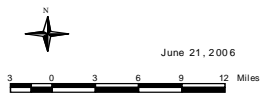


KING COUNTY

The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenue or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

File Name: RP_0146000.apr



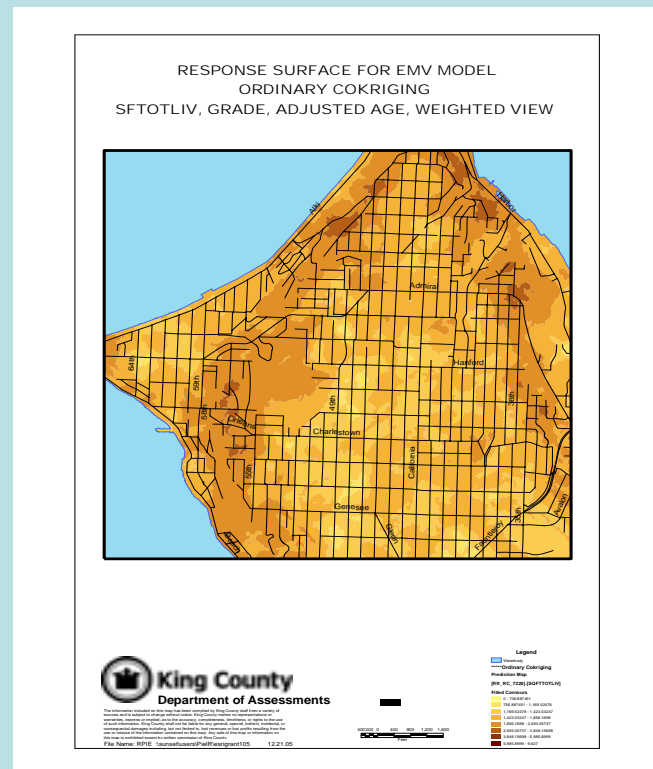
June 21, 2006



King County
Department of Assessments

Response Surfaces in NCSS Modeling Using ESRI ArcGIS Geostatistical Analyst

A Feasibility Study
King County, Department of Assessments
Seattle, Washington
Scott Noble, Assessor



What's Next ?



- Spatial Analyst / Model Builder
- 3D Analyst
- Geostatistical Analysis

Four EMV Models

Estimate of Market Value

- Base Model
- Base Model with Response Surface Added
- Model from Scratch with Response Surface
- Model from Scratch with Response Surface/No Base land

Performance Measures

- Coefficient of Dispersion (COD)
- Coefficient of Variation (COV)
- Price Related Differential (PRD)

Response Surface in EMV Modeling

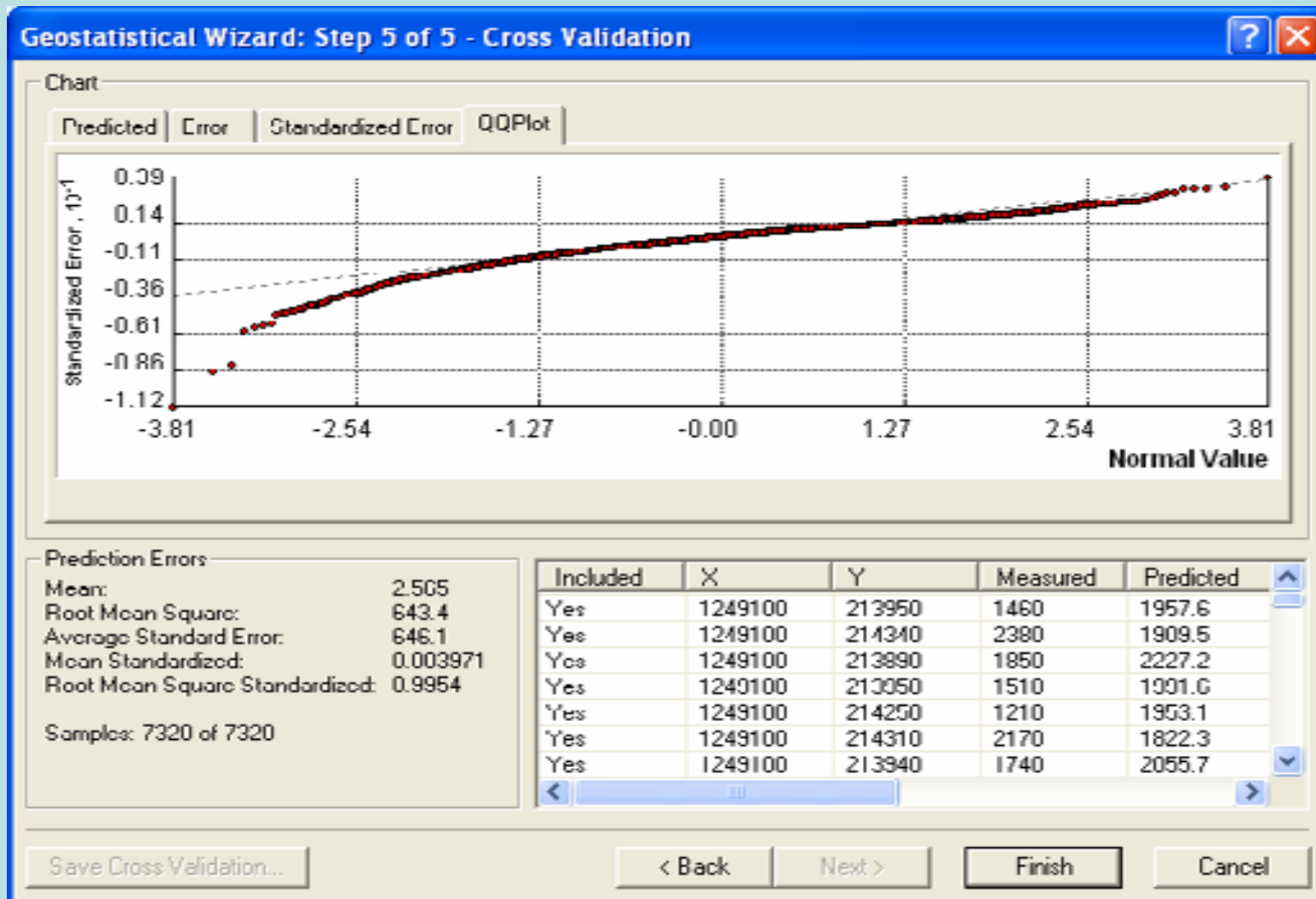
- Two issues:
 - Sales price on both sides of the equation
 - Creating a surface from characteristics only
- Response surface through Kriging and Cokriging

Response Surface Generation

Final model: West Seattle Area

- Variables:
 - Total Living SF
 - Adjusted Age
 - Weighted View
- Ordinary Cokriging Surface

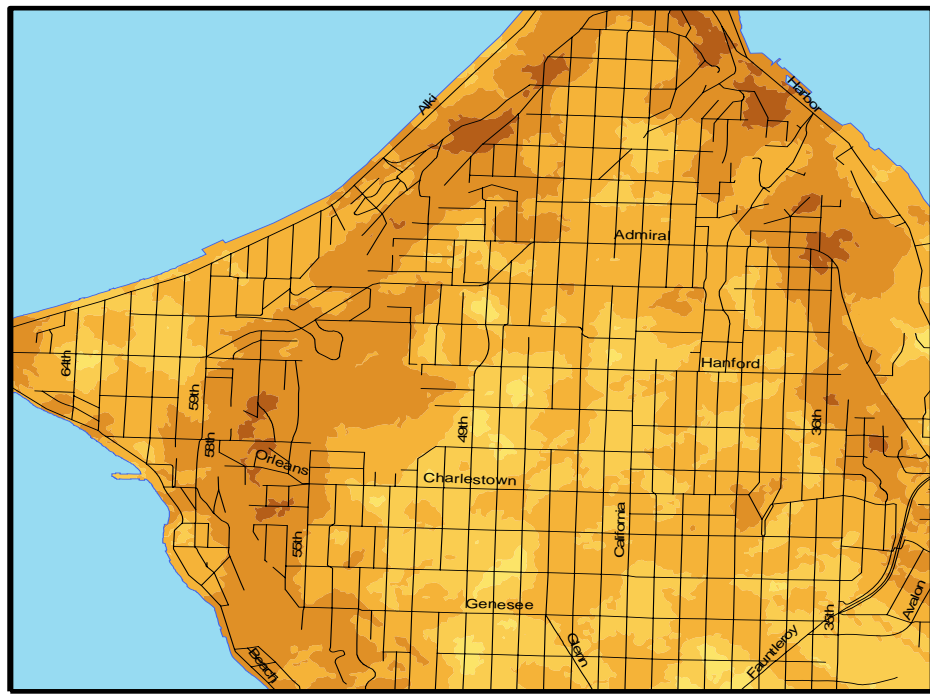
Cross Validation



Assign Parcel Values From Response Surface

- Create a surface layer with all parcels categorized by Pin
- Convert Response Surface to Vectors
- Join surfaces by spatial location using the average of the intersecting vector values
- Assign value to each parcel with Vlookup (Excel)

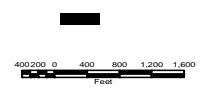
RESPONSE SURFACE FOR EMV MODEL
 ORDINARY COKRIGING
 SFTOTLIV, GRADE, ADJUSTED AGE, WEIGHTED VIEW



King County
 Department of Assessments

The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to the accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

File Name: RPIE : \sunsetusers\Pleir\resgrant105 12.21.05



Legend

- Waterbody
- Ordinary Cokriging Prediction Map [RR_RC_7320] (SFTOTLIV)

Filled Contours

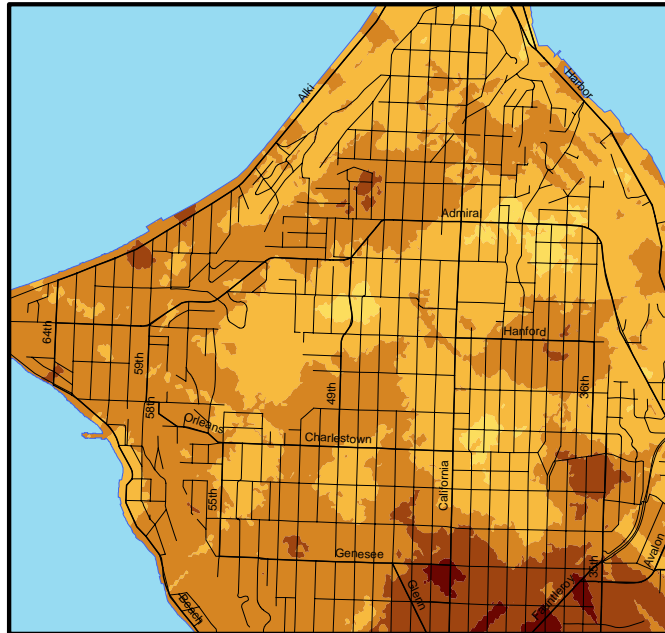
0 - 736.887451
736.887451 - 1,169.52478
1,169.52478 - 1,423.53247
1,423.53247 - 1,856.1698
1,856.1698 - 2,593.05737
2,593.05737 - 3,848.15698
3,848.15698 - 5,385.8999
5,385.8999 - 9,627

Model Results

MODELING RESULTS	Original Model	Original Model	Original Model	ESRI Surface	ESRI Surface
	Before Ratio	No Surface	plus ESRI Surface	New Model	No Limit & Value
	Before Ratio	After Ratio	After Ratio	After Ratio	After Ratio
SAMPLE STATISTICS					
Sample size (n)	771	771	769	767	768
Mean Assessed Value	398,500	394,100	394,800	394,100	392,900
Mean Sales Price	398,800	398,800	397,200	396,700	396,900
Standard Deviation AV	140,077	128,008	129,838	130,160	124,854
Standard Deviation SP	137,140	137,140	137,036	137,286	136,616
ASSESSMENT LEVEL					
Adjusted Mean Ratio	0.990	1.004	1.004	1.004	1.005
Median Ratio	0.993	0.992	0.992	0.993	1.000
Weighted Mean Ratio	0.929	0.993	0.993	0.993	0.992
UNIFORMITY					
Lowest ratio	0.614	0.731	0.736	0.766	0.729
Highest ratio	1.310	1.366	1.366	1.342	1.366
Coefficient of Dispersion	10.77%	8.47%	8.39%	8.34%	8.78%
Standard Deviation	0.125	0.106	0.106	0.104	0.110
Coefficient of Variation	13.40%	10.69%	10.42%	10.38%	10.82%
Price Related Differential (PRD)	1.002	1.011	1.011	1.011	1.012
RELIABILITY					
95% Confidence: Median					
Lower limit	0.918	0.983	0.965	0.982	0.991
Upper limit	0.948	1.009	1.009	1.009	1.008
95% Confidence: Mean					
Lower limit	0.821	0.997	0.997	0.997	0.997
Upper limit	0.689	1.012	1.011	1.011	1.012

* sample size difference due to the removal of influential outliers.

AV RATIO
EMV MODEL WITHOUT RESPONSE SURFACE



 **King County**
Department of Assessments

The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to the accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenue or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

File Name: RPIE :sunsetusers\PielResigant104 12.21.05

Legend

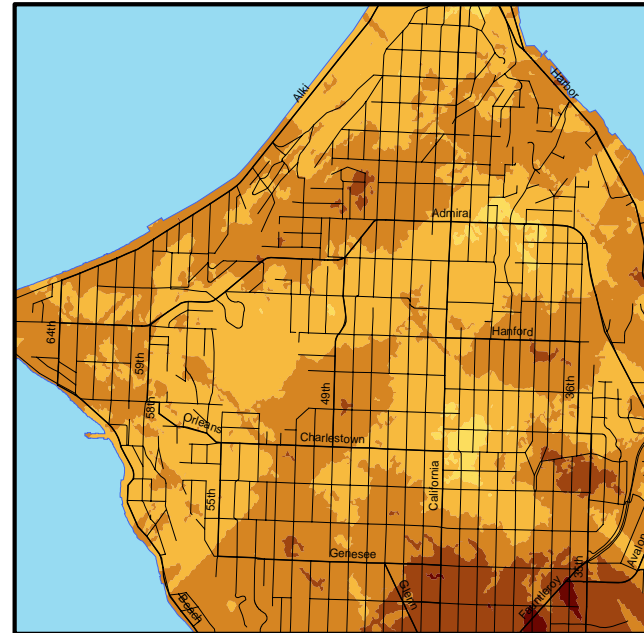
- Waterbody
- Ordinary Kriging, 2 Prediction Map
- [DATA for ratio checks][ORIG, AFTER]


Filed Contours

- 0.9 - 0.95
- 0.95 - 1
- 1 - 1.05
- 1.05 - 1.1
- 1.1 - 1.3085000

400200 0 400 800 1,200 1,600
Feet

AV RATIO
EMV MODEL WITH RESPONSE SURFACE



 **King County**
Department of Assessments

The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to the accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenue or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

File Name: RPIE :sunsetusers\PielResigant103 12.21.05

Legend

- Waterbody
- Ordinary Kriging, 5 Prediction Map
- [DATA for ratio checks][SURFACE, AF]

Filed Contours

- 0.9 - 0.95
- 0.95 - 1
- 1 - 1.05
- 1.05 - 1.1
- 1.1 - 1.4040000

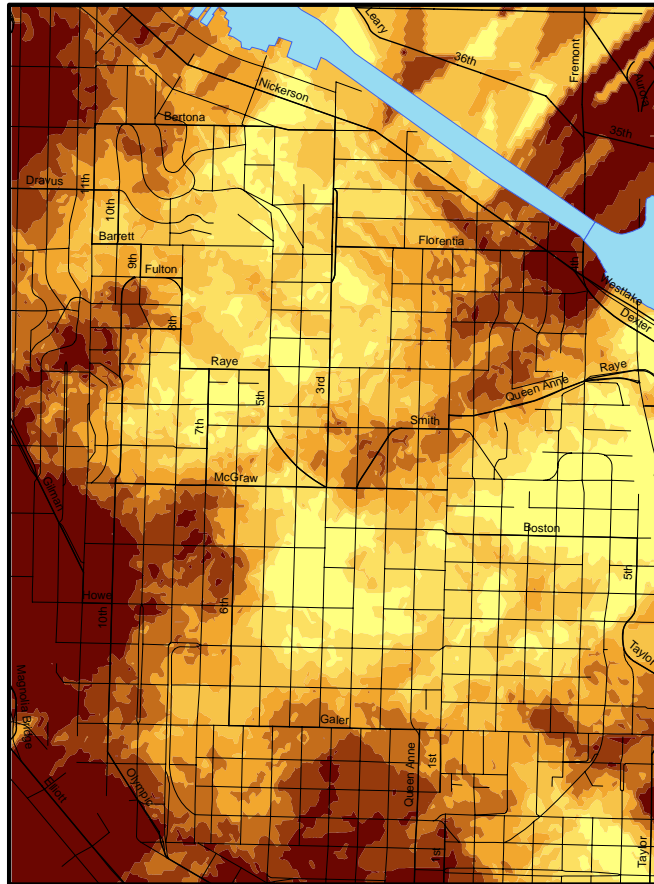
400200 0 400 800 1,200 1,600
Feet

Annual Update Modeling

ANNUAL UPDATE					
ORIGINAL MODEL	BEFORE	AFTER	With RESPONSE SURFACE	BEFORE	AFTER
SAMPLE STATISTICS			SAMPLE STATISTICS		
<i>Sample size (n)</i>	598	598	<i>Sample size (n)</i>	596	596
<i>Mean Assessed Value</i>	511,300	556,300	<i>Mean Assessed Value</i>	510,800	556,000
<i>Mean Sales Price</i>	564,900	564,900	<i>Mean Sales Price</i>	564,800	564,800
<i>Standard Deviation AV</i>	257,092	275,198	<i>Standard Deviation AV</i>	257,003	271,283
<i>Standard Deviation SP</i>	282,551	282,551	<i>Standard Deviation SP</i>	282,580	282,580
ASSESSMENT LEVEL			ASSESSMENT LEVEL		
<i>Arithmetic Mean Ratio</i>	0.917	0.999	<i>Arithmetic Mean Ratio</i>	0.917	0.999
<i>Median Ratio</i>	0.928	1.006	<i>Median Ratio</i>	0.928	1.008
<i>Weighted Mean Ratio</i>	0.905	0.985	<i>Weighted Mean Ratio</i>	0.904	0.984
UNIFORMITY			UNIFORMITY		
<i>Lowest ratio</i>	0.591	0.642	<i>Lowest ratio</i>	0.591	0.643
<i>Highest ratio:</i>	1.273	1.383	<i>Highest ratio:</i>	1.273	1.403
<i>Coefficient of Dispersion</i>	10.71%	10.57%	<i>Coefficient of Dispersion</i>	10.67%	10.09%
<i>Standard Deviation</i>	0.123	0.131	<i>Standard Deviation</i>	0.123	0.127
<i>Coefficient of Variation</i>	13.41%	13.10%	<i>Coefficient of Variation</i>	13.36%	12.71%
<i>Price Related Differential (PRD)</i>	1.014	1.014	<i>Price Related Differential (PRD)</i>	1.014	1.015
RELIABILITY			RELIABILITY		
95% Confidence: Median			95% Confidence: Median		
<i>Lower limit</i>	0.911	0.990	<i>Lower limit</i>	0.911	0.990
<i>Upper limit</i>	0.938	1.023	<i>Upper limit</i>	0.938	1.018
95% Confidence: Mean			95% Confidence: Mean		
<i>Lower limit</i>	0.908	0.989	<i>Lower limit</i>	0.907	0.989
<i>Upper limit</i>	0.927	1.010	<i>Upper limit</i>	0.927	1.009

* sample size differences due to removal of influential outliers

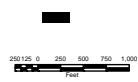
ANNUAL UPDATE RESULTS
MODEL WITHOUT RESPONSE SURFACE



 **King County**
Department of Assessments

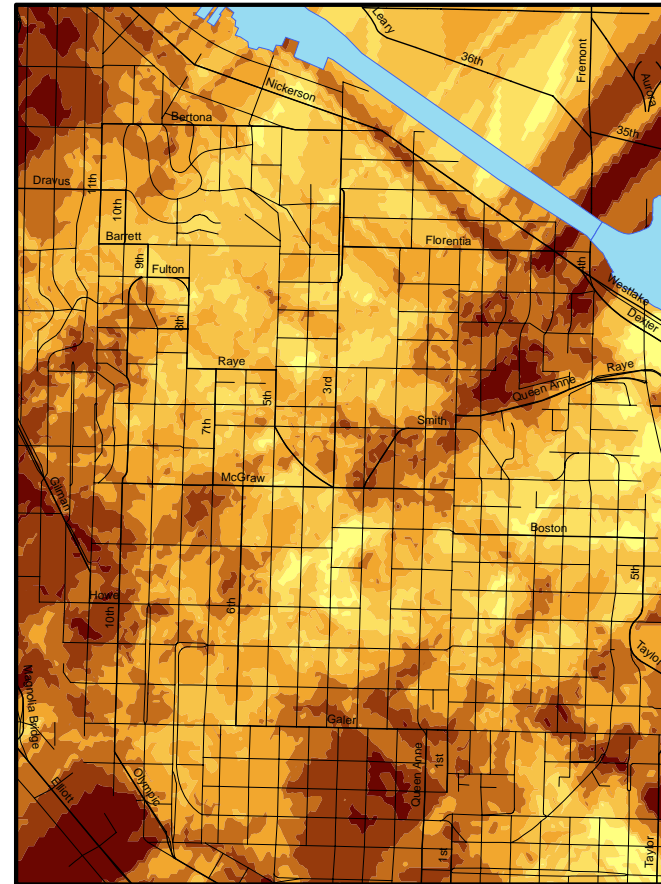
The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to the accuracy, completeness, timeliness, or utility of the use of such information. King County shall not be liable for any general, special, indirect, consequential or compensatory damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

File Name: RPIE : \sunsefusers\PelRResignant102 12.21.05



Legend
Waterbody
Ordinary Kriging_2
Prediction Map
[Model no Surface]_NEWAVRAT101
Filled Contours
0.841755 - 0.95
0.95 - 0.97
0.97 - 0.99
0.99 - 1.01
1.01 - 1.03
1.03 - 1.05
1.05 - 1.403023

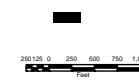
ANNUAL UPDATE RESULTS
MODEL WITH RESPONSE SURFACE



 **King County**
Department of Assessments

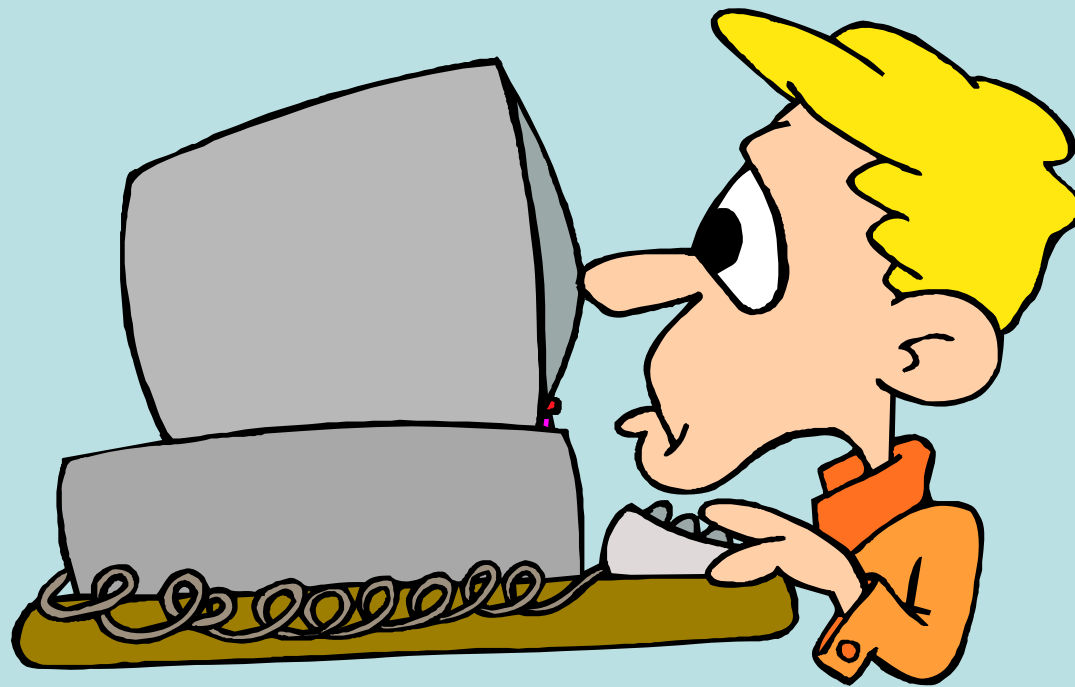
The information included on this map has been compiled by King County staff from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to the accuracy, completeness, timeliness, or utility of the use of such information. King County shall not be liable for any general, special, indirect, consequential or compensatory damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

File Name: RPIE : \sunsefusers\PelRResignant101 12.21.05



Legend
Waterbody
Ordinary Kriging_3
Prediction Map
[SSheevay area 12]_NEWAVR3
Filled Contours
0.84277 - 0.95
0.95 - 0.97
0.97 - 0.99
0.99 - 1.01
1.01 - 1.03
1.03 - 1.05
1.05 - 1.403023

Discoveries along the way



Conclusions / Addenda



Contacts:

Rich Piel, Appraiser II, Primary Analyst

email: richard.piel@metrokc.gov

Christie Most, GIS Specialist, Contributing Analyst

email: christie.most@metrokc.gov

Don Saxby, Assessments System Analyst, Contributing Analyst

Bob Kaldor, Senior Appraiser, Contributing Analyst

Debra Prins, Director, Residential Division

Contacts:

Rich Piel, Appraiser II, Primary Analyst

email: richard.piel@metrokc.gov

Christie Most, GIS Specialist, Contributing Analyst

email: christie.most@metrokc.gov

Don Saxby, Assessments System Analyst, Contributing Analyst

Bob Kaldor, Senior Appraiser, Contributing Analyst

Debra Prins, Director, Residential Division