2016 Statewide Land Use Mapping Accuracy Assessment Results

After completion of the final classification dataset, a comprehensive accuracy assessment is completed. Independent ground truthing samples set aside for this purpose (25% of the final ground truth data) are used in this process. A stratified random sampling method is used for accuracy assessment sample selection. The datasets are stratified by land cover type and county boundary. In the 2016 analysis, more than 10,100 samples were selected for accuracy assessment. These sites are not used to train the classification algorithm and therefore represent unbiased reference information.

The overall accuracy result for the crop mapping statewide was 97.6% (Table 1). Accuracy and error results vary among crop types. In particular, some less extensive crops that have very few validation samples may have a skewed accuracy result depending on the number and nature of validation sample points. Some land cover types (e.g., apples, avocados, bush berries, carrots, cole crops, dates, kiwis) are not included in the error matrix due to insufficient data. In these cases there were either no, or less than 5 samples available for accuracy assessment. Full error statistics including errors of omission and commission indicate the nature of any misclassifications by crop. Omission errors are those where the analysis missed a field in a crop class and commission errors are those where the analysis included a field erroneously in a crop class. These are shown at the statewide level in Table 2.

TABLE 1. STATEWIDE LAND USE MAPPING OVERALL ACCURACY AND ERROR

	Reference Sample Total	No. Correct	No. Wrong	% Corr	Omission Error
Alfalfa and Alfalfa Mixtures	678	672	6	99.1%	0.9%
Almonds	1,976	1,966	10	99.5%	0.5%
Apples	10	8	2	80.0%	20.0%
Beans (Dry)	76	71	5	93.4%	6.6%
Bush Berries	12	11	1	91.7%	8.3%
Carrots	36	30	6	83.3%	16.7%
Cherries	118	115	3	97.5%	2.5%
Citrus	698	691	7	99.0%	1.0%
Corn, Sorghum and Sudan	833	818	15	98.2%	1.8%
Cotton	160	158	2	98.8%	1.3%
Flowers, Nursery and Christmas Tree Farms	17	15	2	88.2%	11.8%
Grapes	995	989	6	99.4%	0.6%
Idle	570	541	29	94.9%	5.1%
Kiwis	16	16	0	100.0%	0.0%
Lettuce/Leafy Greens	12	9	3	75.0%	25.0%
Melons, Squash and Cucumbers	83	78	5	94.0%	6.0%
Miscellaneous Deciduous	42	38	4	90.5%	9.5%
Miscellaneous Grain and Hay	131	91	40	69.5%	30.5%
Miscellaneous Grasses	71	58	13	81.7%	18.3%
Miscellaneous Truck Crops	66	51	15	77.3%	22.7%
Mixed Pasture	435	429	6	98.6%	1.4%
Olives	136	136	0	100.0%	0.0%
Onions and Garlic	40	36	4	90.0%	10.0%
Peaches/Nectarines	217	215	2	99.1%	0.9%
Pears	44	44	0	100.0%	0.0%
Peppers	17	17	0	100.0%	0.0%
Pistachios	273	273	0	100.0%	0.0%
Plums, Prunes and Apricots	191	189	2	99.0%	1.0%
Pomegranates	32	32	0	100.0%	0.0%
Potatoes and Sweet Potatoes	81	79	2	97.5%	2.5%
Rice	291	290	1	99.7%	0.3%
Safflower	67	61	6	91.0%	9.0%
Strawberries	12	11	1	91.7%	8.3%
Sunflowers	79	76	3	96.2%	3.8%
Tomatoes	271	259	12	95.6%	4.4%
Walnuts	825	818	7	99.2%	0.8%
Wheat	328	306	22	93.3%	6.7%
Wild Rice	21	21	0	100.0%	0.0%
Young Perennials	236	229	7	97.0%	3.0%
Total	**10,196**	**9,947**	**249**	**97.6%**	

TABLE 2. STATEWIDE LAND USE MAPPING ERROR MATRIX

Predicted (columns) / Reference (rows)

Reference	Alfalfa and Alfalfa Mixtures	Almonds	Apples	Beans (Dry)	Bush Berries	Carrots	Cherries	Citrus	Corn, Sorghum and Sudan	Cotton	Flowers, Nursery and Christmas Tree Farms	Grapes	Idle	Kiwis	Lettuce/Leafy Greens	Melons, Squash and Cucumbers	Miscellaneous Deciduous	Miscellaneous Grain and Hay	Miscellaneous Grasses	Miscellaneous Truck Crops	Mixed Pasture	Olives	Onions and Garlic	Peaches/Nectarines	Pears	Peppers	Pistachios	Plums, Prunes and Apricots	Pomegranates	Potatoes and Sweet Potatoes	Rice	Safflower	Strawberries	Sunflowers	Tomatoes	Walnuts	Wheat	Wild Rice	Young Perennials	Grand Total	No. Correct	No. Wrong	% Corr	Omission Error
Alfalfa and Alfalfa Mixtures	672								1				1								2																2			678	672	6	99.1%	0.9%
Almonds		1,966										2	2				1	1						1												1	1		1	1,976	1,966	10	99.5%	0.5%
Apples			8														1								1															10	8	2	80.0%	20.0%
Beans (Dry)	2			71				1																												1			1	76	71	5	93.4%	6.6%
Bush Berries					11																												1							12	11	1	91.7%	8.3%
Carrots						30			1																					5										36	30	6	83.3%	16.7%
Cherries							115						2																							1				118	115	3	97.5%	2.5%
Citrus								691					1									1																	5	698	691	7	99.0%	1.0%
Corn, Sorghum and Sudan	2					1			818				1					3	1									3						1		1	2			833	818	15	98.2%	1.8%
Cotton									1	158			1																											160	158	2	98.8%	1.3%
Flowers, Nursery and Christmas Tree Farms											15																							1			1			17	15	2	88.2%	11.8%
Grapes						1		1				989	3					1																						995	989	6	99.4%	0.6%
Idle	1					2		1				1	541		1		1				4		1											1			3		9	570	541	29	94.9%	5.1%
Kiwis														16																										16	16	0	100.0%	0.0%
Lettuce/Leafy Greens						1									9								1										1							12	9	3	75.0%	25.0%
Melons, Squash and Cucumbers									1				1			78																			1	2				83	78	5	94.0%	6.0%
Miscellaneous Deciduous							1	2									38																			1				42	38	4	90.5%	9.5%
Miscellaneous Grain and Hay	4			1									2		1	2		91	3		1														2		23		1	131	91	40	69.5%	30.5%
Miscellaneous Grasses	3								4									3	58		1																2			71	58	13	81.7%	18.3%
Miscellaneous Truck Crops				1		1			2	1	1				4	1				51			2							1					1					66	51	15	77.3%	22.7%
Mixed Pasture	2												3								429															1				435	429	6	98.6%	1.4%
Olives																						136																		136	136	0	100.0%	0.0%
Onions and Garlic	1												1			2							36																	40	36	4	90.0%	10.0%
Peaches/Nectarines								1																215				1												217	215	2	99.1%	0.9%
Pears																									44															44	44	0	100.0%	0.0%
Peppers																										17														17	17	0	100.0%	0.0%
Pistachios																											273													273	273	0	100.0%	0.0%
Plums, Prunes and Apricots																								1	1			189												191	189	2	99.0%	1.0%
Pomegranates																													32											32	32	0	100.0%	0.0%
Potatoes and Sweet Potatoes																					1									79							1			81	79	2	97.5%	2.5%
Rice													1																		290									291	290	1	99.7%	0.3%
Safflower	1												1								1											61	1	1			1			67	61	6	91.0%	9.0%
Strawberries																					1												11							12	11	1	91.7%	8.3%
Sunflowers									1								1																	76			1			79	76	3	96.2%	3.8%
Tomatoes				1		2							1			2										2				2					259		1			271	259	12	95.6%	4.4%
Walnuts	1	1					3																													818			2	825	818	7	99.2%	0.8%
Wheat				3									2					13	1									1							1		306		1	328	306	22	93.3%	6.7%
Wild Rice																																						21		21	21	0	100.0%	0.0%
Young Perennials													4				1	1										1											229	236	229	7	97.0%	3.0%
Total	689	1,967	8	77	12	37	119	696	827	159	17	993	568	16	18	84	42	115	64	51	437	137	43	216	45	20	275	191	32	88	291	65	13	79	267	822	352	21	243	10,196				
No. Correct	672	1,966	8	71	11	30	115	691	818	158	15	989	541	16	9	78	38	91	58	51	429	136	36	215	44	17	273	189	32	79	290	61	11	76	259	818	306	21	229		9,947			
No. Wrong	17	1	0	6	1	7	4	5	9	1	2	4	27	0	9	6	4	24	6	0	8	1	7	1	1	3	2	2	0	9	1	4	2	3	8	4	46	0	14			249		
% Corr	97.5%	99.9%	100.0%	92.2%	91.7%	81.1%	96.6%	99.3%	98.9%	99.4%	88.2%	99.6%	95.2%	100.0%	50.0%	92.9%	90.5%	79.1%	90.6%	100.0%	98.2%	99.3%	83.7%	99.5%	97.8%	85.0%	99.3%	99.0%	100.0%	89.8%	99.7%	93.8%	84.6%	96.2%	97.0%	99.5%	86.9%	100.0%	94.2%				97.6%	
Comission Error	2.5%	0.1%	0.0%	7.8%	8.3%	18.9%	3.4%	0.7%	1.1%	0.6%	11.8%	0.4%	4.8%	0.0%	50.0%	7.1%	9.5%	20.9%	9.4%	0.0%	1.8%	0.7%	16.3%	0.5%	2.2%	15.0%	0.7%	1.0%	0.0%	10.2%	0.3%	6.2%	15.4%	3.8%	3.0%	0.5%	13.1%	0.0%	5.8%					