



INDIAN HILLS GROUNDWATER WATER QUALITY MODELING PROJECT PROGRESS REPORT

Jefferson County Public Health
Environmental Health Services Division

PRESENTATION OVERVIEW

- History that lead to the Study
- Purpose of the Study
- Groundwater Model Results
- Study Recommendations
- Next Steps

HISTORY

1920s – 5 filings platted, creating 3,500 “city size” lots

1968 – Nitrate levels in public wells exceed safe drinking water standards

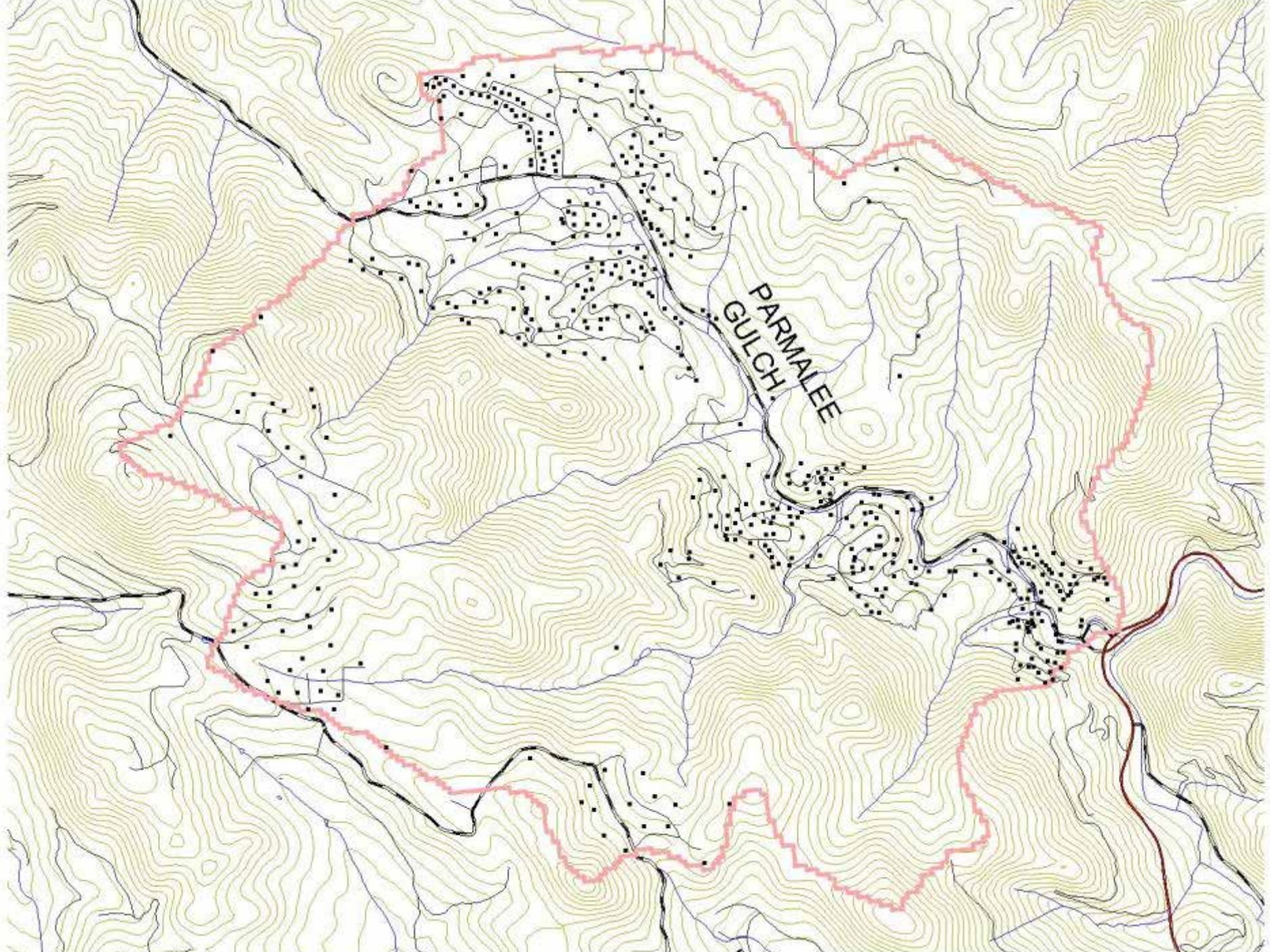
- Septic systems identified as a contributing factor
- High risk area identified > list of lots & tracts > Prohibition Area
- *Subdivided to a density of more than 1 dwelling per acre*

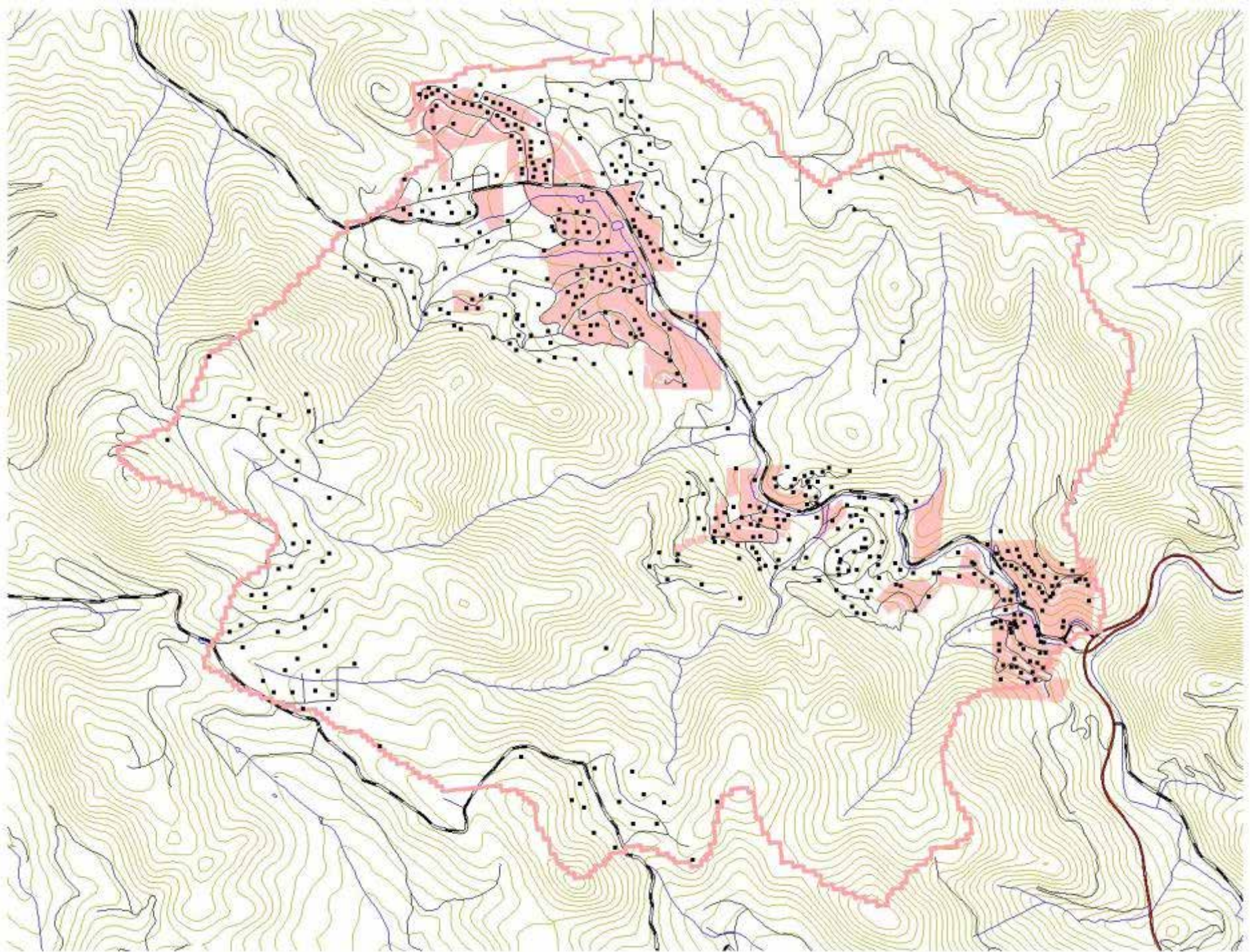
1979 – BOH institutes permanent prohibition

To protect the drinking water supply from further degradation –

No new ISDS permits in the Prohibition Area

“This action was taken in an attempt to preclude further contamination.”





HISTORY

Early 2014 – Property Owner Request

- Remove my 3 lots from the Prohibition, each lot is larger than 1-acre.
- Staff research results – 4 vacant lots are larger than 1-acre.

December 2014 - Board of Health removes the 4 lots from Prohibition

December 2014 – Property Owner Request

- Remove my lots from the Prohibition, owner completed a Property Merger Agreement to create two parcels that are larger than 1-acre.

Would it be prudent and reasonable to grant this request?

HISTORY

BOH to Staff - What would it take to conduct a hydro-geologic study of the Parmalee Gulch watershed?

- Staff recommends a groundwater modeling study
 - use existing data
 - determine the impact of additional OWTS within the prohibition area.
- May 2015 - BOH approves groundwater modeling study contract.
- November 2015 - JCPH receives report & supporting documents.
- March 2016 - JCPH submits redline to Author

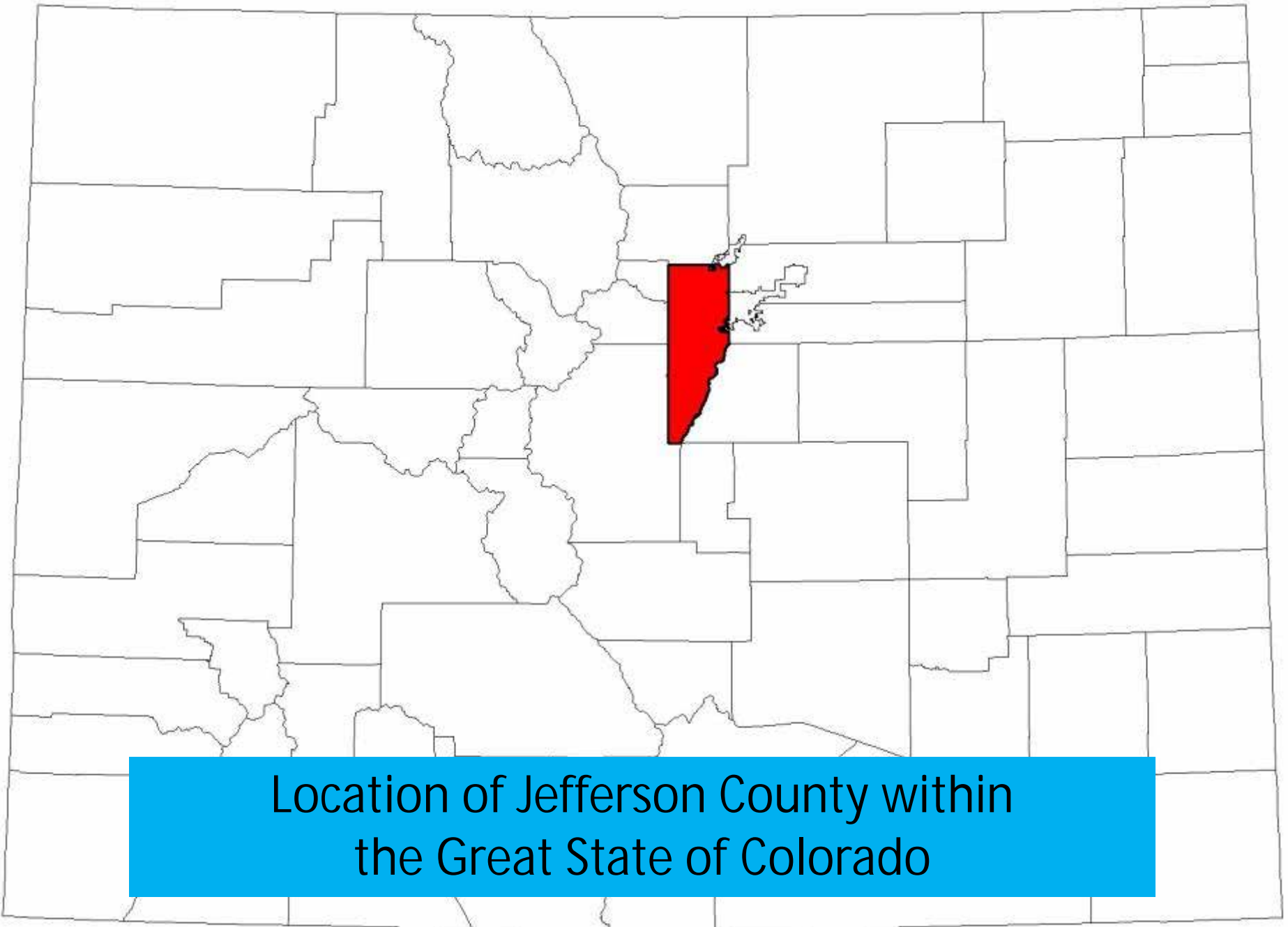
Resolve redline issues, submit to Board of Health for review

PURPOSE OF THE STUDY

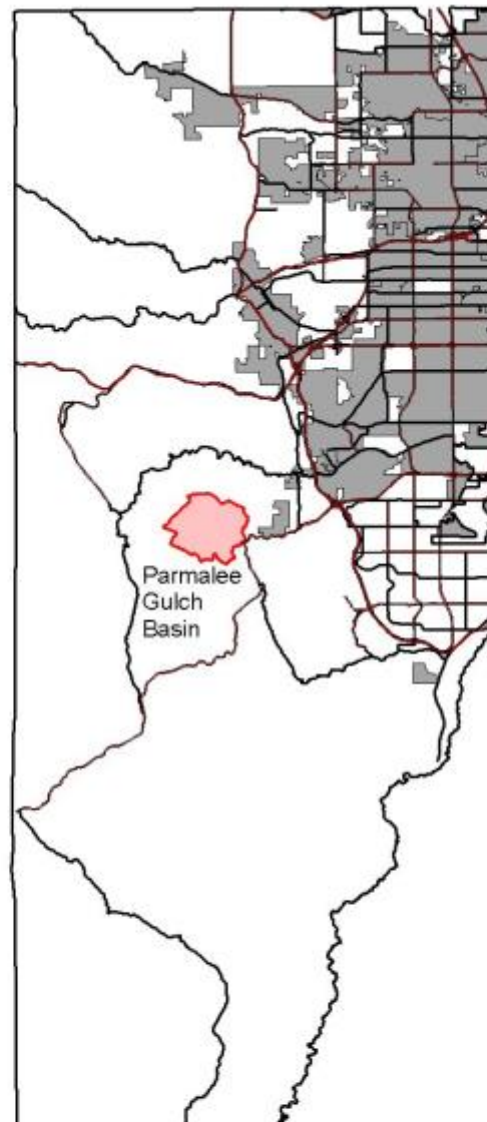
- Integrate over 40 years of research in the Turkey Creek watershed and Parmalee Gulch sub-basin
- Use groundwater models to conduct advanced geospatial analysis
- Determine if and how the additional OWTS in the Prohibition Area might increase nitrate concentration in groundwater.

STUDY PREPARATION

- Assemble of Existing Facts and Data
 - Water Quality Data from Public and Private Wells
 - Public and Private Wells Locations
 - Onsite Wastewater Treatment Systems Locations
 - Prohibition Lots and Area
 - Horses and Horse Property
 - Roads and Driveways
 - Land Use
 - Soil Porosity
 - Geology and Aquifers



Location of Jefferson County within
the Great State of Colorado

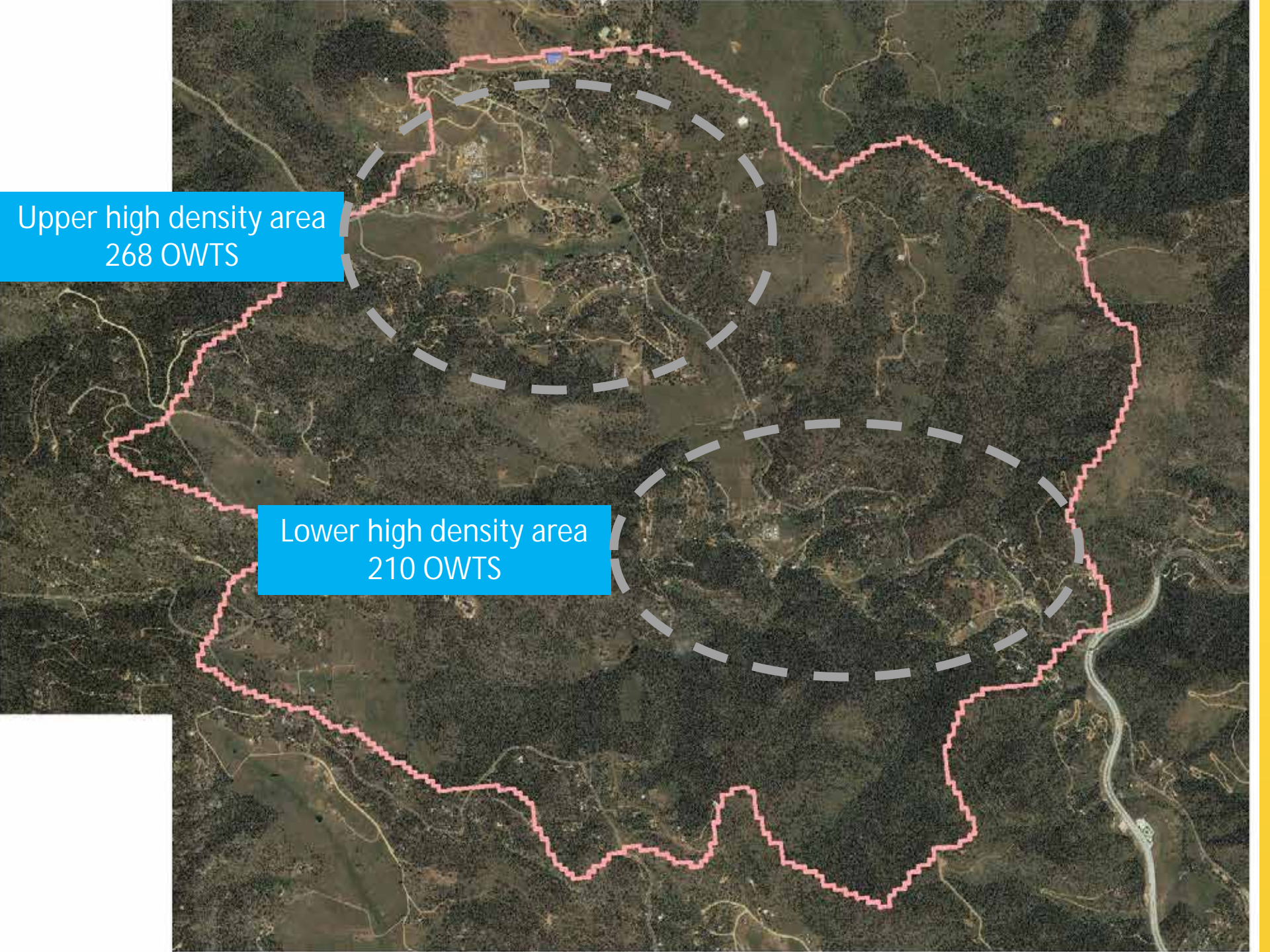


Location of Parmalee Gulch / Indian Hills
within Jefferson County

INDIAN HILLS / PARMALEE GULCH BASIN

FACTS & FIGURES

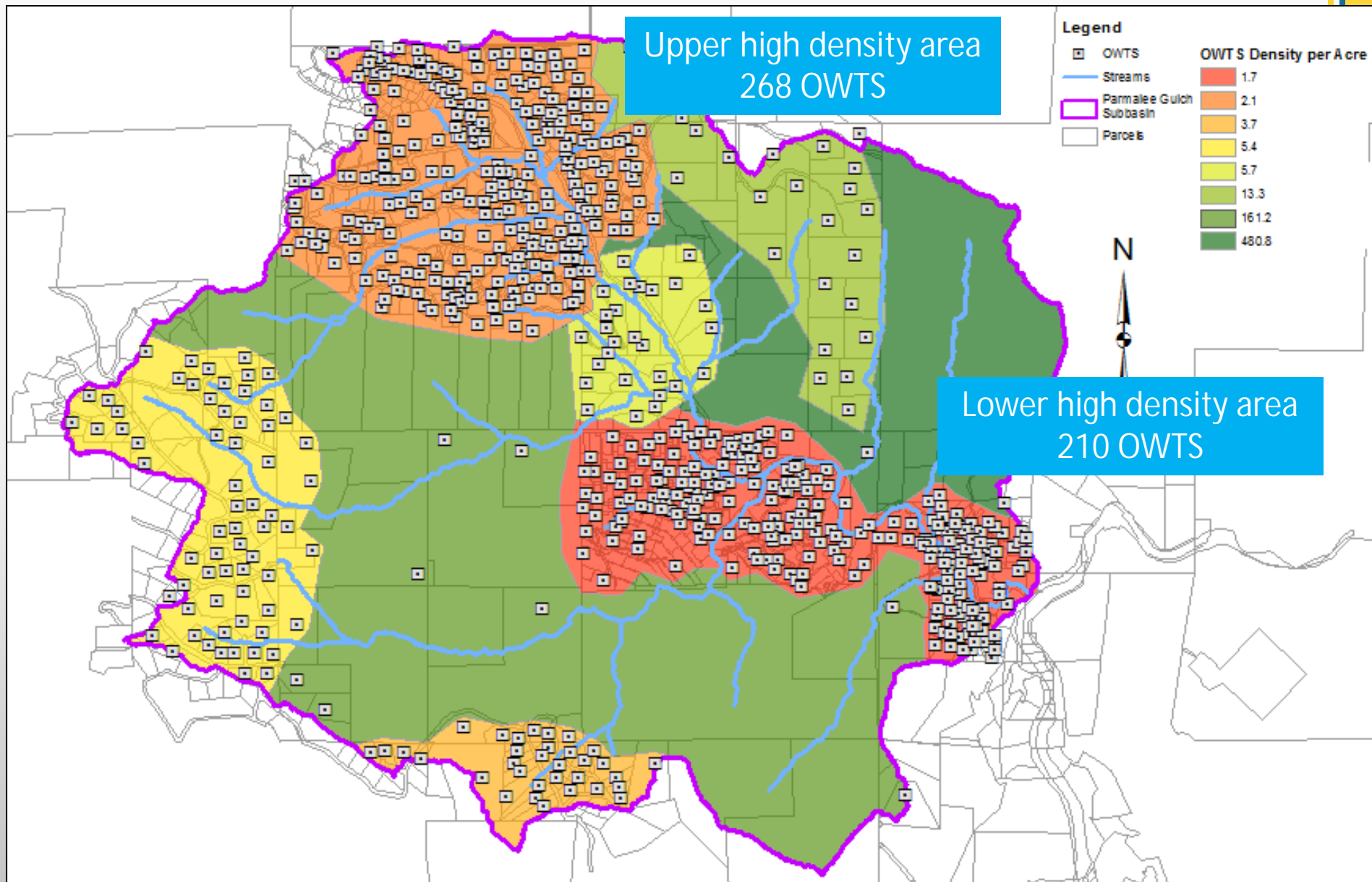
- 700 Residential Dwellings & Commercial Structures
- 1,300 Residents
- 400 Water Taps & 540 Wells
- 700 Onsite Wastewater Treatment Systems (OWTS)
 - 79 High Level Treatment OWTS
- 76 Horses
- 6 Square Miles / 3800 Acres
- Elevation range - 6,726 to 8,635 feet above sea level



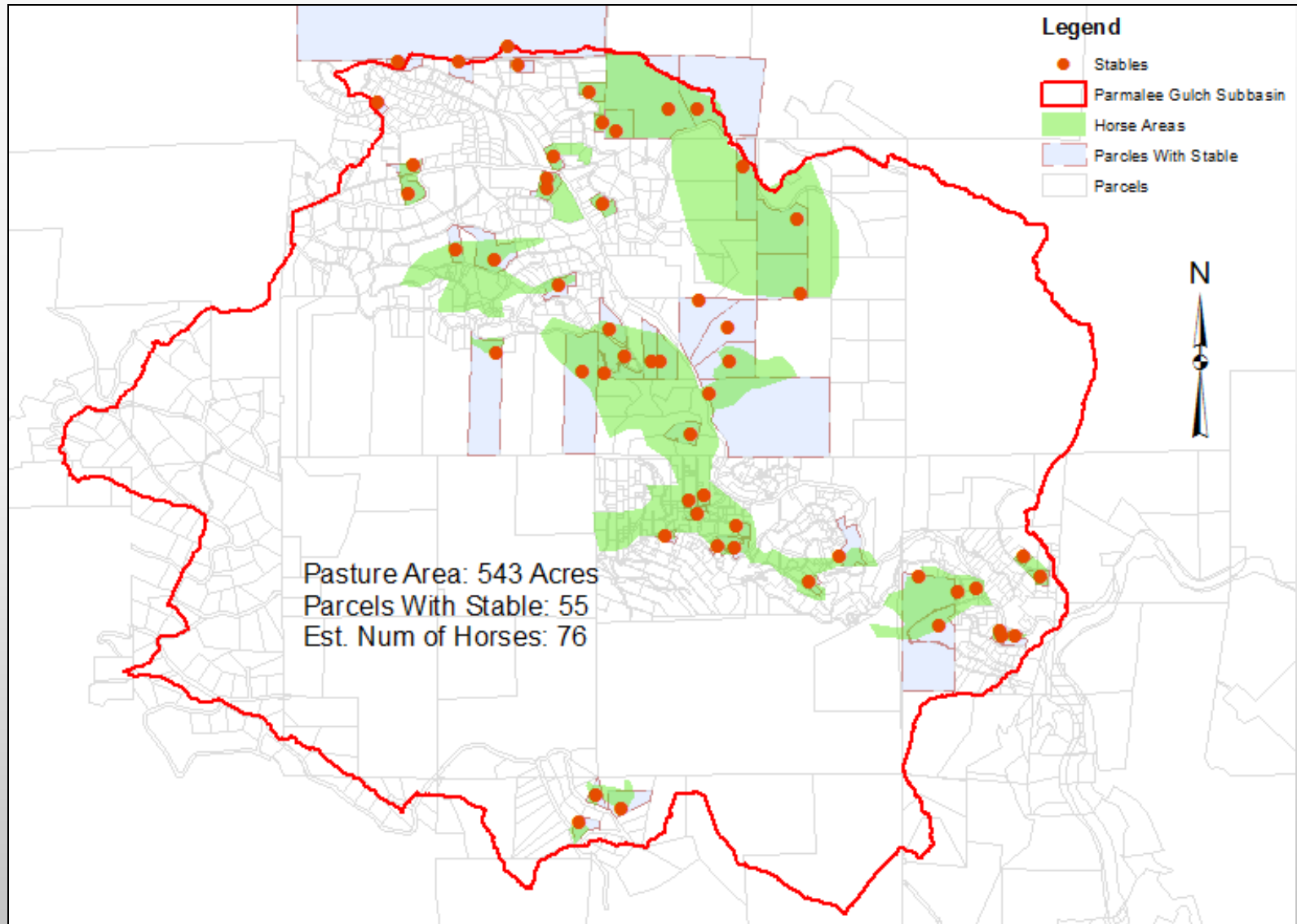
Upper high density area
268 OWTS

Lower high density area
210 OWTS

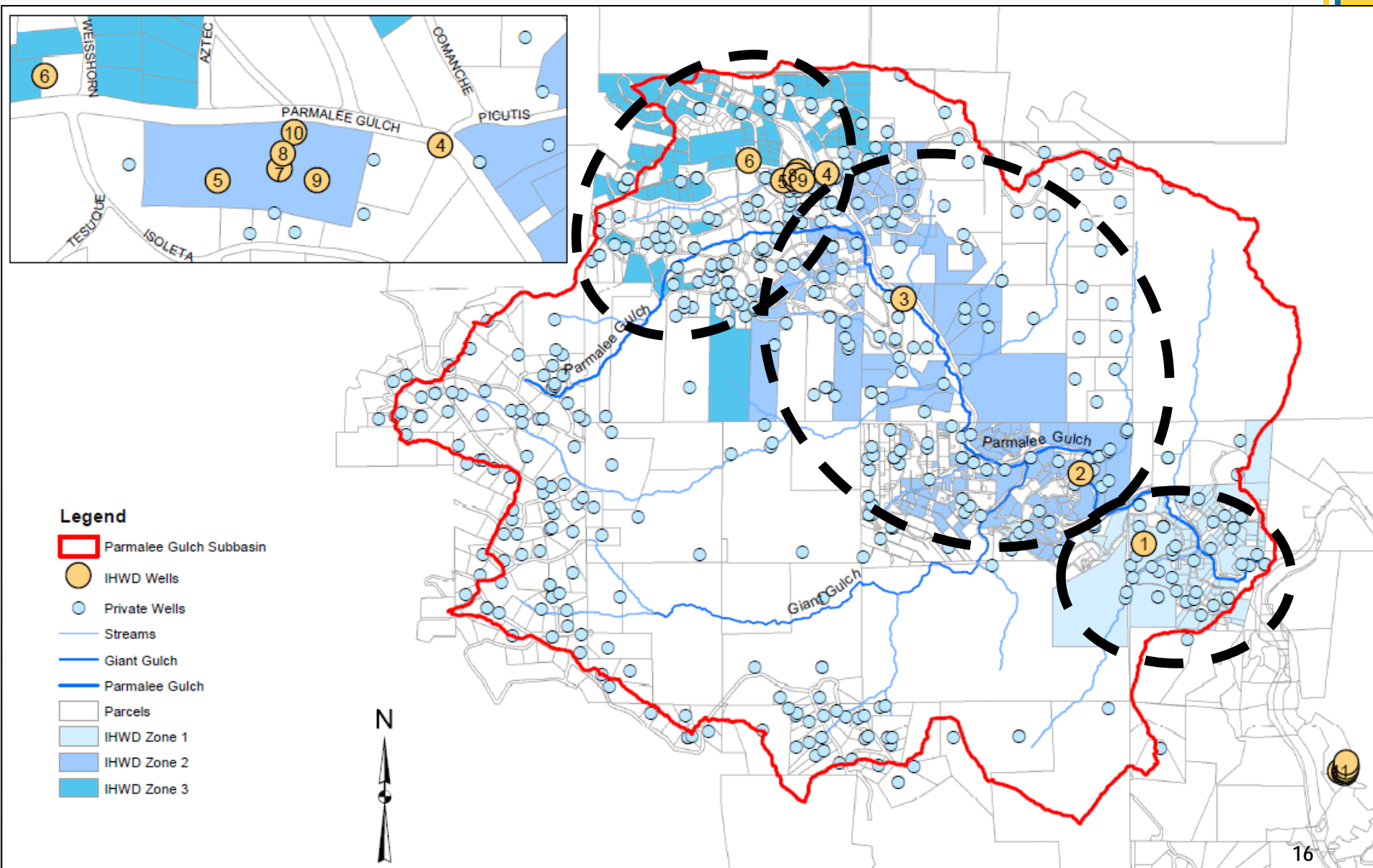
ONSITE WASTEWATER TREATMENT SYSTEMS



HORSE PROPERTY AND HORSES



PUBLIC AND PRIVATE WELLS



GROUNDWATER MODEL RESULTS

- Interpolated Nitrate levels from historic water quality test results
 - High-density upper zone = 8.8 mg/L
 - High-density lower zone = 8.0 mg/L
- Model predicts (with recharge from upslope areas)
 - High-density upper zone (268 existing OWTS) = 8.5 mg/L
 - High-density lower zone (210 existing OWTS) = 5.9 mg/L

NEW 1-ACRE PARCELS

CREATED BY THE MERGE OR SPLIT PROCESS

Split – Gather contiguous vacant lots from within an existing parcel to split-off to form a new 1-acre parcel

Merge – Gather contiguous vacant lots from adjacent parcels to merge together to form a new 1-acre parcel

GROUNDWATER MODEL RESULTS

Upper Zone – 53 new OWTS (268 existing OWTS)

- 43 within prohibition, 10 outside prohibition
- ***Nitrate levels increase by 0.9 to 1.7 mg/L***

Lower Zone – 22 new OWTS (210 existing OWTS)

- 14 within prohibition, 8 outside *prohibition*
- ***Nitrate levels increase by 0.7 mg/L***

STUDY RECOMMENDATIONS

- Use only HLT (high level treatment) systems for new development
- Replace existing Standard OWTS with HTL
- Keep densities above 2 acres to the extent possible
- Keep human wastes out of the OWTS & groundwater system:
 - Composting / incineration toilets
- Identify and inspect older OWTS
- Identify & replace less effective, poorly sited soil treatment areas:
 - Upgrade to pressure dosed sand filters
- Provide incentive to replace standard OWTS with HLT OWTS at Title Transfer / Point-of-Sale

NEXT STEPS / OPPORTUNITIES

- Monitoring water quality at strategic locations
- Encourage private well owners to share nitrate test results
- Initiate a CDPHE-financed source water protection planning process
 - CDPHE WQCD SWPP grant - \$5,000 to both IHWD and JCPH
- Promote well head protection
 - Wells can be a contaminant conduit to the groundwater system
- Properly abandon wells
 - 120 wells on properties that now receive water from the IHWD
- Horses and Horse Property – encourage Best Management Practice

Community Engagement

OUR RECOMMENDATIONS

- Finalize the report
- Distribute the report to Board of Health for review
- Release the report to the Public
- Meet with the Indian Hills Community

QUESTIONS / DISCUSSION

- Thank you!