

True Grit: Gravel, Grain and GIS

The Aggregate Mining/Farmland Consensus Group Experience

A Collaborative Technical Effort By:

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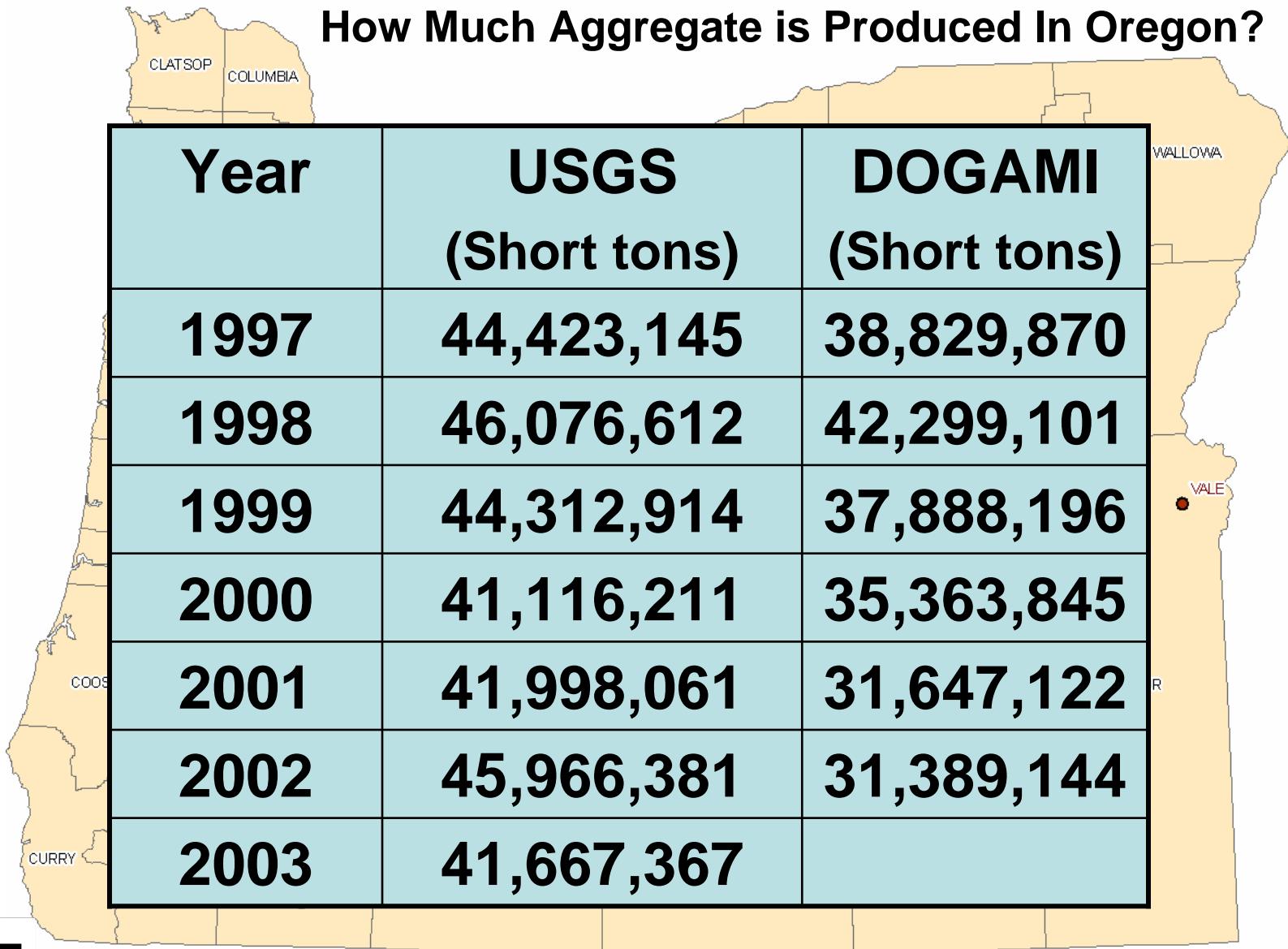
Digital Data Acknowledgements:

**Oregon Dept. of Transportation
Oregon Dept. of Geology and Mineral Industries
Oregon Dept. of Agriculture
Pacific Northwest Ecosystems Research Consortium**

Issues Mapping



How Much Aggregate is Produced In Oregon?

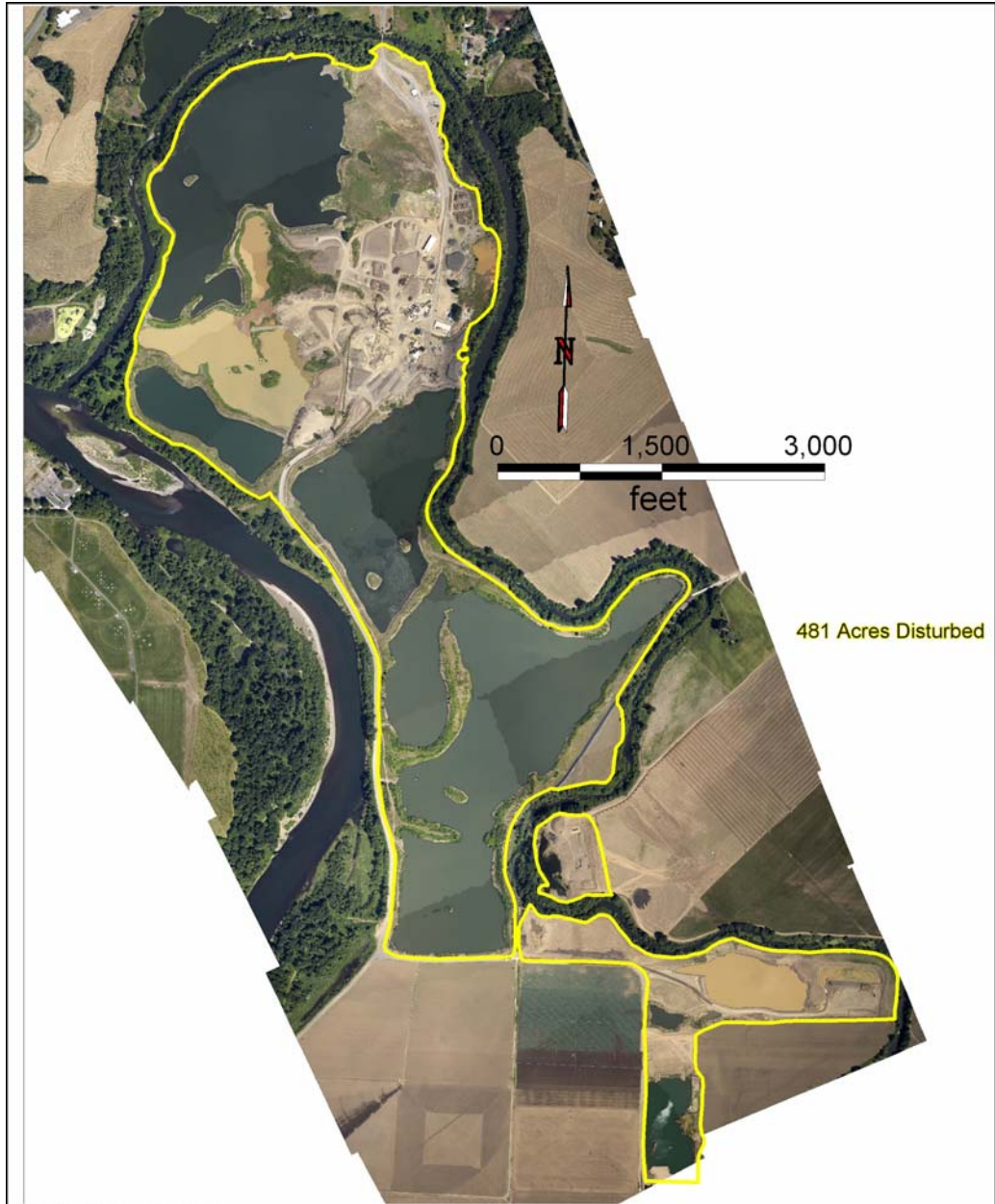


It Depends on Who You Ask.

How many acres have been disturbed in the Willamette Valley by DOGAMI-permitted sites?

County	Number of DOGAMI-MLRR Permitted Mine Sites	Number of Disturbed Polygons	Disturbed Acres
Benton Co.	5	14	889.3
Clackamas Co.	12	15	661.0
Lane Co.	11	14	1420.1
Linn Co.	13	19	905.2
Marion Co.	15	17	1425.8
Multnomah Co.	2	2	149.2
Polk Co.	5	5	318.9
Washington Co.	1	1	6.1
Yamhill Co.	5	6	178.2
Willamette Valley Total:	69	93	5953.8

From DOGAMI Files



How many acres have been disturbed in the Willamette Valley by DOGAMI-permitted sites?

Digitize “on the fly” georeferenced aerial image files.

This is the Morse Bros. pit on the east side of the Willamette River.

It should look familiar.

DOGAMI ID#: 02-0006
Permittee: Morse Brothers Inc.
Site Name: Buliders Supply
Photo Source / Date: D. Shear / 6-29-2004
Prepared By / Date: V. Balzer / 10-29-2004

File Name: S:\02Benton\02-0006\02-0006 GIS Aerial.CVN
Oregon Dept. of Geology and Mineral Industries
Mineral Land Regulation and Reclamation Program
This aerial image and map may contain minor distortions and/or errors and should not be used in place of a detailed site survey or for legal purposes.

**Willamette River Basin soils
GIS layer was downloaded
from the PNERC datasets
used to develop the
Willamette River Basin Atlas**

**Using ArcMap, the soils
layer was clipped with the
DOGAMI aggregate mine
shape files**

Pacific Northwest Ecosystem Research Consortium

Past Conditions:


DATALAYER...
METADATA...

Existing Conditions:

THEME GROUP...
DATALAYER...
METADATA...

Soils - (SSURGO and STATSGO)

(File Name: WRBSOILS) Metadata Data Attributes *information*



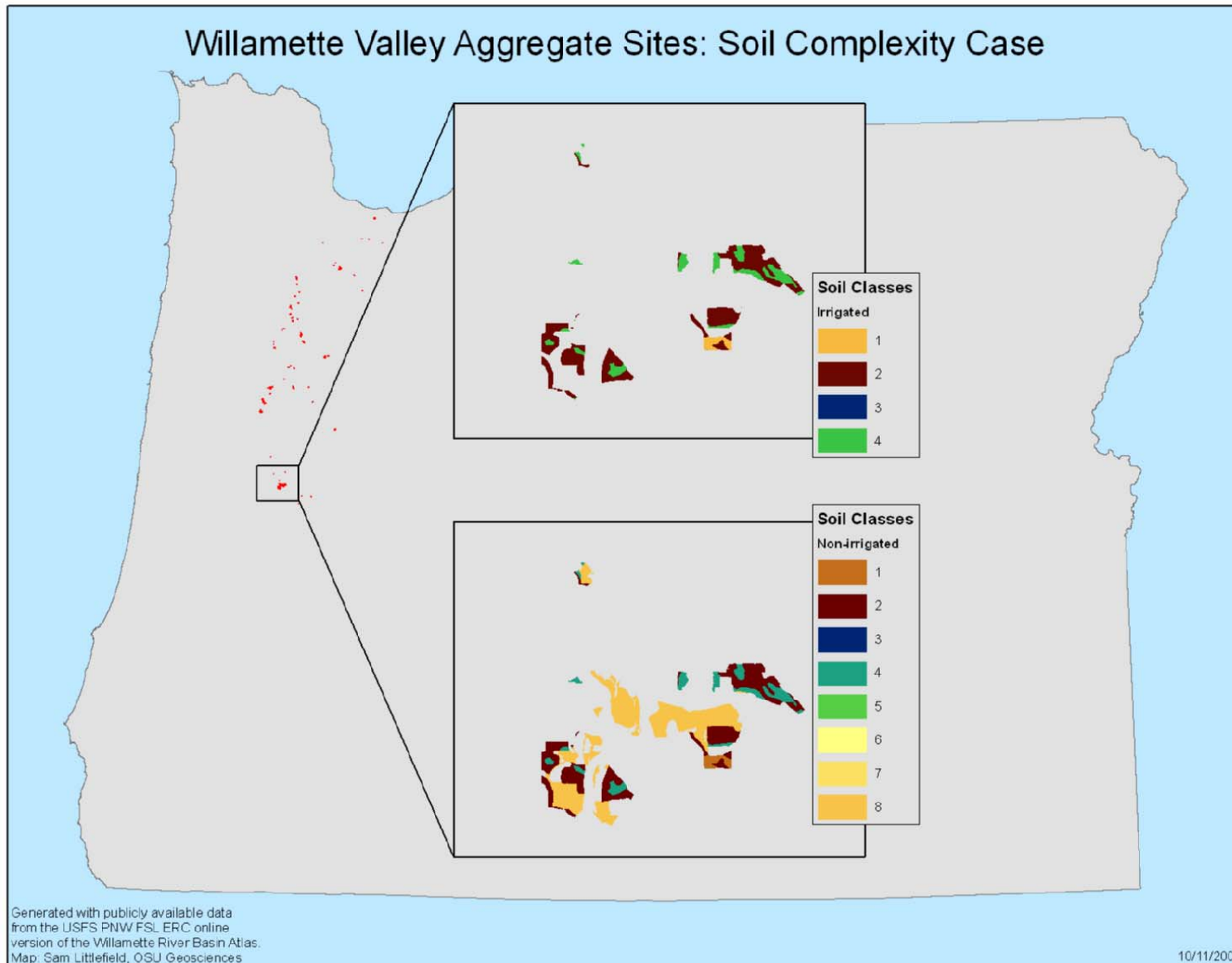
View GIF Preview of Map (370x640) (852x1472) *preview*

Download Zipped ARC Info e00 file *download*

File Size - 79,004K

Vegetation - 1851

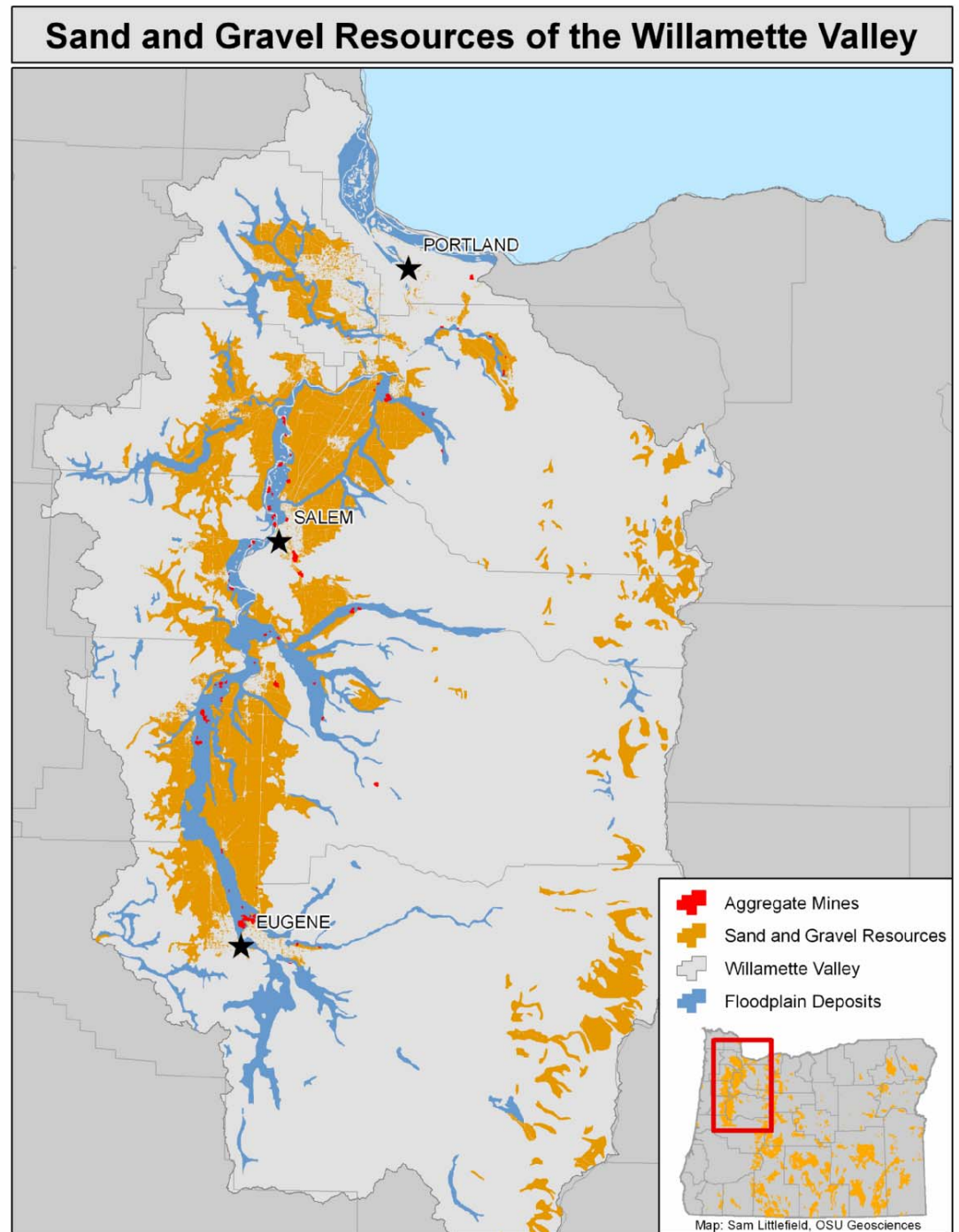
(File Name: Metadata Data Attributes



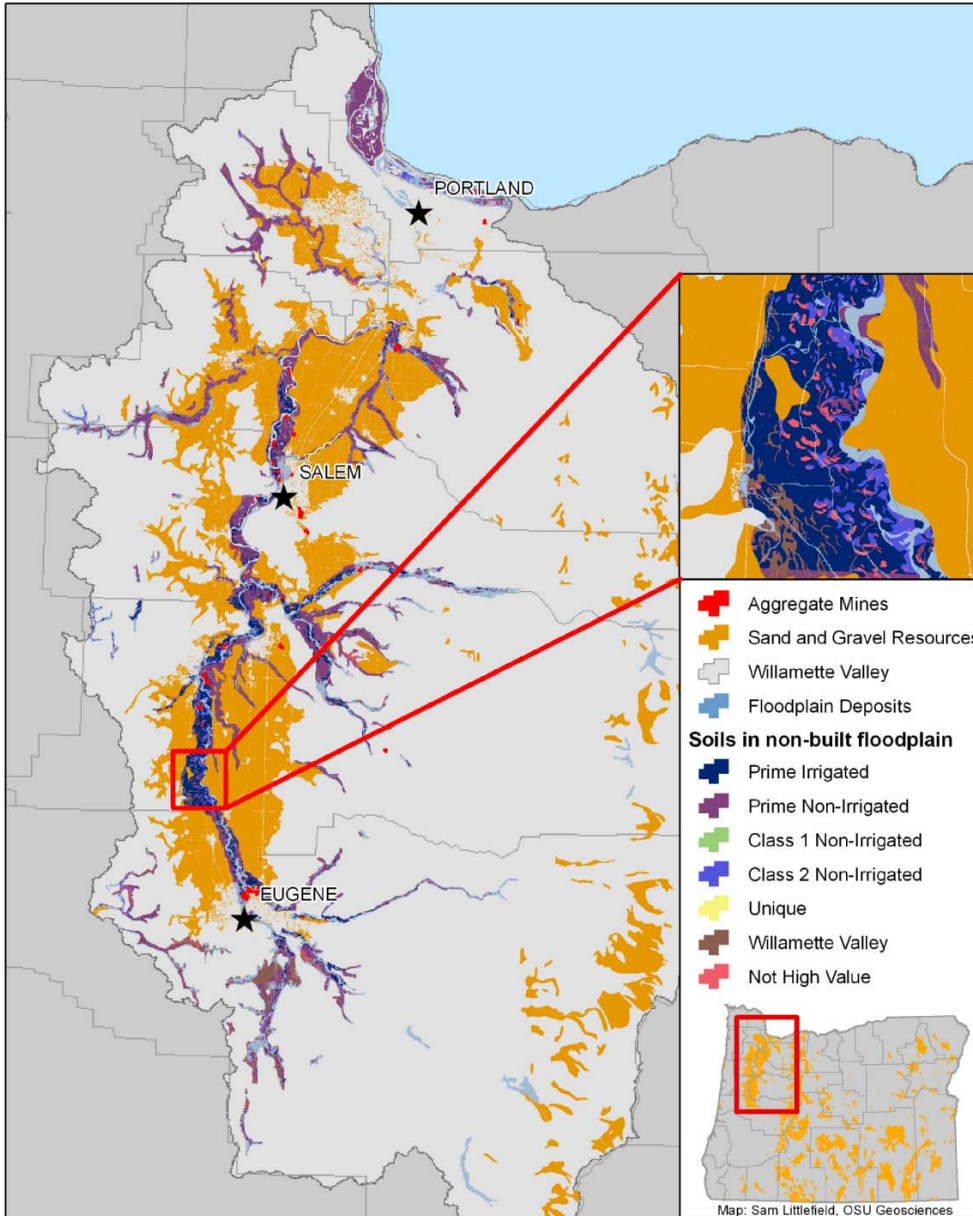
GIS works well on these types of complex settings.

How many acres of High Value Soils overlie mapped sand and gravel deposits?

1. Integrate the sand and gravel deposits mapped by USGS with the High Value Soils layer by clipping.
2. Reproject the Willamette Valley Polygon and Built Area polygons into a common projection by clipping. Built Area = “Sterilized” or nonmineable.
3. Import into a geodatabase for calculations.



Soils in Floodplain Deposit Areas of the Willamette Valley



How many acres of High Value Soils overlie mapped floodplain deposits (blue)?

1. A new feature dataset, the Qal geology polygons from the PNERC dataset was added to the geodatabase.
2. The Built Areas polygons were erased from the Floodplain deposit dataset (Sterilization).
3. The previously clipped High Value Soils feature dataset was clipped with the unbuilt portions of the Floodplain deposit dataset.

Soil Class	Area of soils in non-built floodplain deposit areas (Qal geology)
Prime irrigated	68,462
Prime non-irrigated	227,309
Class 1 non-irrigated	121
Class 2 non-irrigated	12,387
Unique	3,518
Willamette Valley	44,139
Not high value	19,965
TOTALS	375,901

A quick comparison of disturbed areas in the DOGAMI-permitted sites and floodplain High Value Soils

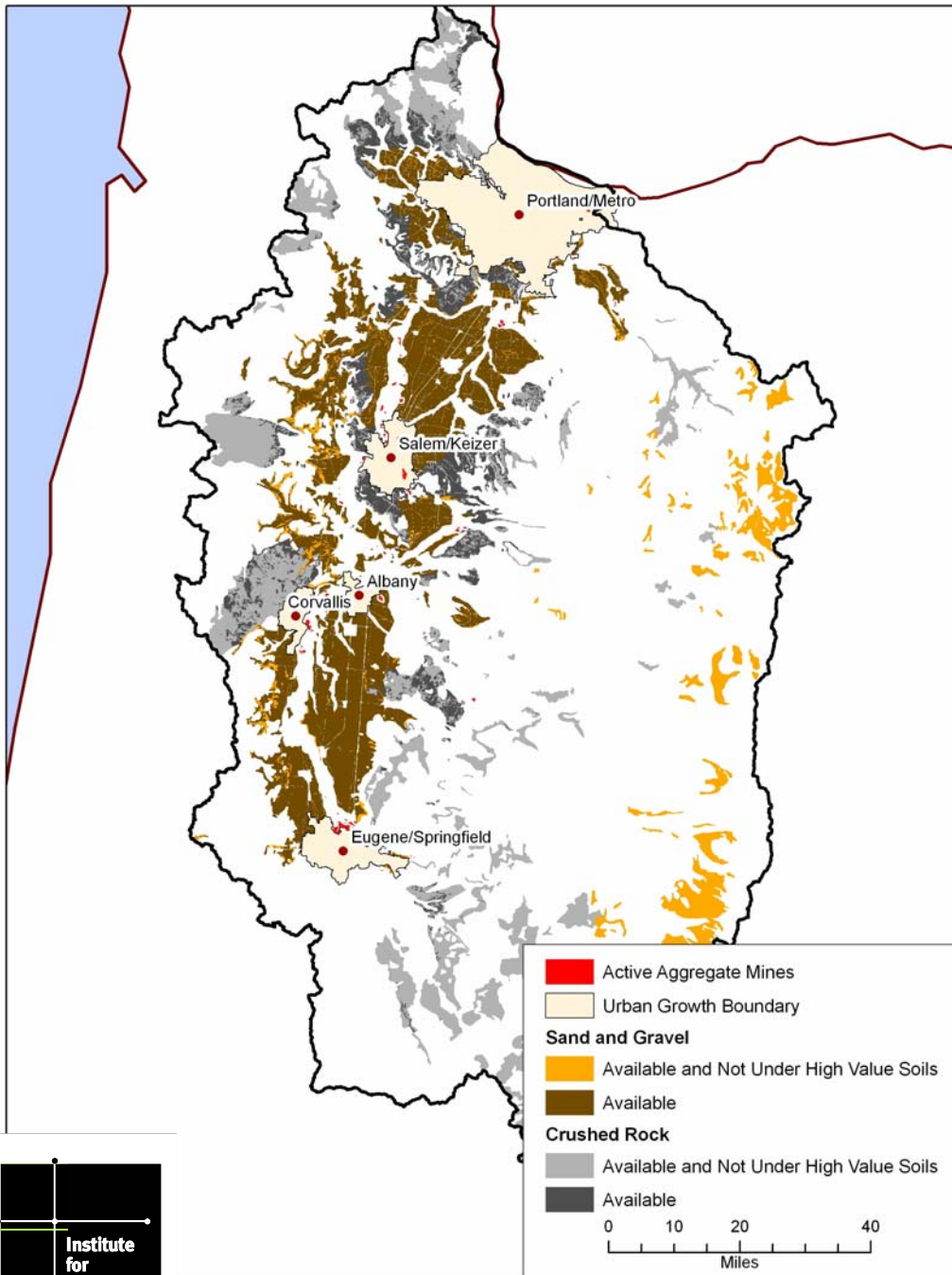
Soil Class	DOGAMI-permitted sites disturbed areas (acres)	Area of soils in “unbuilt” floodplain deposits
Prime (Irr)	1,234	68,462
Prime (Non-Irr)	901	227,309
Class 1 (Non-Irr)	0	121
Class 2 (Non-Irr)	199	12,387
Unique	10	3,518
Willamette Valley	142	44,139
Total	2,486	355,936

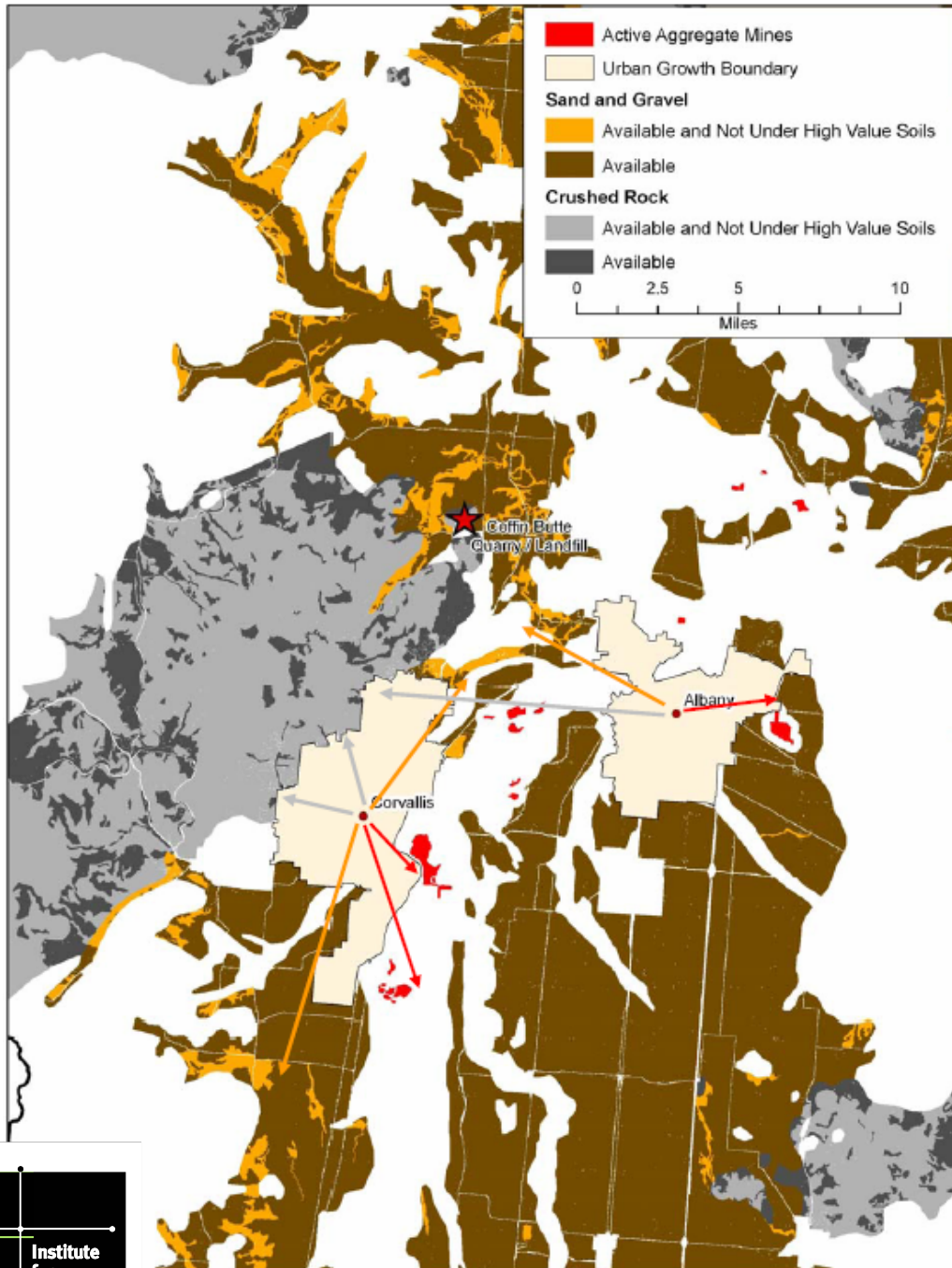
Is this a large impact? It depends on who you ask.



Are There Potential Sources of Aggregate That are Not Underlain by High Value Soils?

1. Integrate the sand and gravel deposits mapped by USGS with the High Value Soils layer by clipping.
2. Integrate the volcanic rock deposits mapped by USGS with the High Value Soils layer by clipping.





How much will it cost society to transport product from a “new” aggregate mine that does not impact High Value Soils?

- 1. Economic analysis reveals cost to society is very sensitive to transportation costs.**
- 2. Cost to society to save High Value Soils may outweigh the economic benefits.**

Conclusions

Many of the Consensus Group, and Dr. Jaeger, were skeptical of the value of GIS to the technical and economic analyses.

The GIS analyses quickly determined the number of acres of High Value Soils impacted by mining in the Willamette Valley using data derived from various state agencies, thus giving analyses credibility.

The GIS analyses quickly integrated geologic and soils data needed for the resource economic analyses.

Need a project? ODOT may desire to complete a similar analysis for areas outside of the Willamette Valley.