Global Journals LaTeX JournalKaleidoscope™
Artificial Intelligence formulated this projection for compatibility purposes from the original article published at Global Journals. However, this technology is currently in beta. *Therefore, kindly ignore odd layouts, missed formulae, text, tables, or figures.*

Temporal Change Detection of AL-Hammar Marsh -IRAQ Using Remote Sensing Techniques

Dr. Salah A. H. Saleh[1]

[1] Al Nahrain University

Received: 5 June 2012 Accepted: 2 July 2012 Published: 15 July 2012

Abstract

The Mesopotamian marshlands, the largest wetland in the Middle East and one of the most outstanding in the world have been lost mainly as a result of drainage and damming. The cause of the decline is mainly as a result of damming upstream as well as drainage schemes since the 1970s. The Tigris and the Euphrates are amongst the most intensively dammed rivers in the world. In the past 40 years, the two rivers have been fragmented by the construction of more than 30 large dams, whose storage capacity is several times greater than the volume of both rivers.The immediate cause of marshland loss, however, has been the massive drainage works implemented in southern Iraq in the early 1990s, following the second Gulf War. Satellite images provide hard evidence that the once extensive marshlands have dried-up and regressed into desert, with vast stretches salt encrusted. Recent satellite imagery shows only limited areas of the marshlands have been reclaimed.

Index terms— Mesopotamian marshlands, land cover, Landsat images, Digital analysis, Temporal change detection.

1 Introduction

Current change detection systems use a variety of image processing tools to make changes visible, but typically rely on manual interpretation by expert analysts to delineate the change areas. Most systems look for changes between only two images: one ”before” and one ”after”. Change -detection techniques in common use include: subtracting spectral bands between the images, subtracting a feature space, principal components analysis, and change vector analysis. Satellite remote sensing is widely accepted as a technique to study land use and land cover change Dynamics .The use of satellite data for compiling land use change area is becoming substitute for data derived from time consuming satellite images interpretation. Better assessment of land use land cover change using digital analysis of remotely sensed satellite data can help decision maker to develop effective plans for the management of land.

Numbers of researchers have used remotely sensed satellite data for change detection, and a number of approaches and techniques have been developed. Locating and characterizing areas of significant change using remotely sensed data is important for many applications. These include: resource management, urban planning and impacts of human activities on the environment Landsat satellite imagery reveals that in the last 10 years, wetlands that once covered as much as 20,000 square km (7,700 square miles) in parts of Iraq and Iran have been reduced to about 15 percent of their original size. The ecosystem has been damaged and, as a result, a number of plant and animal species face possible extinction. **??**UNEP, 2004) Two main approaches to digital change detection have been reported. Both involve multitemporal images and can be categorized as separate data set or single data set analysis. Separate data set analysis involves classification of each-date imagery separately into land cover classes. The results were subsequently compared. Single data set analysis involves co-registering and re-sampling multi-temporal images into the same dataset and matamatical transformation, mainly image differencing and rationing, is then applied to the raw co-registered images to produce a residual image indicating

the relative change in reflectance between the two dates. This technique is gives slightly more accurate result. **??**See, for example, Nelson, 1982; **??**enson and **??**oll, 1982: woodwell et al., 1983; **??**ingh, 1986; **??**uarmby et al., 1987).

2 II.

3 Digital Change Detection Techniques

Change detection is the process of identifying differences in the state of an object or phenomenon by Author : Nahrain University, IRAQ. E-mail : salahsrc123@hotmail.com n recent years there has been a significant amount of research put forth in the development of change detection methods using remotely sensed data. Scientists studying global change may find the ability to monitor land-surface changes over time the most important use of satellite image data. The repetitive coverage, consistent data characteristics, and digital format of the image data provided by several satellite systems makes their respective data readily conducive to the production of a digital "change" database in which the spatial and temporal dimensions of land-use and land-cover change can be detected and evaluated.

4 Global

I observing it at different times. Change detection generally operates by detecting numerical differences in corresponding pixel values between dates. Many digital algorithms have been applied for change detection purposes (Kwarteng and Chavez Jr !998).

The basic reason in using remote sensing data for change detection is that changes in the object of interest will result in changes in radiance values or local texture that are separable from changes caused by other factors, such as differences in atmospheric conditions, illumination and viewing angle, soil moisture etc. It may further be necessary to require that changes of interest be separable from expected or uninteresting events, such as seasonal, weather, tidal or diurnal effects.

Digital change detection techniques may be categorized into two basic approaches: the comparative analysis of independently produced thematic labeling or classifications of imagery from different dates; or simultaneous analysis of multi-temporal data sets. Within these two approaches, there are a number of methods and techniques such as post classification comparison, image rationing and principle components analysis (this list is not exhaustive).

III.

5 Methodology

The bands 4,3,2. Landsat Multispectral data provide the longest duration archive of moderately high spatial resolution satellite image data for monitoring the types and rates of land-surface change imposed by human activity. The derivation of change information from Landsat data generally consists of co-registering the data of two or more images of the same area acquired at different time; adjusting the radiometric properties of the data to normalize for varying observation and atmospheric conditions; implementing a change detection method on the combined data sets; and producing an output product that can effectively convey land-surface change on an image or in statistical basis. Although the consistent data characteristics of Landsat data enable ready production of change images, the procedures of change image production can also be implemented on multiple data sets of non-similar data characteristics, allowing combination of Landsat MSS data with data from other sensors, such as Landast Thematic Mapper (TM) and SPOT Satellite.

6 Temporal Comparison Results

The change detection procedure used has involved a classified images derived for each date. This approach as described above was performed on unsupervised and supervised classifications of Landsat data from 2 dates and subsequently compares the classified images. Hence the output image was greatly dependent upon the accuracy of the classified images. Figures (3-a, b, c, d) and Table **??**1 **??**SS-1975 and **??**M-2002 images. Table (3) shows the result of qualitative evaluation as well as the rate of land use -land cover changes carried out through the analysis of unsupervised and supervised classification statistics summary reports. These changes caused by IRAQ-IRAN war, and as a result of damming upstream as well as drainage schemes since the 1970s and due to massive drainage works implemented in southern Iraq in the early 1990s, following the second Gulf war.

V.

7 Results and Discussion

Change detection has become a useful tool for detecting landcover changes from remotely sensed imagery. It has enabled resource managers to observe changes over large areas and provided long-term monitoring capabilities. Generally we can conclude that digital change detection techniques using temporal remote sensing data are useful to assist human analysts of remote sensing data, and provide detailed information for detecting and assessing land cover and land use dynamics.

8 Conclusion

The obtained results from temporal classification change detection method showed that there are noticeable and clear changes in the land use and land cover in the area for the period 1972-2002. There is no much differences in classification results for supervised and unsupervised techniques.

There are increasing in dry land and deep water areas and decreasing in the wet land and shallow water areas. Also there is decline in spatial extent of date palm and marsh shrubs. These changes caused by IRAQ-IRAN war and as a result of damming upstream as well as drainage schemes since the 1970s. This page is intentionally left blank

9 References Références Referencias

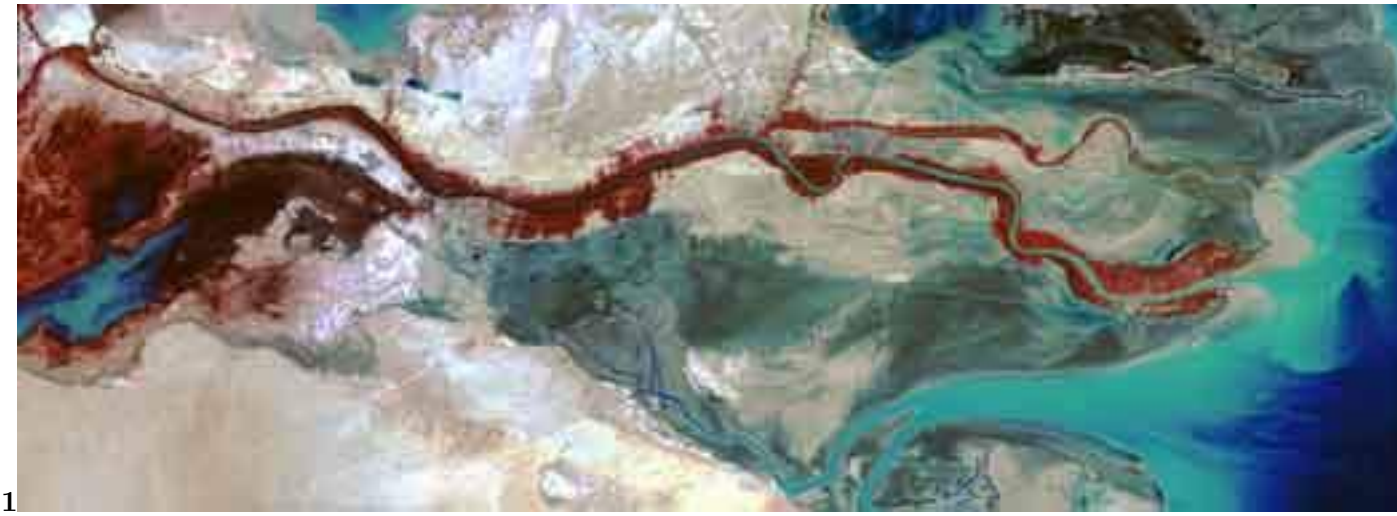
10 Global

Figure 1:

[1] [2]

[1] © 2012 Global Journals Inc. (US) Year

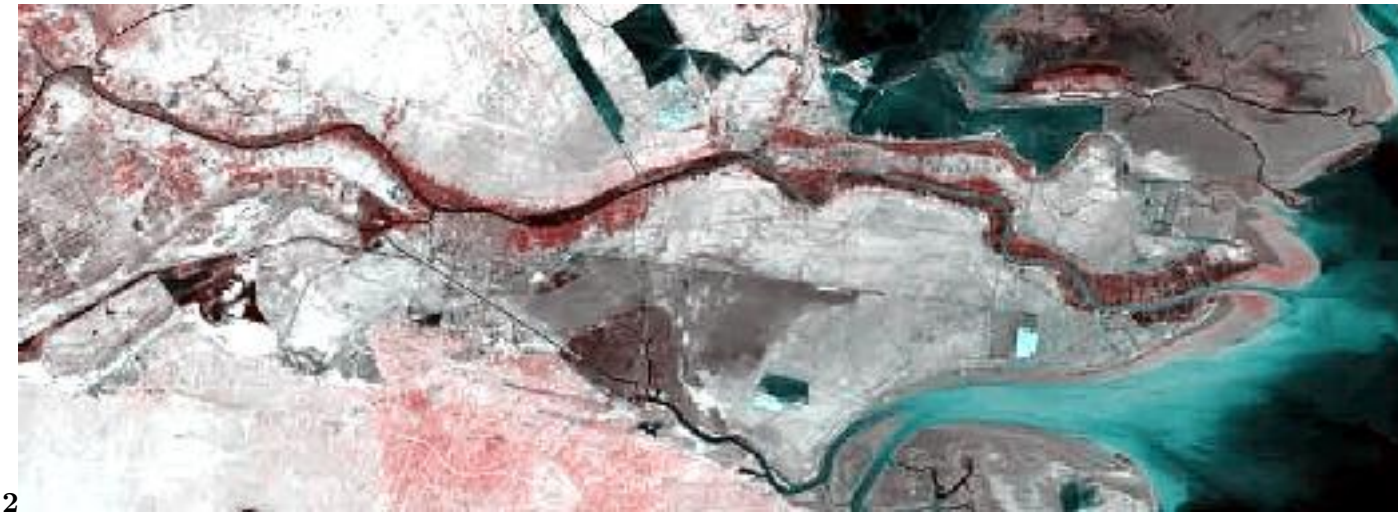
[2] Temporal Change Detection of AL-Hammar Marsh-IRAQ using Remote Sensing Techniques



1

Figure 2: Figure (1

Figure 3:



2

Figure 4: Figure 2 :

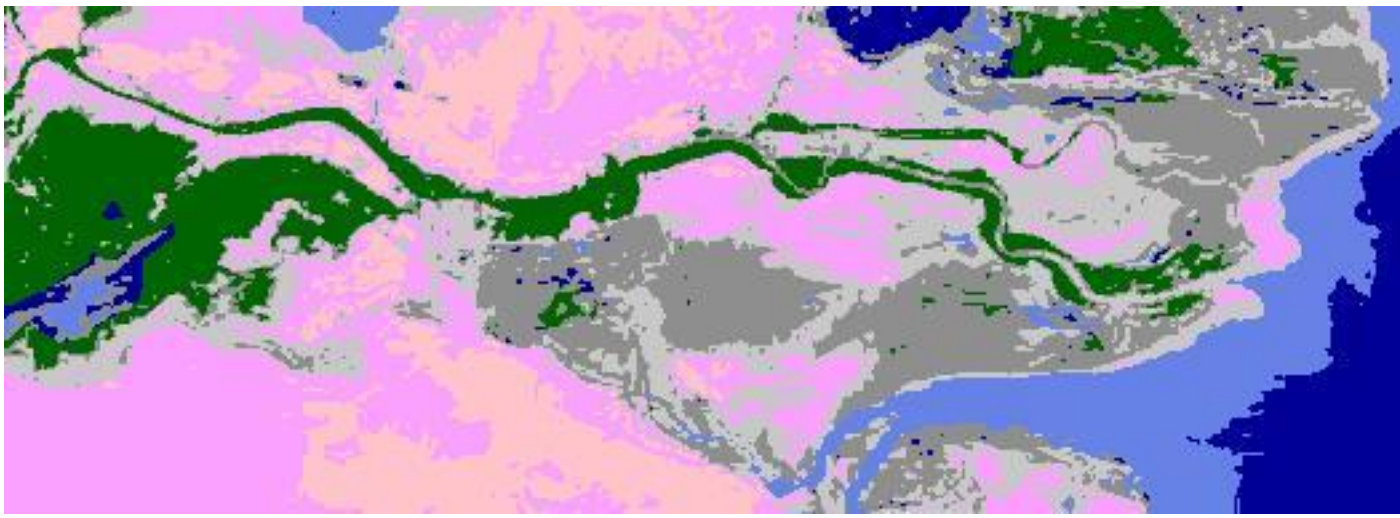
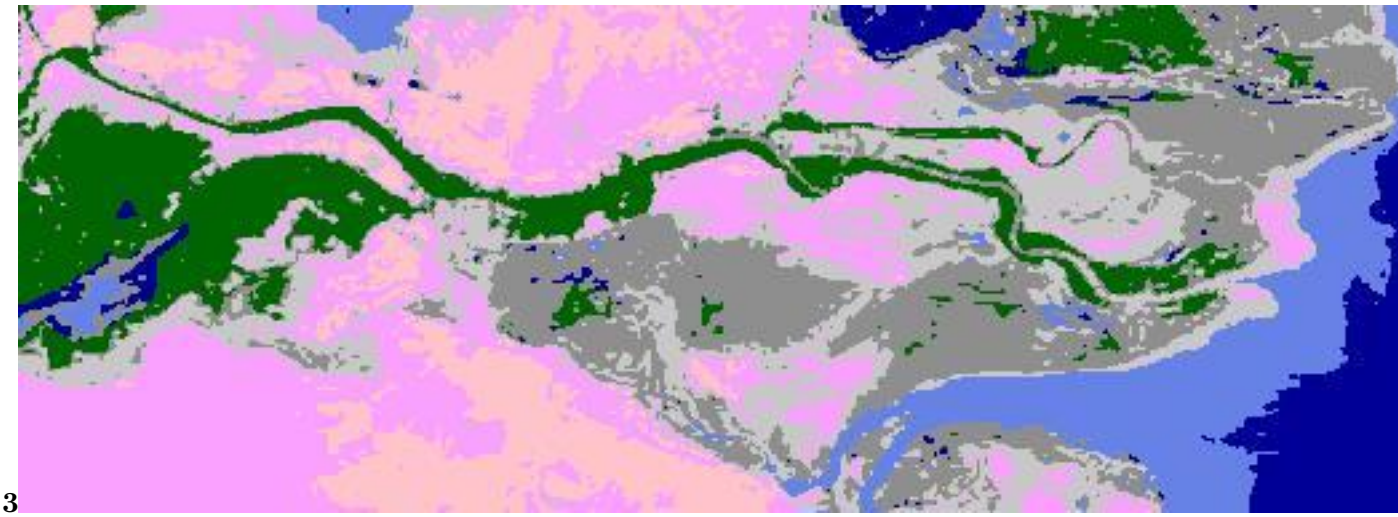


Figure 5:



3

Figure 6: Figure 3 :

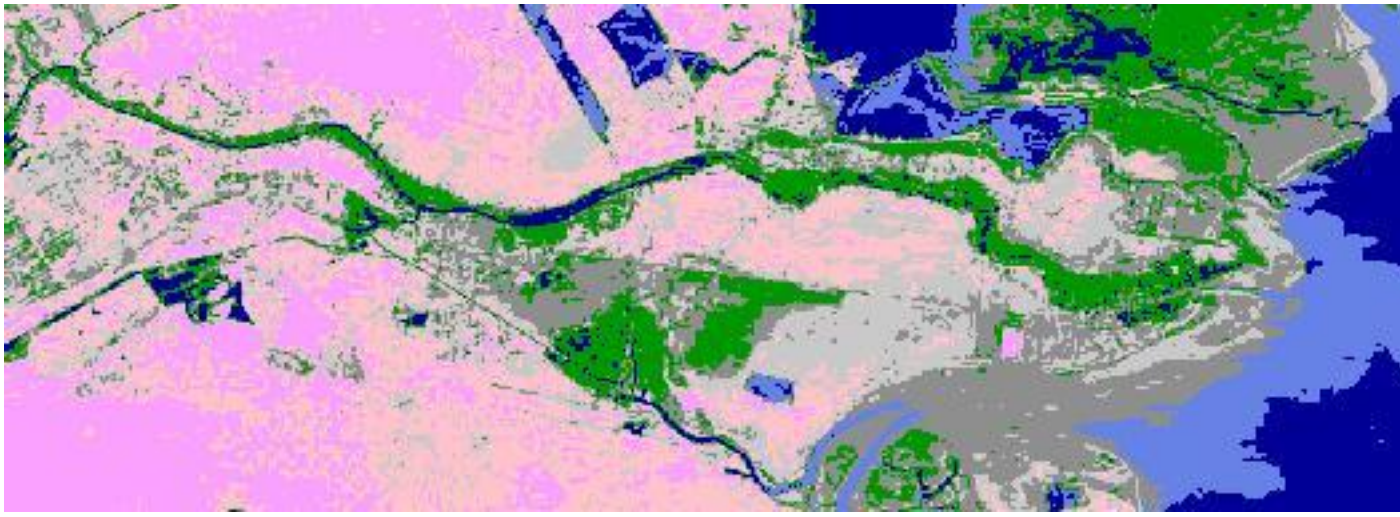


Figure 7:

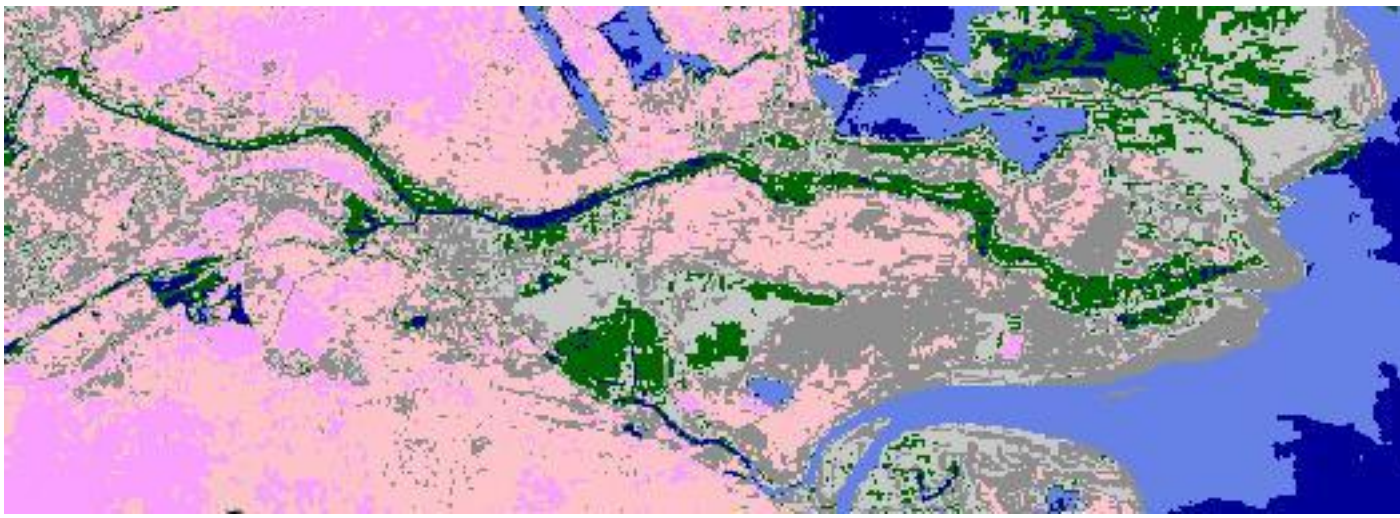
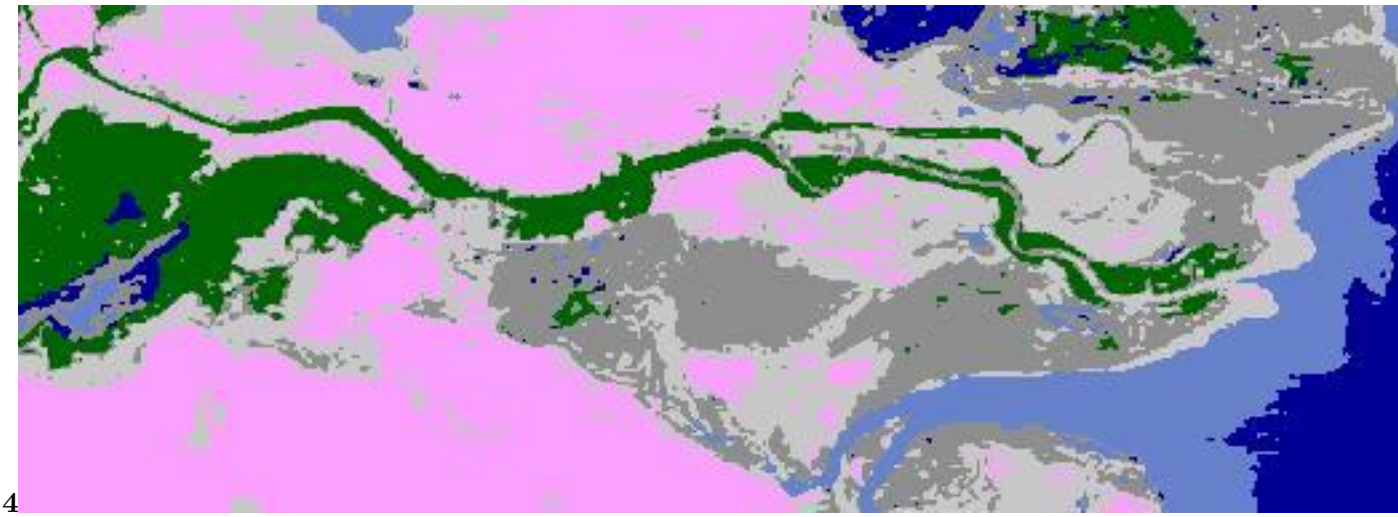


Figure 8: A



4

Figure 9: Figure 4 :

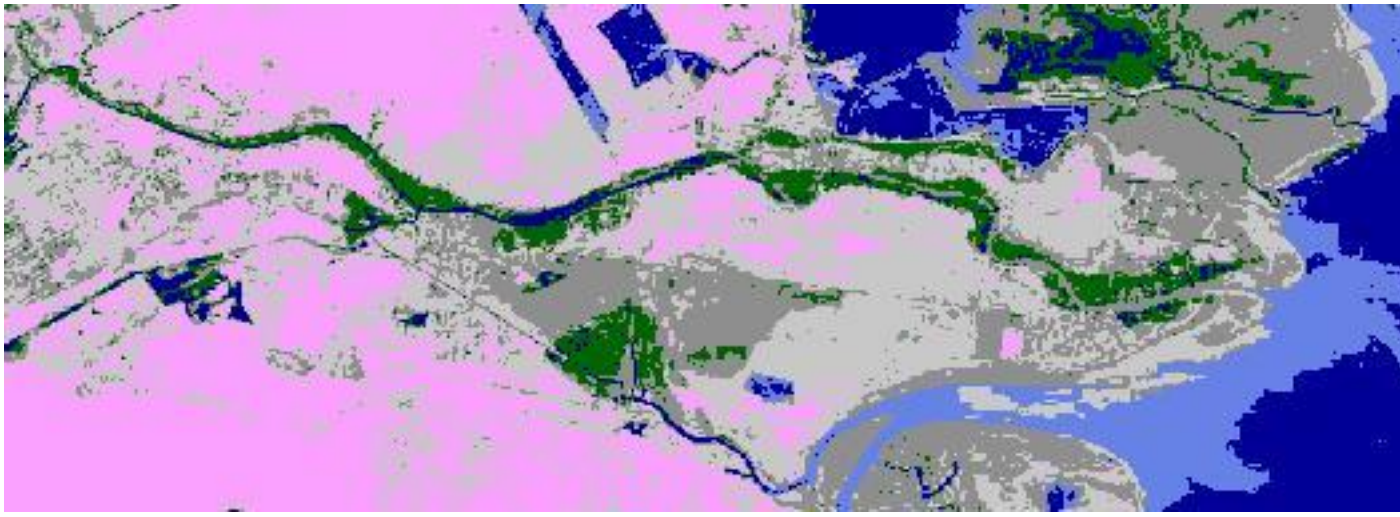


Figure 10:

2

Figure 11: Table 2 :

3

Figure 12: Table 3 :

1. Jenson, J.R. and Toll, D.R., 1982. Detecting residential Land use development at the Urban fringe, Photogrammetric Engineering and Remote Sensing, 48, 629-643 2. Kwarteng, A. Y. and Chavez Jr, P. S. 1998. Change detection study of Kuwait city and environs using multi -temporal Landsat thematic mapper data. International journal of remote sensing, Vol19, Issue 9. 3. Nelson, R.E 1982 Detecting forest canopy change using Landsat. AgRISTARS Report TH 83918 , NASA / Goddard Space Flight centre Greenbelt , MD 80 pp 4. Quarmby, A.A. Townshend, J.R.G. and Cushine j.L. 1987 Monitoring urban land cover changes at the urban fringe from SPOT HRV imagery in South-east England , VI.

Figure 13: