safe Drinking Water Act Amendments (Section 1428, P.L. 93-523, 42 USC 300 et. Seq.)

Non-Community Supply Wells Layer

- Source Layer:
  - Community Well Head Protection Area (WHPA)
    - Basis for layer:
      1. shows potential capture zone for a Community Supply Well
      2. three WHPA tiers (2 year, 5 year and 12 year) indicate the estimated travel time for contamination moving towards a well
      3. different tiers are used to factor in distance from the source

    WHPA delineation is described in NJDEP's "Guidelines for Delineation of Well Head Protection Areas in New Jersey"

Community Supply Wells Layer

- Cells values:

  - Population served:
    - based on the population served by the supply Well as documented by information submitted to the Department and modified by the distance from well
      - ❖ If there are multiple WHPAs, then the scores for each WHPA are added together

  - Travel Distance:
    - WHPA tiers are used to factor in distance from the source
    - Population values are multiplied by the Tier Factor based on the WHPA tier for that site

WHPA Tiers / Travel Time	Tier Factor
Tier 1 / Travel Time less than 2 years	1
Tier 2 / Travel Time between 2 and 5 years	0.5
Tier 3 / Travel Time between 5 and 12 years	0.1

  - Exposure Period: one half year exposure period is used to account for a theoretical time between sampling of a Community Supply Wells

Community Supply Wells Layer

- Calculation Method:
  - Maximum cell value that intersects the ground water Extent Area is used

    Cell Values are based on total population serviced by the well and not population density, as is the Private Wells Layer

    - If the Cell Values were summed, the total population would be counted several times
    - The purpose of the layer is to estimate the potential population at risk
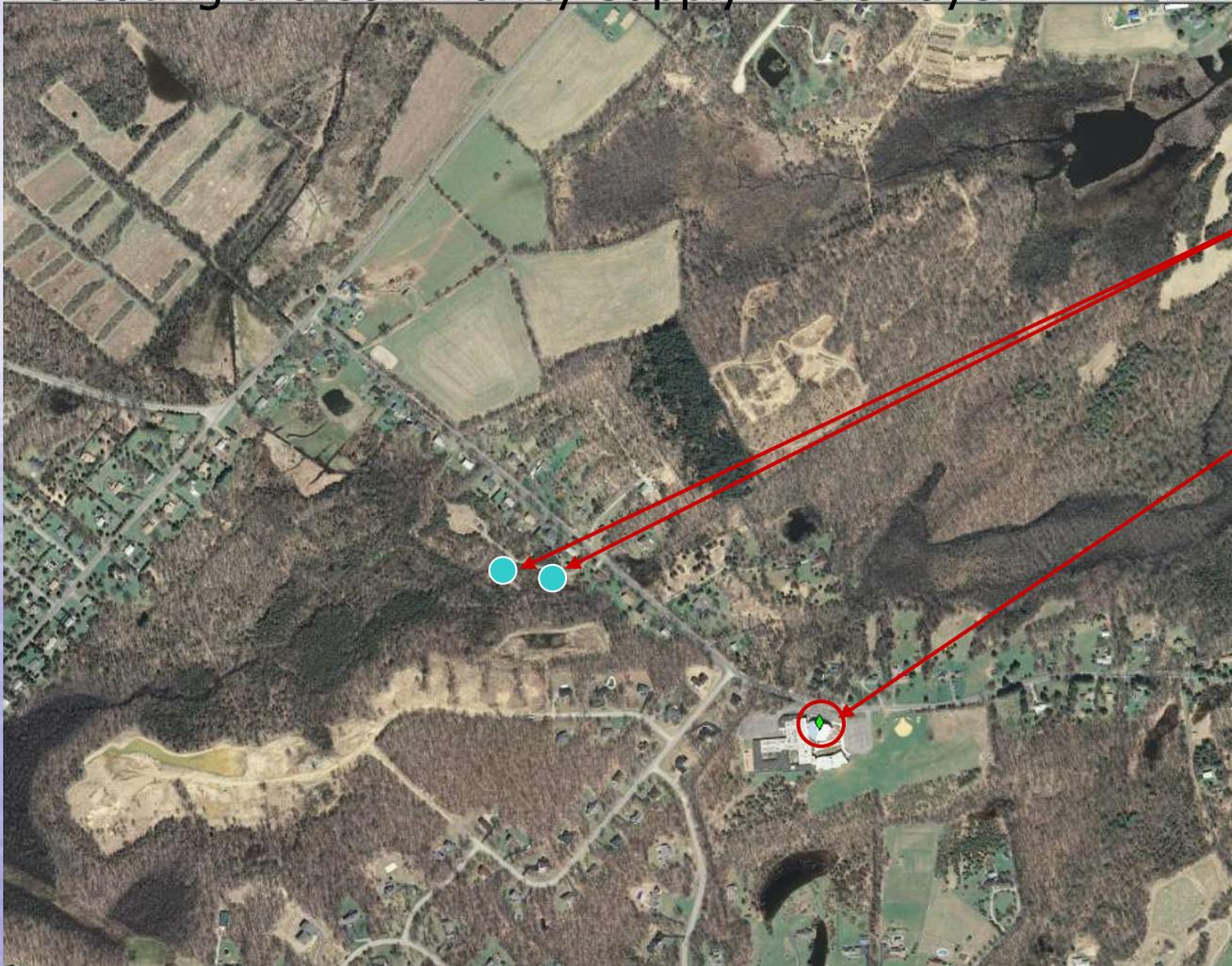
Community Supply Wells Layer

- The following is the method used to create the Public Community Supply Wells GIS layer

Community Supply Wells Layer

Creating the Community Supply Wells Layer

Base Map

Community Supply Wells

(2 supply wells)

Site

Community Supply Wells Layer

Method to Calculate a Cell Value

1. A population served by each well system is calculated from NJEMS

2. The population is divided among the wells within that system

3. Populations are multiplied by the Tier Factor to determine the value that will be assigned
   - Tier 1 = 1.0
   - Tier 2 = 0.5
   - Tier 3 = 0.1

4. GIS layer for each Community Supply Well is converted into a Raster file (100 by 100 foot grid) by assigning the appropriate value

   adjusted population calculated in section 3 is assigned to each cell in the Tier

5. Overlay each individual Supply well layer and sum up the cell values to combine a final Community Supply Well Layer

6. Multiply the Cell values by the exposure duration of 0.5 years

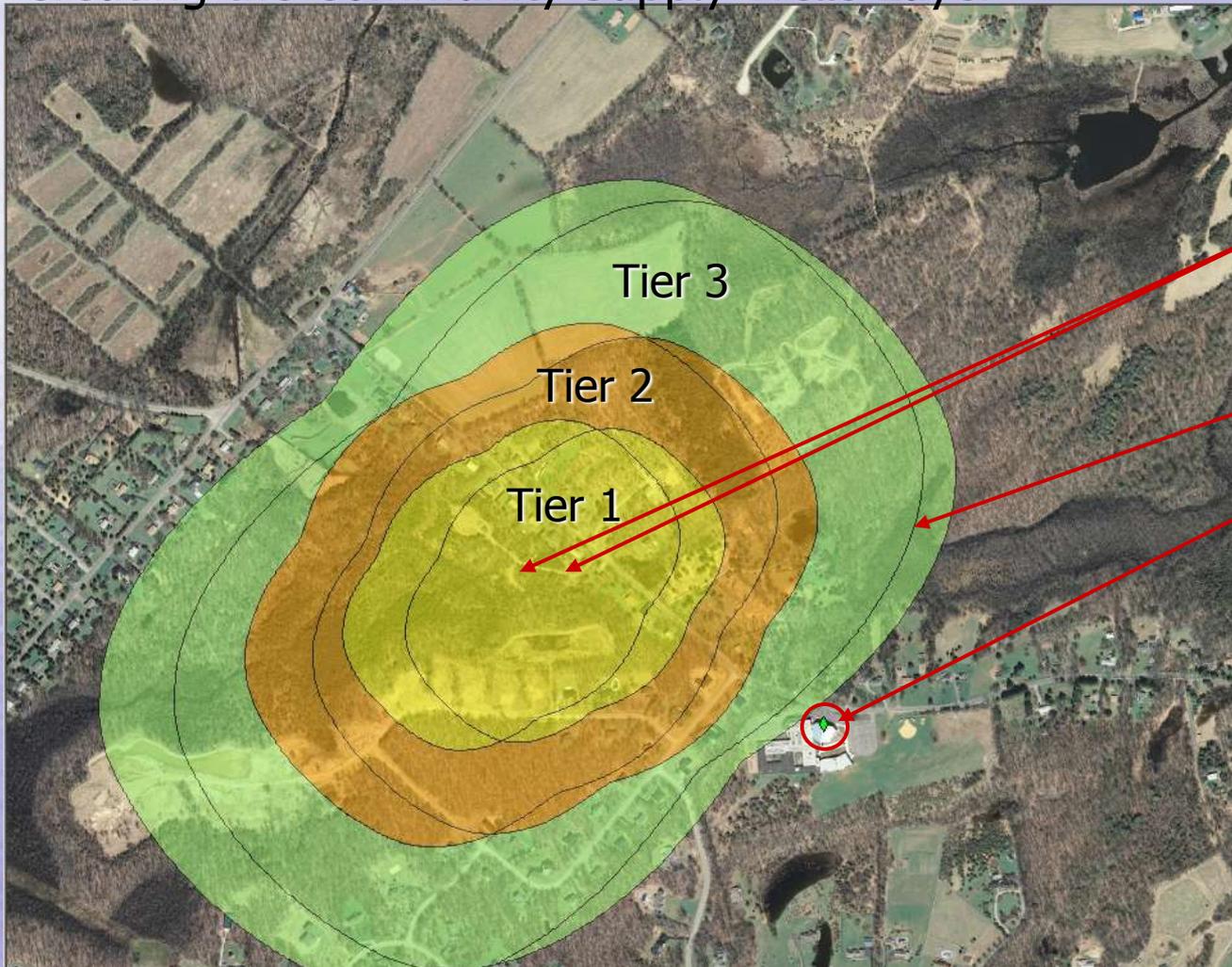# Community Supply Wells Layer

Method to Calculate a Cell Value

1. Population served by each well system = 360 people

2. Population per well: 360 people / 2 wells = 180 people per wells

3. Adjusted Population by
   - Tier 1 = 1,250 X 1   = 180
   - Tier 2 = 1,250 X 0.5 = 90
   - Tier 3 = 1,250 X 0.1 = 18

4. two WHPAs are near the site, both are Tier 3 (cell value = 18); however, only one is actually within the Ground Water Extent Area

5. combine Community Supply Well Layer cell values: 0 + 18 = 18

6. Exposure Duration: 18 X 0.5 = 9

➢ Final Cell Value = 9

Community Supply Wells Layer

Creating the Community Supply Wells Layer

- Use Community Well Head Protection Layer

Community Supply Wells

(2 supply wells)

Tier boundary for individual WHPAs

Site

Tier 3

Tier 2

Tier 1
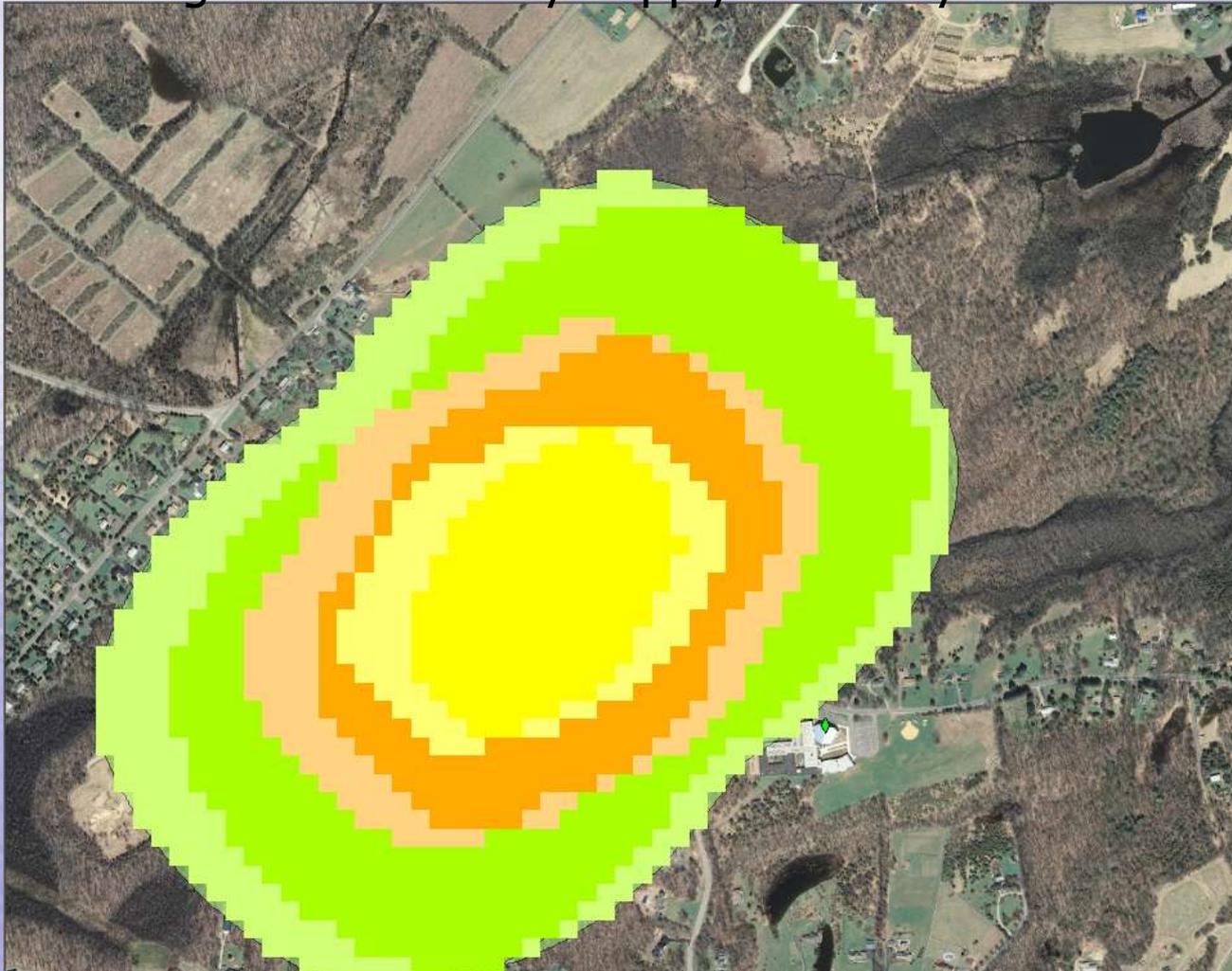
Legend

🟨	Tier 1: 2-Year
🟧	Tier 2: 5-Year
🟩	Tier 3: 12-Year

Community Supply Wells Layer

Creating the Community Supply Wells Layer

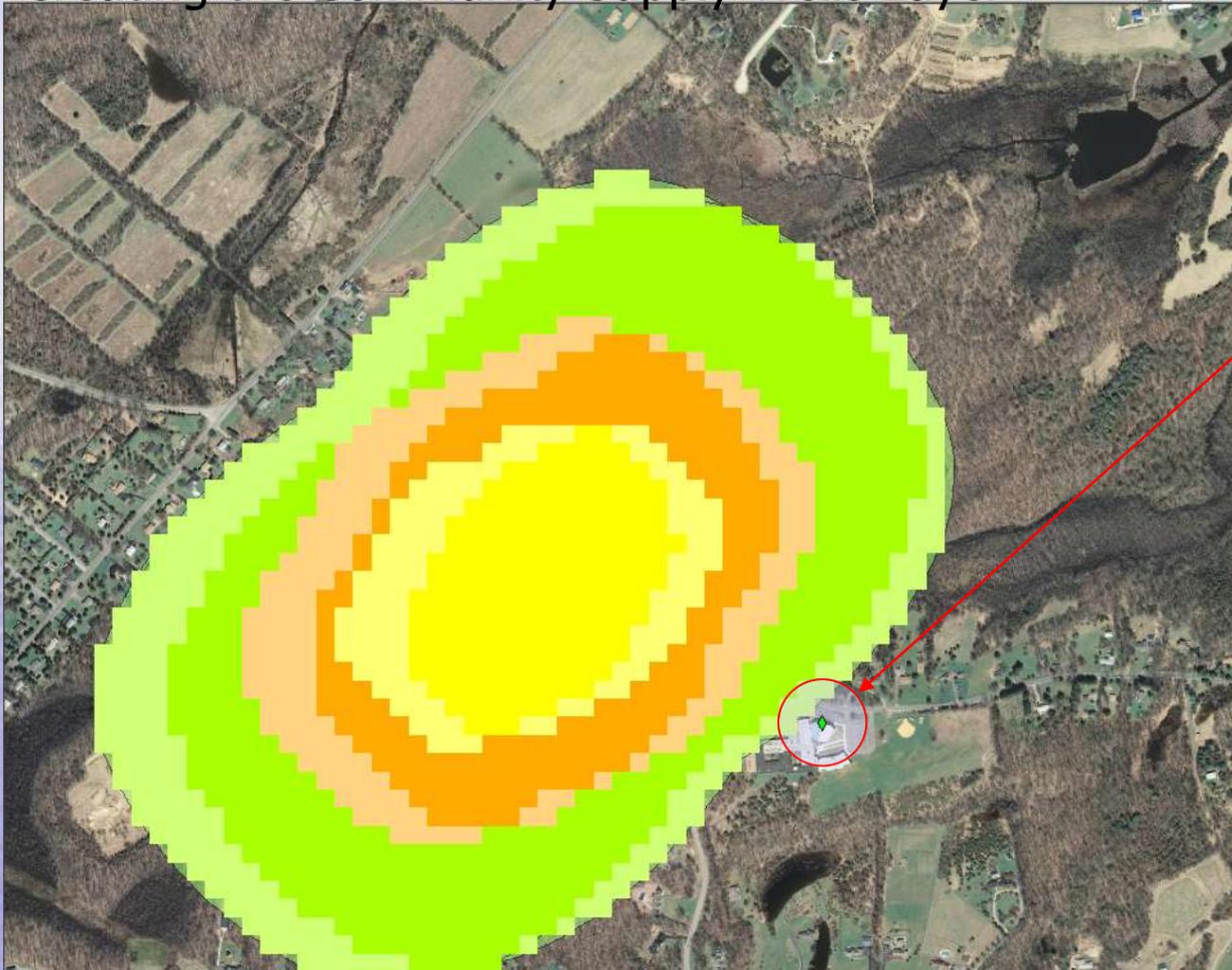- Cell Values are assigned based on the calculation in Slide 10 (Method to Calculate a Cell Value)

Legend

- 9
- 18
- 56
- 94
- 140
- 186

Community Supply Wells Layer

Creating the Community Supply Wells Layer

- Overlay the GW Extent Area on the GIS layer

Ground Water Extent Area

Legend

☐	9
☐	18
☐	56
☐	94
☐	140
☐	186

Community Supply Wells Layer

Creating the Community Supply Wells Layer

18

9

- Zoom in to the Extent Area

- Determine the Maximum Cell Value within the Extent Area

  (Cell must be > 50 % within the Extent Area to be counted)

- **Maximum** Cell Value = 9

➢ **Final Score = 9**

Ground Water Extent Area

Legend

🟩	9
🟩	18
🟧	56
🟧	94
🟨	140
🟨	186

Community Supply Wells Layer

- A Community Supply Wells Layer is created for the entire state

- The following is the layer used to calculate the Community Supply Wells Receptor Layer Score

Community Supply Wells Layer

Legend

Community Supply
Wells Score

Value
- 1 - 58
- 58 - 266
- 266 - 698
- 698 - 1,166
- 1,166 - 16,250