

# **PGDP Property Acquisition Study**

CAB Presentation  
September 21, 2006

Presented by Lindell Ormsbee,  
Director; Kentucky Research Consortium for Energy  
and Environment (KRCEE)



# Agenda

- **Project Goals**
- **Project Task Status**
  - **Potential Remedial Action Alternative Analysis**
  - **Groundwater Modeling**
  - **Property Acquisition Potential Options**
  - **Property Acquisition Potential Costs**
  - **Economic Analysis**
- **Future Activities**



# Project Goals

- **The study is being conducted in accordance with a Congressional Directive to DOE in the 2006 Energy and Water Development Appropriations Act.**

*“Within the funds provided the Department shall undertake a study of the potential purchase of property or options to purchase property that is located above the plume of contaminated groundwater near the facility site. The study shall evaluate the adequate protection of human health and environment from exposure to contaminated groundwater and consider whether such purchase, when taking into account the cost of remediation, long-term surveillance, and maintenance, is in the best interest of taxpayers.”*

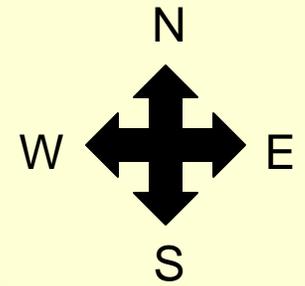
*Energy and Water Development Appropriation Bill, 2006 (Senate Report 109-084)*



# TCE Plume - 2004

## Legend

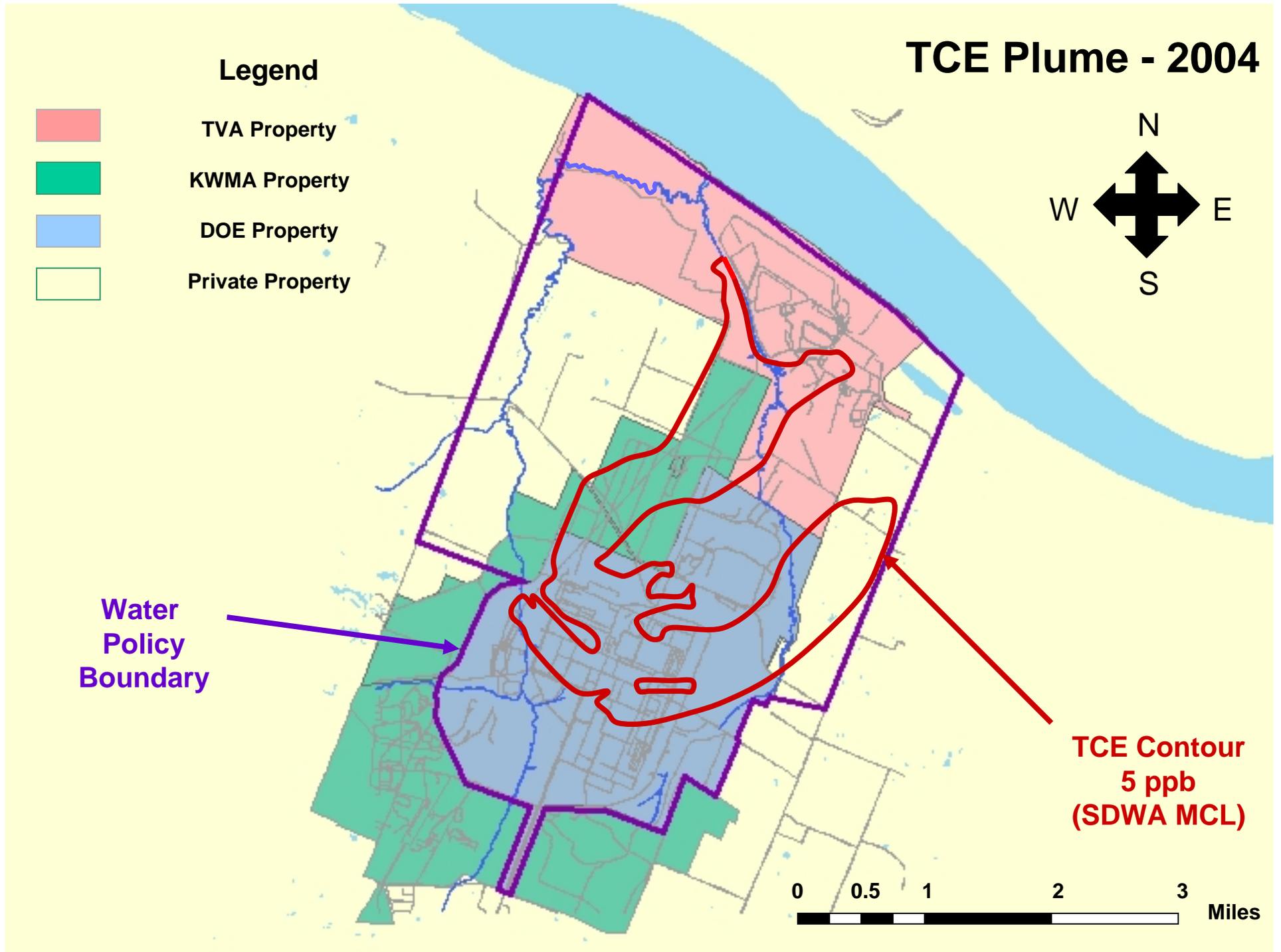
-  TVA Property
-  KWMA Property
-  DOE Property
-  Private Property



**Water  
Policy  
Boundary**



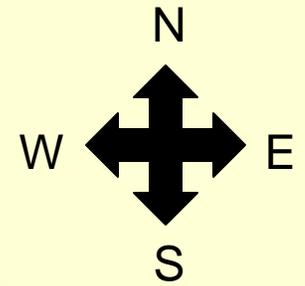
**TCE Contour  
5 ppb  
(SDWA MCL)**



# Tc-99 Plume - 2004

## Legend

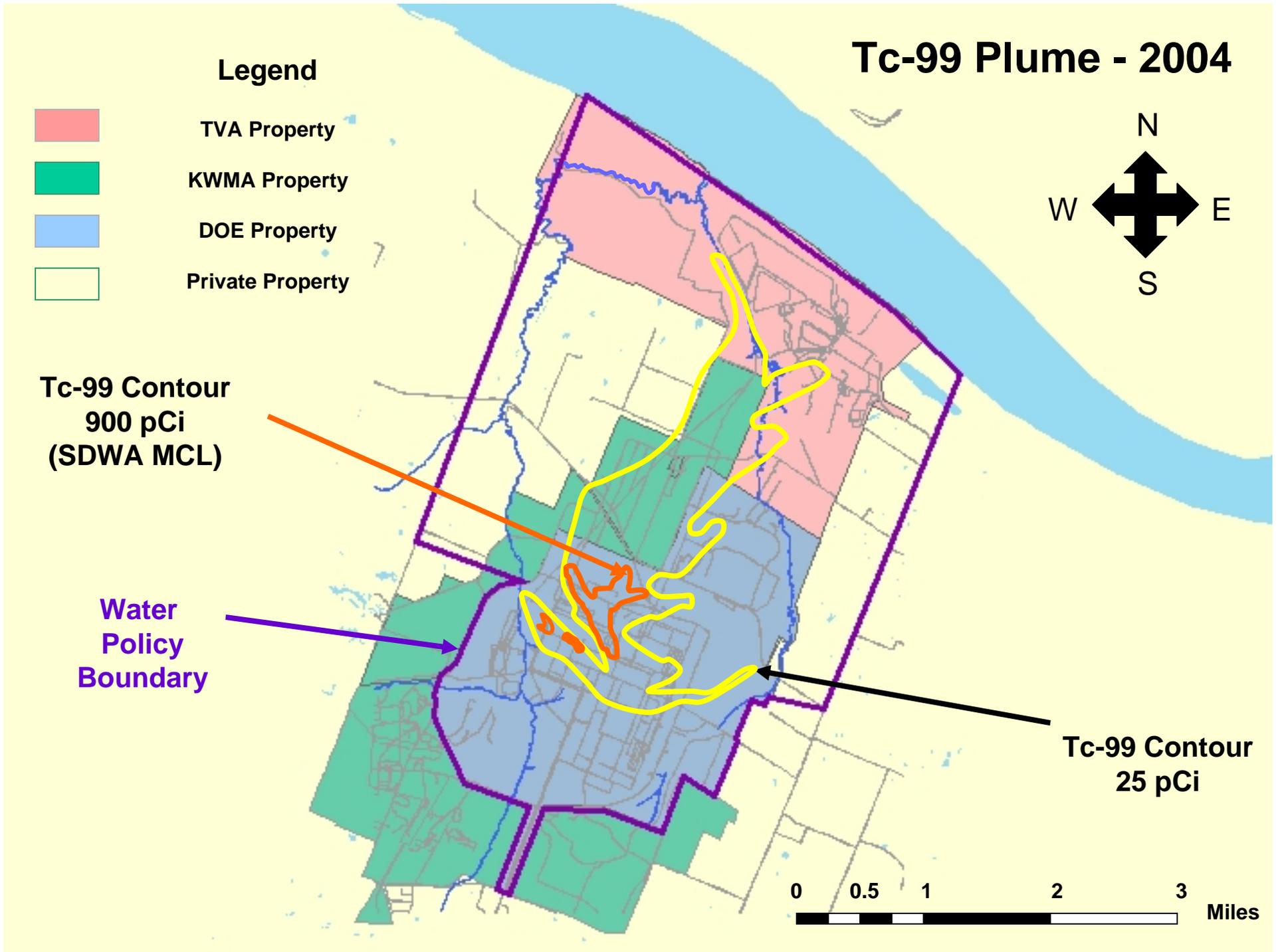
-  TVA Property
-  KWMA Property
-  DOE Property
-  Private Property



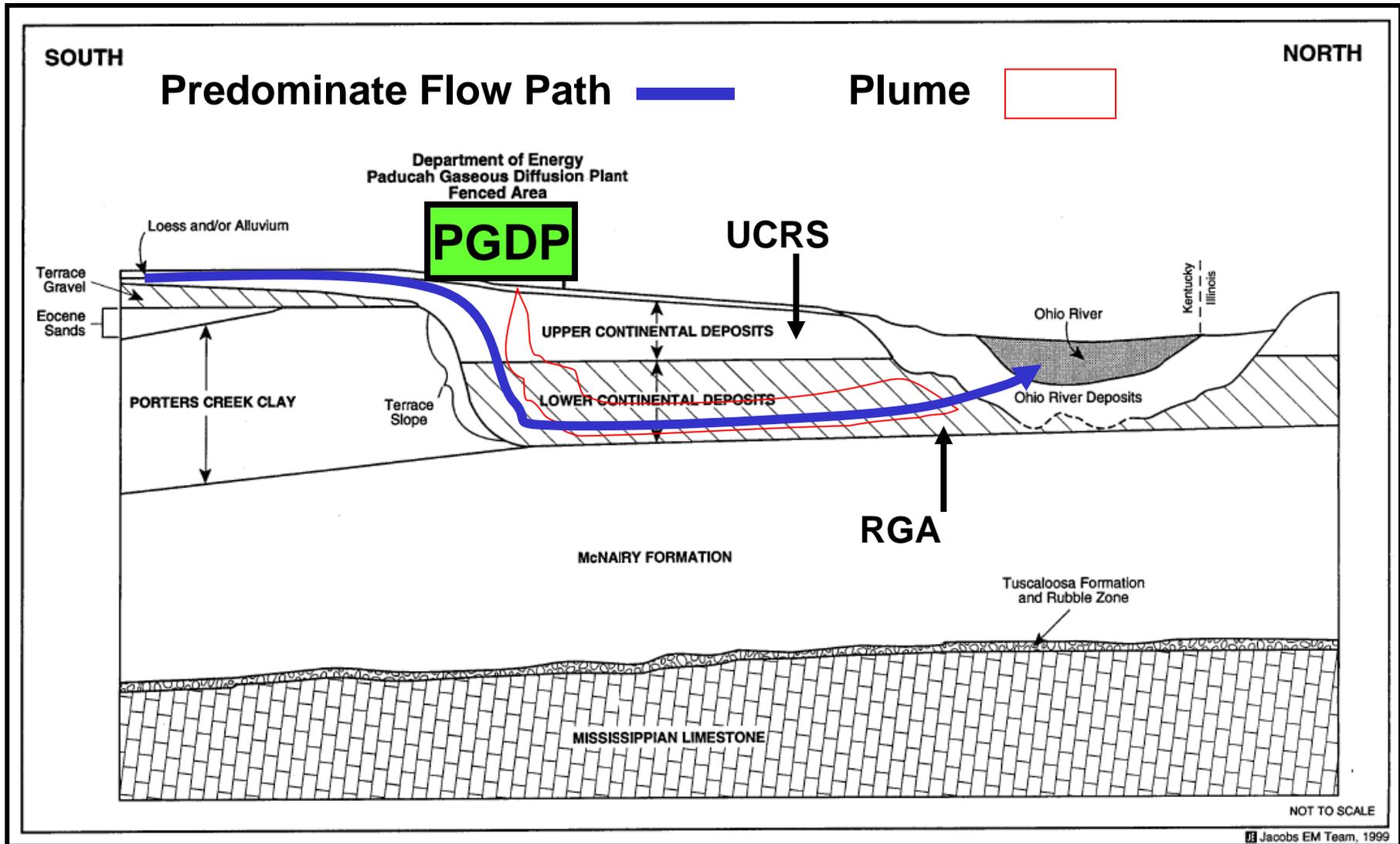
**Tc-99 Contour  
900 pCi  
(SDWA MCL)**

**Water  
Policy  
Boundary**

**Tc-99 Contour  
25 pCi**



# Conceptual Site Model



# Sources of Groundwater Contamination

- **Primary source is a source in the UCRS**
- **Secondary source is a source in the RGA (DNAPL)**
- **TCE Source Areas**
  - C-400 Building area
  - SWMU 4 C-747 Burial Ground
  - SWMU 1 Former Oil Landfarm
  - C-720 Building area
- **<sup>99</sup>Tc Source Area**
  - C-400 Building area



# Potential Remedial Action Option Analysis

- **Based on remedial action options taken from the most recent groundwater feasibility study (FS)**
- **Options considered are:**
  - **No Action**
  - **Existing Pump and Treat**
    - Continuation of existing pump and treat systems
  - **Treat UCRS (Primary) Sources**
    - Remove 95% of TCE found in soil down to 45 ft below surface (UCRS)
  - **Treat RGA (Secondary) Sources**
    - Remove 99% of TCE found in high concentration areas (i.e., DNAPL) in the Regional Gravel Aquifer (RGA)
  - **Combination of Treating UCRS and RGA Sources and the Plumes**
    - Remove 95% TCE from UCRS and 99% from RGA DNAPL
    - Reduce TCE concentrations in the plumes (on and off DOE property)
- **Estimated costs of each remedial action option were developed using information from the FS**



# Groundwater Modeling

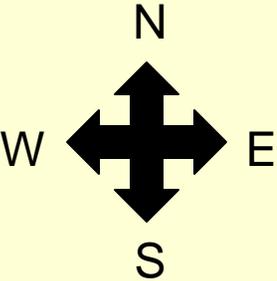
- **Each potential remedial action technology was evaluated using the current DOE Models**
- **Goals are to determine under each remedial alternative scenario:**
  - **Potential extent of plume migration**
  - **Changes in plume over time**
- **100-year period was modeled**



# TCE Plume - 2004

## Legend

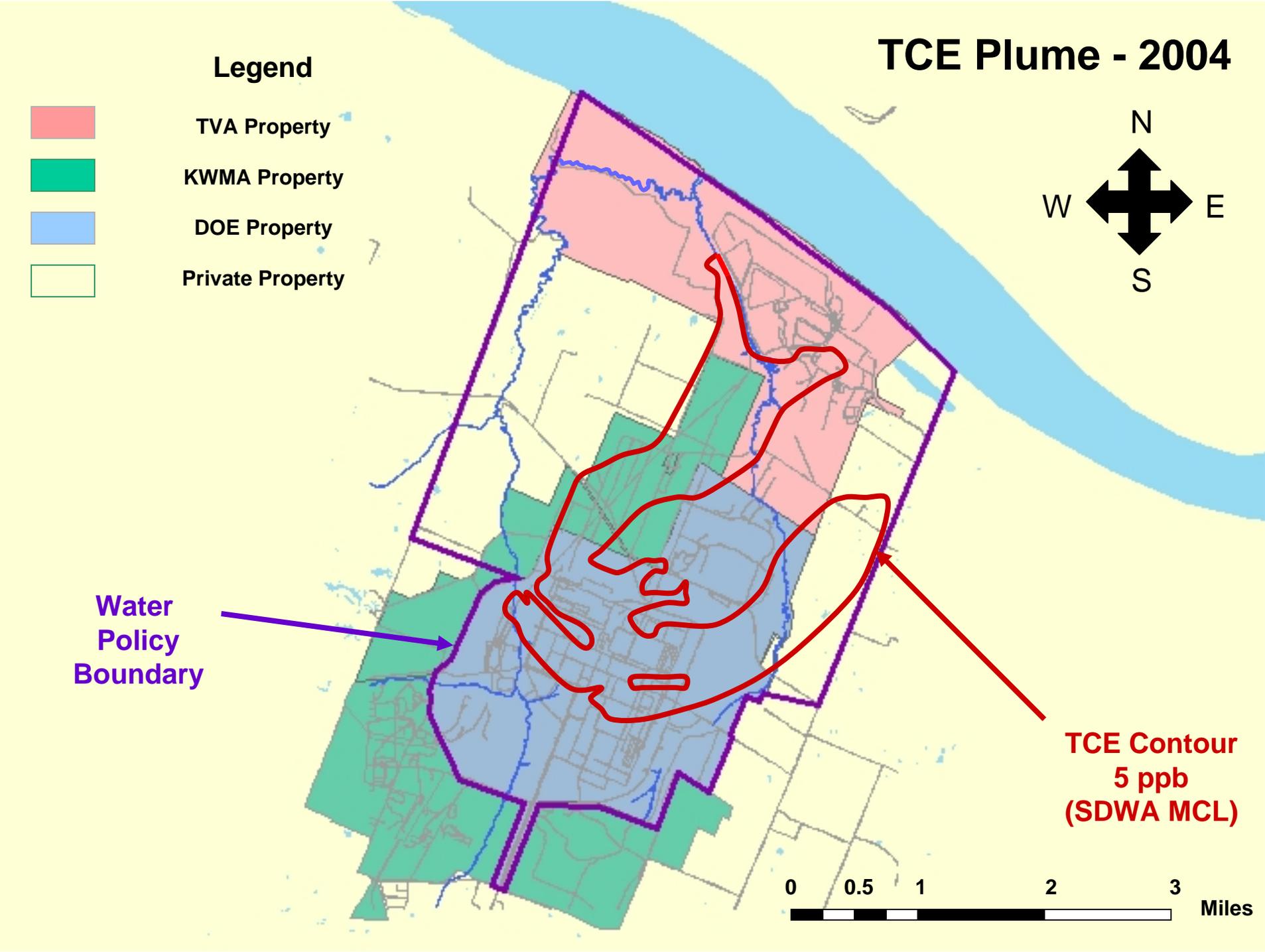
-  TVA Property
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-  Private Property



**Water Policy Boundary**

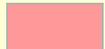


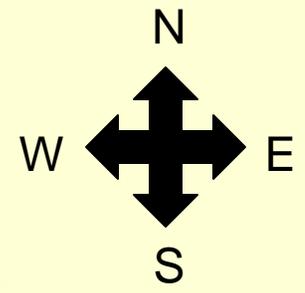
**TCE Contour  
5 ppb  
(SDWA MCL)**



# No Action Scenario – 10 yrs

## Legend

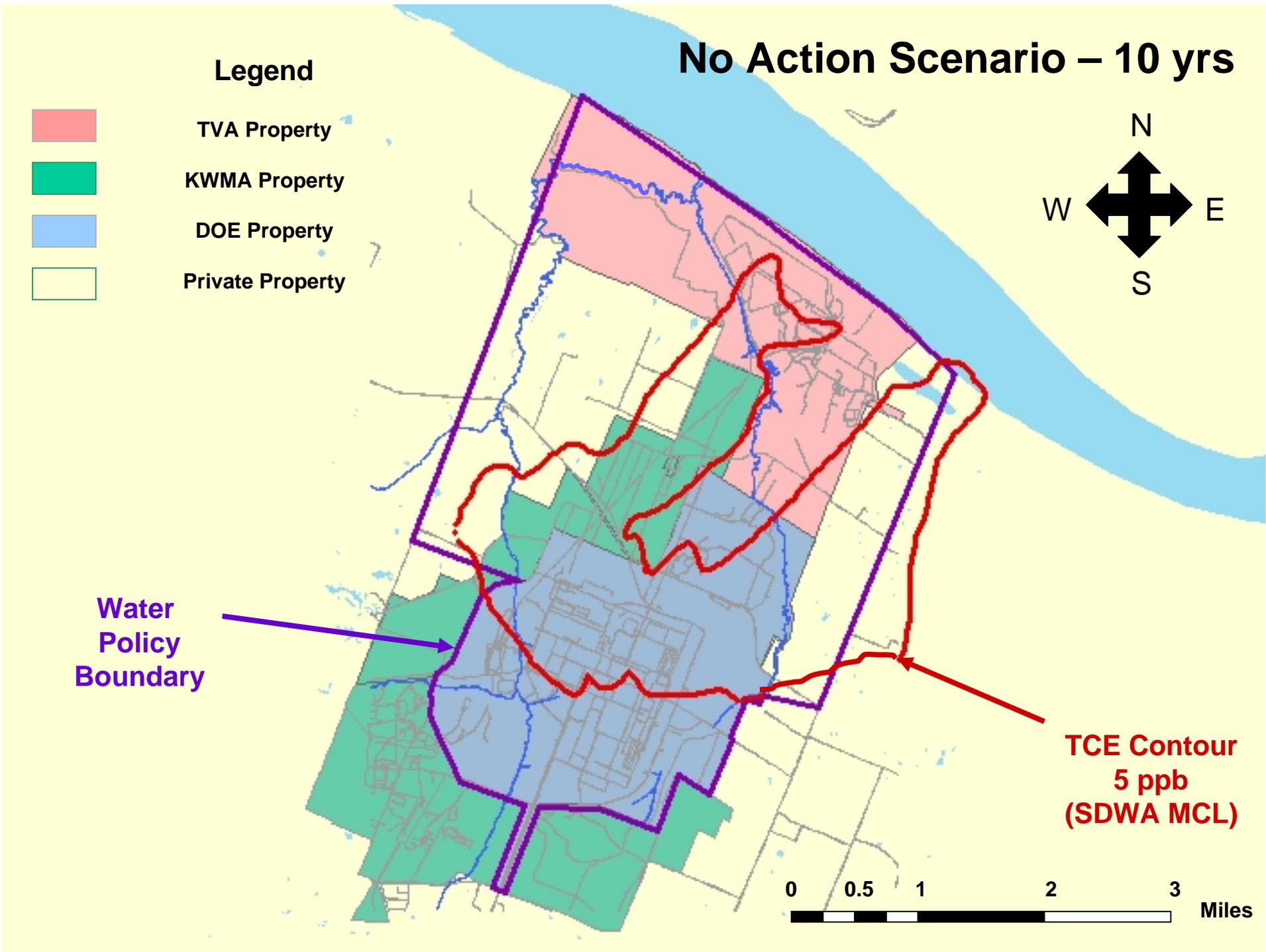
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**Water Policy Boundary**

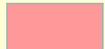


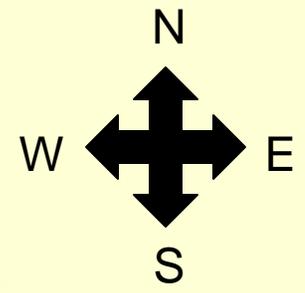
**TCE Contour  
5 ppb  
(SDWA MCL)**



# No Action Scenario – 30 yrs

## Legend

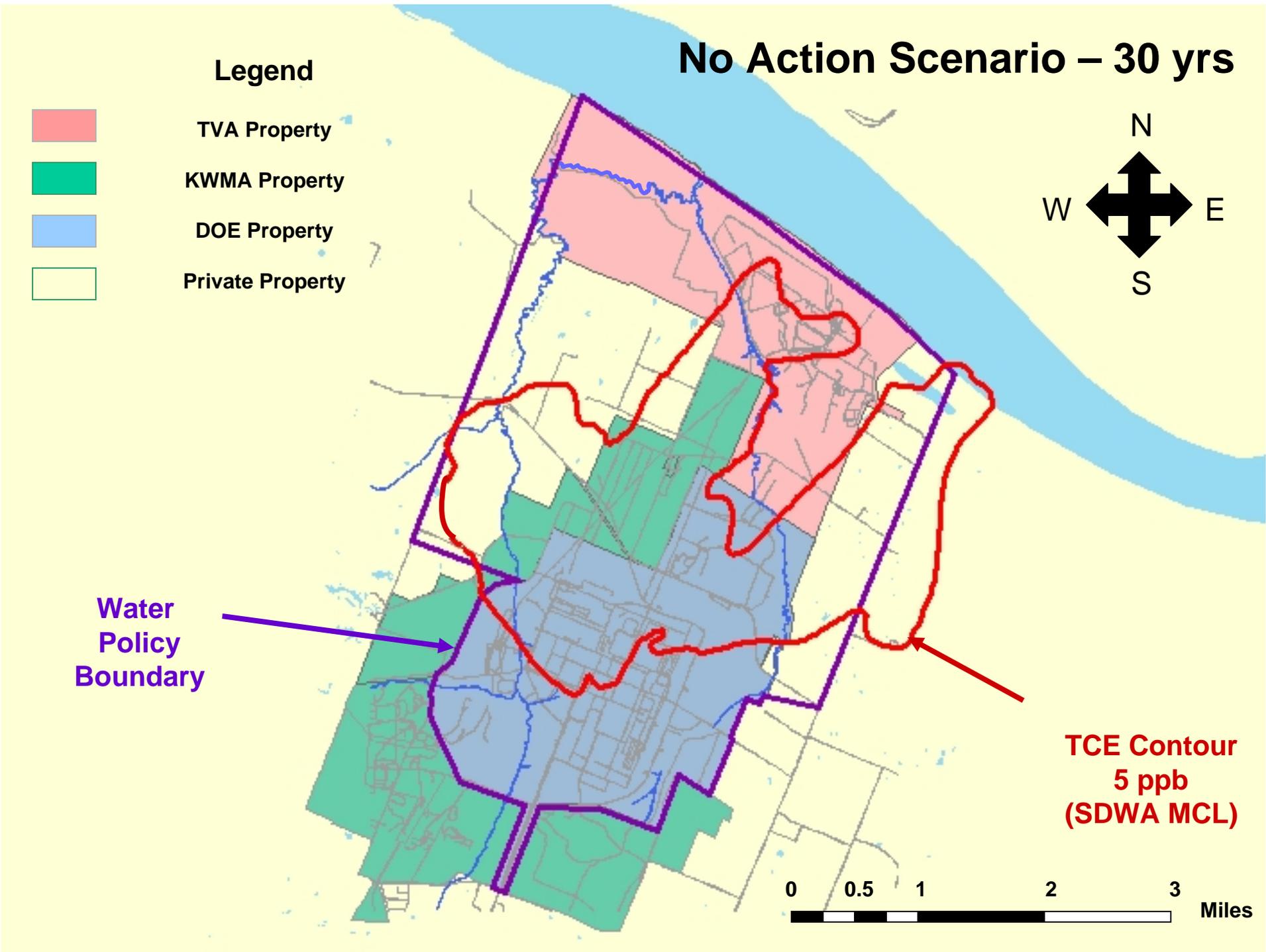
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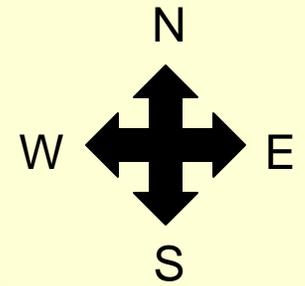
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# No Action Scenario – 100 yrs

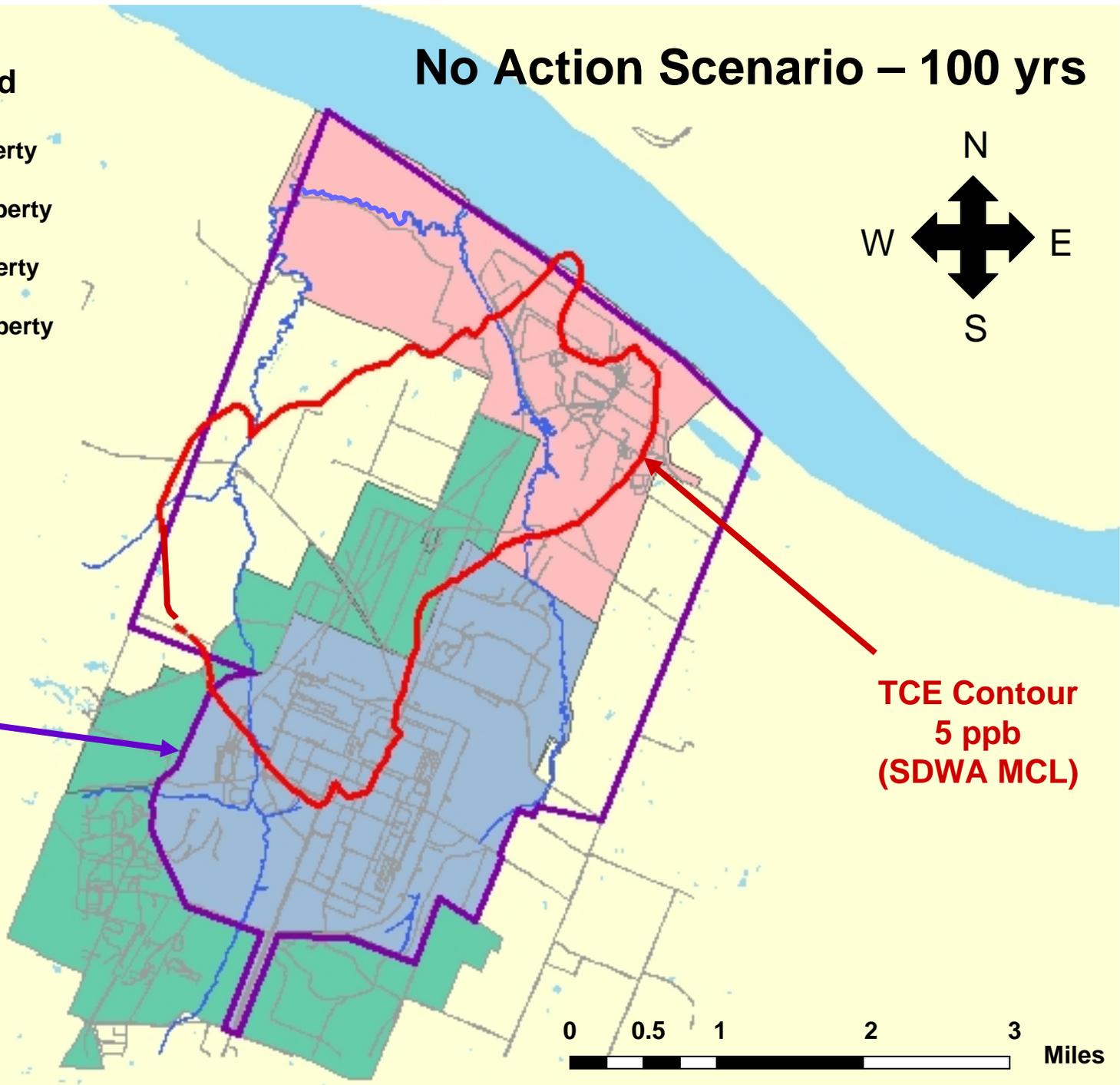
## Legend

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-  KWMA Property
-  DOE Property
-  Private Property

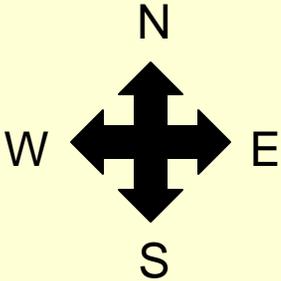


**Water Policy Boundary**

**TCE Contour  
5 ppb  
(SDWA MCL)**



# No Action Scenario Maximum Extent



TVA Property



KWMA Property



DOE Property



Private Property

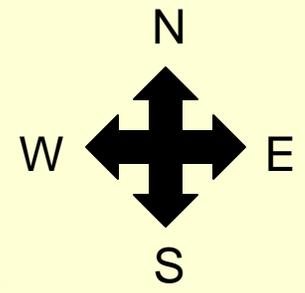
**Water  
Policy  
Boundary**



**Maximum TCE Plume Extent  
5 ppb (SDWA MCL)**



# No Action Scenario Maximum Extent

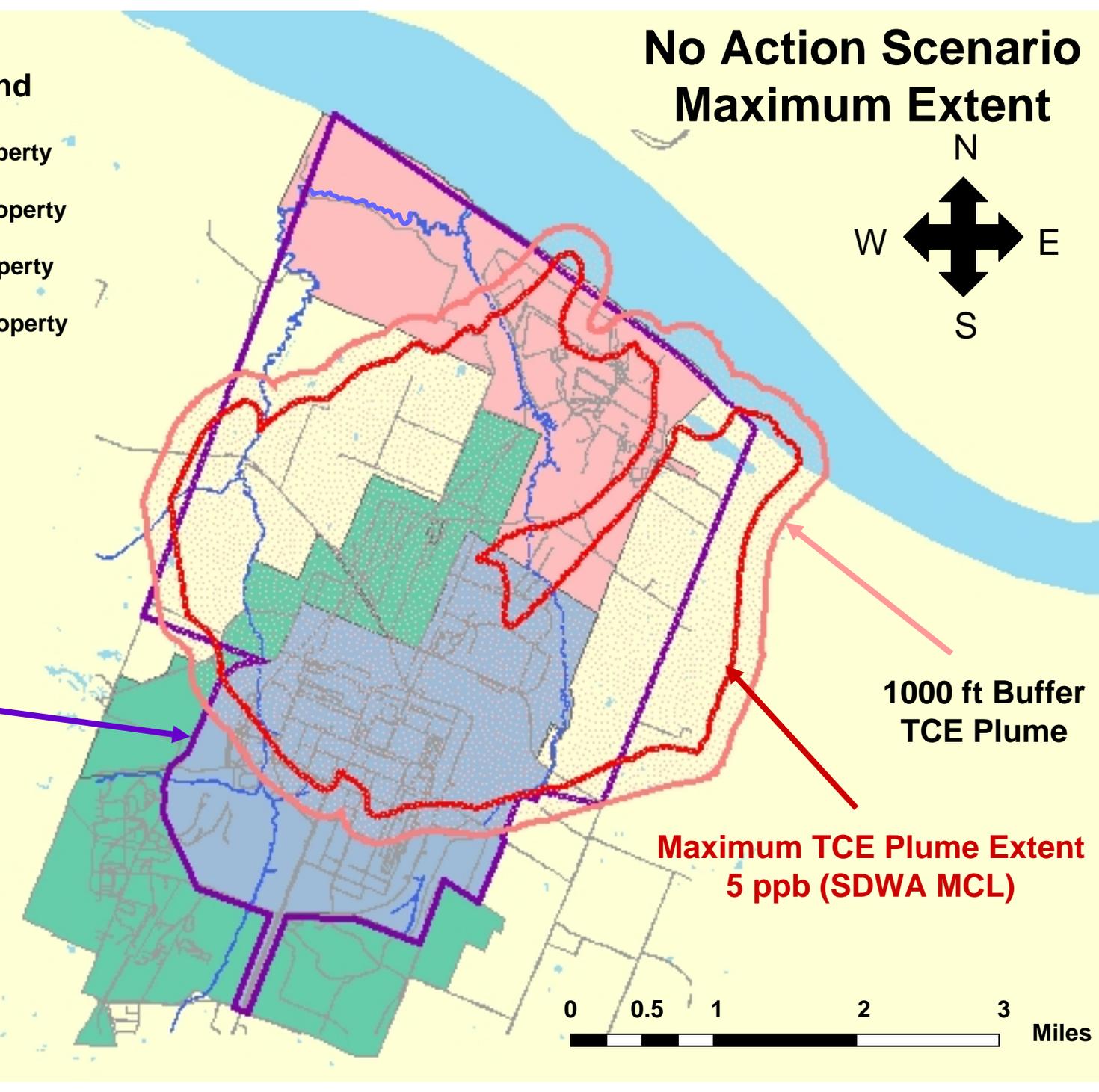


- Legend**
- TVA Property
  - KWMA Property
  - DOE Property
  - Private Property

**Water  
Policy  
Boundary**

**1000 ft Buffer  
TCE Plume**

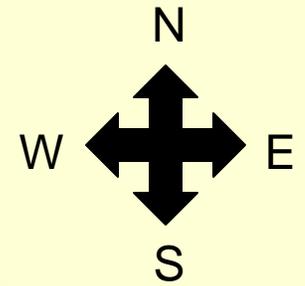
**Maximum TCE Plume Extent  
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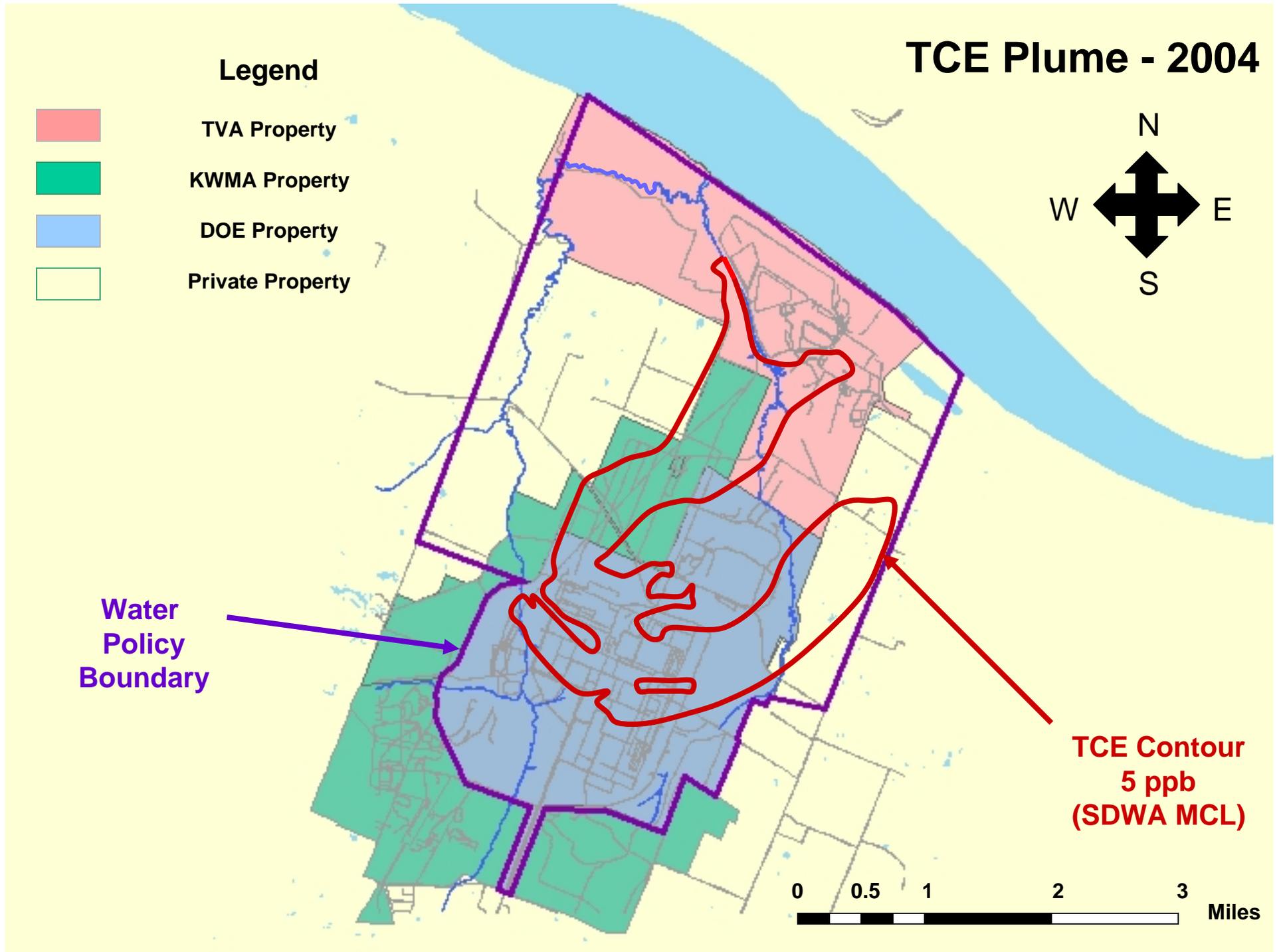
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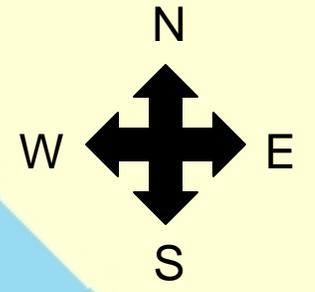
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**TCE Contour  
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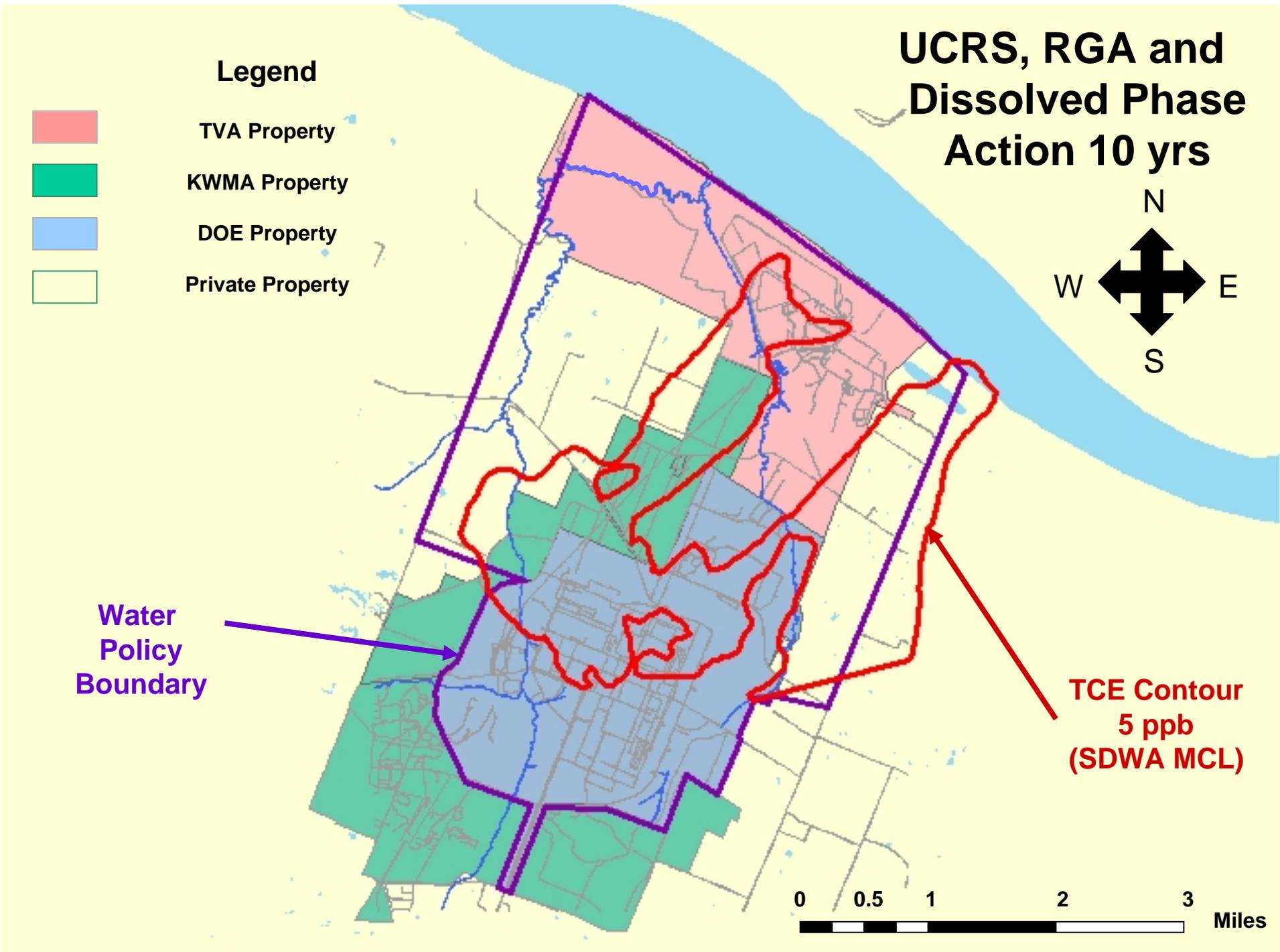
# UCRS, RGA and Dissolved Phase Action 10 yrs



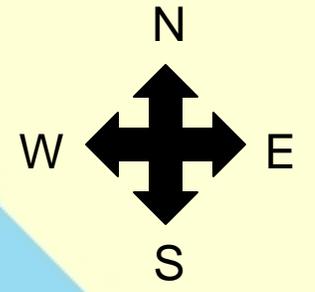
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**Water Policy Boundary**

**TCE Contour 5 ppb (SDWA MCL)**



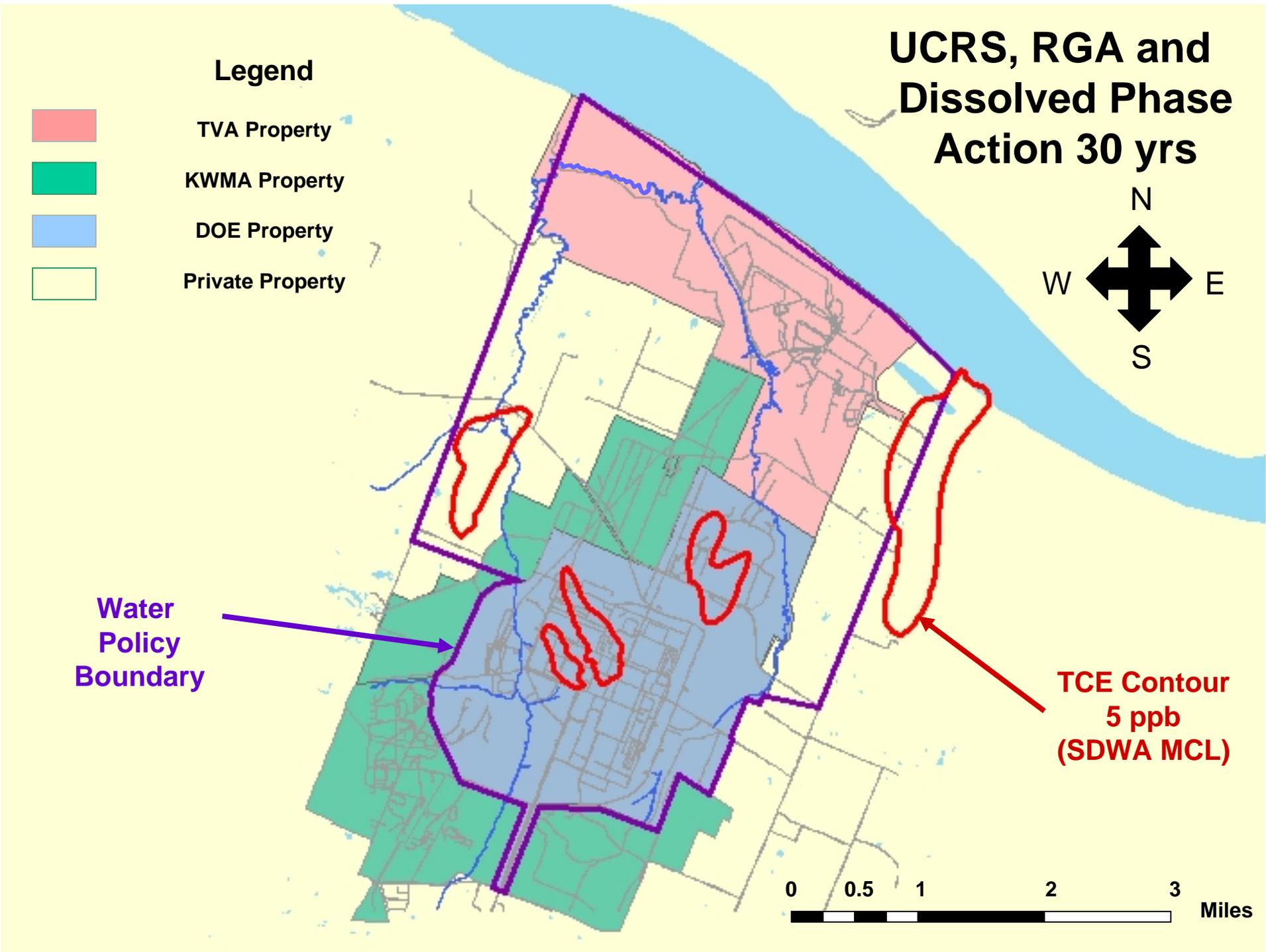
# UCRS, RGA and Dissolved Phase Action 30 yrs



- Legend**
- TVA Property
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**Water Policy Boundary**

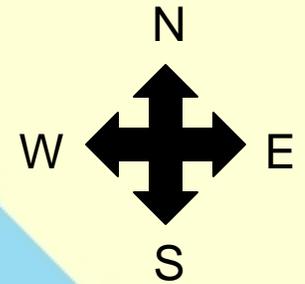
**TCE Contour 5 ppb (SDWA MCL)**



# UCRS, RGA and Dissolved Phase Action 100 yrs

## Legend

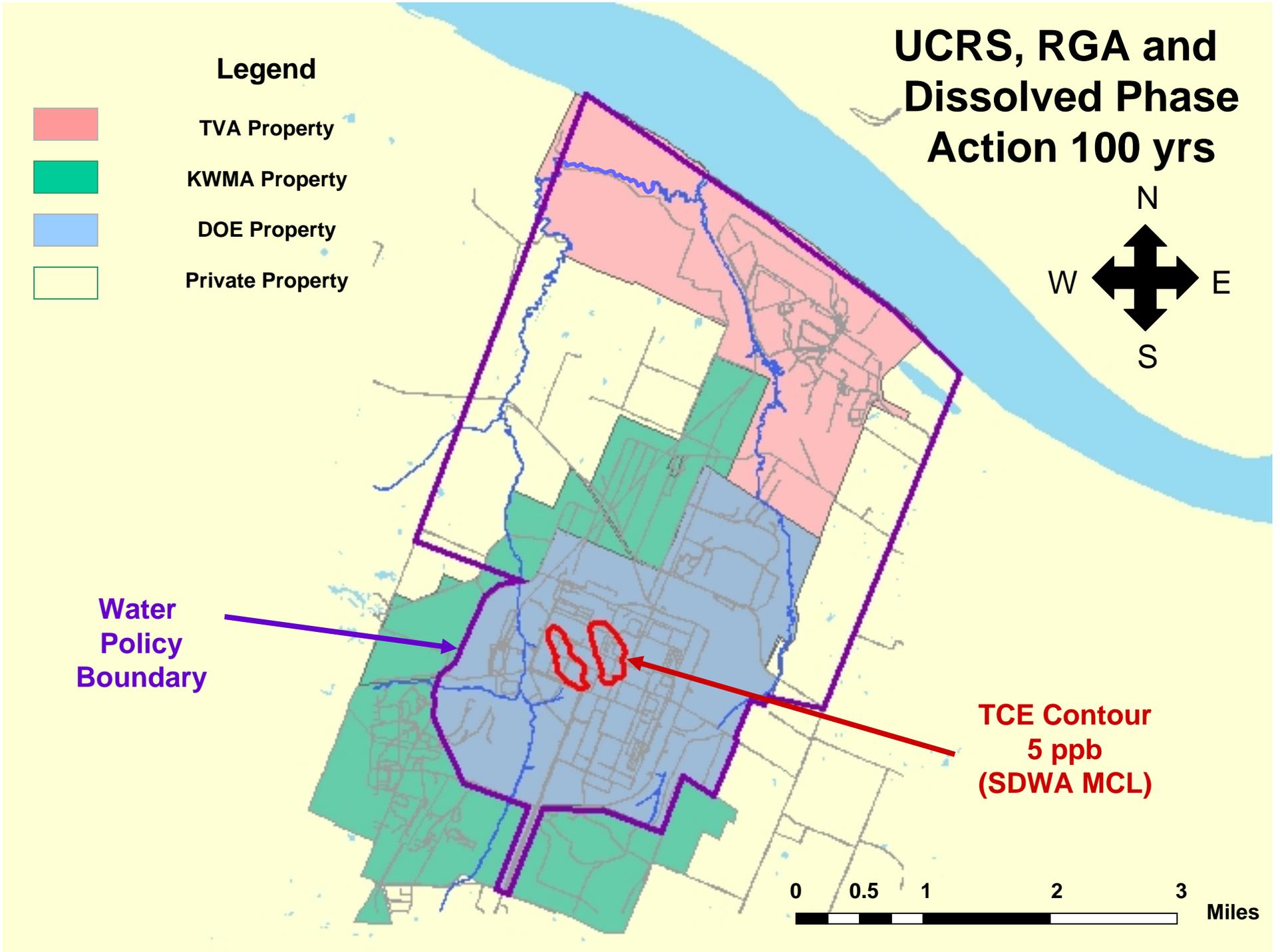
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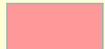


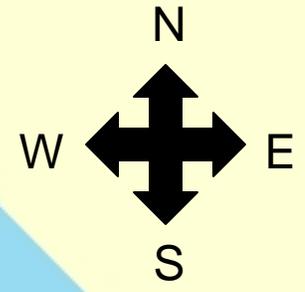
**TCE Contour  
5 ppb  
(SDWA MCL)**



# UCRS, RGA and Dissolved Phase Action Maximum Extent

## Legend

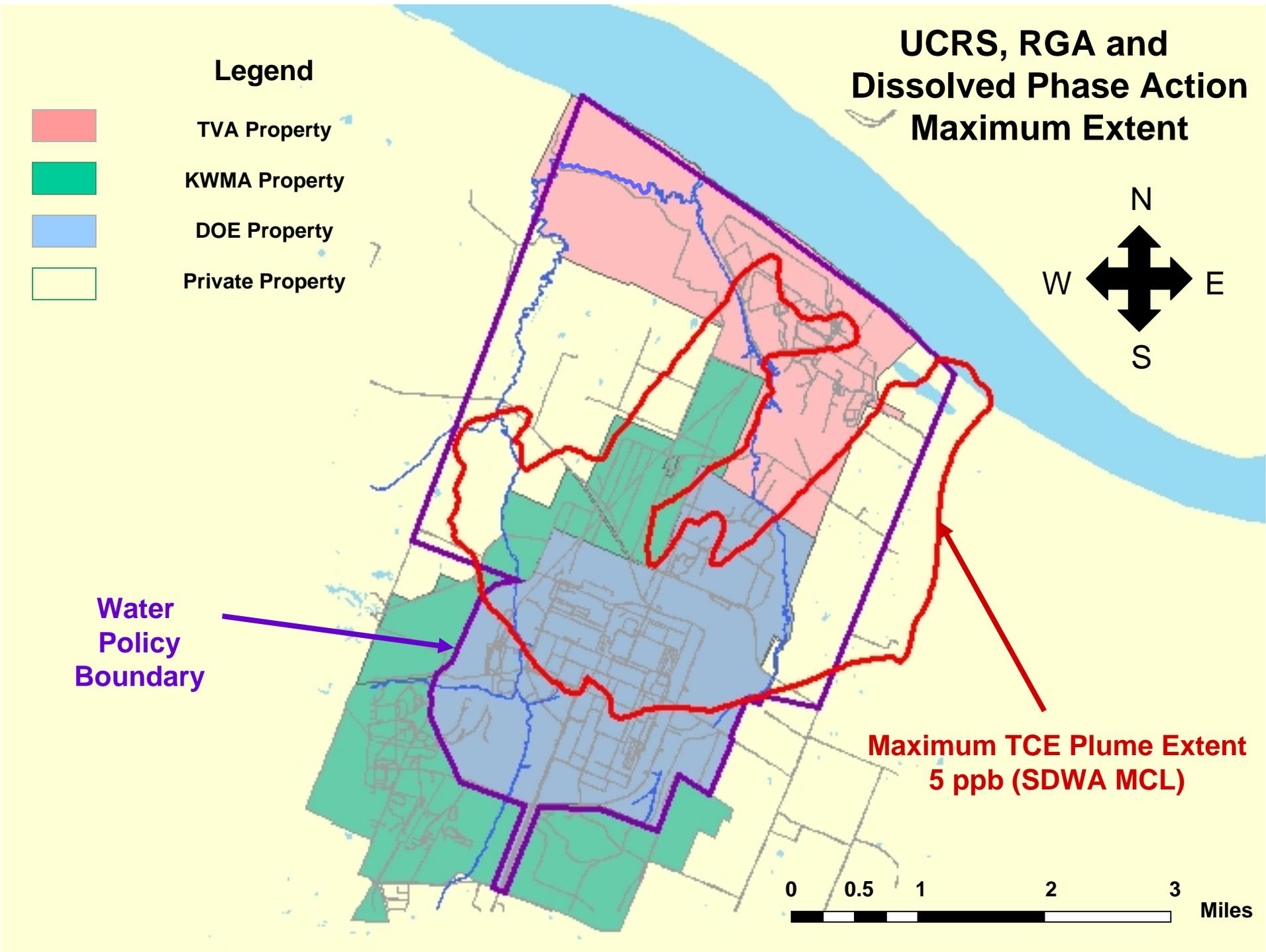
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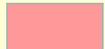


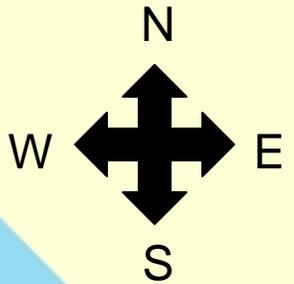
**Maximum TCE Plume Extent  
5 ppb (SDWA MCL)**



# UCRS, RGA and Dissolved Phase Action Maximum Extent

## Legend

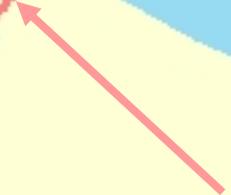
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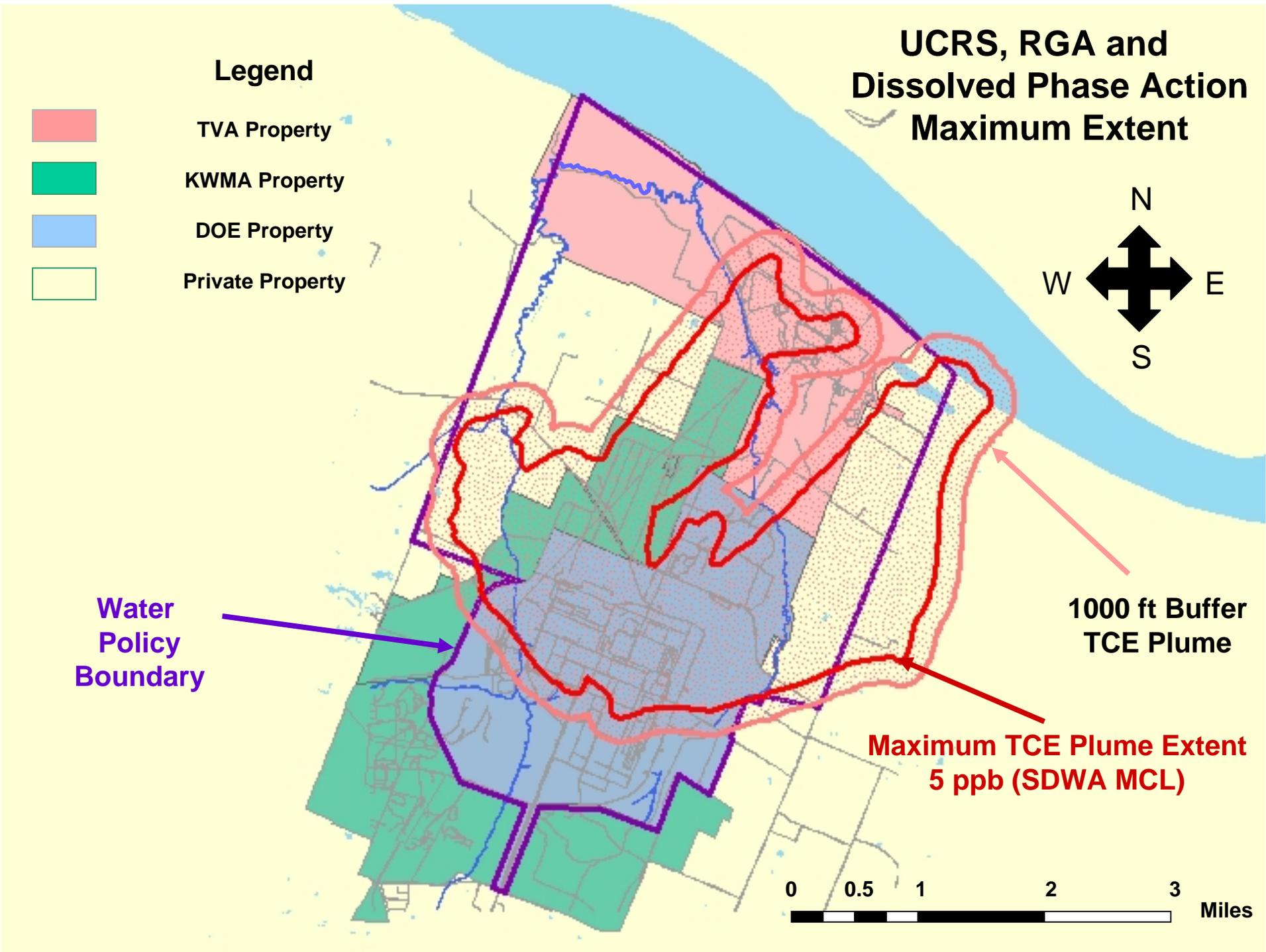
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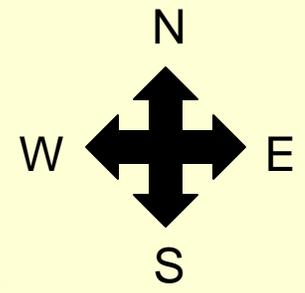
**1000 ft Buffer TCE Plume**



**Maximum TCE Plume Extent 5 ppb (SDWA MCL)**



# No Action Scenario Maximum Extent

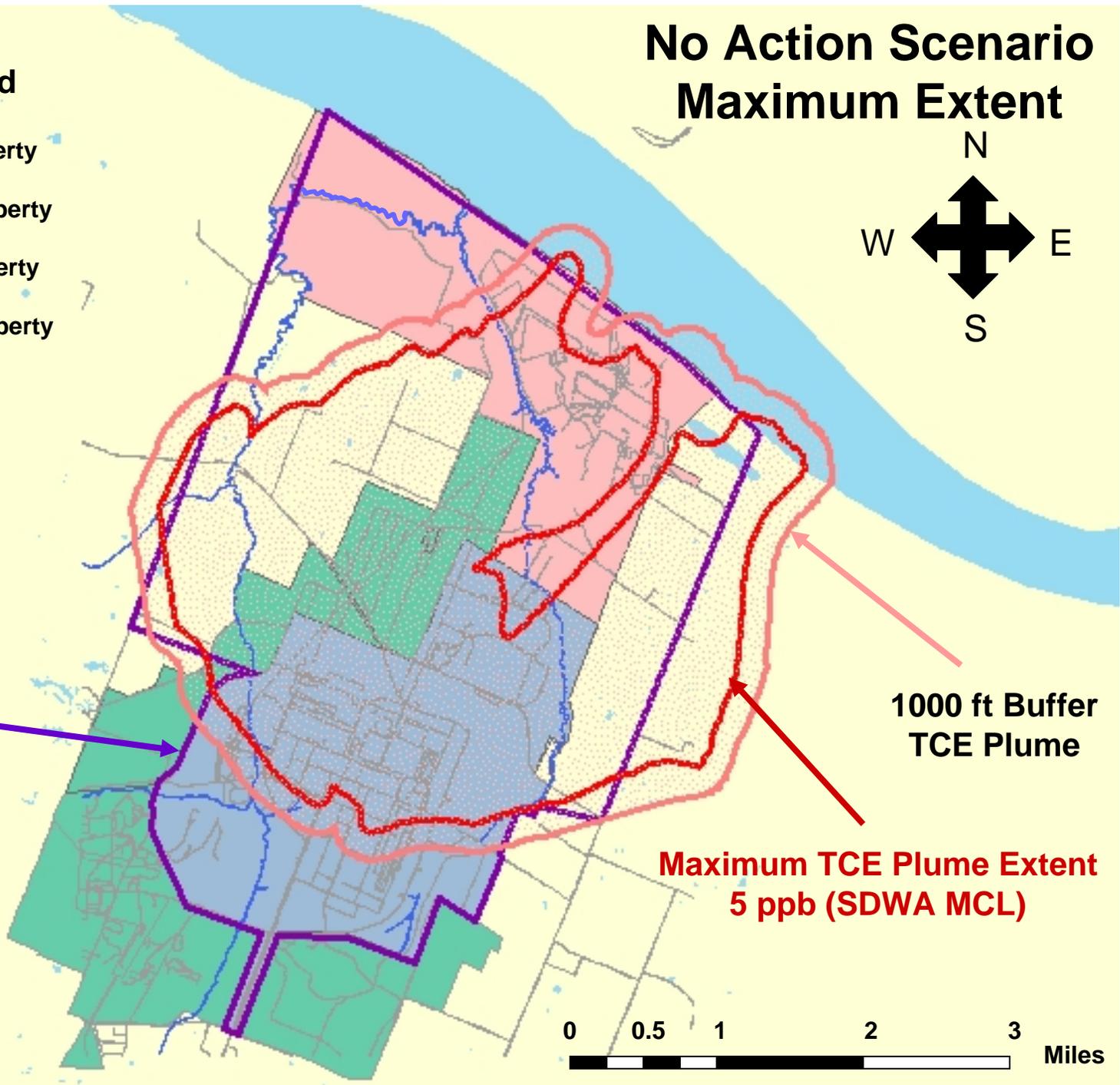


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**Water  
Policy  
Boundary**

**1000 ft Buffer  
TCE Plume**

**Maximum TCE Plume Extent  
5 ppb (SDWA MCL)**



# Summary of Potentially Impacted Private Properties

- Based on conservative estimates of maximum plume extent
- Assumes if any portion of a property is impacted, then entire property is selected for purchase or easement
- Maximum Extent Without Buffer
  - Approximately 3300 acres for all options
- Maximum Extent With Buffer
  - Approximately 4400 acres for all options



# Property Acquisition Potential Options

- **Goal is to identify different ways properties or interests in properties might be purchased in Kentucky**
- **Compiled by UK College of Law**
- **Identified ways include:**
  - **Fee simple ownership (Buy property outright)**
  - **Easements (Restrict use of the property) – several types**
    - **Limited scope easements**
      - **Restrict use of groundwater and/or surface water**
      - **Continuation of water policy**
    - **Expanded scope easements**
      - **Limit use of land, including use of groundwater and/or surface water**
      - **Continuation of water policy**



# Property Acquisition Potential Costs

- Federal and state properties not considered
- Properties being evaluated as a group (mass appraisal)
- Fair market value estimates obtained using:
  - Assumes willing buyers and sellers
  - Sales of comparable properties in McCracken County
  - Easements based on similar state and federal programs
- Appropriate federal guidelines
  - *Uniform Appraisal Standards for Federal Land Acquisitions*
    - Provides standards for use in appraising properties taken for federal land use
  - Highest value and best use
    - *“The reasonably probable use that produces the highest property value”*

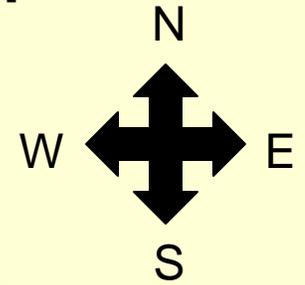


# Property Acquisition Potential Costs

- Examined five remedial actions
- Properties impacted based on maximum potential plume extent
- Property costs determined based on:
  - Agricultural property
  - Rural residential property



# Plumes Overlaid on Properties

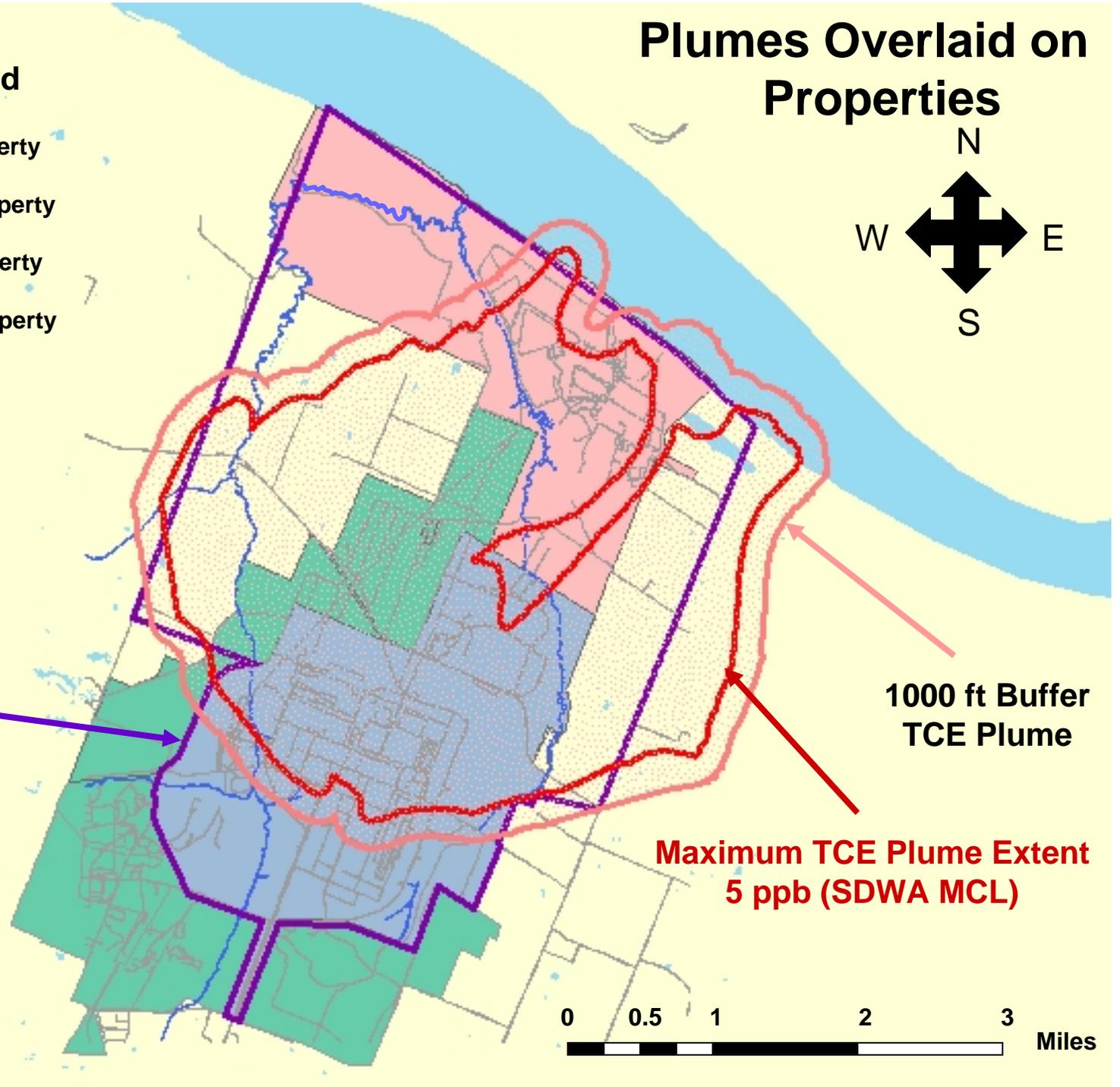


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**Water Policy Boundary**

**1000 ft Buffer TCE Plume**

**Maximum TCE Plume Extent 5 ppb (SDWA MCL)**



# Preliminary Cost Estimate Ranges

- Property acquisition costs
  - Fee Simple - \$19 M to \$47 M
  - Easements - \$2 M to \$16 M
- Remediation costs
  - No Action (without long-term stewardship cost) - \$0 M
  - Pump and Treat - \$68 M
  - Primary (UCRS) Source Action - \$28 M to \$380 M
  - Secondary (RGA) Source Action - \$15 M to \$175 M
  - Primary and Secondary Source and Dissolved Phase Action - \$208 M to \$853 M

**All remediation costs are based on a  
30-year evaluation period**



# Overview of Study

- Consistent with the Congressional Directive:
  - Identified purchase options
  - Identified maximum extent of the area overlying the plume
  - Developed costs of remedial action options
  - Developed costs of property acquisition options
- Draft report under review
- Any policy decisions would consider additional information:
  - No specific actions being taken
  - No specific policy decisions being made



# Future Activities

- Review of draft report started September 15
- Future Briefings/Meetings
  - Public Presentation #2
  - CAB Briefing #3

