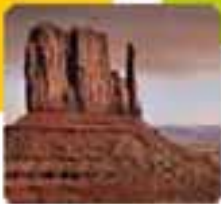




Geographic Information System Screening Tool

**New Mexico Environment Department
Information Technology Bureau
Petroleum Storage Tank Bureau**

Suzan Arfman
Alex Harding
Kim Kleyboecker
Zack Stauber



What is GoNM?



What is GoNM?

- GoNM – Geographic Information System Screening Tool of New Mexico
- A GIS tool that rates 2 types of risks for gas stations: what is the potential risk for a leak and what risk would it cause to the environment.
- Basic tool developed by EPA R6.
- NMED further developed the tool for 4000 USTs at 1275 facilities and 1825 LUST sites.



Why was GoNM Developed?

- EPA mandates inspection of all facilities once every 3 years.
- NM is the 5th largest state and only 9 inspectors.
- Prioritize where additional resources are needed.
- GoNM show at risk stations- frequent visits.
- Low risk sites only need less frequent visits.
- GoNM contains valuable data on corrective action.
- Great communication tool.
- Consistent methodology.
- Flexible.



How was GoNM developed?

- VBA migrating to Java. Spatial Analyst required.
- ¼ mile buffer area around a gas station used in the analysis.
- GoNM uses feature classes to rate a risk.
- Original EPA R6 program had only 2 layers: Landscape, physical surroundings, and Community, demographics.
- NMED, PSTB added Facility, maintenance and equipment, and LUST Ranking Layers. All Facility criteria is from OneStop, PSTB UST database.
- Criteria and corresponding scores from each layer are rated from 1 – 5: a score of 1 implies the least risk while a score of 5 implies the greatest risk.
- All layers and criteria can be modified.



How was GoNM developed?

- The criteria scores for a layer are averaged together to determine a score for that layer.
- Each of the 3 layer scores are averaged together .
 - A low score suggests a facility is well maintained and/or located in an environmentally less sensitive area.
 - A higher score suggests a poorly maintained facility and/or located in an environmentally sensitive area.
- The LUST Ranking Layer is scored separately from the 3 layers using a sophisticated algorithm.



How was GoNM developed?

Landscape Criteria

Surface Water Use	Area Perimeter Ratio
STORET Exceedances	Year Flood 100
Rainfall	Year Flood 500
Average Flow	TRI Releases to Air
Aquifer Geology	TRI Releases to Water
Distance to Water	TRI Releases to Land
Road Density	TRI Toxicity Releases to Air
Nonattainment	TRI Toxicity Releases to Water
Stream Density	Groundwater Probability
Channel Canal Density	Soil Permeability
Surface Water	
Aquifer	
Wildlife	
Agriculture	
Wetlands	
Land Use Ranking	
Unified Watershed Assessment	



How was GoNM developed?

Community Criteria

Population Density
Economically Stressed
Without High School Degree
Children Under 7
Older 55
Children Under 1
Unemployed
With Low to No Ability to
Speak English
Linguistically Isolated
Foreign Born
Regulated Facility Count



How was GoNM developed?

Facility Criteria

Tank Age

Cathodic Protection – Tank

Cathodic Protection – Piping

Overfill/Spill Protection

Piping Construction

Tank Construction

Tank Status

Release Detection – Piping

Release Detection – Tank

Equipment Maintenance Records

Number of Tanks

Frequency of Inspections

Facility History

Tank Contents

Tank Capacity

UST Pumping System

LUST Site



How was GoNM developed?

Lust Ranking

Using the criteria on the following slides each LUST site is determined to be a Priority 1, 2, or 3.

- Priority One: Actual or imminent risk to a receptor (municipal well, domestic well, river , or creek);imminent hazard to public health, safety, and welfare or the environment.
- Priority Two: Product, NAPL, at the site or saturated soils (involves treatment of saturated soils).
- Priority Three: Dissolved phased contaminates in the groundwater that are above ground water standards.



How was GoNM developed?

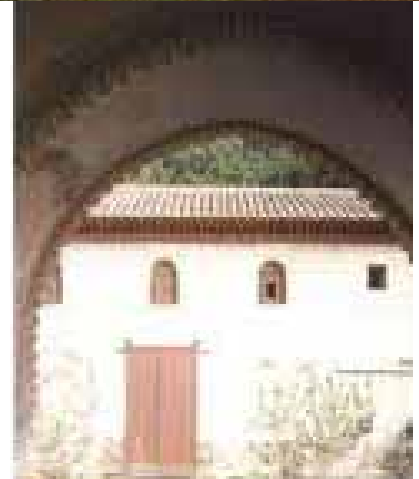
Lust Ranking

Land/Water Use

- Residential property within 400' of source?
- Site within designated source water protection area?
- Irrigation well within 1000' of source?
- Surface water body within 500' of source?
- Private well within 1000' of source?
- Public well within 1 mile of source?
- Ambient water quality

Groundwater and Dissolved Phase Plume

- Concentration
- Vertical downward gradient?
- Contaminant plume off-site?
- Mobility of plume
- Area of benzene > 10ug/l
- Depth to groundwater in feet



How was GoNM developed?

Lust Ranking

Soil/Vadose

Volume of petroleum contaminated soil above RBSL or SSTL

Contamination off site?

Concentrations of Contaminants of Concern, COC, for surficial soil.

Concentrations of COC for leaching pathway.

Concentrations of COC for subsurface soil (indoor air) pathway.

Concentrations of COC for construction worker pathway.

Building overlies petroleum contaminated soil?

If yes, what type of building? Residential or commercial



How was GoNM developed?

Lust Ranking

Non-Aqueous Phase Liquid (NAPL)

NAPL Type: AV Gas, Gas, Diesel/Jet Fuel, Oils, Other

Age of Release

Product (NAPL) found off site?

Area of NAPL plume

Mobility of NAPL plume

Current maximum thickness of NAPL in monitoring well

Condition of NAPL



How was GoNM developed?

Lust Ranking

Contaminant Saturated Soil (CSS)

CSS Type: AV Gas, Gas, Diesel/Jet fuel, Oils, Other

Age of Release

Volume in cubic yards

Product (CSS) found off site?



How was GoNM developed?

Lust Ranking

Priorities and Ranking

Impacts to Human Health, Safety & Environment

Explosive Vapors

Toxic Vapors

Concentrations of COCs in water supply

Water Supply Type

Population affected by water supply impact (in numbers)

Difficulty of replacing water supply system

Ecological Damage

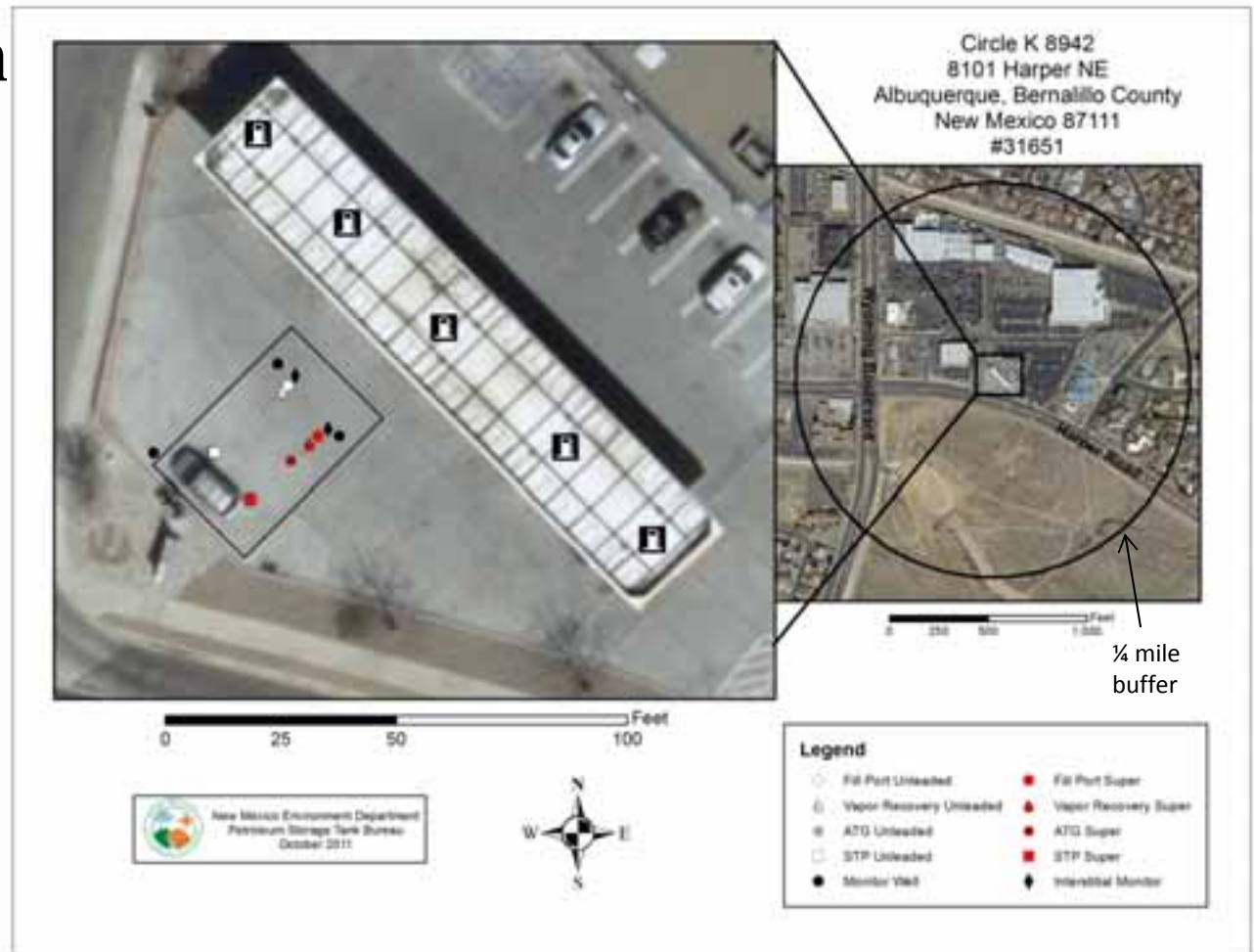
Property Damage



GoNM in Action

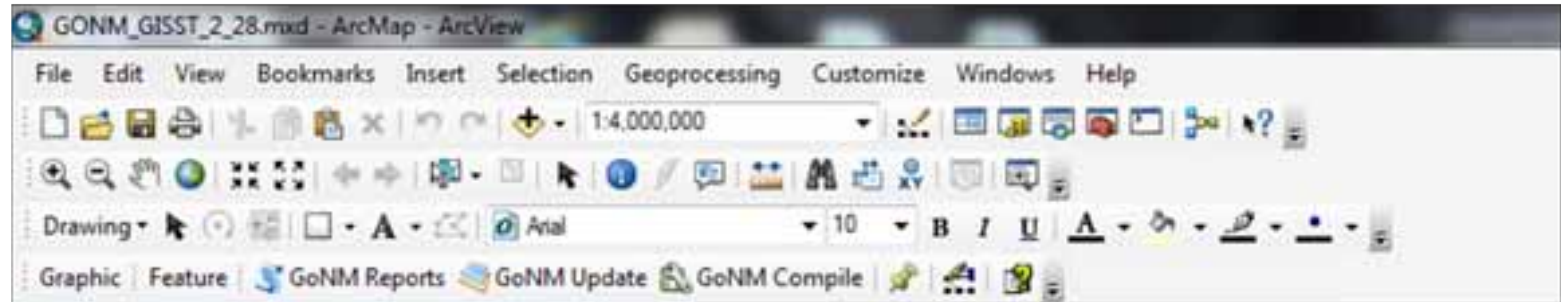
- This is the work product of GoNM.
- GPS all features at a gas station.
- This map is a great asset to the inspectors.

If there is a turn over due to retirement or realignment of territory this help to familiarize them with the facility.



- Used by owner/operator for required maintenance plan.
- Used by Project Manager for release analysis.

GoNM in Action



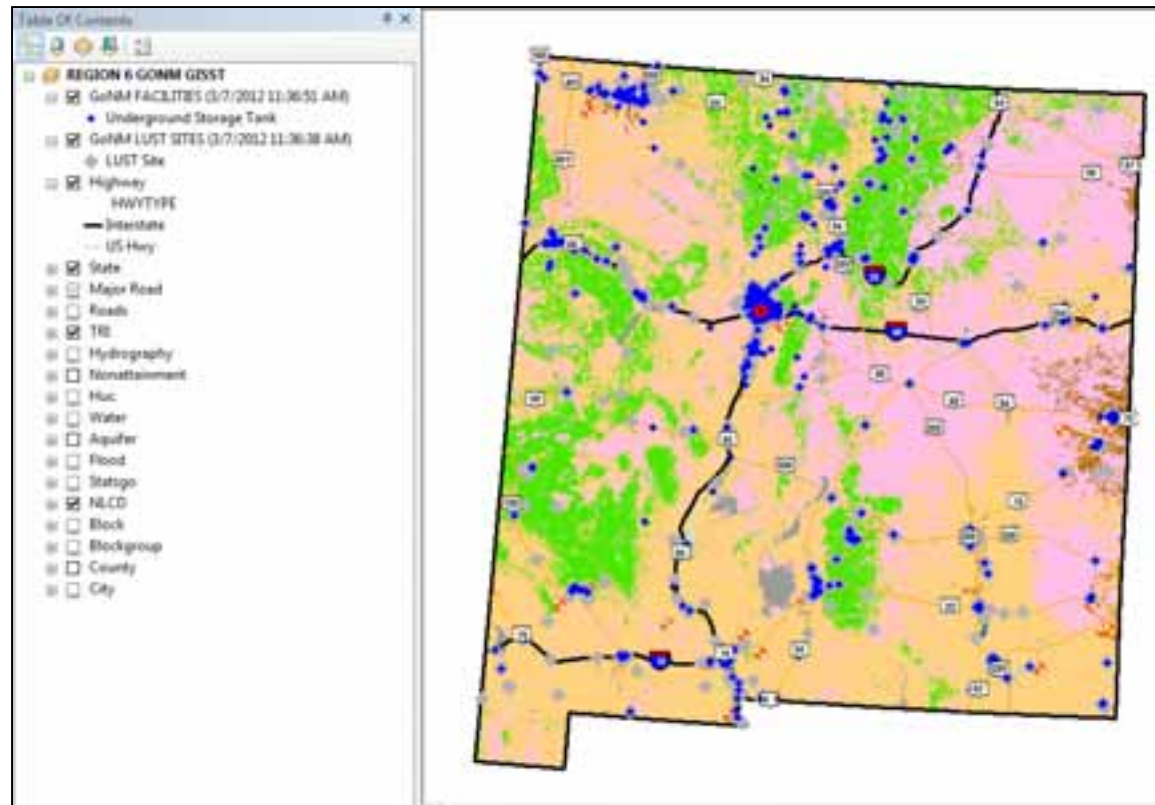
Calculates data for a user defined buffer.

Captures any changes that have been made to OneStop

Crunches or performs the analysis update from Facilities Update ahead of time for all 3 layers.

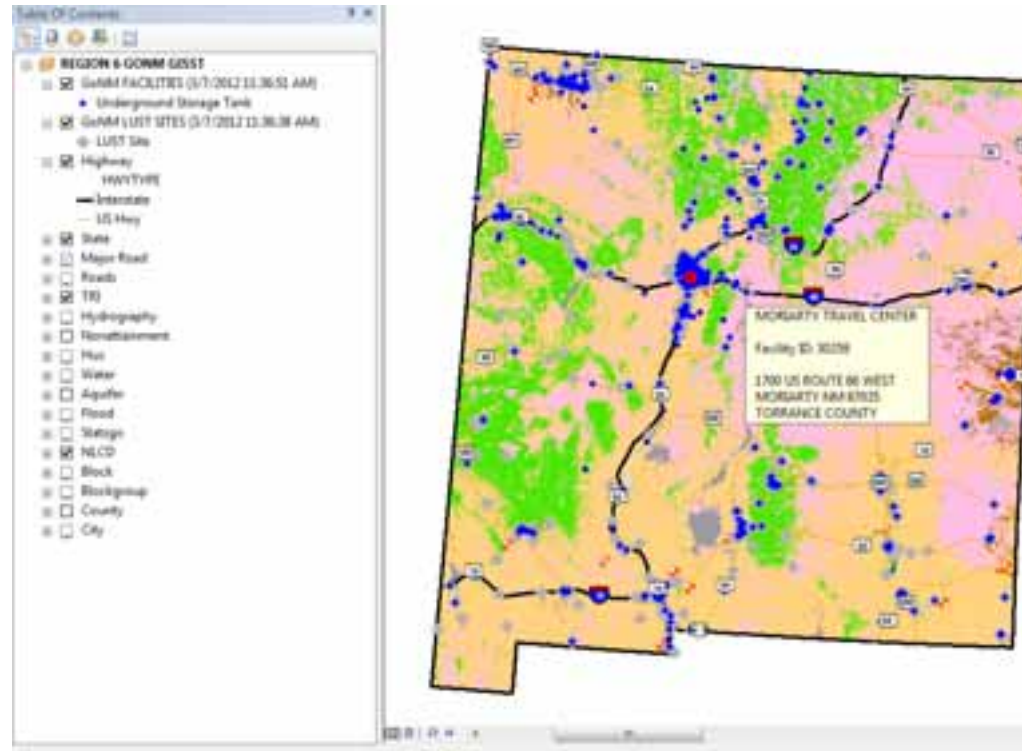
GoNM in Action

- New Mexico with many layers turned on.
- NLCD – National Land Cover Dataset
 - Green- both deciduous and evergreen forest
 - Yellow-shrub/scrub
 - Pink-open space
- I-40 & I-25 are visible
- Facilities visible as small blue dots
- LUST visible as small gray squares.



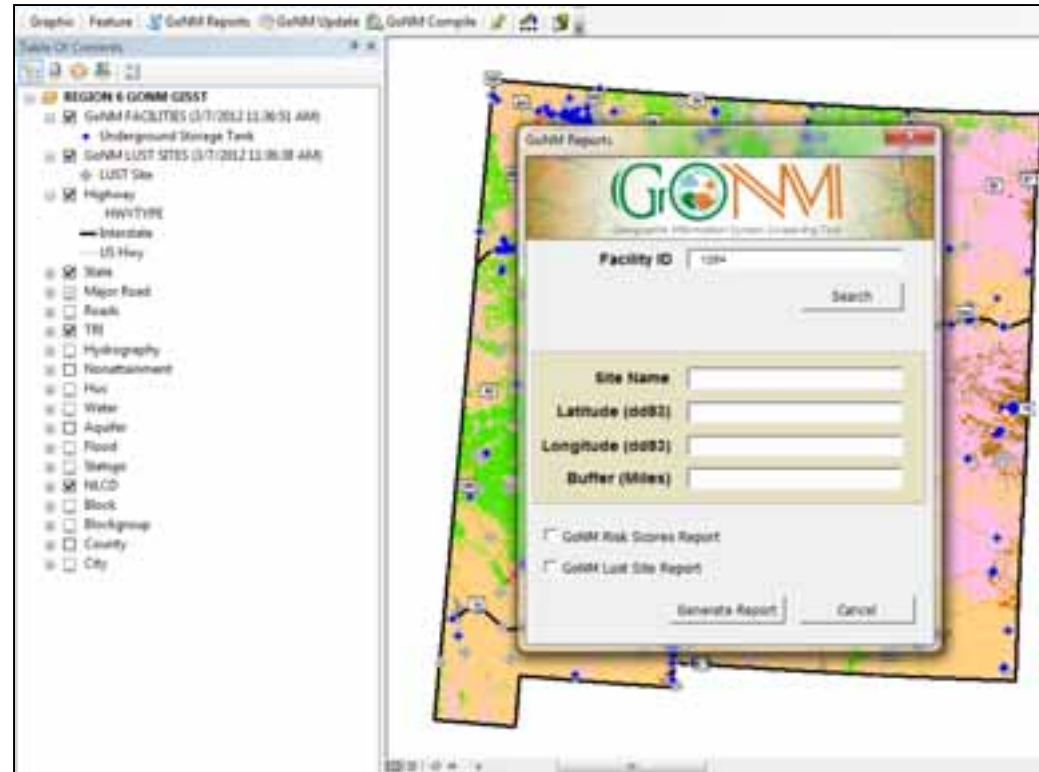
GoNM in Action

When the cursor hovers over a facility or a LUST site an information box pops up with the name, facility ID, and address.



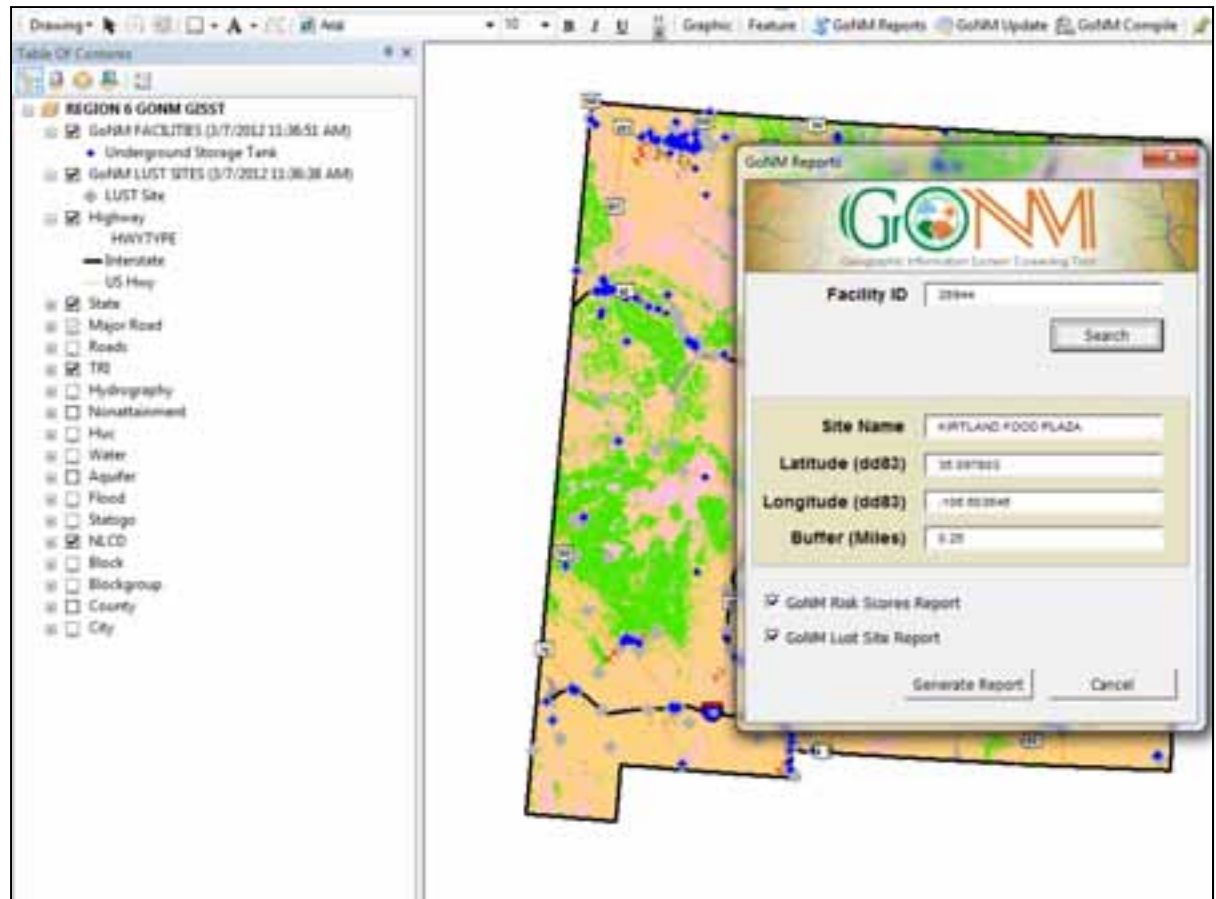
GoNM in Action

- Click on GoNM Reports.
- Enter a Facility ID in the box to the right.
- Click on the Search button.
- Click on the Search button.



GoNM in Action

- The data is automatically filled in once the Search button is engaged.
- The buffer area can be changed as needed.
- This is both an active facility and a LUST site.
- Click on Generate report.



GoNM in Action

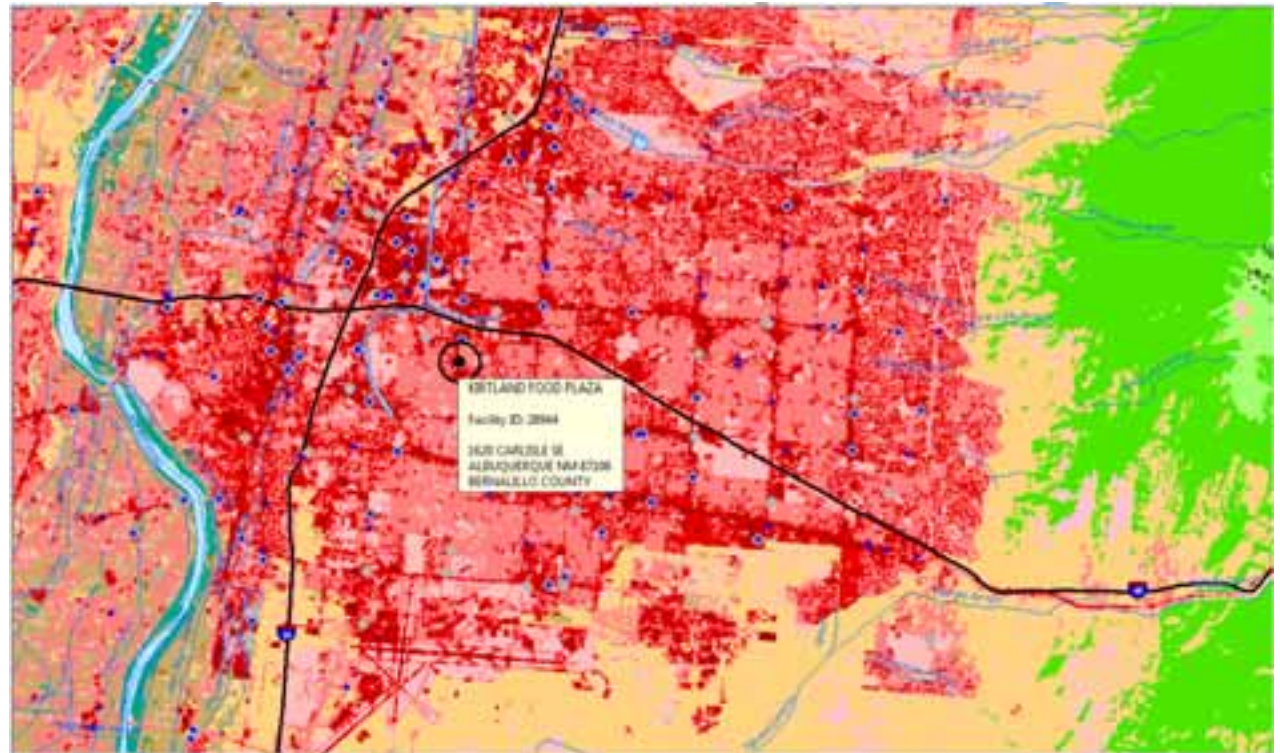
- A report is generated showing the
 - LUST Ranking, score, and the priority.
- Scores for each of the layers – Landscape, Community, and Facility – are shown.
- Score for the average of the 3 layers is also displayed.
- An improved report is available with the GoNM Mapper.

GoNM GISST Scores - KIRTLAND FOOD PLAZA			
LUST SCORE:	2964.00	LUST Site Rank	98
LUST PRIORITY:	2.00	LANDSCAPE:	1.96
		COMMUNITY:	1.50
		FACILITY:	3.33
		GoNM Risk Score	2.28
Facility ID	1094	% Wetlands	0
Facility Name	KIRTLAND FOOD PLAZA	% Wetlands Score	1
Address	1670 CARLELE ST	% Agriculture	0
City	ALBUQUERQUE	% Agriculture Score	1
County	BERNALILLO	% Wetlands	0
State	NM	% Wetlands Score	1
Zip Code	87106	Land Use	3 (95)BERTON748
Owner Name	R. AND E ENTERPRISES INC	Land Use Ranking	2
Owner ID	13812	Area Perimeter Ratio	0
Owner/Operator	R. AND E ENTERPRISES INC	Area Perimeter Ratio Score	1
Phone Number	505-366-0333	% 100 Year Flood	0
Inspector	Beda	% 100 Year Flood Score	1
Tank Owner ID	13812	% 500 Year Flood	0
Tank Operator ID	01201	% 500 Year Flood Score	1
Surface Water Use	0.00	TRE Releases to Air (Tox)	0
Surface Water Use Score	5	TRE Releases to Air Score	1
Storm Exceedances	0.000000001708	TRE Releases to Water (DB)	0
Storm Exceedances Score	1	TRE Releases to Water Score	1
Rainfall	10.9	TRE Releases to Land (DB)	0
Rainfall Score	1	TRE Releases to Land Score	1
Unified Watershed Assessment	High risk priority	TRE Toxicity Releases to Air (DB)	0
Unified Watershed Assessment Score		TRE Toxicity Releases to Air (Score)	1
Average Flow	402.7	TRE Toxicity Releases to Water (DB)	0
Average Flow Score	3	TRE Toxicity Releases to Water Score	1
Aquifer Geology	Sand/gravel	Groundwater Probability	1
Aquifer Geology Score	4	Groundwater Probability Score	1
Distance to Water (feet)	1,180	Soil Permeability	4
Distance to Water Score	3	Soil Permeability Score	4
road density (miles)	71.82	LANDSCAPE CRITERIA AVG SCORE	1.96
Road Density Score	5	Population Density	5431
Nonattainment	Nonattainment area IS NOT present in area	Population Density Score	4
Nonattainment Score	1	% Economically Stressed	17.2
Stream Density (Miles)	0	% Economically Stressed Score	1
Stream Density Score	1	% Without High School Degree	4.38
channel:canal density (miles)	0	% Without High School Degree Score	1
Channel/Canal Density Score	1	% Children Under 7	4.93
% Surface Water	0	% Children Under 7 Score	1
% Surface Water Score	1	% 55 Older	29.16
aquifer	Sole Source Aquifer Not Present within the	% 55 Older Score	3
Aquifer Score	1	% Children Under 1	8.77

Generated at: 11/09/12 2:17:47 PM

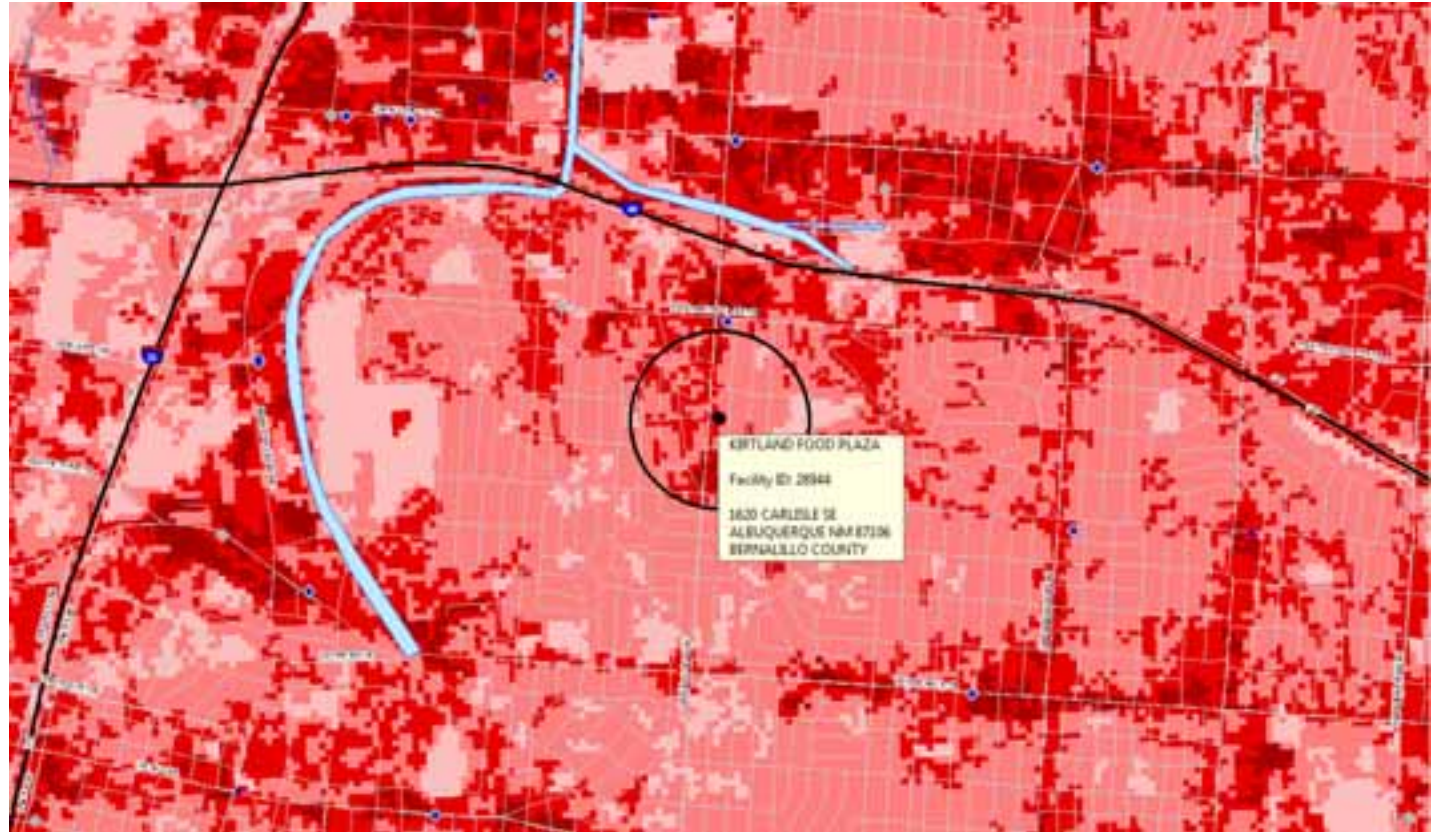
GoNM in Action

- Great tool for outreach and community meetings.
- Interstates are visible.
- NLCD shows the green of Sandia Mountains east of Albuquerque and the Rio Grande.
- Red is high intensity developed
- Medium pink is medium intensity developed
- Pale Pink is low intensity developed.
- Analysis site is visible by buffer where the analysis takes place.



GoNM in Action

- A close up of the site in ArcMap

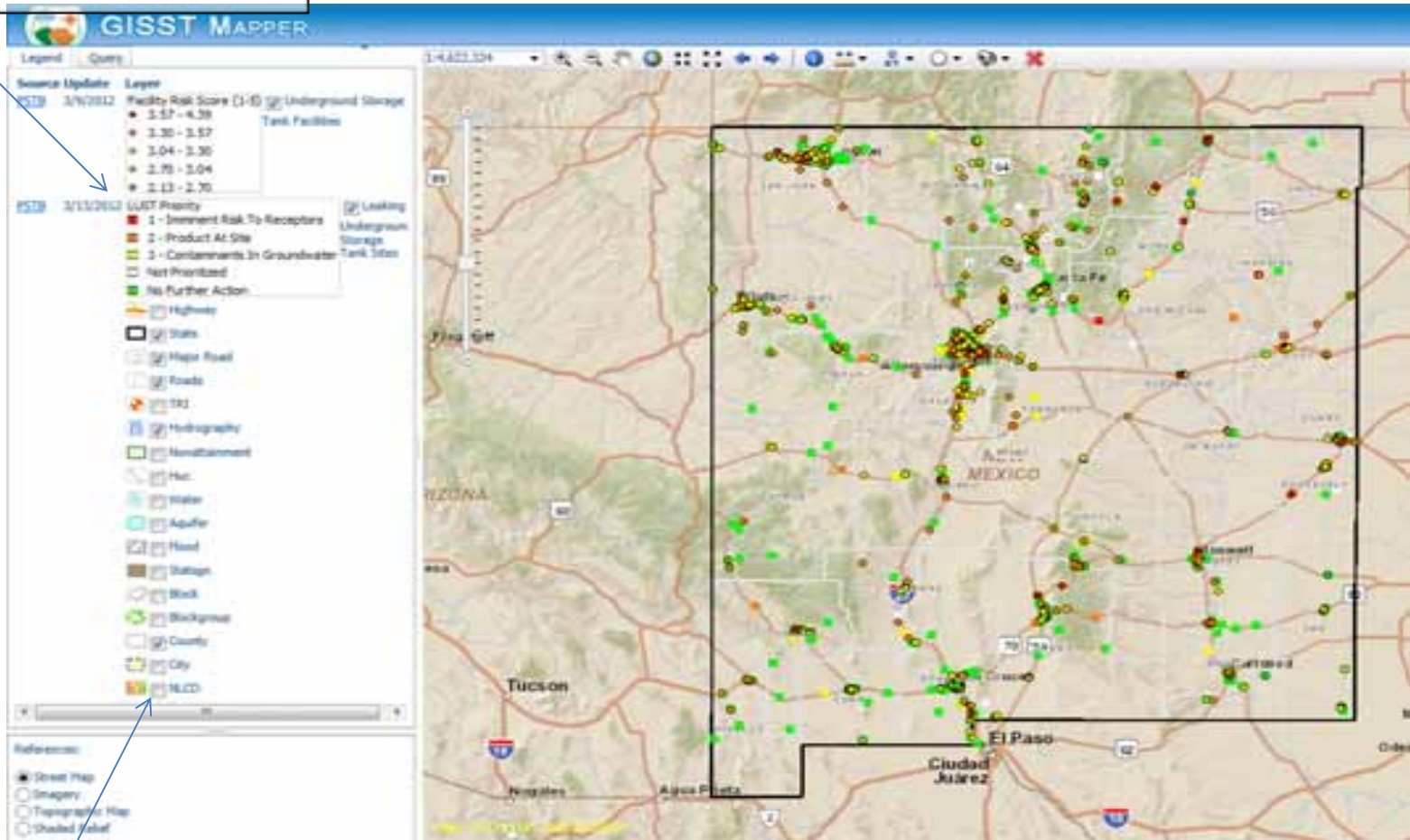


GoNM in Action

<http://gis.nmenv.state.nm.us/GoNM>

How to Use GoNM

Table of Contents

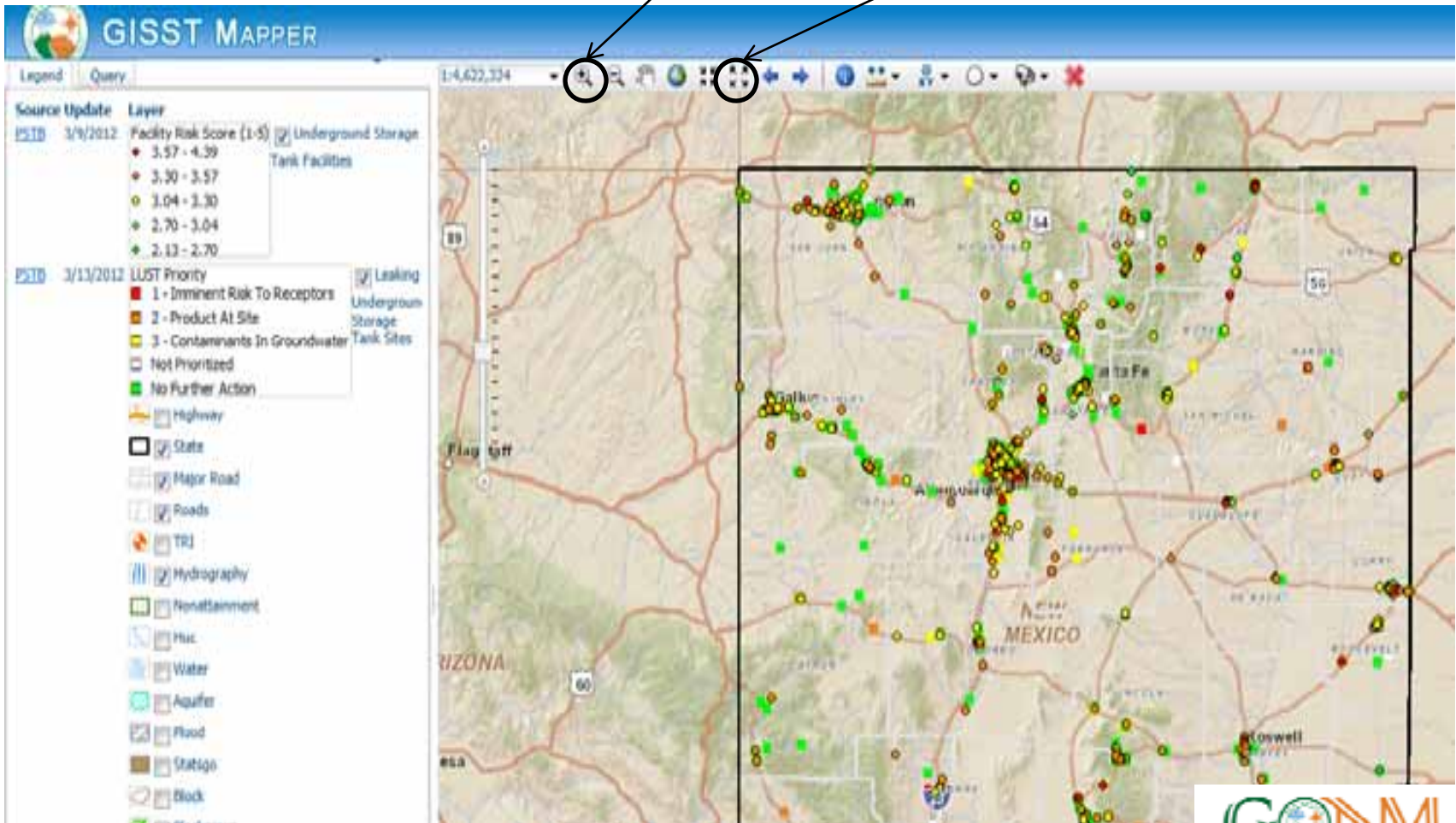


Click the box next to the description to turn layers on and off.

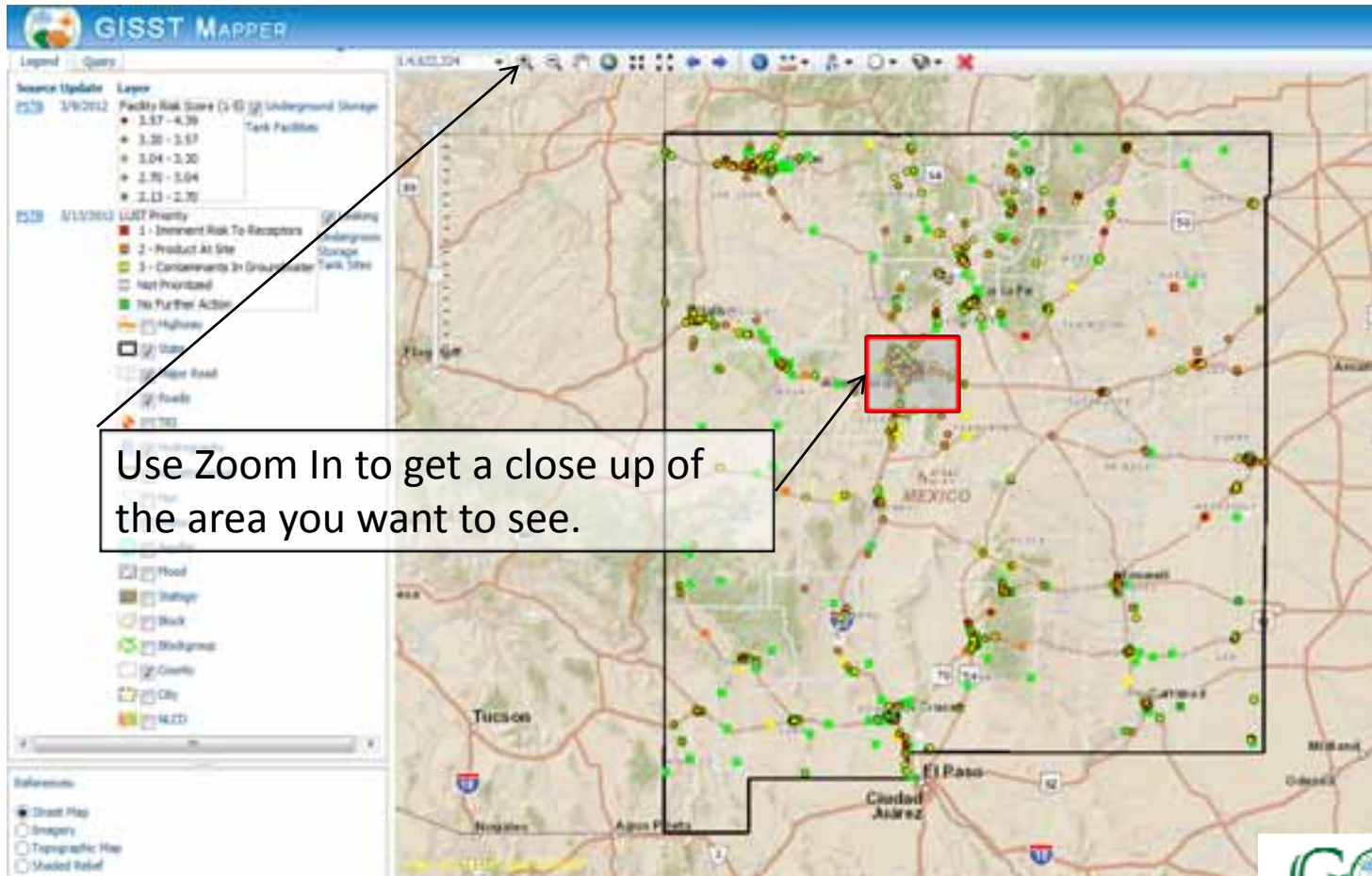
How to Use GoNM

Zoom In, draw a box around the area where the facility is located

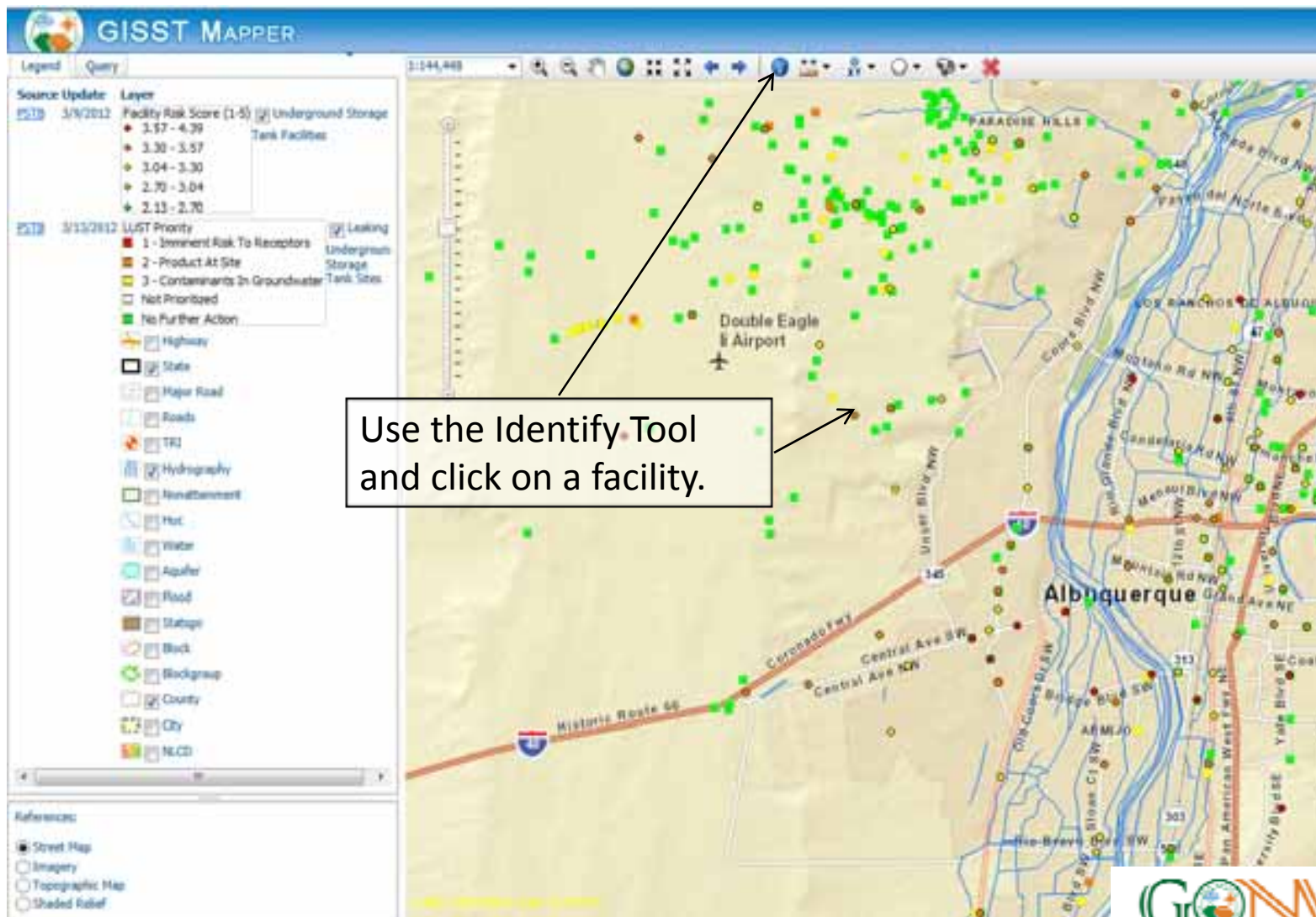
Fixed Zoom Out to see all of New Mexico



How to Use GoNM



How to Use GoNM



How to Use GoNM

The screenshot shows the GISST MAPPER interface. On the left, there are layers for 'Facility Risk Score (1-6)' and 'LIST Priority'. The main map area shows a city street grid with a river. An 'Identify Results' window is open, displaying a table with the following data:

Report	FACILITY_NAME	RUNTIME
	NEW KIRTLAND FOOD PLAZA	4/20/2012 4:28:11

A callout box with the text 'Click on the magnifying glass under Report' points to the magnifying glass icon in the 'Report' column of the table.

How to Use GoNM

GoNM UST reports

KIRTLAND FOOD PLAZA
Facility ID: 28944

Landscape: 1.88
Community: 1.50
Facility: 3.39

UST Score
2.28

Address: 1620 CARLISLE SE
City: ALBUQUERQUE
County: BERNALILLO
State: NM
Zip Code: 87106
Phone Number: undefined

Owner Name: R AND E ENTERPRISES INC
Owner ID: 15842
Owner/Operator: R AND E ENTERPRISES INC
Inspector: Butler
Tank Owner ID: 15842
Tank Operator ID: 03202

LUST Site Details

1/14/2002
Investigation, Responsible Party

LUST Score: 2864
LUST Priority: 2
LUST Ranking: 99

Facility Criteria	Score	Value
Tank Age	5	25
Cathodic Protection Tank	3	C03,C04,C05,C09
Cathodic Protection Piping	5	UNK
Overflow Protection	2	I02,I03
Piping Construction	1	F03
Spill Catchment Basin	2	I03
Tank Construction	5	A01
Facility History	3	NOV-C
Tank Status	2	1
External Protection	4	C03,C09
Internal Protection	5	C03
Release Detection Piping	2	O15
Release Detection Tank	3	H03
Secondary Containment Tank	5	UNK
Secondary Containment Piping	5	UNK
Number Dispensers	1	0
Number Tanks	3	3
Frequency Of Inspections	4	1 INSPECTION EVERY 18 MONTHS
Equipment Maintenance Records	4	NO
Tank Contents	3	B85

Values with “UNK” often signify there was no data entry for a tank detail. There are situations where UNK is appropriate. If a detail is not filled in, “UNK” will be the default in that field with a score of 5. All items need to be filled in. A score of 5 could give the facility a worse score than it deserves

What Has GoNM Taught Us?



What Has GoNM Taught Us?

- A system for QA/QC is necessary.
 - GoNM lets us easily see bad data.
- Where do we need to focus?
 - Owner/Operators with the most leaks
 - Equipment with most leaks
 - Increase Inspection Rate – where do the inspectors need to be on amore frequent schedule
 - Corrective Action that is best for this type of leak
 - Location – where the leaks are most likely to occur.



Next Steps for GoNM

- Benefits
 - Great tool for community meetings and outreach.
- Electronic Inspections for the future
- Other States encouraged to start a program



GoNM will continue to work miracles



- GoNM is a work in progress.
- The hardest part is over.
- It will continue to evolve with our needs and innovations.
- It can be customized to meet the *fundamental* demands of other programs in NMED or any other program anywhere.

GoNM->GoUSA->GoEarth->GoMilkyWay

GoNM Acronym Reference

UST – Underground Storage Tank

NMED – New Mexico Environment Department

LUST – Leaking Underground Storage Tank

STORET - STORage and RETrieval Data Warehouse is a repository for water quality, biological, and physical data and is used by state environmental agencies, EPA and other federal agencies, universities, private citizens, and many others.

EPA R6 – Environmental Protection Agency Region 6 – New Mexico, Oklahoma, Arkansas, Texas, and Louisiana.

GoNM – Geographic Information Screening Tool of New Mexico

BTEX – benzene, toluene, ethylbenzene, and xylenes

NAPL- Non-Aqueous Phase Liquid

TRI – Toxic Release Inventory

PSTB – Petroleum Storage Tank Bureau

COC – Concentration of Concern

CSS - Contaminant Saturated Soil



Geographic Information System Screening Tool

Suzan Arfman

suzan.arfman@state.nm.us

Alex Harding

alex.harding1@state.nm.us

Kim “Kley” Kleyboecker

kim.kleyboecker@state.nm.us

Zack Stauber

zachary.stauber@state.nm.us