

RPS: Remedial Priority System



Site Remediation's GIS Tool for Measuring Potential Receptor Risk

1993 : A Hand Crafted Score

Figure 2

BIOACCUMULATION PROTECTION

Select the bioaccumulation score based on the bioaccumulation factor for each contaminant. Water Quality Guidance for the Ground Water Table 3 of Appendix C) Enter the bioaccumulation factor.

Any contaminants...

RPS System

REMEDIAL PRIORITY SYSTEM SCORE WORKSHEET

SECTION 1:
AIR

SECTION 2:
SUBSURFACE GAS

SECTION 3:
GROUND WATER-OBSERVED

GROUND WATER-POTENTIAL

SCORE X 31.25 =	N/A
SCORE X 31.25 =	N/A
SCORE X 4.17 =	938.25
SCORE X 0.33 =	N/A
SCORE X 0.33 =	N/A

225

GENERAL SITE ADDRESS MUNICIPALITY

Hand Made Rank - Pros and Cons

- Trained Professionals Who Know Site
 - More Likely To Have “Best”/Recent Data
-
- High Resource Demand
 - Slow Progress
 - Subjective Judgments on Criteria
 - Inconsistent Understandings of System
 - Unable To Rank & Re-rank All Cases
 - Above Problems Discourage System Revision

2009 : SRRA Marching Orders

May 7, 2010 - Rank All Sites by Category

Base Ranking Upon:

- 1. risk to the public, environment**
- 2. length of time undergoing remediation**
- 3. economic impact**
- 4. other factors deemed relevant**

What is RPS?



It is NOT a completed RI/FS

It is NOT an electronic Case Manager

It is NOT a Crystal Ball

It IS a Triage Tool to Sort Sites for Further Consideration

How does it work?

**The Site Side
(NJEMS, Hazsite Side)**

**The Receptor Side
(GIS Side)**



$$\text{RPS Score} = \text{Threat Factor} \times \text{Receptor Score}$$

The GIS Layers Fully Populated & Reliable.

Receptor Proximity (and Score) Exists Regardless of Site Threat

Receptor information in RPS is the best available GIS and adheres to standards of contributing programs. They are regularly maintained for quality and timeliness and form the base layers for RPS Receptor Score.

NJDEP is confident in the accuracy of receptor proximity assessments which are the heart of the RPS score.

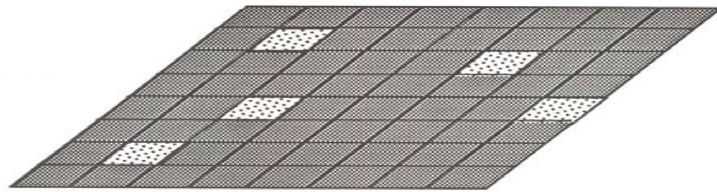
NJ Geoweb is a publically available source for many of the base layers used in RPS.

You can access this at <http://www.nj.gov/dep/gis/geowebdisclaim.htm>

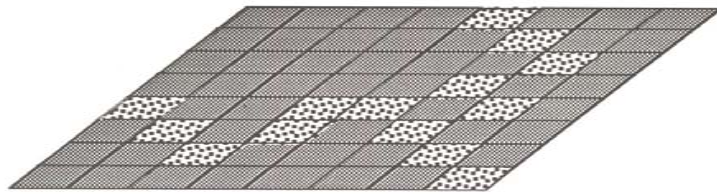
Lets take a look at some of these layers: Landuse, Streams & KCS

“Receptor Side” : Transformation From Lines and Polygons to Grids.

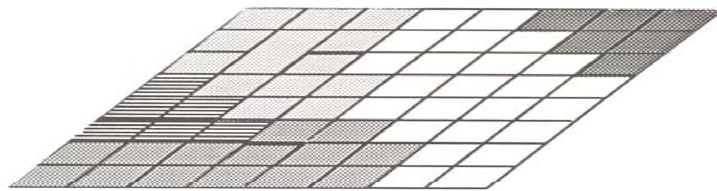
Potable Well Grid



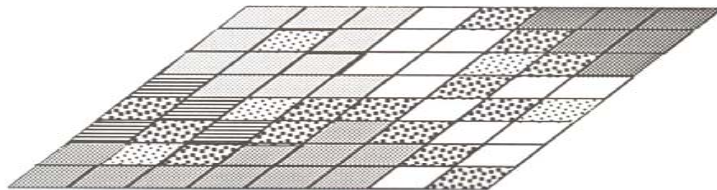
Streams Grid



Land Use Grid



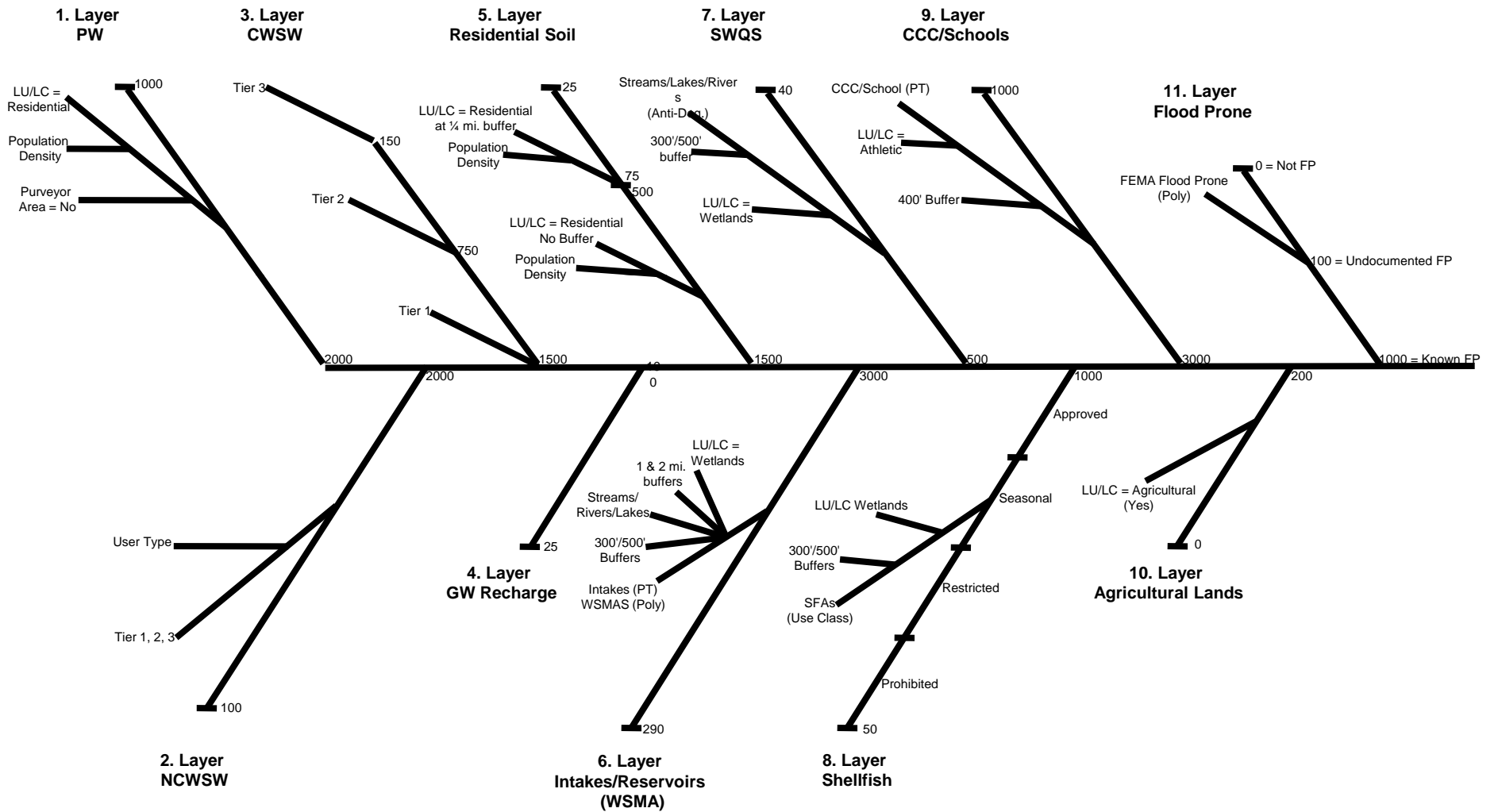
Census Grid



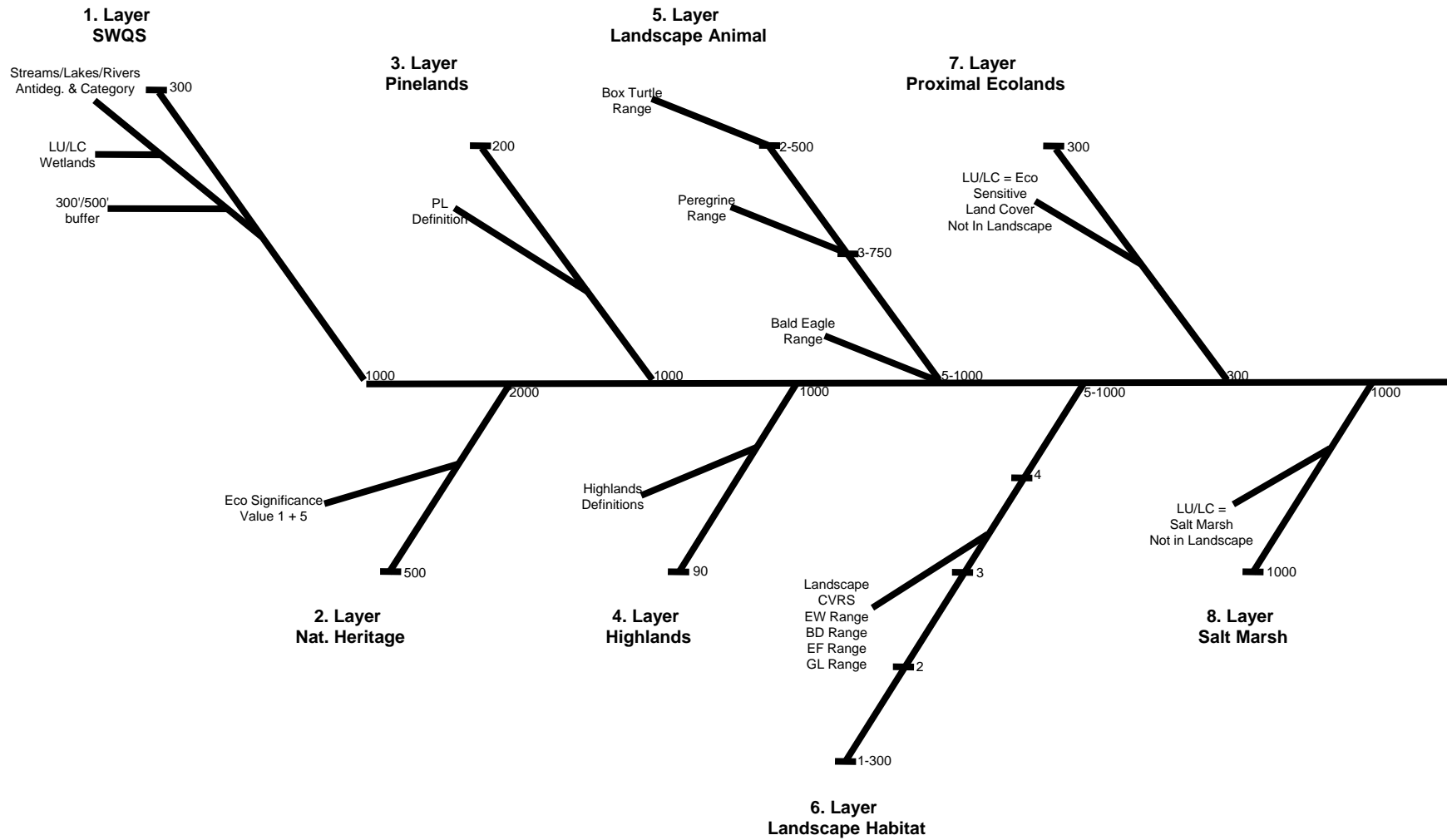
Receptor Data From “Vector” GIS Are Transformed Into Rasters [Grids].

Grid Cells have values based on attributes of original GIS layers.

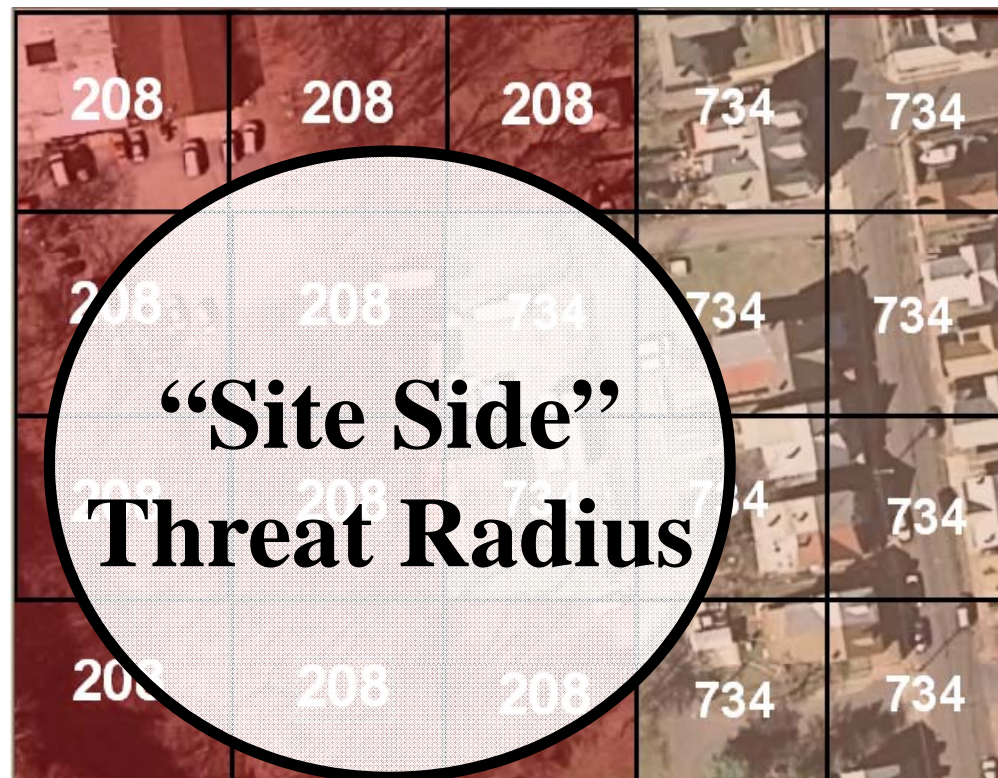
Human Health RPS Process Flow



Eco Health RPS Process Flow



SITE SIDE - Think of a “Site Threat” for groundwater as a “contaminant extent” that “reaches” over receptors. The sum of cell values inside that extent equals the Receptor Score.



Threat Extent: Why a Surrogate?

FACTS:

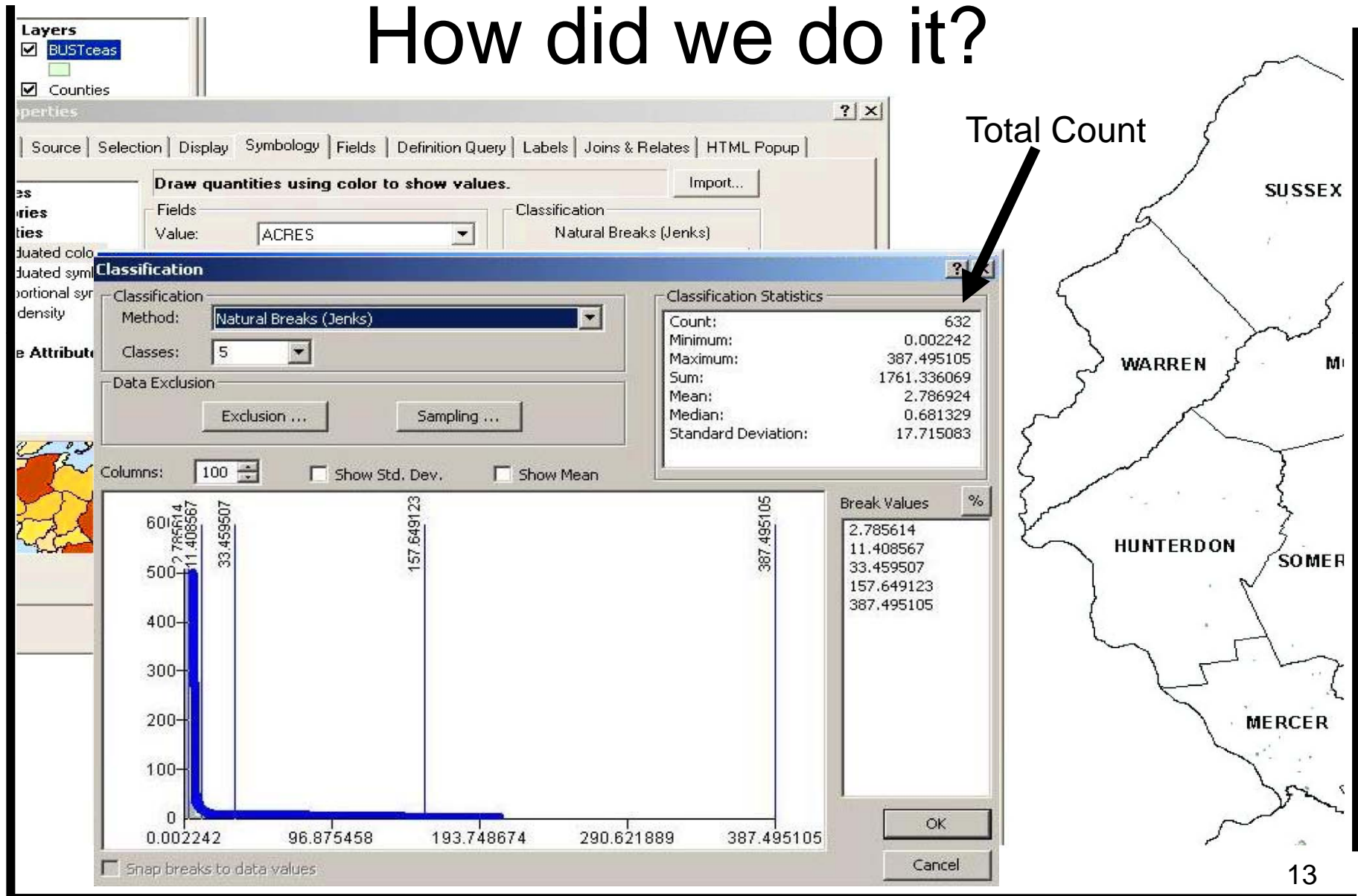
- LAW REQUIRES RANKING RELEVANT SITES FOR “LEVEL OF RISK”
- UNIVERSE OF SITES CONTAINS ALL PHASES OF REMEDIATION
- EARLY PHASE SITES DO NOT HAVE FULL DELINEATION / EXTENT
- EARLY PHASE CONTAMINANT EXTENT WOULD TEND TO UNDERESTIMATE
- GIS GW CONTAMINATION EXTENTS NOT AVAILABLE (EXCEPT CEAs)
- A MEASURE OF EXTENT IS NECESSARY TO ESTIMATE POTENTIAL IMPACT
- CEAs REPRESENT FULL EXTENT OF GROUNDWATER CONTAMINATION

Q & A:

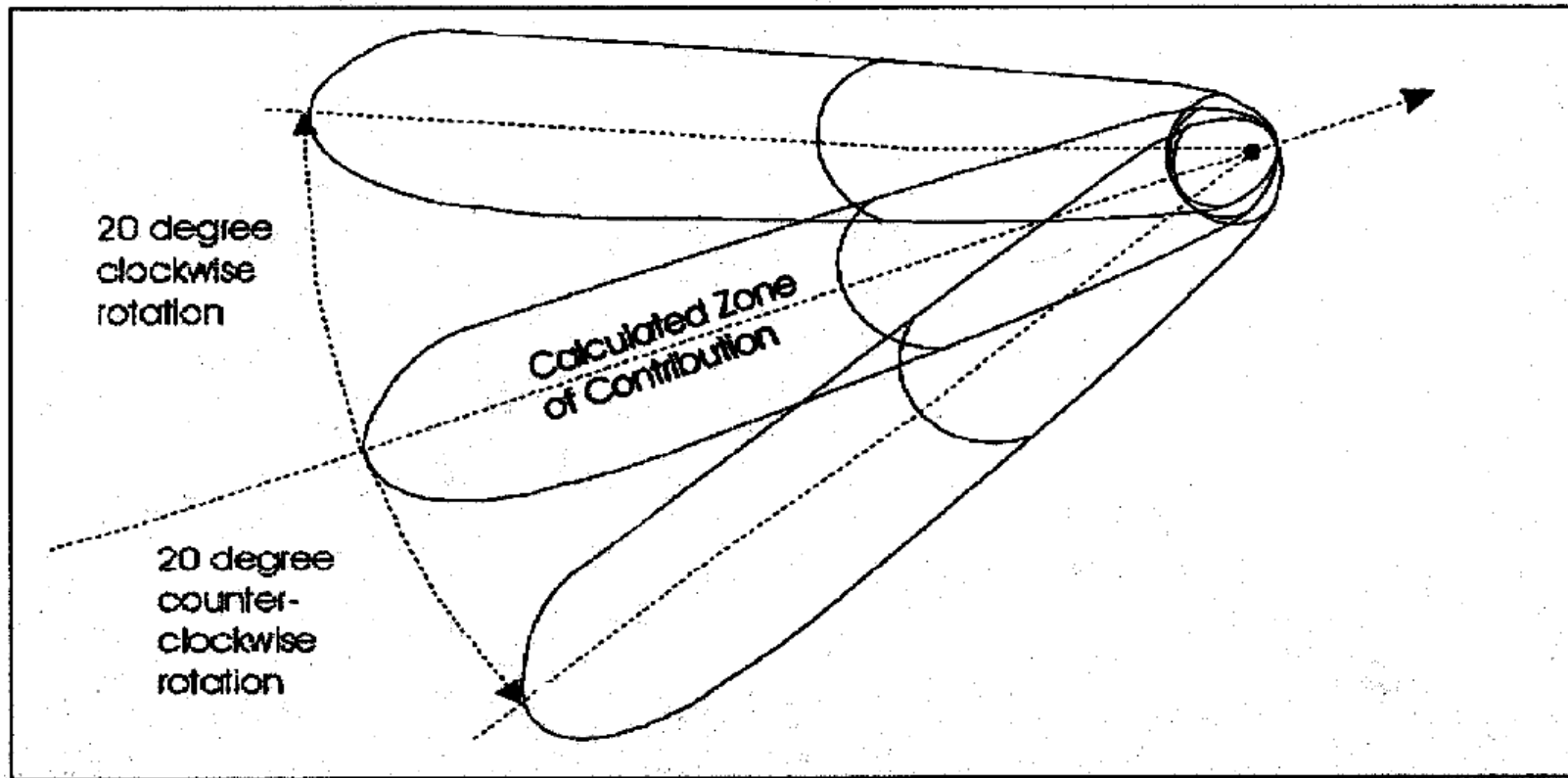
In the absence of site specific extents, how should NJDEP comply with SRRA requirement to Rank All Sites?

A surrogate for full contaminant extent can be supported by statistical analysis of CEA size by Bureau. This is the best extent measure absent full contaminant delineations (which are not available).

Groundwater Threat Extent Surrogates: How did we do it?

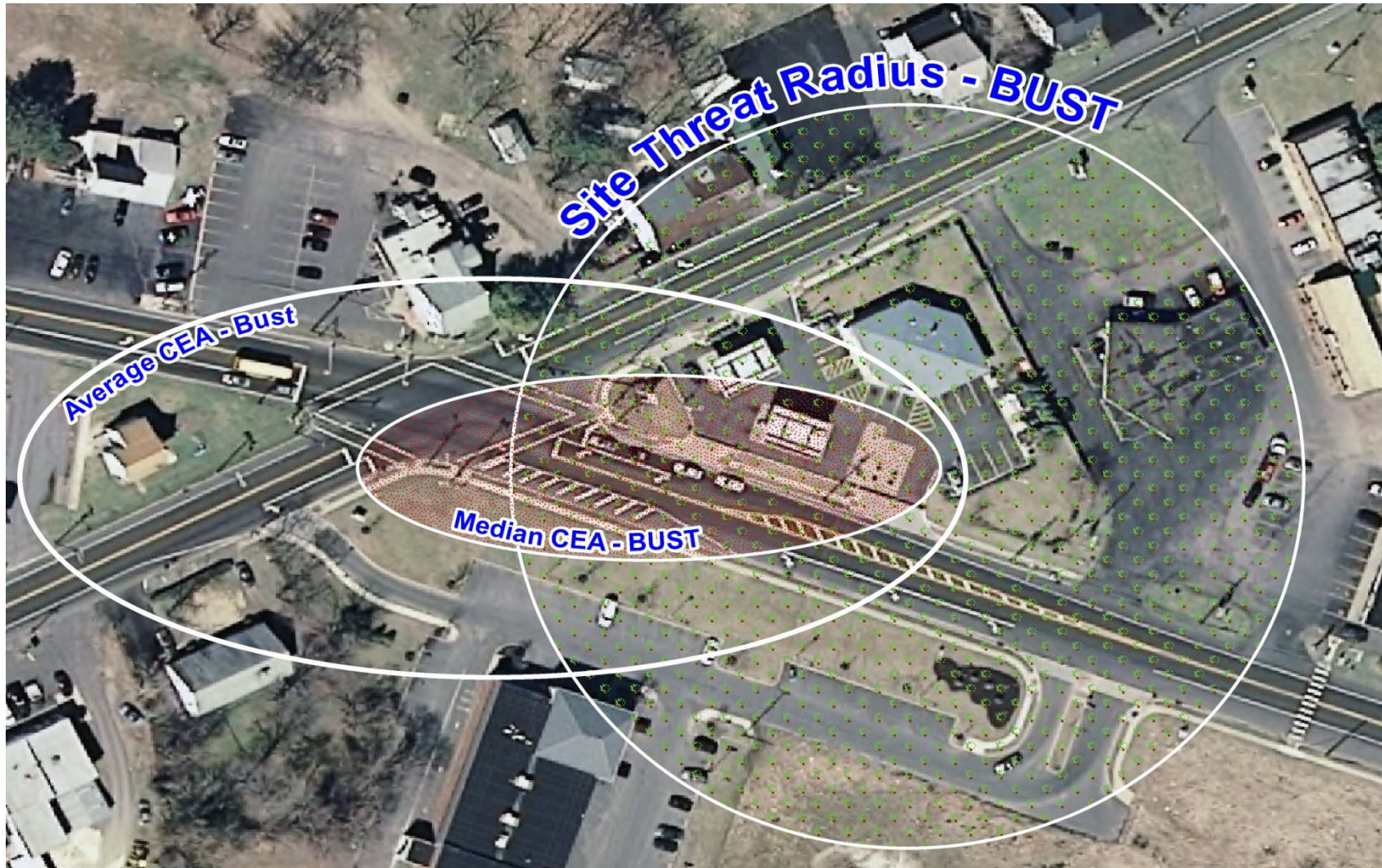


THE CONCEPT OF FLOW DIRECTION VARIABILITY SUPPORTS A LARGER THREAT RADIUS THAN AVERAGE.



The NJ Geologic Survey published a Report which maintains that “A statistical analysis of the data showed that a total variation...of the flow direction was as much as 48 degrees”

Typical BUST Site with Surrogate & Statistical Extents Shown



Measuring Contamination

Introducing Exceedance Quotient (EQ)

RPS was previewed with DEP Case Managers.

They asked: **“Is it a ppb site or a ppm site?”**

EQ was produced to answer this question.

“Raw” EQ- The Foundation of Hazsite Use in RPS

Divide sample result by its standard.

Example: Analytical result of 800 ppb with a standard of 70 ppb. $EQ = (800/70) = 11.43$.

This EQ value, called the “Raw EQ” is about 11 times greater than its standard.

Raw EQ Limitations

Raw EQ values range orders of magnitudes that exceed the Part Per Million category.

Raw EQ values that are extremely high may not correspond proportionately with the likelihood of health risks in the GWQS.

To address these limitations, we created EQ categories, or Tiers as follows:

EQ Values	EQ Tier
1 - 9	1
10 - 99	2
100 - 999	3
1,000 - 9,999	4
10,000 & above	5

EQ Tier and Relative Risk

GWQS consider multiple human health outcomes including Carcinogenic effects, Teratogenic outcomes and Neurological effects.

RPS does not address the question of precise relative risk associated with the EQ Tiers for different standards. For instance, a Tier 2 does not imply a doubled risk for a particular health outcome described by a GWQS.

RPS uses a defensible and simple principle: As EQ Tier increases, contamination threat also increases in terms of migration and health outcomes.

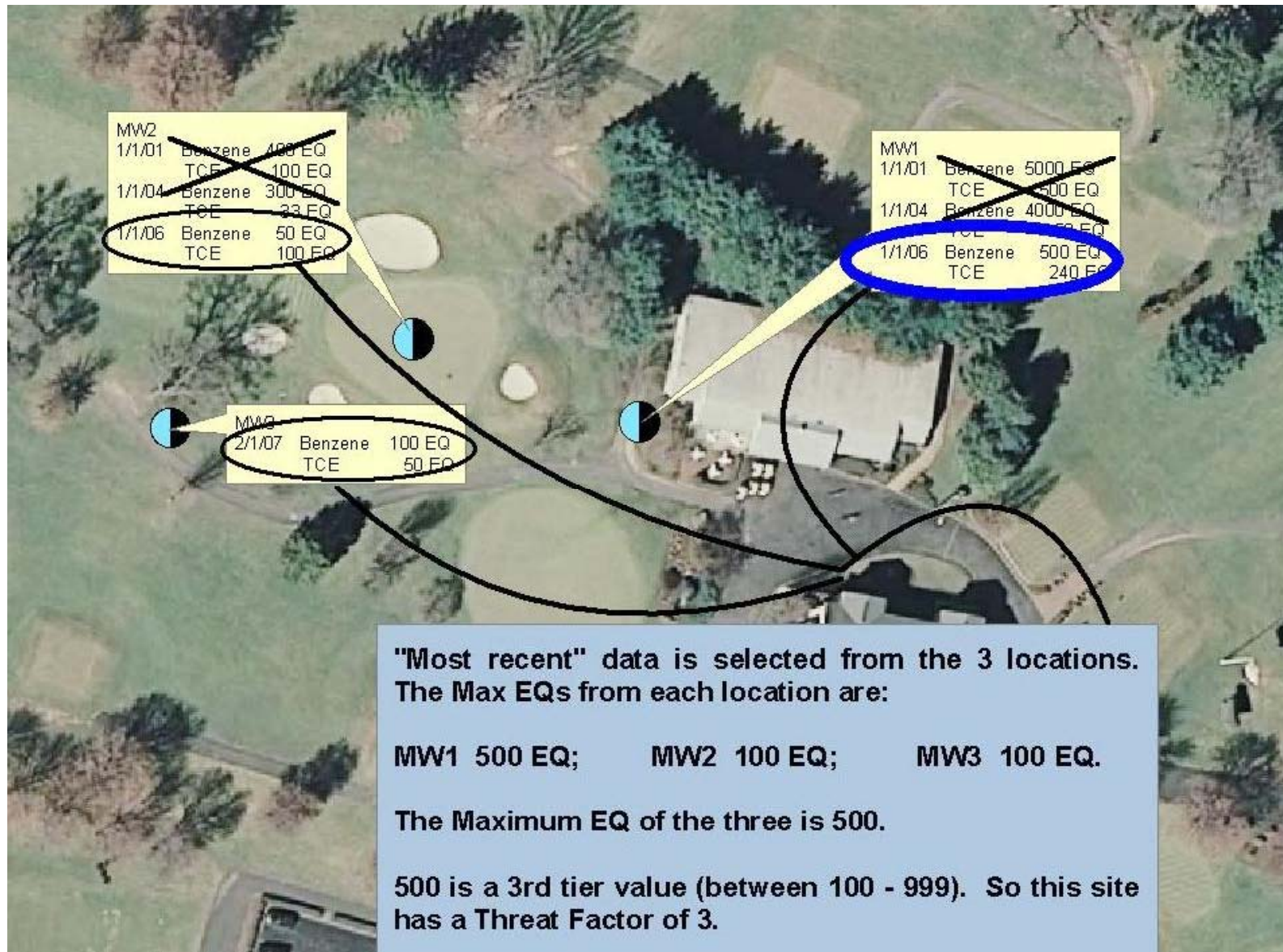
EQ Tier relies upon the order of magnitude threshold, which NJDEP has previously used in administrative code.

EQ Site Recipe.

Which Recipe Best Serves NJ?

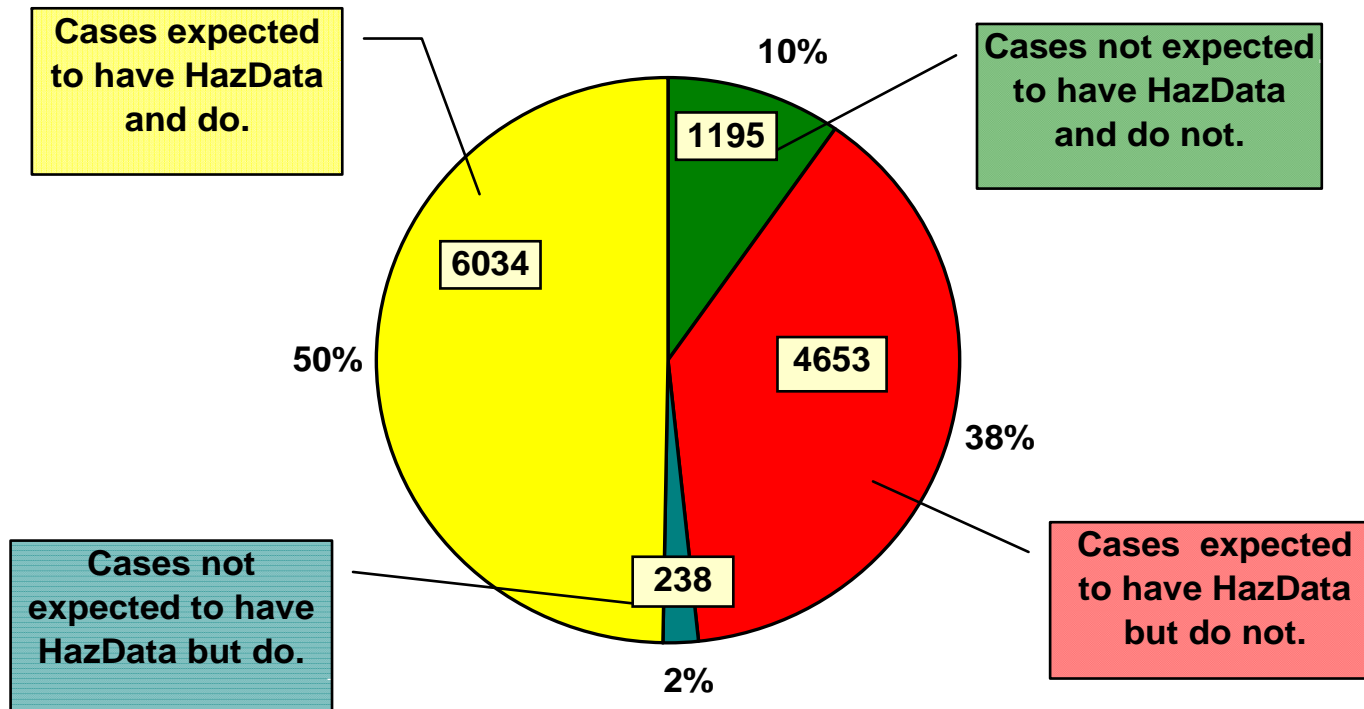


Tier Value = Site Threat Factor



“Missing Data”

KCSL cases* with HazSite submissions
12,120 cases



* includes all cases associated with the KCSL except homeowners

Filling in the Hazsite Gaps

Sites in early phases should not be treated like those in later phases. Currently they are assigned at contamination level = Tier 1.

Sites in later phases should have “Hazsite” submissions. Where data is not available for these, the assumption is that these sites are at the 75th percentile of EQ values. This can be changed by inclusion of data into the Hazsite database.

We Seek Accuracy

Comments will be taken via email.

RPS Scores for the cases managed by: **CHRIS**

Preferred ID: [REDACTED]
 Site ID: [REDACTED]
 Site Name: [REDACTED]
 Address: [REDACTED]
 Municipality: Old Bridge Twp
 Site_Threat: 145
 Threat Radius: 240 ft Should be [REDACTED] ft
 Schools Flag:
 Site Location off by: [REDACTED] ft

	RPS Score	Model Accuracy	Threat Mitigation
Private Wells	0		
Com Supply Wells	2550		
Non-Com SW			
SW Intakes	25500		
Residential Soils	3604		
Schools	0		
SW Quality	2533		
Ag Use	0		
GW Recharge	300		
Shellfish Harvest	0		

	RPS Score	Model Accuracy	Threat Mitigation
SW Quality	8700		
Floodprone	350		
Highlands	0		
Landscape	1200		
Natural Heritage	6250		
Pinelands	0		
Wetlands	300		
Coastal Marsh	0		

Summation Scores	
HH Combined	34487
HH Rank	1889
HH Tier	5
Eco Combined	16800
Eco Rank	951
Eco Tier	5
Combined score:	7436615
Combined Rank:	1667
Combined Tier:	5

Site Comments:

Notes:

Ranks are a description of where the particular score falls relative to all sites after sorted in descending order. Values range from 1 (Highest potential risk) to 11,531 (Least potential risk).

Tiers range from 1 (highest) to 5 (lowest). These tiers are determined using Jenks natural breaks classification.

Landscape is a score for threatened fauna and associated ecosystems. (generally)

Natural Heritage is a score for threatened flora and associated ecosystems. (generally)

Record: 1 of 95

Discussion

Inquiries and comments should be
sent to

srpgis@dep.state.nj.us