

Land Use Change Accuracy Assessment

Peter R. Claggett¹, Jacob Czawlytko², Sean MacFaden³, Kumar Mainali², Sarah McDonald¹, Jarlath O'Neil-Dunne³, and Katie Walker²

¹ Lower Mississippi-Gulf Water Science Center, U.S. Geological Survey, Annapolis, MD 21403

² Chesapeake Conservancy, Annapolis, MD 21403

³ University of Vermont Spatial Analysis Laboratory, Burlington, VT 05405

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Purpose

Assess the user's and producer's accuracy of changes in land cover from 2013-2017 by state, inside and outside the Chesapeake Bay watershed.

Expected Accuracies (lowest value for each change pair)

<u>Classes (11)</u>	<u>Target User's Accuracy (+/- 2% with 95% confidence)</u>
Water	95%
Wetlands (emergent only)	80%
Tree Canopy	95%
Low vegetation/scrub-shrub	95%
Barren	90%
Structures	95%
Roads	90%
Other Impervious	90%
Tree Canopy over Structures	60%
Tree Canopy over Roads	60%
Tree Canopy over Other Impervious	60%

Design

Sample Design: stratified random sample

Sample Frame: 100,000 square mile area encompassing the 206 counties within, straddling, and adjacent to the Chesapeake Bay watershed.

T1	T2	DC	DE	MD	NY	PA	VA	WV	Frequency	AvgRank	Acres	Pct	CumPct
Tree Canopy	Low Vegetation	6	1	1	1	1	1	1	7	1.7	264,077	64.40%	64.40%
Tree Canopy	Barren	11	7	7	8	5	4	9	7	7.3	28,157	6.87%	71.27%
Barren	Low Vegetation	13	9	5	3	4	5	5	7	6.3	26,204	6.39%	77.66%
Low Vegetation	Other Impervious Surfaces	1	3	3	5	3	6	4	7	3.6	23,088	5.63%	83.29%
Low Vegetation	Barren	8	6	4	4	6	7	3	7	5.4	17,068	4.16%	87.45%
Tree Canopy	Other Impervious Surfaces	10	8	6	7	7	8	8	7	7.7	13,340	3.25%	90.71%
Low Vegetation	Structures	7	5	8	9	9	10	10	7	8.3	7,346	1.79%	92.50%
Other Impervious Surfaces	Low Vegetation	2	19	11	6	10	9	6	7	9.0	6,802	1.66%	94.16%
Tree Canopy	Structures	18	11	13	13	11	11	11	7	12.6	3,721	0.91%	95.06%
Low Vegetation	Scrub\Shrub		12	10	10	13	13	7	6	10.8	3,615	0.88%	95.94%
Other Impervious Surfaces	Structures	4	15	14	15	12	12	15	7	12.4	2,995	0.73%	96.68%
Tree Canopy Over Other Impervious Surfaces	Low Vegetation	12	22	12	18	16	16	16	7	16.0	2,120	0.52%	97.19%
Other Impervious Surfaces	Tree Canopy Over Other Impervious Surfaces	5	24	18	14	18	14	14	7	15.3	1,595	0.39%	97.58%
Tree Canopy Over Roads	Low Vegetation	16	30	16	11	14	21	12	7	17.1	1,470	0.36%	97.94%
Scrub\Shrub	Barren	35	25	26	47	17	15		6	27.5	1,160	0.28%	98.22%
Scrub\Shrub	Low Vegetation		14	49		15	18		4	24.0	1,019	0.25%	98.47%
Roads	Tree Canopy Over Roads	9	35	28	12	24	19	19	7	20.9	888	0.22%	98.69%
Structures	Other Impervious Surfaces	14	18	17	23	22	26	20	7	20.0	766	0.19%	98.87%
Other Impervious Surfaces	Barren	26	39	22	22	19	28	21	7	25.3	540	0.13%	99.01%

Land cover change was mapped for 57 of the 110 possible change class combinations and 99% of the change by area was represented by 19 change classes.

Sampling Design (continued)

Minimum Sample Size per Change Class: 50

Sampling Units: 1-meter cell; 3mx3m patch

Sample Allocation: spatially random and proportional in number to the relative area of mapped change classes while enforcing a minimum of 50 samples per class.

Sample count: minimum number required to assess the target user’s accuracy +/- 2% with 95% confidence (see chart below).

Strata: major jurisdiction (i.e., state), watershed boundary, land cover change combinations

Reference Data: 2013/14 and 2017/18 NAIP imagery

Reference Data Classification Method: Manual (visual) interpretation of classes by trained interpreters.

Table 1. Estimating Sample Size based on 2013 Land Cover Class Accuracies					
Class Name	ABRV	User's Acc.	Confid. Int. (95%)	Precision (+/- %)	# of Samples
Water	WAT	0.95	1.96	0.02	456
Wetlands (emergent only)	WET	0.80	1.96	0.02	1,537
Tree Canopy	TC	0.95	1.96	0.02	456
Low vegetation/scrub-shrub	LV/SS	0.95	1.96	0.02	456
Barren	BAR	0.90	1.96	0.02	864
Structures	STR	0.95	1.96	0.02	456
Tree Canopy over Impervious	TCI	0.60	1.96	0.02	2,305
Other Impervious	IMP	0.90	1.96	0.02	864
Total					7,395

Questions for LUWG

Should additional strata be considered (e.g., physiography, data quality)?

Are all land cover change class combinations equally important?

Is knowing the potential for missed change (producer's accuracy) as important as verifying observed change (user's accuracy)?

Other?



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