



U.S. DEPARTMENT OF
ENERGY

Richland
Operations Office

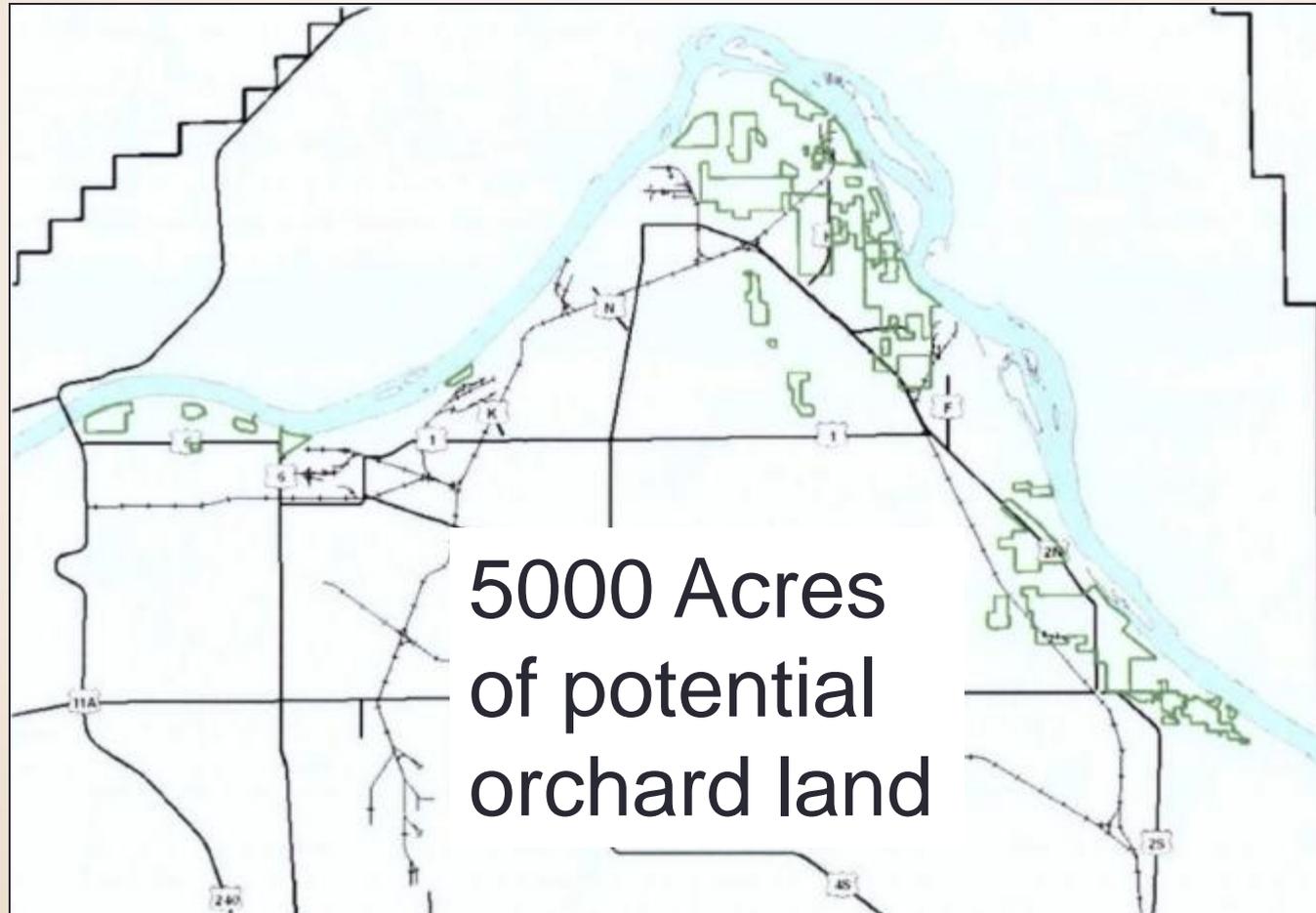
Pre- Hanford Orchard Lands

John Sands

June 11, 2013



Orchard Lands OU is defined by pre-Hanford orchards in River Corridor



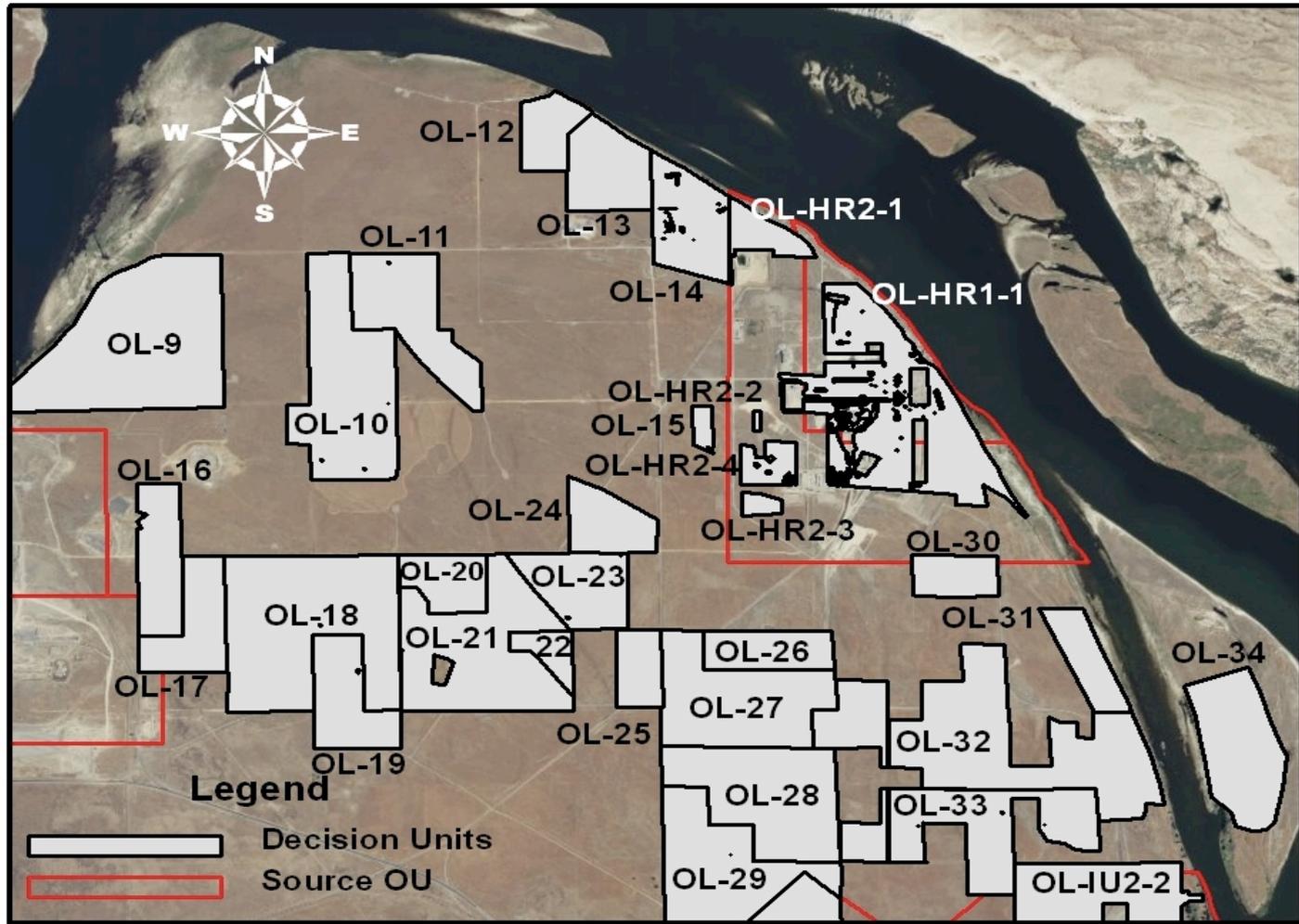
5000 Acres
of potential
orchard land



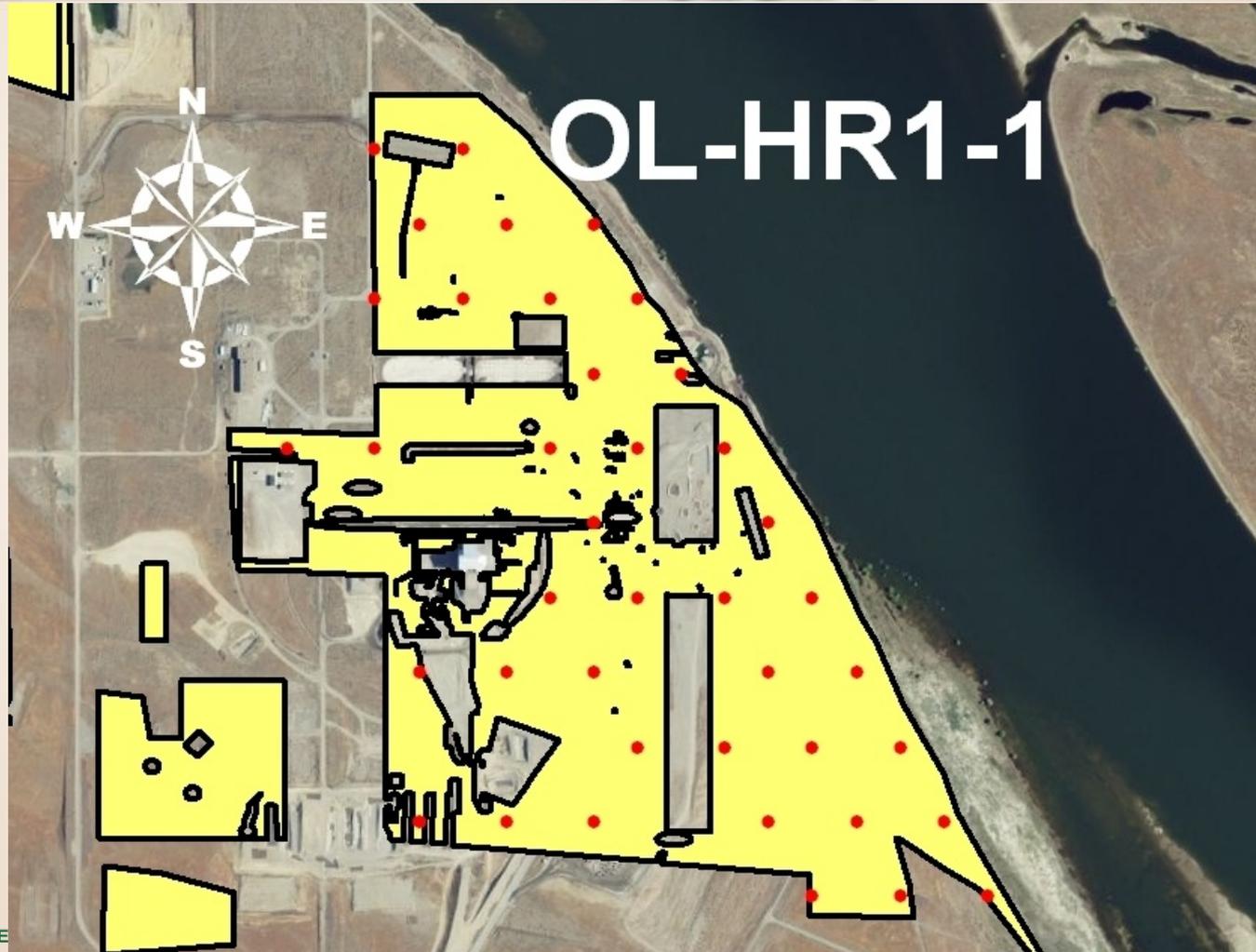
Remedial Investigation Sampling Strategy

- 5000 acres broken up into 69 decision units
 - Evidence of trees from historical photos
 - Evidence of soil disturbance
 - Range from an acre to almost 300 acres
- 69 Decision units X 29 samples per unit = 2001 samples
- Integrated sample of one inch diameter core to one foot depth
- Analyze for lead and arsenic
- Work Plan transmitted to EPA/Ecology in April, 2013

Orchard Decision Units in 100D/H Area



Example of random sampling design of decision unit



Backup Slides

Studies show that Lead and Arsenic migrate very little with depth

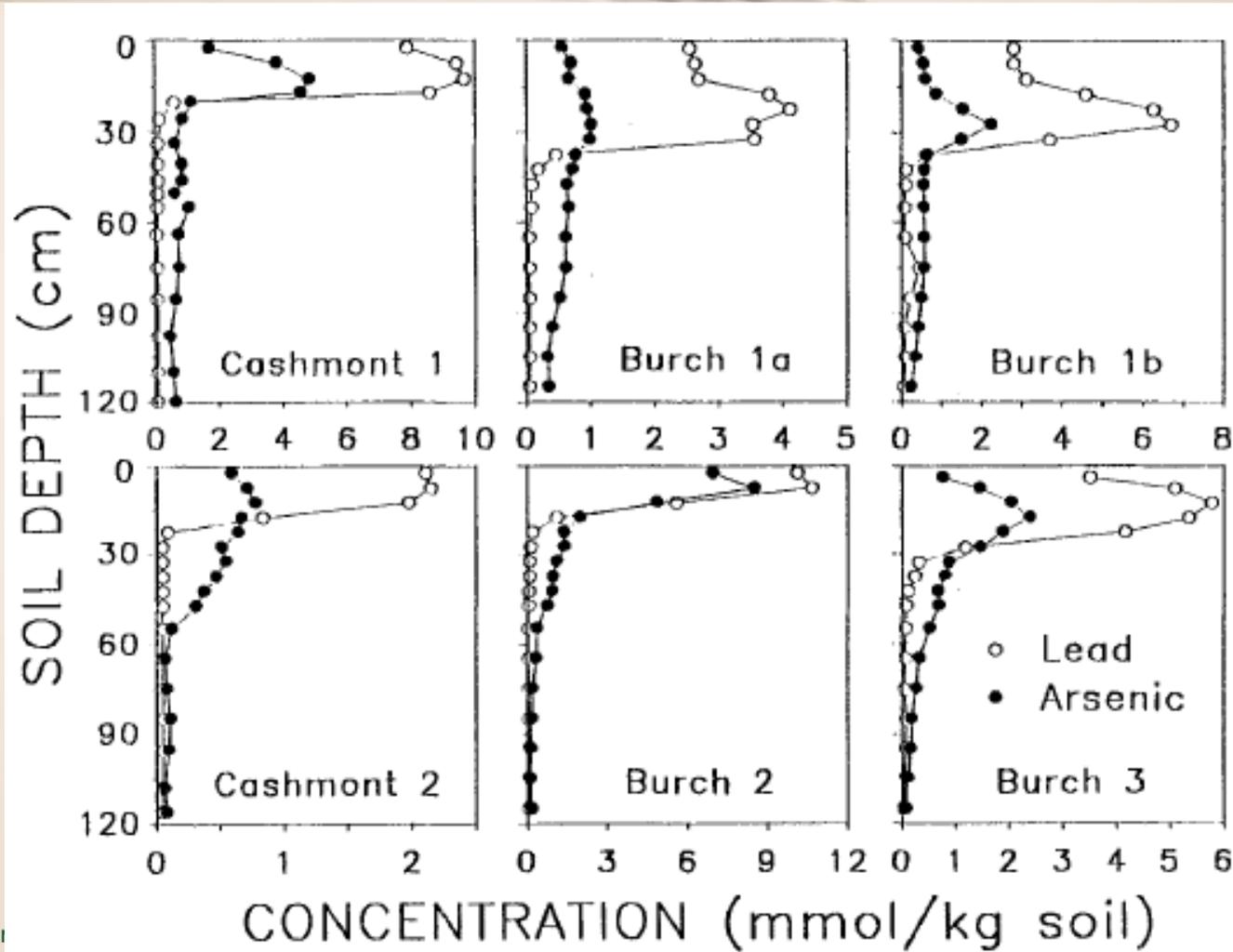


Table 2.1. Surface Soil Concentrations of Arsenic and Lead Measured on Former Orchards on the Hanford Site, and Other Orchard Locations

Source	Arsenic (in mg/kg)					Lead (in mg/kg)				
	n	Mean	Median	SD	Max	n	Mean	Median	SD	Max
Yokel and Delistraty 2003	31	30	5.7	61	270	31	220	27	460	1900
Delistraty and Yokel 2011	11	39.5	NR	40.6	128	11	208	NR	142	390
HEIS Data ^(a)	881	8.7	4.0	14	111	825	35	9.8	91	1240
HEIS Data ^(b)	113	8.0	5.2	7.9	54	78	55	23	98	665
HEIS Data ^(c)	108	26	15	27	111	109	113	44	173	1240

(a) All HEIS soil samples occurred within the boundaries of the orchards as shown in Figure 1.1. Data were removed if sampling records confirmed a result was not representative of orchard surface soils. For example, sludge collected from the bottom of a sump, or soil in an excavation collected more than 1.5 m below grade did not qualify as surface soil samples.

(b) HEIS data from one orchard were used to determine distribution of soil concentrations (Decision Unit OL-IU2-4).

(c) HEIS data from one orchard were used to determine distribution of soil concentrations (Decision Unit OL-10).

HEIS = Hanford Environmental Information System.

Max = Maximum number of samples.

n = Number of samples

NR = Data not reported.

SD = Standard deviation.

