

## Supplementary Materials

**Table S.1.** Prediction accuracy results and error matrices of ResNet models performed with 50, 100 and 200 epochs.

**ResNet Model - 50 epochs**

Class Name	Marsh	Open Water	Swamp	Upland	Total	Users' Accuracy
Marsh	1169	747	43	6	1965	0.59
Open Water	75	1079	11	0	1165	0.93
Swamp	6	7	162	0	175	0.93
Upland	851	167	14	1994	3026	0.66
<b>Total</b>	<b>2101</b>	<b>2000</b>	<b>230</b>	<b>2000</b>	<b>6331</b>	
<b>Producers' Accuracy</b>	0.56	0.54	0.70	1.00		
<b>Overall Kappa</b>	0.56					
<b>Overall Accuracy</b>	0.70					

**ResNet Model - 100 epochs**

Class Name	Marsh	Open Water	Swamp	Upland	Total	Users' Accuracy
Marsh	1252	645	56	2	1955	0.64
Open Water	87	1148	5	0	1240	0.93
Swamp	5	1	152	0	158	0.96
Upland	757	206	17	1998	2978	0.67
<b>Total</b>	<b>2101</b>	<b>2000</b>	<b>230</b>	<b>2000</b>	<b>6331</b>	
<b>Producers' Accuracy</b>	0.60	0.57	0.66	1.00		
<b>Overall Kappa</b>	0.59					
<b>Overall Accuracy</b>	0.72					

**ResNet Model - 200 epochs**

Class Name	Marsh	Open Water	Swamp	Upland	Total	Users' Accuracy
Marsh	1282	639	8	5	1934	0.66
Open Water	101	1202	2	0	1305	0.92
Swamp	16	7	207	0	230	0.90
Upland	702	152	13	1995	2862	0.70
<b>Total</b>	<b>2101</b>	<b>2000</b>	<b>230</b>	<b>2000</b>	<b>6331</b>	
<b>Producers' Accuracy</b>	0.61	0.60	0.90	1.00		
<b>Overall Kappa</b>	0.62					
<b>Overall Accuracy</b>	0.74					

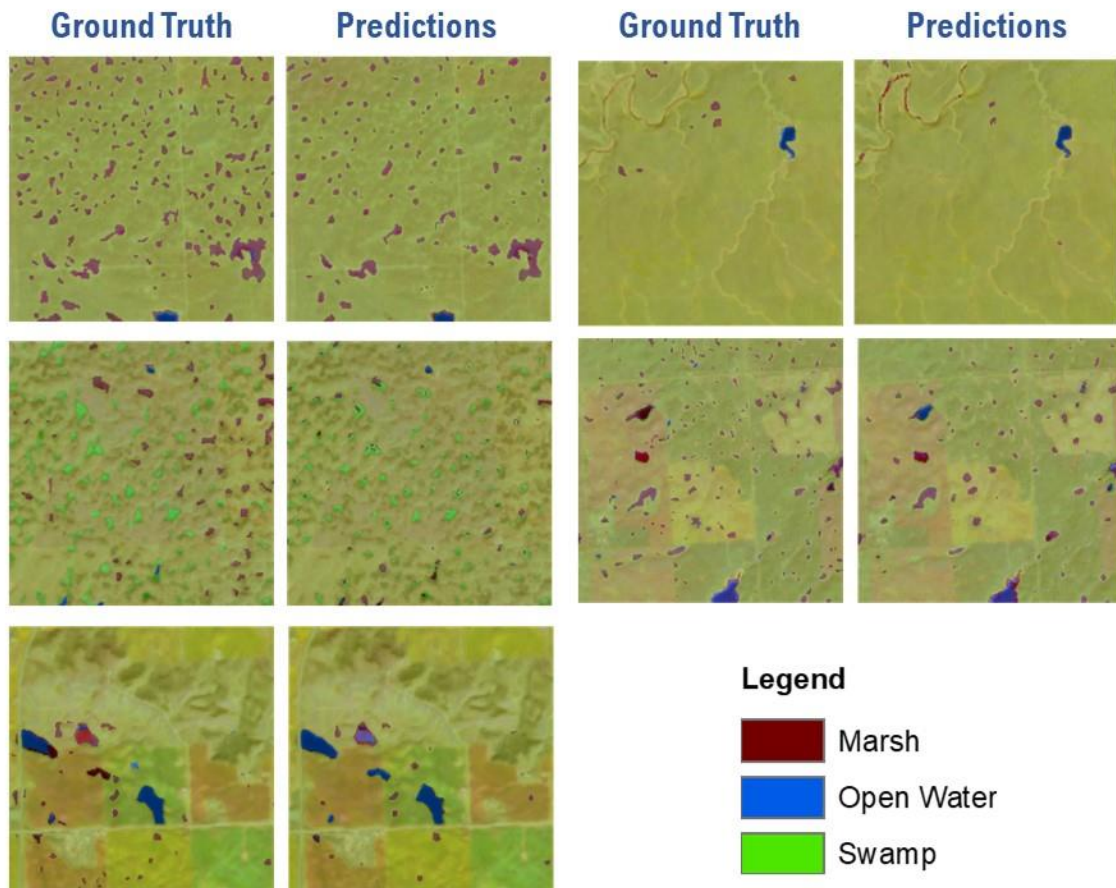
**Table S.2** Error matrices of ResNet, Support Vector Machine, and Random Forest classifications

<b>Reference Data</b>						
<i>ResNet Model 200</i>		<b>Marsh</b>	<b>Open Water</b>	<b>Swamp</b>	<b>Upland</b>	<b>Total</b>
<b>Map Data</b>	Marsh	1282	639	8	5	1934
	Open Water	101	1202	2	0	1305
	Swamp	16	7	207	0	230
	Upland	702	152	13	1995	2862
	<b>Total</b>	<b>2101</b>	<b>2000</b>	<b>230</b>	<b>2000</b>	<b>6331</b>

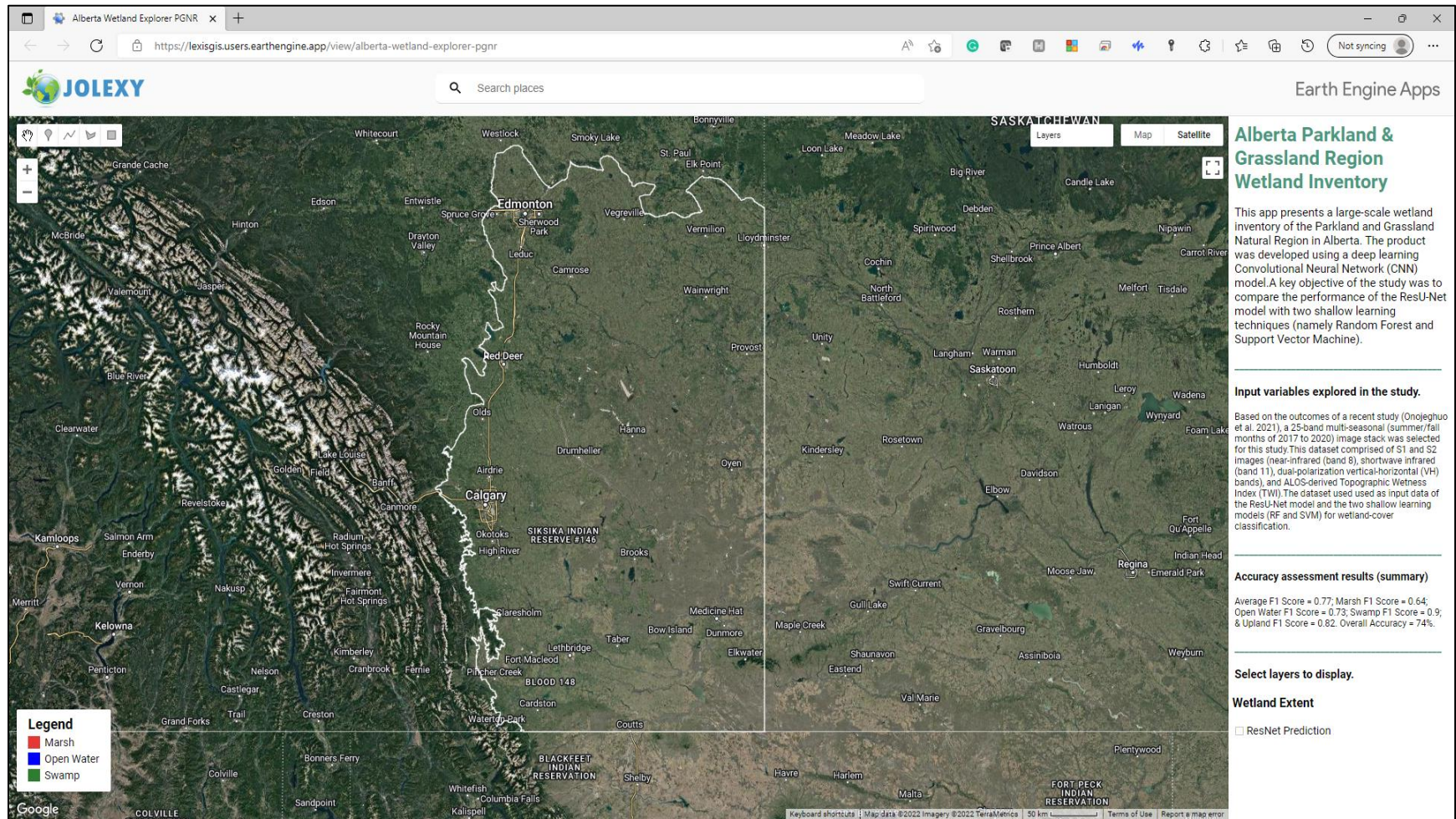
<i>SVM Model</i>		<b>Marsh</b>	<b>Open Water</b>	<b>Swamp</b>	<b>Upland</b>	<b>Total</b>
<b>Map Data</b>	Marsh	1280	686	61	124	<b>2151</b>
	Open Water	105	1122	16	0	<b>1243</b>
	Swamp	43	46	132	49	<b>270</b>
	Upland	673	146	21	1827	<b>2667</b>
	<b>Total</b>	<b>2101</b>	<b>2000</b>	<b>230</b>	<b>2000</b>	<b>6331</b>

<b>Reference Data</b>						
<i>RF Model</i>		<i>Marsh</i>	<i>Open Water</i>	<i>Swamp</i>	<i>Upland</i>	<i>Total</i>
<b>Map Data</b>	Marsh	1283	822	81	126	<b>2312</b>
	Open Water	50	1078	17	0	<b>1145</b>
	Swamp	14	43	107	33	<b>197</b>
	Upland	754	57	25	1841	<b>2677</b>
	<b>Total</b>	<b>2101</b>	<b>2000</b>	<b>230</b>	<b>2000</b>	<b>6331</b>

**Figure S.1.** Examples of ground truth and Predictions of ResNet modelling based on 50 epochs. In the figure, brown depicts marsh, blue open water, and green swamps.



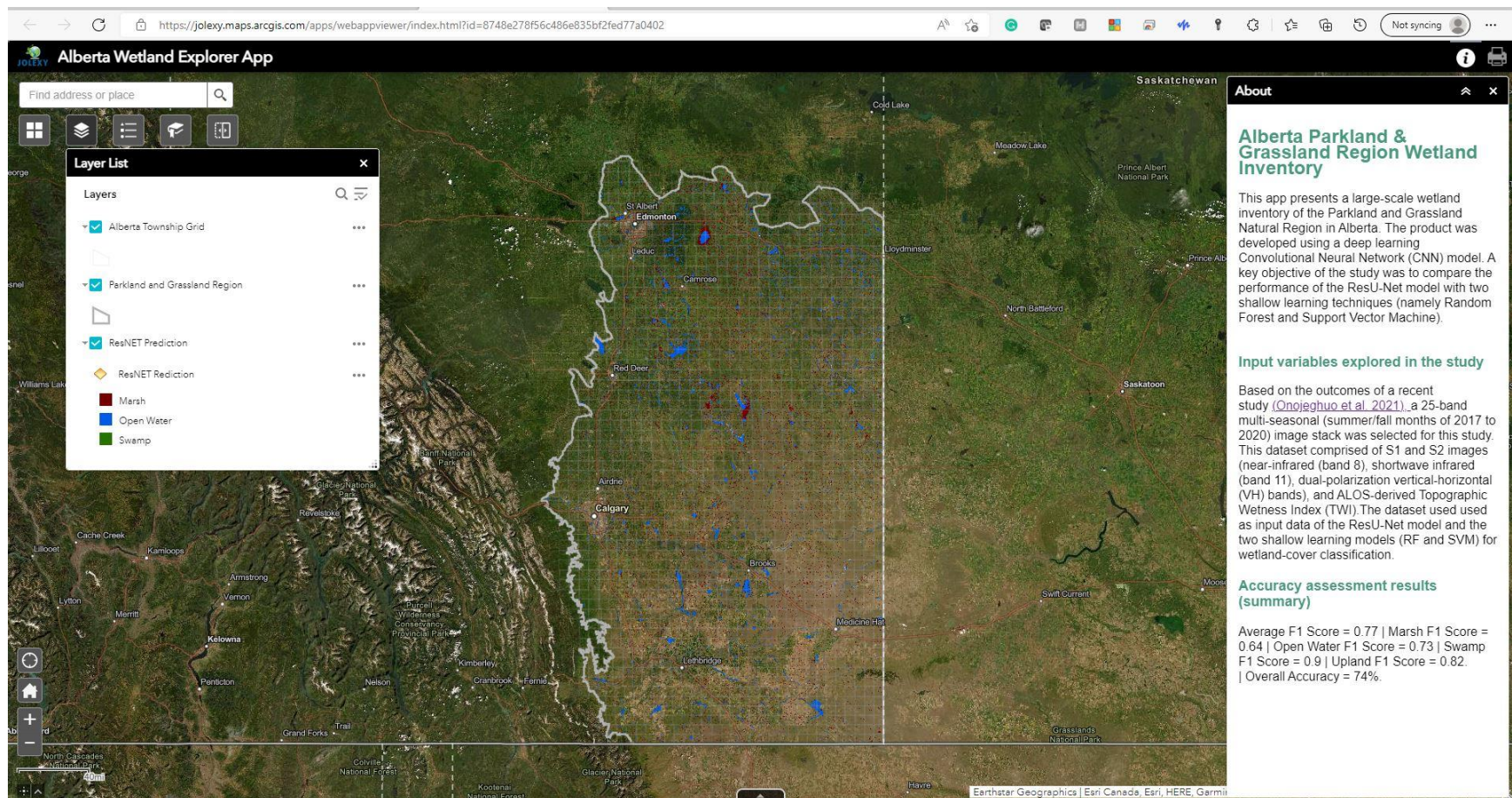
**Figure S.2.** Google Earth Engine wetland explorer app for the Parkland and Grassland Natural Region (landing page)



URL: <https://lexisgis.users.earthengine.app/view/alberta-wetland-explorer-pgnr>



**Figure S.3.** ArcGIS Online wetland explorer app for the Parkland and Grassland Natural Region (landing page)



URL: <https://jolexy.maps.arcgis.com/apps/webappviewer/index.html?id=8748e278f56c486e835bf2fed77a0402>



**Figure S.4.** Visual comparison of ResNet prediction with Alberta Biodiversity Monitoring Institute (ABMI) and Alberta Merged Wetland Inventory (ABMI) wetland inventory products with high-resolution satellite imagery (Maxmar imagery dated July 25, 2019) of selected locations in the study area. The top images represent Crawling Lake, and the bottom image is Beaverhill Lake, both prominent wetland habitats in the region.

