





Classification processes have been performed using SVM supervised classification method. SVM aims to determine the location of decision boundaries to separate classes using a decision surface called optimal hyperplane (Pal and Mather, 2005; Vapnik, 2013). SVM machine learning algorithm works with different kernel types but generally radial basis function (RBF) kernel is a reasonable first choice. RBF kernel nonlinearly maps samples into a higher dimensional space, has low number of hyperparameters which influences the complexity of model selection and has fewer numerical difficulties (Hsu et al., 2003; Vapnik, 2013). The mathematical representation of RBF kernel is as follows:

$$K(x_i, x_j) = \exp(-\gamma \|x_i - x_j\|^2), \gamma > 0 \quad (3)$$

#### 4. RESULTS AND DISCUSSION

SVM classifier has been trained by GPS locations of underwater samples. This procedure has been performed for each two classes that are 'Seagrass Presence' and 'Seagrass Absence'. Following training, Landsat image has been classified using RBF kernel with  $\gamma$  and penalty parameters taken as 0.333 and 100, respectively. Final classification map can be viewed in Figure 5.

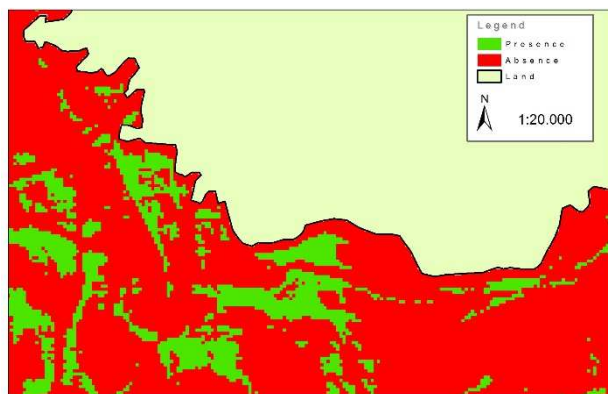


Figure 5. Final seagrass cover map (Green = Presence, Red = Absence)

A total area of 13.75 kilometre square has been classified. Seagrass seems to be present at the %18.3 of study area. Rest of the area mostly consists of sand.

Overall accuracy of the classification has been calculated as %71.05 which is acceptable for aquatic applications. Using near infrared band of Landsat image may increase accuracy.

#### 5. CONCLUSIONS

In this study, seagrass cover maps have been produced using Landsat 8 OLI image using SVM supervised classification and underwater samples in a coastal area in Gulluk Gulf in Mediterranean of Turkey. The study shows that Landsat 8 OLI images provide enough classification accuracy for seagrass mapping in the study area.

For the future work, a more detailed percentage cover map can be produced and it would be more efficient to manage seagrass ecosystem using Landsat time series to monitor changes.

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