2. Wetland archaeology

2.1. Introduction

A wetland has been defined as a land that is predominantly saturated with water for part of each year, or of each day, or which has been drowned by water at any time in its existence (Coles, 1984:1). This can include: marshes (active and reclaimed), peat lands, lake margins, river floodplains, estuaries and lagoons (Coles and Olivier 2001). Wetlands are predominantly depositional environments, but at the same time they are prone to erosion, forming dynamic landscapes. Furthermore, they constitute archives of climatic changes, the record of which is often very well preserved in such settings, (Nicholas, 2007); they contain unique, valuable, and irreplaceable information for landscape reconstructions. In the framework of wetland archaeology, some of the most spectacular discoveries, including trackways, settlements, human footprints and bodies have been recovered in wetlands in remarkable state of preservation (Coles et al., 1973, Raftery 1990, 1996, Bell, 2000, 2007, Brown, 2005, van de Noort and O'Sullivan 2006:9, Carew et al., 2009, ); these finds illuminate the means by which people responded to environmental changes, as well as the impact of human activity on the wider landscape. The significance of wetland archaeology lies thus in the exceptional preservation of a wide range of materials, both natural and cultural, which would not usually be preserved on dry-land sites, as valuable resources for human populations throughout history (Dyson et al., 2006:4).

2.2. Wetland sites complexities: Lakes

2.2.1. Sediments composition

Lakes are standing bodies of water that accumulate sediments from the surrounding environment and from their water column (Gornitz et al., 2009) and as dynamic response systems they integrate environmental, climatic and tectonic forcings into a continuous, high-resolution archive of local and regional change (Schnurrenberger et al., 2003). Lakes are usually deep and are not characterized by as dense organic matrix as the swamps, marshes and lagoons.

The formation of lacustrine sediments is controlled by atmospheric processes, but also by the geology of the catchment basin (Gornitz et al., 2009). As geology does not change significantly through the evolution of most lakes, variations recorded in the sedimentary record are closely related to the climatic variability. Moreover, the tectonically induced displacements at the lakes outlets are sufficient to explain relative lake-level changes, interbasin lake sedimentation and lake morphology. Several abrupt changes in sediment
texture and composition are attributed to seismo-tectonic activity (De Baptist and Chapron, 2008). Lacustrine sedimentation includes:

1. the flux of minerals through fluvial input or aeolian input (density currents, deltaic deposits), but also marginal colluvial action particularly during periods of lake level change. The clastic component of lacustrine sediment illustrates landscape changes, yielding signals of basinal landscape denudation, regional deflation processes, vegetation dynamics and/ or tectonic activity. Intensive physical weathering and the lack of dense vegetation cover provide high amount of minerogenic detritus, which can be easily eroded and transported into the lake. The amount of the transported sediment is correlated to the runoff.

2. biological productivity in the lake, which generates organic or biogenic sediments and

3. chemical precipitation of minerals from the water column forms evaporitic sediments.

Lakes can be divided into several categories according to: a) their genetics (tectonic, volcanic, landslide, glacial, solution, fluvial, aeolian, shoreline, organic, anthropogenic, meteorite b) to the presence of natural outlets (open and close) (Tablot and Allen, 1996) c) to the trophic concept (oligotrophic: low productivity, eutrophic: high bioproductivity, dystrophic: organic input from allochtonous sources).

One of the main characteristics of the physical environment of the lakes is the absence of strong permanent currents (Nichols, 1999). The flow from the rivers entering the lake rapidly loses energy encountering the static water body and most of the coarse sediment is therefore deposited at the shore, as quartzose well sorted sands (Håkanson and Jansson, 1983: 18). In periods of drought, the lowering of the water level, will shift the shoreline to the centre and will lead to the exposure of the periphery to subaerial conditions (fig. 2.1). The wave-rippled sand of the shoreline will be changed to exposed muds, and occasionally a hard, compact surface may be formed in the supra-littoral locations (Ismail-Meyer et al., 2013). In certain cases, the offshore muds maybe followed by incipient soil formation and a suite of pedogenic characteristics (Feibel, 2001). In shallow waters and under aerobic conditions bioturbation processes will prevail, due to foraging fishes, macrofauna and meiofauna. The processes involved are particularly complex and variable, as different
organisms display different mixing activities and are unevenly distributed in time and space in the lake (Håkanson, and Jansson, 1983: 218).

The processes determining the fate of sediments after primary deposition on the lakebed are: suspension entrainment, turbidity currents, wave and wind influences and topographical influences on bottom dynamics (Håkanson, and Jansson, 1983: 177). Away from the mouth, the nature of the lakeshore deposits depends on the strength of the winds generating waves and currents in the lake basin. Waves are responsible for coastal erosion, beach formation and coastal currents, which are responsible for sediment drift along beaches (Morton, 2004). The wind-driven currents can generate flows (Talbot and Allen, 1996), which can move silt and sand and form wave ripples in the sediments.

Wave action and currents in the littoral zone can further cause reworking, reprocessing, and sorting of lake muds, destroying the original structure and laminations, in periods of lake level regression.

Away from the shore, the sedimentation occurs in suspension and transport, by density currents. Silt sized detritus is deposited further from the river mouth, and clay sized material can be distributed by lake currents, before deposited as mud in the lake floor, in laminated structure. Coarser material may reach the centre, if a density current carries it (Nichols, 1999). Density currents with low to moderate concentrations of sediments are turbidity currents, which deposit layers of coarse to finer sediment.
In cases of broad shallow lakes, the action of waves can affect the whole lake; deeper ones are less affected by wave action, even if periods of intense wind can cause considerable sedimentological effects at substantial depth. The trigger for the redistribution of material from the river mouth by currents may be a storm bringing large quantities of sediment from the river to the lake. Storms are episodic catastrophes, bringing high wave energy to bear on the lake margin. They have enormous erosional effect, and they result in the accretion of beach ridges (Feibel, 2001), behind which marsh deposits are accumulated in periods of lake level transgression. Layers of fragmented shells are interpreted as relicts of these storm events (Collinson et al., 2006). Large sediment loads or a rapid fall in lake level can cause lacustrine deltas to expand rapidly over finer grained prodelta deposits and in certain cases intrusive bodies of fine-grained sediments are produced, which can be redistributed by wave action (Gornitz et al., 2009).

2.2.2. Formation processes of archaeological lacustrine settlements
As the conditions above change, the transitional environment of the lake margins produces a complex pattern of sedimentation and sediment modification. Feibel (2001) identifies three types of transitions: a) the successive shifting of erosional, transport, and depositional processes b) the geologically abrupt and catastrophic effects and c) the switch from subaqueous to subaerial conditions. The above complex sedimentary processes can have an irreversible impact on the formation and preservation of the archaeological record.

The degree of the preservation of materials is very much dependent on the environmental conditions and temperature range, being unfavored by the temperate, dry conditions and benefited from humidity (Petrou et al., 2008). Therefore, the lacustrine setting would provide an ideal premise for the preservation of archaeological material. Furthermore, rapid accumulation within a high groundwater table and lack of indicators of terrestrial weathering processes, such as iron oxidation, humification, and bioturbation (Wallace, 1999, Menotti, 2012a) favours the preservation of waterlogged material. After burial, the cultural material, which is below the ground water level is subject to very slow decay and no post depositional alteration can occur under stable wet conditions.

Nevertheless, lake margins are often prone to alternating natural processes that substantially distort anthropogenic deposits (Karkanas et al., 2011). Particularly in lake raised pile-dwelling structures, the anthropogenic post depositional sediments are not
easily related to anthropogenic activities, as the materials fall in the water and are afterwards moved, sorted and graded by waves, and redistributed by erosion during regression and bioturbation in the littoral zone (Wallace, 2003:53). Furthermore, in the sites that are built on wooden platforms, the piles penetrate the underlying layers, disturbing their structure and mixing the materials.

At the same time, cold water which falls in the lake during warmer periods sinks in the bottom due to the higher density, and this process creates an overturn of water from top to bottom drifting and recycling water nutrients together with sediments containing archaeological material (Wallace, 1999). For this reason, it is also difficult to determine the sediment base on which the settlement was originally built (Wallace, 2003). For example, the relatively low density of lake marl leaves the possibility that some cultural remains might sink below the level, where they would be originally deposited. Ground level constructions found on peat are also difficult to assess due to the complexity of post-depositional formation processes. For example, the lowering of the water level may cause the gradual transformation of lake muds to peat after the deposition of archaeological material; moreover, peat is very much subject to bioturbation, and this fact may obscure the understanding of the formation processes.

Furthermore, Ismail-Meyer et al. (2013) have discussed the effect of flooding on peat stratigraphy. Peat absorbs water very rapidly in the surface layer (acrotelm) due to its loose structure and the water moves very quickly vertically and horizontally. In the lower layers (catotelm), on the other hand, the water moves slowly due to the dense structure of the organic components. Therefore, while the acrotelm is filled up, the catotelm is barely influenced by the flooding process. Subsequently the flooding wave action can erode and remove the surficial fine archaeological particles from the peat and leave an aligned and well-sorted substrate of coarser material. As an aftermath, eroded organic residues (from the ‘acrotelm’) become suspended and may subsequently be redeposited.

Morton (2004:14) suggests that archaeological sites found in shallow palludal environments would be expected to undergo significant transformation due to the morphology and vegetation types in relation to other lake margin types. Site disturbances are described to represent two types of processes: a) beach profile adjustment as a result of lake level increase redistributing sediment throughout the shore b) floodplain inundation and deposition of clastic material without changing the beach profile and therefore preserving the archaeological material in situ, especially when the rate of lake
rise is high and the burial is rapid. Rapid depositions of storm beds, or fluvially derived low-energy sediments at and around the shoreline have therefore led to the good preservation of artefacts (Mallol, 2006).

2.3. Living in the wetlands
During the course of the history, lakes, swamps, estuaries, and marshes, have been considered among the most attractive areas for settlement (Nicholas, 1998), as they offer diverse degrees of economic exploitation, merits, as well as dangers. From prehistoric times, remnants of lacustrine settlements to modern metropolitan centres, a variety of settlements demonstrate the age-old attraction of wetlands for human habitation, despite their historically bad sanitary reputation (Papayannis and Pritchard, 2011:57). In Anglo-Saxon traditions, wetlands were associated with swamp monsters, disease and death, producing strange phenomena from the local fogs to marsh fires caused by methane. The intense relationship between humans and water led therefore, to waterlands being imbued with a mystical character (Theodoulou, 2011).

The earliest mention of lacustrine dwellings is found in Herodotus related to Lake Prasias (modern lake Doirani at the borders of Greece and FYROM). He describes the types of houses as follows:

‘…Platforms supported upon tall piles stand in the middle of the lake, which are approached from the land by a single narrow bridge. At first the piles which bear up the platforms were fixed in their places by the whole body of citizens, but since that time the custom, which has prevailed about fixing them is this: They are brought from a hill called Orbelus and every man drives in three for each wife that he marries […] and this is the way in which they live. Each has his own hut, wherein he dwells, upon one of the platforms, and each has also a trap door giving access to the lake beneath; and their wont is to tie their baby children by the foot with a string to save them from rolling into the water. They feed their horses and their other beasts upon fish, which abound in the lake to such a degree that a man has only to open his trap door and to let down a basket by a rope into the water, and then to wait a very short time, when he draws it up quite full of them.’

The value of wetlands has been attributed to their resource productivity, reliability and diversity (Nicholas, 2007). People have been attracted to wetland landscapes for many reasons – for the food, for the security they offer, in terms of both places of refuge and for social or ceremonial reasons (Menotti, 2012b). It is evident however, that even in environmental terms, different types of wetlands offer diverse resources for food gathering and raw materials.
There is now a general consensus therefore, (van de Noort and O'Sullivan 2006:36-42) that not all wetlands are more productive in the sense of biomass compared to drylands, with many types of wetlands showing very low degree of biomass, such as mires and bogs, where the saturation of rainwater depletes the essential nutrients (Menotti, 2012b:104). Most autochthonous floodplain organic-rich sediments, except for bogs, can be placed on a mineral/organic range, which is controlled by protection from inorganic sedimentation and groundwater conditions, which control preservation (Brown, 1997). Marshes and swamps, on the other hand, are base rich; their muds together with decayed vegetation permit cultivation or the establishment of grassland grazing, even in times of flooding and the soils are very fertile when drained (Brown, 1997). Moreover, the mixing of base rich soils with acidic peat can create a fertile environment for grasses and plants (Coles 1984:4). Riverine floodplains and other minerogenic wetlands benefit from the deposition of nutrients brought to the ecosystem from the groundwater and floodwater; estuaries and deltas are the richest in biomass being regularly inundated. It is not a surprise therefore, that most archaeological sites related to the need for food production are found close to minerogenic wetlands and less on peatlands.

Exceptions to this observation, such as the peatlands of North Holland (9th century AD), indicate that many other than fertility factors, play significant role to the selection of dwelling areas (van de Noort, 2004). Trackways within wetlands have facilitated access to otherwise impassable areas (Coles et al., 1973, Raftery 1996, Carew et al., 2009) for people and animals to reach salt marshes or other seasonally feeding locations; the Irish Midlands bogs (Raftery, 1990) have now been associated with fowling, hunting, exploitation of turf as fuel and other domestic activities. At the same time, in the Humber Wetlands (van de Noort 2004) a dichotomy of activities has been identified and it is linked to the preference of minerogenic wetlands for dwellings and craft specialization sites; on the other hand, ritual deposits have been associated with peatlands.

2.4. The importance of wetlands as archaeological landscapes

2.4.1. Introduction

The importance of wetland sites lies in the fact that, due to their exceptional preservation, they provide evidence that cannot be seen in dry sites. Therefore they should not only be seen as a unique type of site isolated from its cultural context (van de
Noort and O'Sullivan 2006:12), but more like a source of valuable information for the understanding of adjacent drylands.

The unequivocal detailed environmental reconstructions, as well as the dendrochronology potential due the good preservation of organic material are key contributions of wetland archaeology to archaeological science (Coles 1988:3, Baillie and Brown, 2002, Billamboz, 2003). The evidence derived from the exceptional preservation sheds new light on the everyday activities and life of the occupants, the lifespan and abandonment of individual structures and the occupational space of the settlement (van de Noort and O'Sullivan 2006:90). Therefore, these clues provide aspects of the past that cannot be replicated in other environments. In this sense, research of wetlands should be used as a valuable source of information to fill our gaps of knowledge created by the loss of data due to formation processes in drylands.

2.4.2. The role of wetlands during the antiquity

Wetland archaeology has played a significant role in the understanding of the human selection strategies dating back to the origins of Homo evolution (Nicholas, 2007) and spanning both the Pleistocene and the Holocene periods. Most of the African hominin sites representative of the emergence and the earliest dispersals of Homo are found in Plio-Pleistocene deposits associated with tectonically active continental-lake margin settings (Isaac, 1997, Mallol, 2006); the most well preserved Early and Middle Pleistocene sites are those related to lake-shore sediments, with the Paleolithic sites in the Mediterranean being an example of such an association (van Andel and Runnels, 2005, Haws et al., 2010, Tourloukis and Karkanas, 2012, Kalbe et al., 2015), South America (Dillehay, 1988) and Asia (Fariz and Hatough-Bouran, 1998, Kuzmin, 1998, Winer, 2006, Yu et al., 2010, Wilkinson, 2012). Therefore, the study of archaeology and human ecology of such settings, offers the opportunity to explore the short-term patterns of human behavior, as well as longer-term responses to environmental change (Nicholas, 2007).

The Mesolithic and the Neolithic populations and settlements were largely associated with wetlands and their research has shed new light on the Mesolithic-Neolithic transition, and contributed to the understanding of the neolithization process (Menotti, 2012b). The first abundant waterlogged archaeological finds in north Europe are dated in the Mesolithic period (Menotti, 2012b :31). Most evidence comes from Scandinavia and the Baltic Sea, where, since the last Glacial Maximum, the ice retreat resulted in the formation of a
number of water basins, which attracted the first colonization and the development of various cultural groups in the region. On the North Sea, in Scandinavia and the British Isles, on the other hand, wetland sites are not as numerous as in the Baltic Sea and are very difficult to locate, as the region has been subject to flooding after the post Late Glacial Maximum sea level rise. Therefore, Mesolithic sites are nowadays submerged several meters under water in the area (Bailey, 2007). More specifically, in Britain, isostatic coastal uplift at its northern part and inundation and erosion at the south, result in the presence of coastal Mesolithic sites largely in Scotland (Warren, 2000, Young, 2000). At the south, the few submerged discovered sites give the opportunity to study the environmental changes through the reconstruction of sea-level changes (Menotti, 2012b: 37). Few inland-waterlogged sites in Britain, as Seven Estuary, (Bell, 2000, 2007, Brown, 2005) and Star Carr (Clark, 1954) constitute landmarks of archaeological research, due to their remarkable preservation of materials. In mainland Europe, the study of waterlogged Mesolithic sites has contributed to the understanding of the Mesolithic way of life (Out, 2009, Menotti 2012b: 39, DeForce et al., 2013). A notable example is that of the bog sites in Sweden (Larsson, 1998), located close to the rich in flora and fauna lakes, which, as filled by peat growth at the Neolithic, they no longer constituted attractive landscapes for the hunter-gatherers.

Climate change combined with the advancing process of neolithization, shaped adaptation patterns from the Mesolithic to the Neolithic wetland sites (Magny, 2004). One of the key values of wetlands for human societies is their agricultural potential (Gopal and Junk 2000), and their significance in the emergence of agriculture is clearly documented in key centres of domestication in many areas of the world. The deliberate selection of wetlands for settlements of agricultural use, therefore, renders the study of these sites of key importance, not only for the understanding of the introduction to agriculture, but also for the spread of farming outside the primary centres of origin. More specifically, in the Balkans it has been suggested that the Neolithic farmers moved primarily via a wetland pathway with a relatively patchy distribution, due to deliberate selection of wetland settings, rather than a linear progression from southeast to northwest, driven by population expansion. In Scandinavia, on the other hand, the lakes inhabited during the Mesolithic underwent a rapid process of infilling (Larsson, 1998, Klassen, 2005) and, because of the drying out, the functional use of wetlands was reduced. Despite the preference of drylands in northern Europe and Scandinavia, the Neolithic farmers would still be connected to wetlands, as indicated by the presence of
A unique type of wetland site recorded in the circum-Alpine region is what is described as the “lake–dwelling phenomenon” (Keller, 1866, Schfferdecker et al., 1974, Pétrequin, P., 1984, 1986, 1989a, 1989b, 1997a, 1997b, Pétrequin, A.M. and Pétrequin, P., 1988, Hafner, 2004, Marzatico, 2004, Pétrequin and Bailly, 2004, Schlichtherle, 2004, Menotti, 2001, 2002, 2003, 2004a, 2004b, 2004c, 2009, 2012a, Ruoff, 2004, Ruttkay et al., 2004, Kristiansen, 2012, Ismail-Meyer et al., 2013, Ismail-Meyer, 2014). More than 800 Neolithic pile dwelling sites have been discovered (UNESCO database http://sites.palafittes.org/map) built from around 5000BC to 500BC, on the edges of lakes: in Germany, on the lakes Constance and Federsee (Schlichtherle, 2004), in Switzerland at Hauterives – Champreveyres on Lake Neuchâtel (Schfferdecker et al., 1974, Egloff, 1979, 1980, 1984) and at Sutz-Lattrigen on Lake Biel (Hafner 2004). In the French Jura Neolithic lake dwellings have been excavated on lakes Clairvaux-les – Lacs, Chalain (Schfferdecker et al., 1974, Pétrequin, 1986, 1989a, b, 1997, Pétrequin and Bailly, 2004) and Charavines- Les Baigneurs (Bocquet and Houot, 1982, Christien and Bocquet, 1993, Tardieu, 2002). In Slovenia, a number of lacustrine and marshland prehistoric sites have been excavated in Ljubljana Marsh complex (Veluscek, 2004); in Austria research has been focused on the provinces of Upper Austria and Carinthia: on Mondsee (Lake Mond), Attersee (Lake Atter) and Traunsee (Lake Traun), and on Keutschacher See (Lake Keutschacher), a small lake south of Wörthersee (Lake Wörther). Finally in northern Italy research has been undertaken in Peschiera region, Brabbia Marsh, Mercurago and Bosisio Parini (Ruttkay et al., 2004).

The study of lake dwellings has shed new light on the neolithization of the region and single-phased, perfectly preserved and dated settlements have helped identifying settlement evolution in household level (Leuzinger, 2000, Jacomet and Brombacher, 2004, Ismail-Meyer et al., 2013, Ismail-Meyer, 2014). The exceptional conservation conditions of organic materials provided by the waterlogged sites, combined with extensive research in many fields of archaeological science, such as archaeobotany and archaeozoology, over the past decades, has provided a very detailed reconstruction of early agrarian societies.

Outside Europe, the role of wetlands is recently proved to play a major role in the emergence and evolution of early settlements. The aceramic and ceramic Neolithic site of Çatalhöyük, located within the semi-arid uplands of Anatolia (Roberts and Rosen 2009) has based major part of its economy on the surrounding wetlands. The site was found within a marshland, which flooded during spring, leading to the inundation of part of the settlement mound for up to 2 months of the year. Furthermore, the prehistoric sites in the Damascus plain were also located close to lakes or marshes. Neolithic lacustrine settlements are further recorded in Donting lake in China, (9ka BP) (Liu et al., 2011), where recent geoarchaeological research has revealed that the settlements were occasionally relocated around the lake shoreline through time, in relation to lake level fluctuations and monsoon climatic variations. Prehistoric stilt houses have been further recorded around the world, from Polynesia and Melanesia (Lapita people) (2,000 BP) (Kirch, 1989, Specht and Gosden 1997, Nunn, 2005, 2007, 2009, Nagaoka, 2011), to Vietnam (Tessitore, 1988) and the USA (ca 4,000-3,000BP) (Crook, 2007)

The formation of wetlands are thought to have played a major role in the emergence of the Sumerian civilization (Wilkinson, 2012), driven by the increased humidity at the early and the middle Holocene and combined with the rising of the sea water level, which resulted in the convergence of anastomosing rivers Tigris and Euphrates. It is suggested therefore that much of the landscape consisted in large part, not of desert or steppe, but of wetlands, and that this finding requires a comprehensive reassessment of southern
Mesopotamian resource management strategies and their role in emergent complex polities (Pournelle, 2003). Therefore, not only the early villages were located between marshlands and swamps, but the emergence of the bigger cities had its base in the exploitation of the wetlands.

2.5. Wetland sites in Greece

2.5.1. Introduction

Greek wetlands represent dynamic and continuously evolving landscapes influenced by a range of environmental, but mainly social and economic factors related to the changing demands of the society (Papayannis and Sorotou, 2007). These demands have recently led to the considerable reduction of wetland resources caused by the needs of cultivable land, electricity production from hydro-power, industry, housing and tourism, as well as protection from flooding and diseases (Kazoglou, 2011). Therefore, since the early 20th century several drainage projects were destined to create new agricultural lands (especially for the refugees from Asia Minor), ensure flood protection (Dodouras and Lyratzaki, 2012) and provide defence from the health risk of malaria. All these works led to the total disappearance of 150,000ha of wetlands. Written sources give us nowadays information on the conditions of living on these lost landscapes. For example, the lakes and swamps of Giannitsa (completely drained today) were the scene of warfare between Greeks and Bulgarians in the early twentieth century (Theodoulou, 2011). The structures in the swamps were described by Delta (1937: 48-49):

‘… These huts were built with reeds and poor quality wood, from the trees of the lake … A structure of piles driven in the bottom, in a long rectangular shape, was the foundation. Between the piles, stacked reeds and branches, resting on the bottom, but rising above the shallow waters, formed the ‘floor’. In the centre, or towards one end of the floor, other posts were raised, and around them reeds woven with thatch and rushes formed the wall of the shack. The beams […] supported a conical roof, covered also with reeds and thatch, so that the rain slides and does not inundate the interior. Where the water was deep, the ‘floor’ should be floating, that is dense and light […] and at the same time solid to support the cabin and the men […]. Around this primitive shelter, the ‘floor’ was extended […] without a roof, open from all sides, where the fishermen would sit to rest, or fish or work […]’

The pile dwellings of the beginning of the 20th century in Giannitsa, similar to the raised dwellings of the Neolithic settlement of Dispilio (Hourmouziadis, 1996) and the neighboring lakes in Northern Greece (Chrysostomou, 2012), resemble the descriptions of Herodotus for lake Prasias (Doirani) (Theodoulou, 2011) and the houses of fishermen
(pelades) at modern Messolonghi (NW Greece). The similarities of these dwelling structures are striking and reveal the everlasting selection of man to inhabit and exploit wetlands.

2.5.2. Wetlands in the ancient Greek world

The Mediterranean region has been the home of some of the oldest inhabited wetlands (Papayannis, 2011, Sorotou and Dodouras, 2011), which sustain a rich biological diversity, provide water, food, raw materials and transport for the people who live around them. Wetlands constituted an attractive feature of the Greek landscape already from the early prehistory. From the Middle Paleolithic humans are attested to camp on river banks, as in Thessaly (Runnels, 1989, Runnels and van Andel, 1993), where the permanent flow of water by Pineios River constituted an attraction to prey and therefore early hominids. Riversides, coastal marshes and estuaries were generally selected for habitation (Bintliff, 2012: 31); the abundant Middle Paleolithic sites of NW Greece are associated with terra rossa sediments, redeposited in runoff-collecting karst depressions (polje) (Runnels and van Andel 1993, 2005). The Upper Paleolithic populations of the same area, on the other hand, seem to move to linear river valleys and upland interfluves, useful places to ambush game. Furthermore, recent surface finds on the terraces of the course of the Aliakmon River yielded indications for human presence from the Lower Paleolithic (Harvati et al., 2006), although this suggestion is based on typological context without stratigraphic associations (Tourloukis and Karkanas, 2012). Middle Paleolithic sites at Grevena and Thrace (Efstratiou and Ammerman, 2004, Efstratiou et al., 2006, Efstratiou et al., 2011) are mainly distributed along watersheds. Recent research on the Middle Pleistocene record of the Aegean (Tourloukis and Karkanas 2012), has yielded that the MIS8 sea regression had a potential effect on the formation of wetlands to the major depressions of the Aegean islands. In this line of evidence, the Aegean landscape would be described as a land dotted with numerous wetlands of alternating freshwater and marine resources constituting the most ideal regime for early hominins during glacier climatic extremes.

The Mesolithic record is sparse in the Greek mainland (Runnels et al., 2005) with a patchy geographical and environmental distribution (Sordinas 1970, Sampson 1998; Panagopoulou et al., 2001, Sampson et al., 2002, Sampson et al., 2003). Recent research in the Argolid has, nonetheless, demonstrated (Runnels et al., 2005) that Mesolithic sites were preferentially associated with freshwater wetlands in coastal zones, which provided
shelter and had optimal access to plants and animals at the intersection of woodland and aquatic habitats.

In the transition to the Neolithic, the very first permanent human settlements were created near water sources. Neolithic sites have been found in lakes and riverbeds of northwestern Greece (for a more detailed description of the archaeological record in NW Greece see chapter 5); the sites in southern Greece are thought to be associated with high water table soils (Bintliff, 2012: 63). Moreover, surveys in south central Greece and Boeotia have attested the existence of farms and hamlets lining along riverbanks and their tributaries. Sherratt (1980) has demonstrated the preference of farmers in the Balkans for naturally irrigated/moist soils to facilitate hand cultivation. The preference for variable occupational habitats during the Neolithic has been discussed for Thessaly, where new evidence suggests the existence of sites in alluvial plain depressions, rather than locations above the riverbed (3-15m), as has been previously believed (van Andel et al., 1995). Furthermore, surface surveys combined with geoarchaeological work and rescue excavations are attesting the existence of numerous prehistoric sites associated with wetlands often covered by thick alluvial deposits (Besonen, 1997, Besonen et al., 2003, Efstratiou and Ammerman, 2004, Dodouras and Lyratzaki, 2012, Kourtessi-Philippakis et al., 2013); the limited number of Neolithic sites in western Greece and around the Gulf of Corinth, is attributed to the submersion of coastal zones due to tectonic activity (Fouache and Pavlopooulos, 2010)

At the Bronze Age the flourishing sites in Peloponnese are related to the existence of water springs with the characteristic example of the EBA House of the Tile in Lerna, located close to the homonymous swampy and spring lined estuary (Caskey, 1968). Further to the Late Bronze Age, the first actions of wetlands management are traced. Storm flood threats to the town of Tiryns at the 13th century BC (Zangger, 1994) attested by flash flood sediments at the Lower town of Tiryns, stimulated the construction of a large scale engineering dam work. To protect the lower town from future floods therefore, the inhabitants of Tiryns installed an artificial river diversion consisting of a dam with cyclopean masonry and a 1.5-km-long canal. Yet another massive hydraulic project of the same period has been found in Olympia (Knauss, 1998). This includes a dyke in Claudios River and a dam in Alfios River. In the basin of lake Copais in Boeotia, in central Greece, it is now evident that in the 14th century BC the Mycenaeans have built huge earthen dykes furnished with cyclopean walls and three main
canals, in order to divert the inflow from outside the lake around its periphery to the karstic sinkholes (Knauss, 2000, Showleh, 2007). This work gave the potential for cultivable land on the drained lake sediments; areas of lakebeds were also dammed to create polders. It has been furthermore believed that the site of Gla was apparently ‘the key point of the whole system”, its main function being to protect the installations by which the lake was drained (Iakovidis, 2001)

The importance of wetlands in the ancient world has been demonstrated and expressed through a number of myths, legends and traditions (Mallarach, 2011, Papayannis, 1992a). The Greek mythology constitutes a valuable source of information regarding the perception of wetlands. Artemis, the protectress of nature, animals and hunting, has been associated with the worship of Lake Stymphalia in Peloponnese. Likewise, rivers were considered gods and were protected by Poseidon, who was living in river Alfios and was the god of all wet elements; nymphs, the daughters of river gods, were goddesses of smaller rivers. Information on the hydraulic engineering works in mainland Greece has survived in the mythic folklore in the legend of the hero Heracles (Koutsoyiannis and Angelakis, 2004). The myth of Heracles fighting against Acheleos indicates the struggle of the early Greeks against the destructive power of floods. According to Diodoros Siculus (IV 35) and the geographer Strabo (X 458–459), the meaning of the victory is correlated to the channel excavation and the construction of dikes to confine the shifting bed of Acheleos. Other labors of Heracles, such as those of the Lernaean Hydra and the Augean stables, also symbolize hydraulic works. Lernaean Hydra was a legendary creature in the form of a water snake with nine heads that lived in the Lerna swamp near Argos. Lernaean Hydra possibly symbolizes the karstic springs of the area or the Lerna swamp itself, and its annihilation by Heracles has been interpreted as the drying up of the swamp.

2.6 Conclusions
Wetland archaeological resources have been vulnerable to a wide range of pressures (Dyson et al., 2006:4), including both natural processes and human activity. The dynamic character of these lands has been subject to episodes of natural destruction including erosive events and storms, but also burying of the sites by abrupt depositional events, which render the visibility of archaeological deposits very low. On the other hand, human activity including the increasing development in and around the coastal zone associated with industry, tourism and regeneration poses a strong barrier on the preservation of wetland archaeological sites; changes in hydrology can result in the
desiccation of deposits containing organic and environmental material. Understanding the process of accumulation and burial of archaeological materials requires a detailed understanding of the depositional history of the site.