Prehispanic Water Management at Takalik Abaj, Guatemala

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Prehispanic Water Management at Takalik Abaj, Guatemala

by

Alicia E. Alfaro

A thesis submitted in partial fulfillment of the requirements for the degree of
Master of Arts
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ABSTRACT

Land and water use at archaeological sites is a growing field of study within Mesoamerican archaeology. In Mesoamerica, similar to elsewhere in the world, landscapes were settled based partially upon the characteristics of the environment and the types of food and water resources available. Across Mesoamerica, landscape concepts were also important to religious beliefs and ritual activity in a manner that may have had the potential to influence the power dynamics of a site. This thesis focuses on the management of water at the site of Takalik Abaj in Guatemala during the Middle to Late Preclassic periods (c. 1000 B.C. – A.D. 250) in order to analyze potential ritual and political functions of the water management system. Using spatial data within GIS, this thesis examines the flow of water across the site as directed by its topographical features. The archaeological record of Takalik Abaj and comparisons to water management systems at other Mesoamerican sites are also used to investigate the functions of the water management system. Thesis findings suggest that the water management system of Takalik Abaj was multi-faceted and that ritual functions tied to the control of water may have contributed to the identities and power of the elite.
CHAPTER 1:
INTRODUCTION

Water is the resource that makes life on Earth possible. Yet, in the history of Mesoamerican archaeology, water has been relatively less studied than other aspects of ancient societies. The connection between humans and their environments is deserving of serious attention because natural resources, such as water, shape all other areas of life. The role of water in ancient Mesoamerican sites varied according to the physical environment, the needs of the people, the social organization at the site, and the cultural beliefs of the area. All of these factors influenced the management of this resource and the ways in which cities were built to incorporate water. Prehispanic people constructed several water management features, such as canals, drains, aqueducts, pools, and reservoirs, to provide potable sources of water, irrigate crops, drain the landscape, and conduct rituals.

Mesoamerica is a culture area that includes parts of Mexico, Belize, Guatemala, El Salvador, and Honduras and is marked by cultural traits such as similar ideological beliefs and the consumption of maize (Clark et al. 2010:3-4). Complex stratified societies developed in Mesoamerica, beginning with the Olmec culture of the Southern Gulf Coast lowlands of Mexico, which has been defined by traits such as artistic style, settlement plans, architecture, and ritual activities (Coe 1968:54; Cyphers 1997:255; Grove 1997:55; Heizer 1967:23-24). The Olmec culture developed during the Preclassic Period,
beginning c. 1200 B.C. with the establishment of the site of San Lorenzo (Coe 1968:75; Cyphers 1982:382; Cyphers et al. 2006:17). Maya culture also began gradually developing during the Preclassic period (c. 2000 B.C. – A.D. 250), with the most significant developments occurring in the latter half of this time span (Sharer and Traxler 2005:178). Figure 1 features some Preclassic sites of Mexico and Guatemala.

![Figure 1](image_url)

**Figure 1** Some Preclassic sites of Mexico and Guatemala (photo courtesy of Alliance for Integrated Spatial Technologies, University of South Florida, ©2011).

The management or control of water has been argued as a factor leading to the political success of ancient Mesoamerican rulers because of its value to the livelihood of societies and the supernatural qualities of water (Fash 2010:81-82; Lucero 2006). Researchers argue that one of the central roles of Mesoamerican rulers was to provide a balance between the supernatural and natural worlds through communication with
ancestors via rituals often involving the underwater underworld, with the goal of securing rain and agricultural fertility (Cyphers 1999:164-165; Grove 1968:486-487; Guernsey 2002:66; Love and Guernsey 2007:926-928; Reilly 1994:129-130). The research carried out for this thesis serves to investigate how water flowed across the Guatemalan site of Takalik Abaj during the Middle to Late Preclassic periods (c. 1000 B.C. – A.D. 250), a time in which significant modifications to the landscape were made to influence the flow of water at the site (Popenoe de Hatch and Schieber de Lavarreda 2001:990-991). From this information, the potential influences of water management upon the political dynamics at the site are discussed.

Political dynamics include any factors that may have influenced the balance of power within the polity, such as economic factors that may have been affected by the use of water and the possible importance of water within spiritual beliefs. Rituals and the economy have impacts upon the statuses of individuals and the ability to lead a society, so the role water may have played within influencing these variables is relevant to a study of political power. The flow of water informs upon water use, and the surrounding contexts can be suggestive of the meaning behind the use of water.

Takalik Abaj flourished during the Middle to Late Preclassic period and is one of the many Mesoamerican sites with numerous human-made water features and a close relationship to its natural water resources of rivers and springs (Crasborn and Marroquin 2006:45). Takalik Abaj is located in the municipality of El Asintal in the Retalhuleu department of Guatemala about 190km from Guatemala City (Graham et al. 1978:88; Jacobo 1999:548; Figure 2). It is a water-rich site that receives approximately 3,284 mm of rain annually (Rizzo de Robles 1991:33). Takalik Abaj is located on the piedmont,
foothills, of the Sierra Madre range of volcanoes near the southwestern Pacific Coast of Guatemala (Dawson and Smith 1992:321; Love 2007:277; Schieber de Lavarreda 1991:8). The area of the site consists of nine terraces, running south to north, which have increasing elevations as they approach the mountains to the north (Schieber de Lavarreda 1991:8).

![Figure 2 Location of Takalik Abaj and its neighboring sites (Love 2007:276).](image)

The human-made water features and other landscape modifications at the site primarily functioned to drain the landscape, prevent erosion, and conduct potable water to residential areas (Marroquín 2005:955). However, it has been suggested that these architectural features at Takalik Abaj may have also been used to ritually manage water (Marroquín 2005:955; Love 2007:294). Marroquín (2005:956) suggests that ritual functions are implied in the human-made water features at Takalik Abaj because some of the canals are associated with a ceremonial space of the site known as “El Escondite.”
During the Late Preclassic (c. 300 B.C. – A.D. 250), the inhabitants of Takalik Abaj constructed a center of water distribution made up of six canals in this space (Marroquín 2005:956). To meet their needs, the people of Takalik Abaj constructed a total of 25 canals, nine terraces, and other architectural features, that altered their landscape and thus the distribution and flow of water at the site (Marroquín 2005:956; Schieber de Lavarreda 1991:8; Figure 3).

This thesis investigates the built environment of Takalik Abaj using a geographic information system (GIS), digital elevation models (DEM), and other remote sensing technologies, such as mapping-grade global positioning systems (GPS). The data used in this thesis were supplied by the Alliance for Integrated Spatial Technologies (AIST), directed by Drs. Lori Collins and Travis Doering. DEM data from the National Elevation Datasets (NED) of the Shuttle Radar Topography Mission (SRTM) made available by the United States Geological Survey (USGS) provide information on the elevations of various areas of the site (Doering and Collins 2011). These data were analyzed within GIS to reveal changes in slope throughout the site that are evaluated to create an interpretation of how water may have flowed across the site. The distribution of water features combined with the topographical features of the landscape, including slope, elevation, and the characteristics of landforms, are evaluated together to interpret water flow to imagine the ancient environment in a three-dimensional fashion that allows a better understanding of the functions of the water management system.
Figure 3 Site map of Takalik Abaj (Graham et al. 1978).
The flow of water itself cannot predict the social influence of water and water use within a society because the architecture of a water management system represents a part of a whole. In the same manner that a site cannot be fully understood without taking the use of land into consideration, a system put in place to control water cannot be understood unless the cultural context of the rest of the site is considered within the analysis of the water management system. To evaluate the potential importance of the role of water within the society of Takalik Abaj, the flow of water and the traits of the water management system must be interpreted along with evidence suggesting the functions of areas that are affected by water control.

The GPS survey along with topographic and cartographic data previously gathered by Doering and Collins (2011), Marroquín (2005), and Graham et al. (1978) assist in the interpretation of the water management systems and the flow of water at the site by providing the locations of known canal features, structures, and springs. Historical maps of the site and aerial photos allow the water features and the characteristics of the terrain to be analyzed in relation to the structures of the site. The functions of structures, which can be deduced from the types of artifacts and the sculptures found around them, can help establish the function and meaning of the water management system of the site. The integration of water features into the site plan and the subsequent flow of water influenced by these features may inform upon the role of water in society, including ritual functions, when they are analyzed in terms of the cultural surroundings indicated by the architecture and other material cultural of the site.

The analysis of water flow and the relationships between water features and other parts of Takalik Abaj that this paper presents is informed by research on water
management that has been undertaken at other Mesoamerican sites. Several Preclassic Mesoamerican sites demonstrate examples in which religious, monumental, and elite architecture are located in association with water features in a manner that has been interpreted as being influential to culture, especially ritual activity and the acquisition and sustainment of political power. Discussions of previous water research within San Lorenzo, La Venta, La Blanca, Kaminaljuyú, and Cerros illustrate the variety within Preclassic Mesoamerican water management techniques while also showing arguments that describe how water can further the goals of rulers (Coe 1967; Coe 1968; Cyphers et al. 2006; Diehl 1981; Heizer 1976; Love and Guernsey 2007; Love 2009; Reilly 1994; Scarborough 1983; Valdés 2006). The research on these Preclassic sites provides examples of the role of water in Mesoamerican cultures and of the way archaeologists have studied water. This information can be used to draw comparisons to the patterns of water use within Takalik Abaj.

This thesis also discusses Classic period water management strategies at the sites of Palenque, Copán, and Tikal to further understand the ways in which archaeologists have investigated water management within Mesoamerica (Davis-Salazar 2003, 2006; Fash 2010; Fash and Davis-Salazar 2006; French et al. 2006; French and Duffy 2010; Scarborough 1998; Scarborough and Gallopin 1991; Stuart 2010). These sites, while not contemporaneous with Takalik Abaj, have the ability to provide models by which investigations of water management may be carried out. Analysis of water management that considers the ways in which water and its management can influence not just the livelihoods of ancient people, but also the cultural and political environment of society will reveal additional detail to Takalik Abaj’s history.
There are many ways in which water can be managed to affect the sociopolitical organization of a site. For this thesis, the two most important facets of water control to be considered when investigating the effects of water management on political control are the utilitarian and ritual control of water. Drinking, washing, cooking, and irrigating crops are examples of utilitarian uses of water that can be affected by the placement, use, and control of water features (Scarborough 2007:164). Control over the ritual aspects of water is implied when water resources are entrenched within the ceremonial centers of a polity, especially when there is iconographic evidence to support the sacredness of water and when ritual artifacts are found in association with water features or with sculptures displaying water-related themes (Reilly 1994; Scarborough 1998:139-141; Scarborough and Gallopin 1991:659-660).

If the control of water played a role in the success of the ruling elite, I would expect to find a site layout that incorporated water in a centralized and organized way (Scarborough 2007:164; Scarborough and Gallopin 1991:659). In such a centralized layout, I would expect water features—such as springs, canals, and steam baths—to be located in close proximity to structures that are considered to be elite, ceremonial, and monumental in scale (Scarborough 1998:139-141; Scarborough and Gallopin 1991:659-660). The use of water management features as a political tool for the ruling elite is implied if these conditions exist because it is logistically more difficult to control water and water features if they are dispersed across the landscape, or equally available to all social classes, from the lowest to the highest (Scarborough 1983; Scarborough 2007:164). An association of water with civic-ceremonial areas also represents an investment that shows the values and priorities of the leaders and the decision-makers of communities
who plan the locations, materials used, and the maintenance costs of all architectural features within presumably state-maintained civic-ceremonial areas (Davis-Salazar 2006:131).

With greater access to water resources, the ruling class may have also enjoyed privileges over the sacred qualities of water. Water features, both natural and human-made, have been associated with ceremonial and elite architecture at other Mesoamerican sites in a ritual context (French et al. 2006:149; Valdés 2006). One such site is the Preclassic Guatemalan site of Kaminaljuyú, which is a locale related closely to Takalik Abaj, both temporally and spatially (Valdés 2006). At this site, Lake Miraflores, described as being “the heart of the city” both literally and spiritually, is surrounded by elite residential structures and ritual offerings (Valdés 2006:71). In this instance, the source of water serves as the hub for both elite and ritual activity. As the central residents around the lake, the elites may have sponsored or led the ritual activity occurring in the vicinity (Valdés 2006:70-72). If Takalik Abaj shows no association between water features and the elite, ceremonial, and monumental structures of the site or demonstrates a dispersed pattern, then it is likely that access to water resources was not restricted and that rulers did not have a strong control of them for either their daily needs nor for ritual (Scarborough 1983:736-737; Scarborough and Robertson 1986:171).

If the ritual control of water was key to successfully wielding political power, I would expect to find ritual artifacts, stone monuments, and other art forms displaying water-related iconography to be located near elite, civic, and ceremonial structures as well as natural and human-made water features (French et al 2006:149-151; Love and Guernsey 2007; Reilly 1994). I would also expect to find illustrations of rulers on
monuments emphasizing the connection of the elite to water or water control (Love and Guernsey 2007:926-928; Fash 2010:81-82). Monumental stone sculptures are important to this discussion because they were commissioned by the elites of society and have been used across Mesoamerica to express the dominance of elites and their connections to the supernatural realm in ways that influence the worldview of the rest of the population (Clark 2007:28; Grove 1968; Guernsey 2006:4-6; Reilly 1991). Previous research findings inform the central research question of this thesis: Does the management of water at Takalik Abaj, expressed through the flow of water, indicate a relationship with monuments, architecture, and material culture in a manner that may have influenced the sociopolitical organization of the site?

According to Bender (1998), the concept of separating culture and nature is a unique worldview that is not shared universally among cultures through time and space. What is conceived of as “nature” or the “environment” is often influenced by people in meaningful ways to serve their various needs. The characteristics of the landscape of Takalik Abaj may have been key for water management and city planning in not only a utilitarian sense, but also a cultural and spiritual sense. When considering power relations at polities within ancient Mesoamerica, the ritual connotations of water are just as critical as the functional aspects because ritual activities were commonly some of the prominent duties of rulers (Reilly 1989:5; Schele and Miller 1986). Takalik Abaj is a prime candidate for water management studies of the type suggested here because it is a site with known natural and human-constructed water features, an altered landscape, and a vast sculptural corpus by which the ideology of the manufacturers can be inferred to help
enlighten the motivations behind land use. Control and use of land and water has the potential to affect the daily lives of people, at all levels of society.

The Organization of the Thesis

This thesis is divided into eight chapters. In Chapter 2 I will focus on the theoretical framework of this thesis. Chapter 2 lays out models of landscape archaeology that are relevant to this work, examining the variety of ways in which archaeologists have incorporated the environment into their analyses of ancient civilizations. Chapter 2 also touches upon how natural resources can influence the religious beliefs and the distribution of political power of a society. In Chapter 3 I will discuss research on water that has been done at other Mesoamerican sites to illustrate how water research can be done at Takalik Abaj. Chapter 4 explores the historical background of Takalik Abaj, including its environmental setting and the previous research that has been conducted at the site. In Chapter 5 I focus on the research methods using data obtained by remote-sensing technologies within GIS. Within Chapter 6, I present the results obtained from the study, using the methods described in Chapter 5. The spatial relationships that have been uncovered between the water management system and the rest of the site will be explained in Chapter 7. In Chapter 7 I also elaborate upon the archaeological contexts of the site that are relevant to the use of water. Chapter 8 summarizes the findings of the research, describes the ways in which the research done at Takalik Abaj will have applied aspects, and provides suggestions for future research.
CHAPTER 2:
THEORETICAL FRAMEWORK

The analysis of the role of water management in the political dynamics of an area involves an examination of the ways in which water has been interpreted as a part of the environment and as a part of the worldviews of both the archaeologists conducting research and of the cultures of interest. An archaeologist’s conception of how the environment fits into culture will reflect his or her biases and will influence both the methodology behind the research done and the results achieved. In order to avoid losing sight of the critical influence of theoretical approaches in research, this chapter is devoted itself to the exploration of the development of archaeological thought in regards to how the environment has been studied as well as research that has been done on Mesoamerican-specific worldviews of the environment. A general discussion of how water and its management are believed to have been influential to political power in Mesoamerica will be presented to demonstrate the most critical elements to consider in studies at Takalik Abaj.

*Integrating Environments and Cultures*

In general, the environment has been important to archaeology almost since the field’s infancy. All data obtained by archaeologists have a spatial significance and all cultures developed within particular environmental constraints. Considerations of the environment in archaeological contexts extend as far back as the mid-19th century with
scholars such as the Danish geologist, Johannes Japetus Streenstrup, who associated cultural evolution with environmental history (Trigger 2006:130-131). Ideas on how environments or “landscapes” should be studied have changed considerably through the three largest theoretical movements within archaeology—the cultural-historical approach, the processual approach, and the post-processual approach (Trigger 2006).

The first major movement in archaeology, known as the culture-historical approach, emerged during the late 19th century and the early 20th century as archaeology was becoming established as its own legitimate area of study in many areas of the world (Trigger 2006:211-213). This approach did not emphasize the relationship between humans and their environments, which may be why the general initial conceptualizations of ancient landscapes tended to present a strict dichotomy between natural environments and their associated cultural spheres. During this era dominated by the culture-historical approach, the relationship between nature and culture appeared asymmetrical with the environment frequently governing cultural factors in a way that would be later criticized as being environmentally deterministic (Anschuetz et al. 2001:168; Crumley 2007:20).

Early functional-processual archaeologists tended to consider the relationship between cultures and their environments as one centered on the adaptation of people to their environments, in which the environment both provided resources and was a structuring force of culture (Trigger 2006:315). By developing cultural ecology, which stressed that humans were a part of their ecosystems, Julian Steward, in particular, was influential in the ways in which archaeologists would examine the role of the environment in cultures (Steward 1949; Trigger 2006:372-373). Steward (1955) developed the concept of multilinear evolution, which suggests that environments limited
the ways in which cultures could develop and implied that societies with similar environments were more likely to develop similar cultures. Ecological anthropology has been linked to the development of settlement pattern research that flourished in the late 1940s and the early 1950s (Anschuetz et al. 2001:168). At this time, archaeologists became more concerned with the spatial relationships of material culture, which differed significantly with the way culture-historical archaeologists focused on stylistic features and typologies of artifacts (McKern 1939:312).

As processual archaeology developed and became more dominant in the latter half of the 20th century, archaeologists began to emphasize the scientific study of the relationship between humans and their environments, especially in regards to the role of the environment in the economy and in cultural evolution (Ashmore 2004:260; Shanks and Tilley 1987:31). Advancements in technology, such as radiocarbon dating and computer technology, significantly contributed to the development of processual archaeology and contributed its “scientific” image because these techniques were also used in the “hard sciences.” The views of processual archaeologists on the whole in regards to environments, considered landscapes primarily for their materialistic qualities and for the roles they played within the systems of culture (Flannery and Marcus 1993:35; Flannery 1968).

Lewis Binford, the leading advocate of processual archaeology, explicitly advocates for a scientific archaeology and stresses the systematic nature of cultural phenomena by claiming that an understanding of the system will lead to “general laws of cultural variability” (Binford 1962; Binford 1967:10). He suggested that the stresses caused by ecological factors were pivotal to inciting cultural change (Trigger 2006:395).
Within this frame of mind, cultures and their environments were made to appear to be seamless, well-functioning machines, largely devoid of conflict and individual agents. As function characteristically is featured in processual approaches, the functional relationship between humans and their environment was stressed in processual studies of landscape.

Although landscapes have both physical and environmental qualities as well as cultural, meaning-laden qualities, the movements in the history of anthropological theory described above have suggested that the term “landscape” is synonymous with the “natural environment,” and that culture is distinct from nature (Anschuetz 2001:158; Bender 1998:25). In other words, the physiological needs of people were given precedence over the ways in which peoples’ interpretations of their surroundings could affect their use of the land.

Postprocessual archaeology, which developed in the 1970s and 1980s, significantly altered views on landscapes, by focusing on landscapes as social constructs (Knapp and Ashmore 1999; Trigger 2006:444). In doing so, landscapes became humanized and aspects of culture became naturalized (Ashmore 2004:260-261). The individual as an active participant of culture and the concept that material culture is meaningfully produced are two cornerstones of postprocessual perspectives that feature predominantly in postprocessual landscape approaches (Hodder 1985:1-3). Peoples’ belief systems and their identities began to be considered as pivotal to the ways in which people organized their spaces, used their resources, and incorporated the environment into their rituals.
Postprocessual archaeologists advocated the idea that landscapes could be interpreted in many different ways at the same time and that there were different types of spaces, such as gendered spaces (Deagan 1996:149). The implication that men, women, and other genders could use space in different ways differs considerably from systems approaches, because it emphasizes diversity within a group rather than unity. In addition to considering the role of individuals in society, postprocessual archaeologists also re-interpreted the meaning of “landscapes.”

According to Ashmore (2004:256), “human involvement is what distinguishes landscape from environment.” Tilley (1994:9) asserts that previous views represent landscapes as passive entities in which activities occurred. In this way, landscapes were removed from agency and meaning. More expressively, he criticizes archaeologists for viewing landscape as containers that existed “indifferent to human affairs” (Tilley 1994:9). Bender (1998:25-34) argues that people constantly reinterpret their ideas of the landscape, suggesting that landscapes are relative and that consideration of peoples’ varied perceptions is key to understanding the landscapes of the past. Her analysis demonstrates how landscapes are more than physical environments because they are also concepts that are actively developed by every individual living within them. Implied is the idea that landscapes are ever changing and nuanced.

Postprocessual perspectives also moved away from considering landscapes strictly for their functional purposes, but also for the ways in which they are associated with religious and other beliefs. Flannery and Marcus (1993:38) argue that cosmological beliefs can considerably influence subsistence strategies and settlement patterns. Using the ancient Greek as an example, Flannery and Marcus claim that the ancient Greek
belief that trees had souls and were the homes of supernatural creatures was reflected in the ways in which harvesting of timber was restricted (Hughes 1983; Flannery and Marcus 1993:38). Despite these beliefs, palynological evidence supports the grand clearance of land in Greece for use as pasture by the second millennium B.C. (Halstead 1996:33). Greece, like other ancient societies, grew in population and developed new subsistence strategies over time, which likely would have shifted their values (Runnels and van Andel 1987:147).

While beliefs may play a role in the ways in which land is used, changes in society over time, including changes in the demands for land, can re-shape concepts of the land. Land can be seen as similar to other types of material culture, in a dialectical relationship with humans. According to McGuire (1992:94), a dialectical view of society is one in which the “world is inherently dynamic and conflictual” with all its parts “forever in flux.” Land is changed physically as people grow and expand their populations and develop new lifestyles, but it is also re-interpreted by individuals over time depending on social and historical contexts as well as the events of the lives of individuals.

While postprocessual archaeologists criticized processual archaeologists for being too focused on the material aspects of culture and for ignoring meaning and the individual, processual archaeologists criticized postprocessual archaeologists for veering too far in the opposite direction (Hodder 1985:2). Arguably the harshest criticism of postprocessual perspectives is that their interpretations use analogies as explanatory tools without enough evidence to support them. In the words of Fleming (2006:276), postprocessual landscape archaeologists became “hyper-interpretive” in response to their
beliefs that processual archaeologists were over-empirical. Anschuetz et al. (2001) claim that the potential for being too interpretive is especially high where ritual landscapes are considered. The concept of ritual landscapes suggests that places are associated with traditional knowledge and are thought to be full of history, knowledge, and power that can structure activities and relationships (Anschuetz et al. 2001:178). Comprehensive, testable results can be achieved in ritual landscape studies when cosmological or traditional knowledge is applied to probabilistic assessments of the spatial patterns of ritual features (Anschuetz et al. 2001:178). In ancient societies in which written records, iconographic evidence, ritual material culture, and ethnographic information exist, the interpretation of ancient worldviews is more viable.

Throughout the theoretical movements within the discipline, ideas of how landscapes could be interpreted in archaeological contexts have changed significantly. From being considered very little in cultural-historical approaches, the environment became an important structuring force of culture in processual perspectives. Then, in response to the materialist and systems approaches taken by processual archaeologists, postprocessual archaeologists applied concepts of agency and meaning to their landscape approaches. Anschuetz et al. (2001:175) suggest that the concerns emphasized by processual and postprocessual archaeologists can both be addressed in landscape archaeology.

The study of how water and its management can influence the political dynamics of a society is one area in which both processual and postprocessual ideas can be simultaneously applied. The political climate of a society is tied to both the use and control of water as a resource and to the cosmological beliefs surrounding water. The
goal of this research is to acknowledge the ecological and economic aspects of water management, while also incorporating the religious and cultural meanings of this resource to the question of how water influenced power relations.

*Mesoamerican Worldviews of the Environment*

While ideologies are not concrete things that can be measured in the same way that sherds or dietary remains can be measured, traces of meaningful beliefs were left upon various types of material culture in ancient societies. It is from this material culture that ideas of ancient Mesoamerican worldviews have been interpreted. Iconography found on sculptures and other forms of ancient art are believed to reflect ideology (Guernsey 2006:16; Popenoe de Hatch 2006:39). The organization of site plans, the distribution of ritual artifacts, and messages left behind in written records are also argued to be reflective of the type ideologies held in a society (Ashmore 1991; Guernsey 2002:66). Archaeological, iconographic, epigraphic, and ethnographic evidence is compiled together to increase understanding of the ways in which ancient Mesoamerican societies viewed their environments, including their water sources.

The consideration of the worldviews of ancient societies is necessary in archaeological studies because other aspects of ancient life existed within the contexts of belief systems. Actions are influenced by beliefs. According to Bassie-Sweet (2008:53), the worldviews of ancient Mesoamerican people explained the origin of life, provided a model for how the world should be organized, and also explained how the world could be maintained and renewed to ensure the prosperity and future survival of the world and the people living within it. Within Mesoamerican worldviews, supernatural and natural spaces were linked to each other. The landscape was alive and sacred, with certain
aspects of it being embodied with greater symbolic value than others (Schele and Freidel 1990:67).

When considering the worldviews of the people that settled Takalik Abaj, it may be helpful to draw upon Preclassic worldviews, such as those of the Olmec, because Takalik Abaj was a polity that flourished during the Preclassic period. According to Reilly (1994:129), the Olmec worldview separated the cosmos into multiple levels that were each ruled by animals that corresponded to the environmental traits of each realm. Raptorial birds represented the celestial realm, humans (especially rulers) and jaguars reigned over the terrestrial realm, and fish, amphibians, crocodiles, and sharks represented the watery realm of the underworld (Reilly 1991:161-162; Reilly 1994:129).

These ideas and animals were often featured in various artistic forms, such as the sculptures and the architectural features of ancient Olmec cities. The human form was a common theme in Olmec sculptural art, frequently portrayed as more than a representation of the human body, but also as a metaphor for cosmological and supernatural principles. The Olmec believed that the cosmos, which was often symbolized by a motif of four dots aligned symmetrically around a vertical bar, could be symbolized by the human body (Taube 2004:13).

One example of this phenomenon is found on the Middle Preclassic green stone sculpture known as “Slim” that features symmetrical illustrations of the different realms and the animals corresponding to them on different body parts of his body (Reilly 1991:152-163). In the case of Slim, his head has elements of the raptorial birds of the celestial realm, his arms and torso feature elements of ritual and human sacrifice that are associated with the terrestrial realm, and his lower body has designs of watery creatures
associated with the underworld (Reilly 1991:152-163). Slim has been interpreted as being an elite personage because of his adornments and his participation in ritual activity (Reilly 1991:152). Thus, the significance of his body symbolizing the different parts of the cosmos may have been to emphasize the role of the elite in unifying the natural and supernatural worlds. Slim represents the elite’s status and role in ritual activity as something so vital that the image of the elite becomes synonymous with the universe. Sculptures demonstrating these types of concepts have the potential to represent nobility positively, which is a likely reason for their production.

Within Olmec art, human beings were also frequently depicted as half-animal or with features of animals. Feline features, typically modeled after jaguars, in particular, were common within these artistic representations of animal-human hybrids. Perhaps due in part to its status as a dominant predator and the ruler of the terrestrial realm, the jaguar was connected to the powers of rulership, especially shamanistic powers (Taube 2004:64). The transformation of a human to a jaguar was common in Olmec art, both in monumental sculptures and in portable figurines (Guernsey 2006:81-82; Figure 4). The ability of an elite to use his shamanistic abilities to become a jaguar not only symbolized his jaguar-like superiority and his power over the earthly domain, but also his ability to travel into the underworld and communicate with both deities and sacred ancestors.
Figure 4 Middle Preclassic figurine of the human-to-jaguar transformation pose (Taube 2004:59).

Among the Olmec, the jaguar had an association with the underworld because it was known to dwell in caves and to have a penchant for swimming (Heizer 1967:21; Reilly 1994:129). Caves, as well as the surfaces of water, were believed to have been portals to the underworld across Mesoamerica, including among Preclassic populations like the Olmec (Cyphers et al. 2006:27; Reilly 1994:129-130). Several Olmec sculptures illustrate the special relationship between the ruling elite, sacred ancestors, and caves. Monument 14 at the Olmec site of San Lorenzo (1200 – 900 B.C.) shows what is
interpreted as a sacred ancestor emerging from a cave-niche portal to the underworld (Cyphers et al. 2006:17-20; Figure 5). Altar 4, located at La Venta (800 – 400 B.C.), similarly depicts a ruler emerging from a jaguar maw that is believed to also symbolize a cave entrance to the underworld (Cyphers et al. 2006:18; Reilly 1990:14-15; Figure 5).

Figure 5 San Lorenzo Monument 14 (Top), 3D model of La Venta Altar 4 (bottom) (photos courtesy of Alliance for Integrated Spatial Technologies, University of South Florida, ©2011).
The supernatural characteristics of caves contributed to the significance of mountains as well. On their own, mountains were spiritually valued to the Olmec because they were dominant features of the terrestrial realm, but also because their towering peaks reached the celestial sphere and they contained caves that led to the underworld (Cyphers et al. 2006:20; Taube 2004:34). Mountains were towering, sacred symbols that united the cosmos due in part to the cave-portals within them. Conceivably because the jaguar found its home in these sacred features of the landscape, the jaguar could harness their power to travel between worlds, which endowed the animal with increased ritual and political significance. Whether through the sacred landscape or the animals associated with it, the natural aspects of the world were ritually significant within Preclassic Mesoamerican worldviews.

Caves and mountains served as important locales for rituals, especially those related to water and vegetative fertility. Caves carried watery connotations due to their status as portals to the underworld, but they were also connected to water because caves were believed to have been sources of rain and mist among the Olmec (Cyphers et al. 2006:20). In the same manner that these points on the earth gave jaguars special powers, they also channeled enhanced spiritual energy into ritual activity. These beliefs surrounding caves and mountains can be inferred from the artwork produced during the Preclassic period. At the Middle Preclassic site of Chalcatzingo in Morales, Mexico, Monument 1, which is one of the site’s most recognized Olmec rock carving, illustrates the type of imagery associated with water rituals that also features both caves and mountains (Grove 1968:486-487; see Figure 9).
This carving, commonly referred to as “El Rey,” portrays a figure wearing an elaborate headdress that is seated within a half-quatrefoil symbol that has been interpreted as a personified cave and an entrance to the underworld (Grove 1968:486-487; Reilly 1991:164-165). Clouds, mist, rain, and vegetative symbols surround the cave, or earth monster, suggesting a strong connection between the ritual occurring within the cave and the abundance of water and, consequently, agricultural fertility (Love and Guernsey 2007:926-928). One explanation of this carving is that the seated figure was intended to have been interpreted as a ruler, whose participation in the cave ritual was essential to the prosperity of the community because his communication with the spirit world induced the fall of the rains that ensured the productivity of the land (Love and Guernsey 2007:926-928).

“El Rey” suggests a worldview in which land and water were spiritually interrelated. The power of the mountain and cave was employed by humankind to communicate with sacred ancestors and deities with the goal of receiving the blessing of rain. This rain, in turn, nourished the land that would sustain the humans to allow them to repeat the process. Within Preclassic Olmec worldviews, characteristics of sacred land and water symbols were frequently amalgamated to emphasize the sacred unified relationship between these different elements of the environment. The jaguar, as described above, was chiefly a symbol of the earth, but also had associations with the underworld. Just as the jaguar was closely connected the underworld and its watery elements, creatures that are predominantly of the underworld domain were associated with the earth and vegetation.
The concept of a “mawlike entrance” to the underworld, which has been briefly alluded to, originated with the Olmec (Reilly 1994:125). This entrance represented a bridge between land and water as well as life and death, so it is fitting that the jaws chosen to represent this portal belonged to creatures that can traverse through both land and water. As previously mentioned, the maw of a jaguar was sometimes used to represent this underworld portal. The aquatic counterpart of the jaguar – the crocodile – was also envisioned as having jaws that represented the otherworldly gateway (Reilly 1994:130). The crocodile was one of the creatures of the underworld that shared many parallels with the jaguar and a significant sacred status among the Olmec. The maw of the crocodile may have assumed a role as the portal to the underworld because, like the jaguar, this animal was a dominant predator with the ability to transition between land and watery environs.

As a ruler of the underworld, the watery aspects of crocodiles were emphasized within Olmec sculpture and art, but allusions to the animal’s associations with the earth and vegetative health were also prominent. Sacred watery connotations were attached to the crocodile, not only because this reptile inhabits many freshwater bodies of water, but also because of the animal’s behavior in nature. Reilly (1991:162) describes several traits observed in the crocodile in its natural habitat that may have inspired its association with water and rain, such as the thunder-like bellow of the male crocodile and the splashes crocodiles are known to make in the water, which Reilly describes as “water dancing” (see also Stocker et al. 1980:748). Stocker et al. (1980:748) suggest that the reptile’s tendency to remain almost entirely submerged at the edge of a watery surface before a swift attack is evocative of the underworld because of the suddenness with which the
predator strikes its land-dwelling prey from unseen, presumably, otherworldly depths. The crocodile floating discretely in the water, sometimes just barely within perception, provides a suitable symbol for the transitory passage between life and death because it is at the edge of the underworld, which is symbolized by the still water it inhabits. The underworld symbolism is enhanced when the crocodile drags its prey underneath the water to be drowned and devoured in its jaws, bringing death and transporting its victim to the other side (Stocker et al. 1980:748). The surprise and terror provoked from such abrupt attacks may have also contributed to the crocodile’s status as an underworld symbol.

While water was associated with the unknown, death, and the underworld in the Olmec worldview, it was also connected significantly with life. Large bodies of water, especially, were viewed as portals to the underworld, but water taking the form of rain was more liable to be associated with life. The observed natural traits of the crocodile imbued the reptile with a symbolic and supernatural dominance over water that extended over both the underworld properties of water and over the power to make rain. The association of the crocodile with thunder and making rain, via behaviors such as water dancing, contributed to the animal’s connection to the fertility of the earth because rain ensures the productivity of the soils and the growth of life. Vegetative motifs illustrated on the ridges of the backs of crocodiles, as if the scales of the crocodile represented the earth, support the idea that crocodiles contained earthly powers in addition to watery ones (Stocker et al. 1980:753). Other Preclassic sites outside of the Olmec heartland also illustrated the crocodile as an important symbol of fertility. Stela 25 at the site of Izapa
depicts a crocodile whose lower body forms a tree (Stocker et al. 1980:745; Stross 1994:33; Figure 6).

Figure 6 Crocodile tree featured on Stela 25 from Izapa (Stross 1994:33).

Ideas surrounding the sacredness of the environment were well represented in Olmec art, and were also represented through the architecture of Olmec cities. The architectural features that were influenced by Olmec worldviews involving the scared landscape will be further discussed in the following chapter. Many of the Preclassic ideas elaborated upon appear to have continued to be of importance to later Mesoamerican cultures, such as that of the Maya. Classic period Maya worldviews on the environment, which were inspired by Preclassic traditions, are relevant to the study of water at Takalik
Abaj because Takalik Abaj had neighbors, such as Kaminaljuyú, that were of Maya culture. Maya worldviews of the environment were reflective of the broader Mesoamerican beliefs systems that may have influenced the site of Takalik Abaj.

In a manner similar to the Olmec culture, the Maya regarded caves, mountains, and water as especially significant aspects of the sacred landscape (Brady and Ashmore 1999:124; Brady and Prufer 2005). Caves carried culturally significant meanings due to the belief that caves doubly functioned as portals to the underworld and as wombs from which the gods, human beings, and perhaps even the sun and moon were born (Fash and Davis-Salazar 2006:136; Bassie-Sweet 1991:76-87). Caves were embodied with sacred properties relating to both life and death because of this underworld and womb imagery, which made them locations of power. Ritual artifacts and the remains of sacrifices located within and around caves provide evidence for the practice of cave rituals, which continued to be carried out into the Postclassic and contact periods (Bassie-Sweet 1991:78). At the site of Copán, Honduras, jade and other highly valued goods were found deposited in caves and other openings in the earth in mountains that were located near water sources, such as lagoons and springs (Fash 2010:81). According to Schele and Freidel (1990:72), mountain and cave imagery continues to be represented in modern indigenous ritual ceremonies.

The iconography featured in Classic period Mesoamerican art also frequently represents caves. The Maya used the quatrefoil symbol, which was first used at the Preclassic site of La Blanca in Guatemala (Love and Guernsey 2007:920; Love 2009:2). The quatrefoil was prominent at Maya sites such as Copán, and is argued to be a symbol for portals, openings, mouths, and caves, which are often simultaneously invoked in the
use of the symbol (Bassie-Sweet 1996:66; Fash 2010:81; Love and Guernsey 2007:920). The use of the quatrefoil with similar meaning associated with it at both Preclassic and Classic sites suggests that cultures across these spaces of time both recognized that caves were ritually powerful aspects of a landscape that were considered to be sacred. The sacredness of caves within the Olmec worldview influenced both the offices of power and notions of sacred ancestors. The similarity of importance of caves within Classic period Maya sites arguably played a comparable role for the Maya.

Brady and Ashmore (1999:127) argue that caves and cenotes, a type of sinkhole, were thought of as axis mundi, or the center of the universe, because these features of the landscape sometimes marked the centers of Maya villages. The world tree, which was another symbol for the axis mundi, has also been associated with quatrefoil caves, suggesting that both the cave and the world tree can represent the center of the universe (Taube 1998:438-439). All of the meanings attributed to clefts in the earth, such as caves and cenotes, carried implications for ritual activity. These areas of power would have contributed to the identities of cities and, consequently, the ruling elite that would have desired an association with the axis mundi. Considering that similar depictions of caves are found in both Olmec and Maya communities, these sacred properties of caves may have been a vital element of a Pan-Mesoamerican worldview.

Analogous to Preclassic Olmec ideas, the sacredness of the mountain, or witz in Mayan, stemmed in part from the link that mountains had to caves, and therefore, to the underworld and the gods (Schele and Freidel 1990:71-72). Bassie-Sweet (1996:66) argues that the whenever the Maya referred to mountains, they tacitly evoked caves as well because all mountains conceptually contained caves. If the cave was the door
standing between life and death, than the mountain was the home of all things supernatural.

The “Earth Lord,” described as Tzuultag, or “hillvalley,” by modern Maya was believed to reside within mountains, which were commonly thought to be hollow (Brady and Ashmore 1999:126; Vogt 1969:387). Scholars have argued that mountains were not only thought of as homes for the gods, but also could be used as representations of deities themselves (Bassie-Sweet 2008:10; Vogt 1969:387). The living essence of the sacred landscape was well represented in images of witz monsters, in which mountains were personified, sometimes with mouths that represented caves (Bassie-Sweet 2008:10; Schele and Freidel 1990:68). Witz monsters were also often associated with water (Scarborough 1998:152).

Among the Maya, mountains and caves have both been suggested to be full of water—an idea that may have originated due to the karstic limestone topography that is found in many areas of Mesoamerica, in which the honey-combed landscape often naturally collects water (Bassie-Sweet 1996:10; Brady and Ashmore 1999:133). Porous features, such as caves and cenotes, punctuate the limestone topography. Mountains are also commonly located near springs, which are important sources of potable water in many parts of Mesoamerica (Scarborough 1998:149). The water associated with caves was considered to be “ritually pure” and was designated with a special name, zubuy ha, and an iconographic symbol known as the tuun sign (Brady and Ashmore 1999:127; Fash and Davis-Salazar 2006:138). Based upon ethnographic studies of the modern Maya and descriptions found within the Popol Vuh, Bassie-Sweet (1996) argues that mountain
water located at higher elevations was used to purify low-water shrine areas, such as cenotes, lakes, and springs (Scarborough 1998:154).

Ideas surrounding water were extremely complex in Mesoamerica. While water sources associated with mountains, caves, and elevated areas were considered to be ritually significant and sacred, they were not the only types of water sources imbued with ritual significance. Still water—not necessarily associated with mountains or caves—is argued to have been comparative to mirrors (Brady and Ashmore 1999:137). Like caves, mirrors represented portals, and have commonly been cited as fundamental shamanistic tools due to their ability to reflect “parallel worlds” (Brady and Ashmore 1999:137; Scarborough 1998:151). Sources of still water, whether captured in a bowl or occupying lakes, cenotes, ponds, or constructed water features at sites, were natural mirrors (Brady and Ashmore 1999:137). Human-made pools at Maya sites, such as the pools that have been discovered at the site of Palenque, if envisioned as mirrors, were also likely to have been regarded as sacred portals to the underworld (French et al. 2006:144).

Water has also been suggested to overlap with blood, such as sacrificial blood and the bloody waters of the underworld, due in part to the similar ways in which blood and water were represented iconographically with dots in a line and the fluid and saline qualities shared by blood and oceanic waters (Houston 2010:72; Reilly 1991:154-155). Among Classic period populations, the underworld was considered to have been watery and the entrances to this underworld were often located in areas that were filled with water, such as caves, oceans, and lakes (Schele and Miller 1986:42). The transportation of a dead soul was often represented by a canoe journey on a river leading to the underworld (Guernsey 2002:70). The images incised on a bone found in Burial 116 at
Tikal are prime examples illustrating this canoe journey to the watery underworld (Scarborough 1998:150; Figure 7).

Evidence to support the sacredness of water-filled locales and their connections to the underworld has also been found in cenotes. The Cenote of Sacrifice found at Chichén Itzá is a natural opening in the earth full of still water that revealed a wealth of artifacts attesting to the sacredness of the dark, watery orifice, which included various ceramics, ornamental body adornments, carved bone and shell artifacts, jade artifacts, and objects made of precious metals (Martos López 2010:224). Complete skeletons suggesting human sacrifice were also found in this cenote and other cenotes across Mesoamerica (Martos López 2010:224).
Among the ancient Maya, living things, such as plants and creatures, were also strongly linked to the supernatural qualities of the landscape. Aquatic animals were well represented in iconographic imagery, carved stone monuments, and artifacts. According to Houston (2010:69-76), turtles, crocodiles, and caiman were especially valued because they were creatures that could travel between elements and they could also represent the Earth and the primordial sea from which all life came. Crocodiles, turtles, and caiman were believed to represent the earth because of the crevices found on their rough skin that have been likened to the terrain of the world and the ability of these animals to float on the surface of waters in ways similar to the manner in which the earth floats in the cosmos (Finamore and Houston 2010:227; Houston 2010:70). Images of these reptiles as creatures representing the world have been found on pottery, murals, effigies, and sculptures, such as Monument 2 at Kaminaljuyú, which depicts the world-crocodile (Finamore and Houston 2010:227; Figure 8). These ideas are reminiscent of the worldviews involving crocodiles among the Olmec in which crocodiles were associated with the production of rain and vegetative fertility (Reilly 1990:32-33; Reilly 1991:162). Although these animals are aquatic and thrive in watery environments, their connections to the earth were also vital characteristics contributing to their sacredness.

The water lily floats along the surfaces of bodies of water along with crocodiles, caiman, and turtles. From its presence in iconographic imagery and Maya glyphs, it can be inferred that this plant, like the reptiles, was a significant symbol for water. The water lily plant is featured in the glyphic representation for “pool” or “sea,” or nahb, and was sometimes drawn in images to represent bodies of water in place of depictions of those bodies of water (Houston 2010:73-74). The use of the water lily imagery in Maya glyphs
and iconography suggests that water lilies were synonymous with bodies of water. Although the water lily was used to represent all types of bodies of water, because it is a plant that only grows in clean water, it may have been used to specifically signify sources of potable water (Lucero 2002:815; Davis-Salazar 2003:278). The water lily was typically associated with still water sources, and was sometimes personified as a Water Lily Monster (Bassie-Sweet 2006:87; Schele and Miller 1986:46-47).

![Figure 8 Kaminaljuyú Monument 2 (photo courtesy of Alliance for Integrated Spatial Technologies, University of South Florida, ©2011).](image)

Throughout Mesoamerican worldviews, water appears to have been a unifying element (Houston 2010:68). Symbols of water were intertwined with symbolism of the earth and vegetation, suggesting that all life permeated from water. Underworld symbolism insinuated that all life also ended in water. The thread of the universe appears to have been spun from water because, despite the ways in which water can be bounded, water seems to have permeated through all other areas of the world. Water fell from the sky, rolled down mountains, and collected into still water sources that could be used by human beings in a repetitive cycle that joined humans to the heavens and the earth to people. Water was also the common element linking mountains, caves, and the underworld together. Both Preclassic and Classic period worldviews reflected ideas of the
importance of water. Unlike the Olmec, the Maya had a writing system that was able to emphasize the considerable value of water within society.

The ways in which the Maya named places and objects inform archaeologists of the importance of water. The Mayan word for water, *ha’*, was commonly used to name ancient cities and to identify specific structures by the water sources surrounding them (Houston 2010:73). Stuart (2010:42) argues that the ancient name of Palenque, *Lakamha’*, meaning “Wide Waters,” may have referred to the Otolum River that bisects the ceremonial complex of the site. French et al. (2006:146) note that Temple XIX of the Cross Group at Palenque had an inscription on it that translated to the “well at *Lakamha’*,” which emphasized the significance of the connection between the nearby spring and the temple. Other monumental buildings have also been named based upon water features. The ancient name of El Duende at Dos Pilas was *K’halha’*, after the spring that was associated with the complex (Brady and Ashmore 1999:129).

Inspection of the worldviews of the environment held by societies of ancient Mesoamerica through material culture reveals that parts of the environment were sanctified. Evidence in the form of artwork, the types of ritual artifacts located in and around these features of the landscape, and written records suggest that caves, mountains, and water sources, in particular, were especially sacred. Ideas surrounding these features that were prominent during Preclassic periods continued to be significant among later Mesoamerican populations. Their status as valued symbols allowed caves, mountains, and water sources to play essential roles during ritual activity, and also in the shaping of communities, both physically and socially. Rulers in particular, used the sacred landscape to their advantage to build communities that would best promote their political power.
Mountains, caves, and imagery of animal supernaturals were woven into royal narratives and city plans. The sacredness of water was also a reoccurring component within political messages. Water, especially, was necessary to the survival of polities and is argued by archaeologists to have been vital to political dynamics in Mesoamerica both because of the necessity of having water supplies and because of the ritual aspects associated with the resource.

*Rulers and Resources*

The means by which water was managed in Mesoamerica had great potential to structure a society because water was not only a basic necessity, but also has been suggested to have been full of ritual and cultural meaning (Scarborough 2007:163; Fash 2010:82). Scholars have argued that ruling elites, especially, attempted to use water and its management to distinguish themselves as individuals with exceptional shamanistic powers through the privileged connection to sacred landscapes, ancestors, and deities they could achieve by participating in water rituals (Guernsey 2002:66; Lucero 2006; Reilly 1989:5). Rulers conveyed their privileged relationships between themselves and the sacred elements of the universe by commissioning iconography in artwork and works of monumental architecture that would act as their political “billboards” to spread their desired messages (Guernsey 2002:80; Reilly 1991:151-152). Analysis of artwork, the types of artifacts in elite burials, and the spatial organization of sites illustrate how rulers could have promoted their control over both the sacred and the functional aspects of the landscape.

According to Wells and Davis-Salazar (2007:15), “privileged access to the spirit world has been proposed as a key factor in the emergence of political inequality.”
Beginning during the Preclassic period (c. 1800 B.C. – 250 B.C.) in Mesoamerica—a time during which many of the fundamental elements of Classic period (c. A.D. 250 – 900) Mesoamerican cultures were emerging—ruling elites, including those from both the Olmec and Maya cultures, appear to have used symbolic imagery to manipulate the sacred aspects of nature to their political benefit (Reilly 1991:166). Brady and Ashmore (1999:127) argue that individuals who associated themselves with caves and mountains increased their power because these elements of the landscape were imbued with the earth’s powers. Water was often linked to these caves and mountains as a part of the sacred landscape.

Cyphers et al. (2006:19) argue that among the Olmec, “supernatural beliefs, particularly those related to water and the underworld, constituted the ideological certification of royal descent groups.” The various images of sacred ancestors or rulers emerging from cave-niche portals support this idea. As described above, caves held important connotations to the underworld and water. Involving cave imagery within the narratives of rulers and sacred ancestors politicized the sacred characteristics of these landforms by demonstrating that certain leaders mastered supernatural powers that ordinary people could not. Their ability to cross over to the underworld was conceptually related to the fall of rain and to the prosperity of the community. The journey through the cave portal and back draws upon all of these ideas of power.

According to Coe (1968:55-57), richly dressed individuals carrying an infant Rain God were a reoccurring sculptural theme for the Olmec of La Venta. These sculptures evoked the underworld and water due to the beliefs surrounding caves, but the inclusion of an infant emerging along with the ruler created additional meaning. The production of
a supernatural infant, such as that as the Rain God, from a cave-niche portal suggests that the cave may have been home to the gods, or possibly, in a manner similar to the Maya, a womb. The figure carrying this infant out of the portal emphasized the shamanistic and ritual powers of sacred ancestors and rulers because these figures could carry the power of the gods from their places of origin to the earthly realm. The infant may have also been symbolic of life in a more general sense as if to suggest that a successful journey to the underworld would yield life.

Whether the figures emerging from the cave-niches are ancestors or rulers, they must have been meaningful to the office of power because these pieces were frequently commissioned to be sculpted. Indeed, Cyphers et al. (2006:19) suggest that one of the goals of Olmec iconography was to emphasize the divine descent of rulers and topics concerning the underworld, water, shamanism, and agricultural fertility. Sculptures of figures emerging from cave-niche portals draw upon many of these themes.

The carving of “El Rey” at Chalcatzingo exemplifies the unified themes of the role of rulers as shamans, communication with divine beings, and cave rituals that produced the rains that would foster the growth of vegetation (Love and Guernsey 2007:926-928; Figure 9). Similar to the sculptures of figures emerging from cave-niche portals, this image demonstrates that rituals, which were the specialty of shaman-rulers, were vital to the survival of the community. On the surface of “El Rey,” a ritual in a cave, which is performed by a ruler, induces rain and mist to encourage vegetative growth, all of which is depicted in the motifs surrounding the cave (Grove 1968:487). Ideas such as those present in this scene encourage notions of the divine right to rule as well as divine descent because only a select portion of society was inherently endowed with the power
to communicate with sacred ancestors and to successfully perform rituals. These rituals are conceived to have sustained the most vital natural resources of the environment.

Figure 9 Terrestrial laser scan image of Chalcatzingo Monument 1 (El Rey) and section of the monument showing the human personage seated within a quatrefoil, which is a symbol for portals, openings, mouths, and caves (seen in detail below) (Collins and Doering 2012).
Burial goods and the themes found surrounding elite graves provide additional evidence to support that Olmec elites desired to be associated with the sacred qualities of water and the underworld. At the site of La Venta, a crocodile sarcophagus (Monument 6) has been uncovered 4.8m above of a polished serpentine pavement known as Massive Offering No. 2, which has been interpreted as representing “the waters of the underworld” (Reilly 1994:128; see Figure 15). Several other watery themes accompany the tombs located at Complex A of La Venta, such as a shark’s tooth, a jade frog, and a carved jade clamshell that were uncovered from Tomb A of the complex (Reilly 1994:128).

Water-related funerary objects were also uncovered within elite contexts at Maya sites. At the site of Copán, for example, the burial goods of the ruling elite included an abundance of spondylus shells, which Fash (2010:81) argues was a means for rulers to evoke “the primordial sea upon death.” Spondylus shells also served as a form of currency, were associated with the chastity of young girls, could be used as offerings in rituals, and were thought to increase one’s supernatural power during the enactment of rituals (Schele and Freidel 1990:92-94). The presence of great quantities of the shell in the graves of rulers then has a multitude of possible meanings. By virtue of being a marine artifact, the shell evokes the sea, but its use in ritual and as currency also suggests meanings of wealth and ritualistic power to the person with whom the shells are buried. Other marine objects, including stingray spines, corals, sponges, and pearls were common in tombs as well (Zender 2010:84).

The ruling elite also expressed their most crucial identifying qualities in their portraits. Among the Olmec, the sculpture of the noble youth known as “Slim” conveys
information suggesting that he was involved in ritual activity, possibly human sacrifice, and that he held the power of the underworld (Reilly 1991:155-160). The artwork on this sculpture suggests that Slim’s body represented the cosmos and that his participation in rituals allowed him to communicate with the beings of the underworld for the benefit of humankind. Reilly (1991:153) also suggests that within their portraits, Olmec and Maya rulers the used the details found on their headdresses to convey their names and titles, as well as ritual information.

The Maya, especially, may have used the inclusion of water lilies in portraits of rulers, often on their headdresses, to suggest the participation of rulers within the water management profession in an effort to emphasize their ability provide their people with clean, potable water (Fash 2010:82; Lucero 2002:815; Davis-Salazar 2003:278). One example of a water lily headdress is found carved upon Structure 32 at the site of Copán (Fash 2010:82). Clean water and water lilies are linked due to the fact that the plant blooms wherever clean water is available, including well-maintained canal features (Schele and Freidel 1990:93). Water lilies also represent a part of the ecosystem that nourishes and sustains fish and other life forms to create a diverse environment. With such qualities, this plant symbolizes clean water, ecological health, and prosperity. Maya elites drew upon these aspects of the water lily not only by representing the flower in their portraits, but also by referring to themselves as Ah Nab, which translates into “Water Lily People” (Schele and Freidel 1990:94). The relationships among rulers, water lilies, and the ecosystem suggests that water lilies were symbols of power and that the management of water may have been an important duty for the ruling elite (Lucero 2002:815).
Another method that could be used by elites to structure society and to communicate messages was through the types of architecture they commissioned to be constructed. The size, shape, spatial distribution, and decorative features of monumental structures were frequently meaningfully planned to influence or play upon worldviews of the rest of society while also physically organizing cities. In illiterate societies, such as the Olmec, the impact of images and symbolism in architecture would have been an especially effective means of conveying ideas to the populace (Ringle 1999:186). The ability of religion to create order in the world, which is especially vital in communities that do not have highly formalized government, can be extended into architecture to add a materialist extension to the beliefs systems that are already in place in the community (Ringle 1999:186).

The allusions to watery themes, ritual, and the underworld within elite burial contexts and upon monuments promote an image of the Olmec ruling elite as a class of people that were entitled to power because of their connections to sacred ancestors and their ability to successfully navigate through supernatural locales in a manner similar to the jaguar or the crocodile. These ideological concepts were arguably bolstered by the means taken to build waterworks, such as drains, and other grand architectural features in ancient Olmec cities because these features could stand as physical reminders of the messages in other types of material culture (Cyphers and Zurita-Noguera 2006; Diehl 1981; Reilly 1994). San Lorenzo is one Olmec site in which a considerable amount of labor was expended to create basalt stone drains, lagoons, and artificial ridges that projected from the plateau of the site (Coe 1967:45-57). These developments altered the landscape considerably and, in addition to practical applications such as preventing
erosion and increasing the area of habitable land, they may have also carried spiritual purposes.

Monuments built of earth could have fulfilled purposes similar to carved stone monuments that more explicitly displayed ideology through iconography. From analysis of carved monuments, it has been suggested that mountains were sacred locations because they have associations with the gods, ancestors, and the underworld. These meanings likely carried on to artificial mountains. Cyphers (1997:272) argues that the San Lorenzo plateau and the ridges that enhanced it may have symbolized the first sacred mountain of Mesoamerica. The conical pyramid of La Venta, known as C1, has also been suggested to have been a sacred mountain, possibly symbolic of a volcano (Heizer 1967:19-20; Figure 10).

Figure 10 The C1 pyramid at La Venta (photo courtesy of Alliance for Integrated Spatial Technologies, University of South Florida, ©2011).

The construction of a mountain in an area where none exists, such as La Venta C1, or the augmentation of a mountain-like feature, like the plateau of San Lorenzo,
demonstrates that a ruling class of individuals in the community had the power to organize the labor needed to move massive amounts of soil. The effort expended to construct these moments is indicative of their importance, but their placement within the community is equally suggestive. The C1 pyramid of La Venta and the plateau of San Lorenzo occupy the civic-ceremonial centers of both sites, suggesting that these earthen monuments were important to both religious and political activity. These large, earthen features were symbols of power, and also imposing material representations of the concept of a spiritual landscape that was so prominent within Olmec iconography.

Mountain symbolism played a significant role within Maya architecture as well. According to Fields and Reents-Budet (2006:125), Maya kings recreated the sacred landscape using the designs of their cities in such ways that pyramids represented sacred mountains and open plazas symbolized bodies of water. The desire to mimic mountains and bodies of water in architecture came from the established beliefs surrounding an ideal landscape. The landscape was ideal because it allowed for communication with supernatural beings, which in turn promoted the physical and spiritual health of the community.

There is great symbolic power represented in the association of towering public architecture and real or perceived bodies of water. The combination of a mountain and a water source has been referred to as a “water mountain,” which is a term used to designate specific features of the sacred landscape that suggest mountains are sources of water (Brady and Ashmore 1999:133; Scarborough 1998:143). Rulers could create the illusion of water mountains by creating mountains in the form of pyramids and by creating water sources to accompany them if these features did not occur naturally.
(Scarborough 1998:143). Brady and Ashmore (1999:128) suggest that this phenomenon is evident at the site of Dos Pilas, in which two of the largest public architectural complexes are directly associated with “caves and their expression as springs.”

The concept of a water mountain is probably derived from Preclassic ideas, such as the allusions to sacred mountains apparent in the iconography and architecture of Olmec sites. The model of power created through the imagery of the water mountain evokes the same ideas illustrated on “El Rey” of Chalcatzingo, in which a ruler is perceived as personally responsible for the fall of rain through his participation in rituals that occur within a sacred mountain (Reilly 1991:164-165). Within architectural representations of the idea implied on this monument, the pyramid substitutes the mountain and the springs, reservoirs, or other water features associated with the pyramid, become the manifestations of “the rains” brought upon by the shamanistic powers of the ruler.

While the placement of architecture can allude to sacred and symbolic power, economic power can be inferred from the layout as well. Scarborough and Gallopin (1991:659) argue that the tight, centralized organization of water sources and civic and administrative complexes increases the degree of control that a class of ruling elites could wield over a city’s most important water sources. Scarborough (2007:164) argues that the further away a water source is from a governing center, the more likely it is for people to have unrestricted access to the water source. The layout found at Tikal well represents a “water mountain” model that is both powerful symbolically and functional for management purposes. At Tikal, the largest reservoirs are associated with the civic-
ceremonial structures of the site, as well as the residences of the elite (Scarborough 1998:139-141; Scarborough and Gallopin 1991:659-660).

This spatial organization suggests that ruling elites had privileged access to water resources, both for ritual ceremony and for use in daily life, because the nexus for public and elite activity was located in such close proximity to the reservoirs. While citizens may have had the option to leave to another location to achieve the unobserved and unrestricted access to water that they may have desired, the system developed over centuries at Tikal with its capacity to contain up to 100,000-250,000m$^3$ of water was an attractive incentive for people to remain within the control of the elite (Scarborough 1998:141-146). Establishing a new system would require a great degree of labor and expense, with the added threat of failure if management of the system was inadequate.

An advantage in the spiritual sphere of society can often translate into material advantages. According to Scarborough and Clark (2007:9), “Mesoamerican economies were inextricably linked to ritual and ideology.” If the people of the city associated the ruling elite with the abundance of water due to their supernatural and managerial abilities to provide this resource, then the rule of this class of individuals would be validated. Elites consistently associated themselves with ritual and ancestor communication to suggest that they did have unique characteristics that would ensure the well being of the polity, justifying the collection of tribute to sustain and honor the nobility. One form of tribute reflective of the power of the elite may have been the labor used to create water features and monumental architecture. The scale of labor and the value of the materials used to create monuments and to construct monumental structures are representative of power. Labor is as much a resource as land, water, and other goods.
These ideas draw heavily upon political economy and ritual economy. Political economy focuses upon the relationships in society that are characterized by inequalities in wealth and power (Cobb 1993:44). This theoretical approach emphasizes the importance of material culture, especially on how resources may be used for political aggrandizement (Wells and Davis-Salazar 2007:3). While water is a renewable resource that is a part of the environment, it can also be seen as a commodity that can be collected and distributed in such ways that certain people benefit more than others. By limiting access to water, for instance, elites may have created a culture of dependence by which the power of the individuals that made up the rest of the society was diminished.

Ritual economy focuses upon ritual behavior as a part of the economy, as well as how ritual can actively structure the economy (Wells and Davis-Salazar 2007:3). Similar to political economy, ritual economy concentrates upon the material aspects of ritual, including the consumption that occurs during ritual, and the impact these activities have upon other modes of material exchange. Both political power and ritual meaning are abstract concepts that can influence the consumption of resources. The interweaving of water with both ritual and political dynamics affected the distribution of the resource as well as the physical shape of the land, and the organization of cities.

According to Lucero (2006:7-9), an increase in political power results in an increased ability to collect tribute. Mesoamerican elites reinforced their power by monopolizing upon access to resources while also suggesting that they were essentially intertwined with the ritual aspects of the sacred landscape. They wished their names to call upon links to sacred ancestors and the ritual qualities of water, so that their existence would seem essential and worthy of acknowledgment through the gift of tribute and
special status. This political narrative was expressed across a wide variety of media, including sculpture, architecture, and artifacts. Observing patterns of iconography and patterns evident within a site’s organization can test the connections between elite control and water management.

Pervasive water-related iconography may suggest that rulers wished to identify water and the management of water with their rule. The centralization of water features with architectural features of elite or ceremonial functions, especially monumental buildings, also suggests greater control by a ruling class due to both the sacred implications of “water mountains” and the greater ease with which water resources can be controlled in a centralized layout. Water sources dispersed across a landscape and a lack of water-related iconography suggests that the control of water resources was likely less important to the political dynamics of a site (Miller and Taube 1997; Taube 1995).

These aspects of society have been studied at various sites across Mesoamerica, including those of various cultures and time periods. In this thesis, the land and water features will be the focus, especially in the ways these elements of “nature” were represented in architecture, art, and by rulers.
CHAPTER 3:
WATER IN ANCIENT MESOAMERICA

The study of the role of water in ancient Mesoamerica has incorporated a wide range of disciplines, including archaeology, art history, ethnography, epigraphy, and geography. Researchers examining the role of water in ancient Mesoamerican communities have also been proponents for a variety of theoretical stances. Interdisciplinary and theoretically diverse lines of inquiry are important in studies of the use of water in Mesoamerican societies because the management of water was complex and had the potential to influence the organization of societies, agriculture, politics, lines of communication between polities, and religion.

The following Mesoamerican sites from several time periods and geographic locations demonstrate the types of approaches that researchers have taken to study water in Mesoamerica. The sites discussed will focus on the Olmec and Maya cultures because these cultural groups are the closest affiliated with the polity of Takalik Abaj. The Preclassic sites discussed in this chapter are San Lorenzo and La Venta of the Olmec culture, and La Blanca, Kaminaljuyú, and Cerros. Palenque, Copán and Tikal represent a sampling of Classic Maya water management systems. Figure 11 provides the locations of these sites as well as some neighboring sites.
San Lorenzo, located in the municipality of Texistepec in southern Veracruz, Mexico, at the Gulf Isthmus of Tehuantepec, is recognized as the first major site of the Olmec culture (Cyphers 1999:158; Graham 1989:227; Love 2007:287; Pool 2007:1). According to radiocarbon dates and the ceramic typology of the site, San Lorenzo flourished between c. 1200 B.C. and 900 B.C. (Coe 1967:60; Diehl 1981:70). The settlement of the site was spread over an alluvial plain and focused around rivers, levee tops, and a plateau overlooking the savannas in the vicinity (Clark 2007:17; Coe 1967:44; Cyphers and Zurita-Noguera 2006:36-37; Matheny 1976:639; Figure 12).
Figure 12 Site map of San Lorenzo (Coe 1967:43).
San Lorenzo, which is considered by some archaeologists to have been the first state-level society in Mesoamerica, was distinguished by its monumental stone sculptural art and by the architectural features of the site that would have required enormous amounts of labor and planning to construct (Clark 2007:11-13; Scarborough and Clark 2007:4). The large earthworks and the modifications to the landscape of the site are less apparent as efforts requiring significant energy to construct because of the manner in which they blend into the seemingly natural landscape, but they are also an important part of the legacy of the ancient inhabitants of San Lorenzo. These changes to the landscape as well as the carved stone monuments of the site are representative of Olmec ideas regarding power because they are the result of thoughtfully expended labor and resources.

The center of San Lorenzo is comprised of several mounds, some of which enclose courts located on top of a plateau (Coe 1967:44-45; see Figure 12). During ancient times, two tributaries of the Coatzacoalcos River surrounded the site and provided vital ravine resources (Cyphers 1997:258-264). Various shallow depressions and features commonly distinguished as lagoons surround the central portion of the site and continue on to the ridges extending from the plateau (Coe 1967:43). These human-made ridges that are estimated to have involved the movement of about 67,000 cubic meters of soil to construct are an example of the types of major construction projects of San Lorenzo (Coe 1967:44; Diehl 1981:74). In addition to the earthen ridges, considerable labor was invested in the creation of a water management system that consisted of lagoons and various basalt conduits (Coe 1967:57; Diehl 1981:73-74; Lowe 1989:43-45). Stone-lined water features were present early on in San Lorenzo, and their
construction continued into the Late Preclassic period (c. 300 B.C. – A.D. 100) along with the construction of *chultunes*, or cisterns (Matheny 1976:639).

There is evidence to suggest that the lagoons and *chultunes* were designed to allow these features to retain large quantities of water, which could have been desirable for many reasons. According to Matheny (1976:639), the people that inhabited the area would have prioritized the securing of a potable water supply due to seasonal scarcities of drinking water. Excavations at Laguna 10 revealed traces of bentonite, a type of clay used by the modern inhabitants of the area to seal wells, which may have been used similarly in ancient times to aid in the retention of water within the lagoons (Coe 1967:57; Diehl 1981:74). The lagoons of San Lorenzo may have functioned as reservoirs, especially when considering that many of these features would have been able to contain water all through the year (Coe 1967:57). Several ideas exist surrounding the possible functions of the lagoons, some of which are contradictory to the argument that these features were sources of portable water.

Diehl (1981:74) notes that the existence of several permanent springs at the base of the San Lorenzo plateau would have made it unlikely that the lagoons on the surface of the plateau were used as sources of potable water because the inhabitants would have possessed sufficient drinking water from the springs. If the chief sources of drinking water were the springs, the lagoons may have instead served as baths for the elite (Coe 1967:57; Diehl 1981:74). Ritual functions are implied for these features as well because some of the lagoons were cut into geometric shapes and monuments displaying water-related symbolism have been uncovered associated with the drain system that links to the lagoons (Diehl 1981:74; Doering 2007:272). Any ritual connotations attributed to the
lagoons and the drain system would increase the likelihood that these water features were used as elite baths because the elites had an interest in being related to supernatural themes, especially those of the watery underworld. The positioning of the water system and the monuments in relation to different types of architecture is also useful in determining the functions of the water system.

The highest areas of the site, which are on the top of the plateau, accommodate the residences of elites and their servants as well as the greatest numbers of stone sculptures (Cyphers 1997:264). The Central Court that was constructed at the center of the plateau over a span of two millennia and several construction phases includes one of the tallest mounds of the site, which reached 6m in height (Diehl 1981:70). The surface of the San Lorenzo plateau also served as the construction site of an area formed of red sand, sometimes referred to as the “Red Palace,” upon which a basalt column was placed and basalt step coverings were used (Blomster et al. 2005:1068; Cyphers 1997:264-265; Flannery et al. 2005:11222). Flannery et al. (2005:11222) have suggested that this reddish area with its basalt monument may have been associated with a temple or a public building. The area surrounding the Red Palace contained a basalt workshop, in which basalt monuments were carved and possibly re-carved to recycle the valuable material for reuse (Blomster et al. 2005:1068; Cyphers 1997:264-265). The overall material culture on this summit indicates a degree of richness that contrasts with the items associated with the less elaborate houses that were uncovered on the terraces of the plateau (Cyphers 1997:264-265). While craft specialization suggestive of elite patronage is apparent from the workmanship of the stone monuments uncovered upon the plateau and the existence of a basalt workshop within the scope of an elite space, it is also
implied because of the use of massive blocks of basalt to craft most of the monuments that could have only been obtained by the wealthiest members of society (Clark 2007:28; Cyphers 1997:264).

Basalt was an expensive import to San Lorenzo because the heavy stone blocks, weighing up to 25 tons, had to be transported from the Tuxtla Mountains, approximately 70 km northwest of San Lorenzo (Breiner and Coe 1972:2; Clark 1997:217; Cyphers 1997:273; Doering 2007:45; Drennan 1984:35; Heizer 1976:7). Although these basalt stones are commonly believed to have been transported through the river systems for at least part of their journey, the labor necessary to move multiple blocks without the aid of wheels or draft animals has been argued to have been almost comparable to the herculean effort required to move the earth that was used to expand upon the plateau of San Lorenzo to create artificial ridges (Cyphers 1997:273; Grove 1997:83). Given the “exotic” nature of the stone, which would have rendered it valuable for its rareness alone, in addition to the toil required to obtain it, it can be surmised that basalt was a luxury item and that its use was an ostentatious display of wealth. The fact that basalt was used to construct many of the water features of San Lorenzo corroborates with the notion that the water system was controlled by the elite and used for their benefit.

One basalt aqueduct, called Monument 73, is incorporated into a part of the plateau known as the Group E complex, which is considered to have been a “locus of elite activity” (Cyphers et al. 2006:20-26). Monument 73 is 171m long and runs from a freshwater well that is located in the South Platform of Group E (Cyphers et al. 2006:20-26). The location of the aqueduct, its construction materials, and the other materials located in Group E, suggest that water played a role in the legitimization of rulers at San
Lorenzo. According to Guernsey (2006:1), sculptures can be used as tools to express the authority of the elite and to shape the worldviews held by the people. The carved stone monuments surrounding the area of Group E display imagery emphasizing the office of rulership and cosmological themes, such as the underworld.

San Lorenzo Monument 14, which is a throne depicting a sacred ancestor or ruler emerging from a cave, or niche, is located in the Group E complex, across from the aqueduct, near the North Platform (Cyphers et al. 2006:20-22; see Figure 5). The depiction of ancestors or rulers seated within or emerging from caves or niches is a common theme across Mesoamerica during various time periods that emphasizes themes of the sacred landscape and of the office of rulers. This imagery, which appeared in the Early Preclassic and continued on to later periods, is connected to water and its sacred attributes because caves are believed to descend to the watery underworld and they are located within mountains, which are thought of as being sources of water, rain, and mist (Cyphers et al. 2006:20; Love and Guernsey 2007:926). By portraying himself in a cave-niche, a ruler is associating himself with sacred ancestors or gods, the underworld, the mystical properties of the earth, and the procurement of water through supernatural means that is the reward for having a connection to the previously mentioned spiritual themes. The watery connotations of Monument 14 at San Lorenzo are emphasized by its placement in front of an aqueduct, and also on the edge of Laguna 8 (Cyphers et al. 2006:20). Monument 14 may also be promoting the divine descent of San Lorenzo nobility because of the implied association of the ruler on its stone surface with sacred ancestors or gods via underworld communication. The suggestion that the ruler in the cave either travelled to the underworld or participated in a cave ritual that allowed him to
achieve contact with supernatural beings or spirits also emphasizes the ruler’s unique shamanistic powers, which would have given him a ritualistic privilege to rule.

Another symbol of rulership in this area is Monument 61, or Colossal Head 8, which was also found in the Group E complex, on the East platform, because basalt colossal heads found within the Olmec heartland are believed to have been portraits of rulers (Cyphers et al. 2006: 20-23). The placement of this sculpture in the area that also contains Monument 14 contributes to the perception that Group E was an elite space. Considering that water features constructed of valuable materials were uncovered in this area as well, it is likely that water was meaningful in a ritual, if not political sense. The location of the well and aqueduct may have served as a manifestation of the ruler’s ability to provide and control water, especially if, as Monument 14 suggests, the ruler of San Lorenzo wished to portray himself in association with a niche or cave and the supernatural powers connected to these features.

The supernatural control of water that came along with a sacred bond to gods and ancestors was likely reinforced by the very real organization of resources. The monumental adjustments to the landscape of San Lorenzo as well as the construction of water features like the drains and lagoons may have contributed to the ascent to and the maintenance of positions of power. According to Scarborough and Clark (2007:3-4), it is likely that kingship as well as the first political economy arose at San Lorenzo because of the ability of leaders to organize and control labor. This labor was used to change the landscape, carve stone monuments, and transport the basalt stone that was used to carve the aqueduct and the colossal stone heads (Clark 1997:217; Clark 2007:30; Cyphers et al. 2006:25).
The monumental works carved from this stone provide insight into the types of messages rulers wished to convey to the rest of the population, which was that the ruler was endowed with his position of power because of his proclivity to enact rituals and to act as a shaman. The charisma of this leader, then, would have contributed to his ability to direct others to supply their labor as a form of tribute. In return for their work, the people would have a community that was ritually sound and prosperous. Iconography, water resources, ritual, and power are often intertwined at Mesoamerican sites. Leaders in areas that face a seasonal scarcity of potable water, such as San Lorenzo, would have wished to identify themselves with themes that were related to water resources precisely because this resource was scarce and vital to the society, not only because of the need for potable water, but also for its ritual aspects.

*La Venta*

La Venta is an Olmec site that has been characterized as an island located east of the Tonalá River, which is a river that bisects the Mexican states of Veracruz and Tabasco (Coe 1968:53; Heizer 1967:9). The site, located in the municipality of Huimanguillo within the northeastern corner of Tabasco, covers approximately 200 hectares and was occupied between c. 1000 B.C. to 400 B.C (Gonzalez-Lauck 2001:798-799; Heizer 1967:14). The structures and complexes of La Venta are generally oriented along a line that is angled approximately 8° W of north (Flannery and Marcus 2000:7). The main complexes of the site include Complex A, Complex C, and Complex B (Figure 13). Complexes H and D, are located to the south of Complex B, while Complex G is east of Complex A.
The northernmost complex of the site is Complex A, which is a symmetrically organized set of mounds positioned around plazas (Diehl 1981:80; Grove 1997:58). The only known tombs of La Venta are located within this complex, along with extravagant caches of artifacts (Diehl 1981:78; Heizer 1967:9-10; Reilly 1994:125). Reilly (1994) has argued that the offerings and monuments uncovered within Complex A carry meanings pertaining to the cosmological worldviews of the Olmec, with an emphasis upon the
underworld and the sacredness of water. The assemblages of Complex A, which accentuate the themes of nobility, power, and death, establish scenes laden with religious meaning that draw upon the sacredness of the landscape that is associated with the multiple levels of the cosmos.

Complex A is an area shaped by the esoteric knowledge of skilled artisans and architects who sculpted stone sculptures rich in iconography, who designed the symmetrical layout unique to Complex A, and who turned deposits of offerings into an art form (Gonzalez-Lauck 2001:800). The materials used to create the atmosphere of Complex A contributed to the opulence and the symbolism of the themes represented within it. The La Venta Olmec prized stones of green and blue hues, known as jadeite, as one of their most precious commodities (Coe 1968:55-57; Harlow 1993:9; Wagner 2001:66). This highly desired resource, however, was not available directly within the Olmec heartland. Archaeologists have argued that the jadeite used by the Olmec may have been obtained from sources as far as the Río Motagua Valley of Guatemala (Bishop and Lange 1993:125-128; Griffin 1993:203; Harlow 1993:9-11; Taube 2004:206-208). Each of these potential sources of Olmec jadeite suggests travel distances of hundreds to thousands of kilometers.

As an import from distant regions, jadeite, which is sometimes generally referred to as “jade,” would have been notable in the Olmec region for its beauty and rareness alone. In addition to the exclusivity of jadeite use that is implied by the cost of its transportation, the stone carried powerful symbolism that also increased its importance as a luxury and status good. Milliken (1949:53) argues that the cultural importance of jadeite is derived from its symbolic association to “rain, vegetation, life, and godliness”
most likely because the green and blue stones share the hues of water, the sky, and maize, which are significant spiritual aspects of the Olmec cosmos (see also Taube 2004:145). In appearing to resemble aspects of the sacred landscape, jadeite itself was likely regarded as a material of spiritual import, which is supported by the ritualistic burials of jade that have been recovered (Garber et al. 1993:214; Wagner 2001:68).

Jadeite use is believed to have been restricted to the elite class among the Olmec not only because it was a precious symbolic material that was difficult to obtain, but also because the types artifacts fashioned from the material suggest elite use (Garber et al. 1993:213-215). The discovery of jade “awl” bloodletters at La Venta suggests that jade was associated with elite and spiritual activity because bloodletting has been regarded as an important function of the ruling class as part of their responsibilities to communicate with the supernatural world (Garber et al. 1993:215; Miller and Taube 1997; Taube 2004:122). One of the jade bloodletters of La Venta was crafted to resemble a stingray spine, and was found within one of the tombs of Mound A-2 among several natural stingray spines, a shark’s tooth, and another bloodletter in icepick-form (Joyce et al. 1991:3; Taube 2004:122-125; see also Figure 14).

The Olmec of La Venta may have considered jade to be a desirable material for their most valued bloodletters because of the watery connotations of jade as well as its rareness. There exist many parallels between blood, bloodletting, and water. Blood, like water, is a liquid associated with both life and death. The loss of blood results in death, as does the desiccation of the earth. Without water, the vegetation that feeds the creatures of the planet cannot grow. The purpose of bloodletting is to establish a connection to beings in the underworld, which is considered to be watery, often with the aim of receiving life-
giving rains. Blood sacrifices represent the willingness of humans to give life in return for life. The prevalence of aquatic themes within the caches in which bloodletters are discovered and upon the bloodletters themselves reinforces the association of blood with water. According to Joyce et al. (1991:9), the Olmec “archetypal perforator had a marine source,” which may explain why jade, a material that is also imbued with traits of water and vitality, is well matched to the purposes of bloodletters (Figure 14).

![Middle Preclassic jade icepick bloodletter](image.png)

**Figure 14** Middle Preclassic jade icepick bloodletter (Taube 2004:125).

The symbolism of jade and its status as a luxury good suit the functions of elite activity beyond bloodletting. As a spiritual material, jade had power that could be inherited to perpetuate the prestige of certain lineages that had ancestors wealthy enough to own jade in the first place. Olmec jade artifacts were passed down as significant ancestral objects, establishing another connection between jade, sacred ancestors, and the legitimization of the ruling elite (Taube 2004:207; Wagner 2001:68-69). The deference for jade exhibited by the Olmec may have initiated a tradition shared across Mesoamerica. Olmec jade was so revered that Olmec jade heirlooms have been discovered in the caches of other Classic and Postclassic Mesoamerican cultures,
including those of the Maya and the people of Teotihuacan (Miller and Taube 1997; Taube 1995; Taube 2004:207; Wagner 2001:68-69). Jade artifacts symbolized the power of ancient Olmec rulers in such a distinct manner that subsequent cultures wishing to be associated with ancient power and prestige recognized their significance.

The attractive culturally ascribed material and sacred qualities of jadeite, along with the expenditure of labor and capitol needed to acquire the stone, add several layers of political and spiritual meaning to the areas in which it is used. Drennan (1984:35) remarks that approximately 5.1kg of jadeite was transported to La Venta annually, amounting to about 2,039kg over the site’s 400 years of active occupation. Of note, greater than 90% of this highly valued material was uncovered in deposits along the centerline of Complex A (Drennan 1984:35). Serpentine stones, a substitute for jade, were found in great quantities along the centerline of Complex A in offerings such as that of the 213 serpentine celts that were discovered aligned vertically in a massive cache within the area (Harlow 1993:10; Taube 2004:16; Wagner 2001:66). Five serpentine offerings of this grand scale were deposited in Complex A, as well as about 45 smaller caches consisting of pottery, green stone celts, figurines, jade beads, and other artifacts (Diehl 1981:78; Heizer 1967:14). These deposits of precious materials emphasize both the wealth of Complex A and the significance of its symmetrical design because many of the caches were found along its centerline.

The ancient inhabitants of La Venta also crafted monuments and architectural features out of basalt, a resource that may have been even more difficult to procure than jadeite (Drennan 1984:35). La Venta, like San Lorenzo, imported basalt from the Tuxtla Mountains at considerable cost because each individual block would have been extremely
heavy—up to 30 tons in weight—and the distance each piece travelled was great (Drennan 1984:35; Grove 1997:83; Matheny 1976:639). Within Complex A, this imported basalt was used to create columns, some of which were fashioned into structures to house tombs like Tomb A and Tomb E located on Mound A-2 on the northernmost section of Complex A (Diehl 1981:78; Reilly 1994:131). A basalt column fence in the area has been interpreted as increasing the exclusivity of Complex A due to the manner in which it was constructed to enclose it from the rest of the site (Gonzalez-Lauck 2001:799; Reilly 1994:131). Basalt was also the material of choice from which the colossal heads of the site and monumental thrones were sculpted.

The use of basalt, like that of jadeite, is argued to have been both economically and symbolically important because it was costly and rare, but also because the material may have been considered sacred (Cyphers 1997:264-265; Cyphers 1999:167; Matheny 1976:639; Stark 1999:301). Stark (1999:301-303) argues against the idea that basalt was sacred because ritualistic offerings have only been uncovered in front of stone monuments that were carved or re-carved, and not in front of unworked stone fragments. Regardless of whether or not the stone itself was sacred, the use of basalt is important in the manner in which it suggests control by the elite because this resource could only be obtained by the wealthy and the individuals that purchased the stone would have likewise regulated the themes carved upon them.

In this sense, basalt is endowed with the ability to inform scholars of the subject matters that were valued enough to be sculpted upon a rare material regulated by the elite sphere of Olmec society. Not surprisingly, perhaps, a great deal of basalt at La Venta was used to promote the nobility via portraits of rulers on colossal stone heads and thrones.
Three of the basalt colossal heads of the site, identified as Heads 2, 3, and 4, were found approximately 110m north of Complex A, while the only other discovered colossal head was found in Complex B to the south (Grove 1999:267).

The frequency of artifacts as well as the rareness of the materials discovered within Complex A surpasses those of the other complexes of La Venta. The substantial use of imported basalt and jadeite predominately within Complex A, and the quantity of other caches discovered suggests that considerable wealth was invested into this complex. Complex A was likely established as an important space for ritual activity as well as an area that symbolized the power of the ruling class because the consumption of luxury goods was greatest at this area of the site. The colossal heads north of this complex also suggest that the area was regarded as an environment of royalty. Ritual connotations for Complex A can be inferred from the types of objects uncovered and the manner in which they were offered, in addition to the materials from which they were made.

Complex A contains five features that have been interpreted as “burials” despite the lack of human remains in most of them (Diehl 1981:78; Garber 1993:214). Human remains have only been discovered in Tomb A of Complex A, which, as previously mentioned, was housed in imported basalt (Reilly 1994:126-128). Other burials have been identified based upon the artifacts associated with the areas. Monument 6, a sandstone sculpture measuring 2.8m in length, was designed to appear as a dragon or crocodile and has been identified as a sarcophagus because of its size, shape, and the manner in which objects were placed within it as though they had once lain around a deceased person (Garber 1993:214; Grove 1997:59-60; Lowe 1989:64; Reilly 1994:126-128; Figure 15). Monument 6, located in the center of Mound A-2, contained red clay, a
serpentine figurine, two earspools, a bloodletter, a jadeite stingray spine, and a “clamshell” (Garber 1993:214; Grove 1997:59-60). The sarcophagus and its associated assemblage exemplify the central themes of Complex A, which are that of the nobility, the underworld, and water.

Figure 15 Monument 6, La Venta (Schele 2000).

Green stone, finely crafted artifacts, and ornately carved monumental stone are symbols of affluence that suggest the assemblage of La Venta Monument 6 tells the story of a wealthy member of the nobility. Funerary goods, especially, are revealing in that they summarize the character and the livelihood of the person interred while also potentially representing the hopes of the departed in regards to the afterlife. The bloodletter and stingray spine attest to the interred individual’s ritual activities and his connection to the spirit world during his life, while also suggesting that he will continue to carry power in death. The functions of bloodletting that were carried out by the deceased during his life may have ended, but he has transitioned to the underworld where
he may be consulted by his successors, which is one of the ways he will continue to hold power even after death.

The cyclical nature of rain, life, and death parallels that of the flow of power embodied by royal lineages. Although the ancestor is gone, his descendants will take his place to continue the spiritual responsibilities of the offices of the elite until they also succumb to death, leaving their own progeny to carry on the cycle. As a symbol of water, the crocodile is a symbol of the underworld and a fitting carrier of the dead. It may also be meaningful that the noble personage interred within the crocodile sarcophagus was carried into the afterlife by a fellow ruler because crocodiles were considered masters of the watery level of the sacred Olmec cosmos (Reilly 1994:129). Additionally, the elite had the power to move between realms, just as the crocodile does, although this ability was achieved by bloodletting and other rituals.

The crocodile upon Monument 6 may also represent the continued significance of the deceased because the reptile is associated with rain and vegetation, in addition to the underworld (Reilly 1991:161-162; Reilly 1994:129; Stocker et al. 1980:753-754; Stross 1994:33). The life and death duality of water can be related to lineages because the present and future prosperity of a community or family line depends, in part, upon the very real fortunes that were inherited by descendants and by both the worship of sacred ancestors, who represent the dead. Without the wisdom and efforts of previous generations, success for posterity becomes more difficult. At the same time that the crocodile carved on Monument 6 represents the passing of a generation, the sprouts upon its back allude to the life-giving properties of water and the prosperity of the present. As long as present generations succeed, the legacy of the dead lives on. The oceanic artifacts
in the assemblage of the sarcophagus recall both the watery underworld and the fruitfulness implied by a plenty of water. The sacredness of water, and its potential connotations within the theme of rulership, may help explain why there are many allusions to water within Complex A and the rest of the site.

Reilly (1994) suggests that Monument 6 is one of the many pieces within a cosmic scene, illustrated partially by the architecture and material culture of Complex A. The artful placement of jadeite within Complex A represents another portion of the sacred scene suggested by Reilly (1994). The serpentine pavements of Complex A were also known as “Massive Offerings” because of the manner in which these elaborately designed patterns of stone were quickly buried after being constructed, suggesting that they were not meant to be viewed by the inhabitants of La Venta and that their function was not utilitarian (Coe 1968:63; Diehl 1981:78; Gonzalez-Lauck 2001:799; Heizer 1976:4). The sands used to bury the Massive Offerings, each of which measured approximately 4.8m by 4.4m to cover areas of about 21m, were vibrant reds and yellows, suggesting that the burial process was a ritual activity because even the color of the sand used to bury the pavements was carefully planned (Coe 1968:61-63; Reilly 1994:10). In other words, the burial of the artworks contributed to their meaning.

If the human eye was not meant to view the pavements, the implication is that their creation was intended as an offering to some part of the supernatural world. Gonzalez-Lauck (2001:799) suggests that the hundreds of serpentine blocks that were used within these pavements to construct abstract designs may have served as offerings to an Earth deity. Many of the Massive Offerings were uncovered beneath mounds, which
has lead other archeologists to believe that the pavements were dedicated to the initiations of the building phases of each mound (Diehl 1981:78).

Considerable labor and attention was invested in securing nearly 500 serpentine blocks per pavement, in designing the patterns in which the blocks were laid, in deciding the manner in which the monuments would be buried, and in moving the selected soils for the burial (Reilly 1994:10; Figure 16). These efforts demonstrate the importance of the offerings, while also emphasizing the existence of a complex society. The collaboration between the laborers need to move the stone and soil and the artisans that planned the designs of ritual significance is a tribute to the ability of the ruling class to command various segments of ancient society.

Figure 16 Drawing of a Massive Offering (Coe 1968:63).

The designs of the mosaics are abstract, but have been interpreted by some scholars as possibly representing jaguar masks (Coe 1968:61; Reilly 1994:10; see Figure 16). Interestingly, the patterns are symmetrical, in the same vein as the layout of the complex in which they rest. If the surrounding architectural features of Complex A were meant to represent elements of the Olmec cosmos, it is possible that the patterns drawn by the buried serpentine blocks had similar meanings. Reilly (1994:126-128) argues that
Massive Offering No. 2, in particular, represents “the waters of the underworld” partially because of its relation to Monument 6 that was uncovered 4.8m above of the polished serpentine pavement and because of the colors of the stones used to construct the mosaic design.

The Olmec are known to have preferred a type of slightly translucent blue-green jade that has been hypothesized as originating from Guatemala (Griffin 1993:203-205; Taube et al. 2004:208-210). Serpentine stones can also be green or blue-green. The pavements of Complex A may have been “symbols of water and agricultural fertility” analogous to the crocodile of Monument 6 that resented upon Massive Offering No. 2 due to the color they share with water and the vegetation that water is able to support (Cyphers et al. 2006:30). The five tombs uncovered within Complex A also may support this interpretation of the serpentine pavements given that water symbolism suggestive of the underworld is concurrent with the theme of death. Reilly (1994:130-132) adds that the cleft symbol found upon the serpentine designs is representative of an opening to the underworld and that the red sand supporting or covering the various tiles may have been intended to represent blood—specifically, the “bloody waters of the underworld.” Blue and green soils were also used as foundations beneath caches that had watery themes (Reilly 1994:130).

An incentive to create a watery atmosphere within an elite context may have been because water had been transformed into an emblem of power. Altar 5, a basalt monument representing a noble individual or a sacred ancestor, is notable because it is one of the many representations of figures emerging from niches at La Venta and because the headdress of the individual on this monument is decorated with three raindrops (Coe
The function of a headdress is, in part, to relate the most important traits of an individual to the community, so the inclusion of raindrops upon this headdress immortalized in stone suggests that rain and water were significant to the nobility. Altar 4 also depicts a ruler emerging from a cave entrance to the underworld (Reilly 1990:14-15; Cyphers et al. 2006:18).

The theme of the journey from the underworld to the earthly plane on these sculptures is evocative of spiritual communication and is closely tied to water both because the underworld is a watery place and water itself can be a means to facilitate communication or transportation to the other world. At La Venta, figures of the nobility were repeatedly chiseled upon stone emerging from niches, often carrying an infant that has been interpreted as representing the Rain God (Coe 1968:55-57; Cyphers 1999:164; Grove 1999:267). Creating the illusion of a control over rain through supernatural means that seemed as genuine as the physical control of natural water resources through modifications of the land could have been a part of legitimizing the rule of the elite (Cyphers 1999:164-165; Cyphers and Zurita-Noguera 2006:41-42). The integration of themes alluding to the sacred qualities of water within architectural features and sculptures, along with the occurrence of other architectural features designed to control water is suggestive of a rulership in which water was focal point of the seat of power.

La Venta’s massive monument to earthly power, known as Complex C (or Mound C-1), balances the homage to water and the underworld seen in Complex A (Grove 1999:265). The ancient inhabitants of the site moved approximately 113,267 cubic meters of soil to create the 30-meter tall fluted cone pyramid that has been hypothesized as representing a sacred volcano due to its resemblance to naturally occurring cinder cone
volcanoes (Diehl 1981:76; Grove 1999:265; Heizer 1967:19-20; Heizer 1976:4; Reilly 1994:130). Heizer (1967:19-20) suggests that Complex C was a surrogate volcano that may have been meaningful and sacred to the people of La Venta because the locals were likely to have witnessed the explosive powers of San Martin Tuxtla, a conical volcano within the region.

This ridged pyramid that rests atop a raised platform south of Complex A has been called the “Mountain of Creation” (Cyphers et al. 2006:30; Grove 1999:265). As a human-made mountain or volcano, Complex C would have represented the sacred aspects associated with naturally occurring mountains. The Olmec *axis mundi*, which was commonly represented by the world tree or the body of a ruler that had been marked with the different realms of the cosmos, could also be symbolized by a sacred mountain (Reilly 1994:130). Human-built mountains, especially of the scale of Complex C, are evocative representations of the power of the elite not only because mountains are dominant earthly symbols, like rulers, but also because the labor invested within these monuments would have necessitated strong control and influence by a ruler to organize people and resources (Reilly 1994:129).

Complex A and Complex C vary considerably in the types of artifacts and architecture they include, but they harmonize when the themes they represent are considered. They are each parts of a whole that symbolizes the order of the universe according to the Olmec worldview (Cyphers et al. 2006:30; Reilly 1994:129-130). The association of Complex C with Complex A mirrors the cave-water dynamic found upon the sculptures of the site, like Altar 5. Complex C symbolizes mountains, caves, and the niche-portal while Complex A symbolizes the still waters of the underworld. The area of
Complex C and the complexes surrounding it (Complex A and Complex B) also contain most of the stone monuments crafted at the site, which suggests that these areas were paramount to the dissemination of ideological information through carved messages at the same time that they were full of symbolic characteristics, like the water and mountain imagery expressed within the architecture (Grove 1999:265). Gonzalez-Lauck (2001:799) adds that Complex C also likely served to contribute to the secluded nature of Complex A by limiting entrance to the area, much like the basalt fence surrounding Complex A did.

Complex A is a vivid example of how power and the supernatural can be translated into spaces through artifacts, architecture, and monuments. Water, sacred ancestors, and the underworld come together in this space that is restricted in access to the individuals that have the most to gain from perpetuating a link between the underworld and the nobility. On the other hand, Complex C would be visible from a distance, standing as a symbol of the power gained from the supernatural and from the leadership of the elite. Complex C represents life, dominance, and prosperity, as organized by the political authorities that doubled as spiritual leaders.

The architecture of these two complexes is relevant to that of the complex containing the water management system of the site because they show the iconography and the material resources important to La Venta’s society as well as the influence of the ruling class. The complex containing the architectural features of water control is Complex B, which resides south of the pyramid of the site and includes the Stirling Group and Acropolis (Diehl 1981:76). The Stirling Group was a flat, earthen construction that measured about 122m east to west and 152m north to south (Heizer 1967:34). This group was associated with a row of basalt columns and the Stirling Acropolis, which was
a platform mound that resided on the northern end of the complex (Grove 1997:68; Heizer 1967:34). The Stirling Acropolis is a large area with platforms located within its center (Grove 1997:59-68). Grove (1999:273-275) has argued that the platforms and structures that compose Complex B were vital public stages in which rituals are likely to have occurred.

Posited as a drainage or water distribution network, the water management system found within Complex B consisted of channels formed from U-shaped basalt troughs cemented together with asphaltum (Gonzalez-Lauck 2001:799; Grove 1997:68-78; Heizer 1967:33-36). Five of these stone drains were uncovered on the eastern side of the Stirling Acropolis, one of which measured 13m in length (Gonzalez-Lauck 2001:799; Heizer 1967:33). Stone slabs covered segments of the channels, while others were associated with features identified as “large stone basins” (Gonzalez-Lauck 2001:799).

The use of basalt for the construction of the water management system suggests an investment by the elite because, as seen within Complex A, basalt was an expensive material that was used by only the wealthy that could afford it. Careful consideration went into how each piece of basalt would be crafted into a meaningful material representation of the values of the ruling class. Used within the water management system, basalt may have held similar importance, especially if the material was regarded as sacred itself, as suggested by Cyphers (1999:167). The drains of La Venta have stood the test of time because basalt was used in their manufacture (Figure 17).

An argument could be made that the material was chosen deliberately, not only because it was sturdy, but also because the ancient residents esteemed several aspects of society that were connected to water. The reverence attached to objects associated with
water may have contributed to the desire to create a durable water management system of rare and highly valued basalt. The material remains of Complex A suggest that water and its use had multiple meanings. Spiritually, as the key component of the underworld, it was a sacred element attached to political figures as a means to aggrandizement. Economically, the role of water at La Venta was equally powerful.

![Figure 17 Stirling Group drain measuring 13m in length (Heizer 1967:33).](image)

Rust and Sharer (1988:104) note that La Venta’s development as a major site can be partially attributed to its location that allowed the inhabitants to make use of the fertile levee soils and to harvest the rich marine resources of the surrounding rivers. The
Estuaries and rivers fed the citizens while also increasing the opportunity for trade by allowing passage along the streams (Rust and Sharer 1988:104). The perceived sacredness of water and its vital role to the livelihood and prosperity of the city may help explain why such luxuriant materials were used within the water system, why it was important for the drains to last throughout the ages, and why it was decided that they should be constructed in such close proximity to the looming monument known as Complex C. While the drains prevented erosion within the platforms of Complex B, the stone basins attached to the drains may have been used to collect water for the ritual activity occurring on these public stages (Gonzalez-Lauck 2001:799; Grove 1999:273-275).

The ways in which Complex A represents themes related to water, including the underworld and portals, may suggest that Complex C was a Preclassic Olmec representation of a sacred water mountain (Brady and Ashmore 1999:133; Scarborough 1998:143). Complex C is surrounded by watery themes to its north and south. Complex A, with its associations of underworld power and the power of rulers, lies to the north of the artificial mountain, while the drainage systems of the Stirling Acropolis resides to the south of Complex C. As a metaphor painted with architecture, artifacts, and sculptures, these complexes appear to represent aspects of the sacred landscape of the Olmec cosmos. References to spiritual themes are highly influential within culture, especially when combined with political expressions. The material culture of La Venta suggests that the elite of the polity were aware of this reality because religious symbology was not only ubiquitous, but also often monumental and extravagant, in the areas associated with elite activity.
La Blanca

La Blanca is a Preclassic Mesoamerican site located on the Pacific Coast of the Soconusco region in western Guatemala (Joyce 2004:11; Love 2007:288). This site is situated east of Río Naranjo within Ocós, San Marcos, Guatemala (Love et al. 2004:1; Nance and Kirk 1991:371; Figure 18). From its position on the coastal plain, La Blanca would have benefited from the marine resources provided by the lagoons and estuaries created by the nearby piedmont streams as they moved water to the Pacific Ocean (Tejeda 2008:89).

La Blanca, functioning chiefly as a ceremonial center, was one of the many sites in the region with a status that ascended to that of a powerful polity around c. 900 B.C. during the Middle Preclassic period (Love 2007:288; Popenoe de Hatch and Schieber de Lavarreda 2001:991; Tejeda 2008:87). At the size of approximately 280ha, La Blanca became one of the largest sites of its time, with some of the earliest monumental architecture (Love 2007:289; Love 2009:2). Various archaeologists often relate La Blanca to the Olmec culture, hypothesizing that the polity may have been the only Olmec site in Guatemala (Popenoe de Hatch and Schieber de Lavarreda 2001:991).

Schieber de Lavarreda (2006:26) claims that the low, long, and wide platforms and the pyramidal structures of La Blanca resemble the architecture found at La Venta. The largest mound of La Blanca, known as Mound 1, was constructed c. 900 B.C. and is considered to have been one of the earliest Mesoamerican temple pyramids (Love and Guernsey 2007:923). The structure, which lies at the site center, reaches 25m in height and has a base measuring 150 x 90m (Love 1999:138; Love 2009:1; Rosenswig
Several smaller mounds extend around Mound 1 and, like San Lorenzo, these mound features were located in an area surrounded by lagoons (Coe 1967:43; Love 2009:4; Figure 19).

Figure 18 Position of La Blanca on Río Naranjo (Coe and Flannery 1967:88).
Figure 19 Site map of La Blanca (Love 2009:4).

According to Rosenswig (2006:346), the entire site contained at least 43 house mounds. In the 1km² area that includes the central area of the site and all the land extending up to the area known as the Joyas Group, which is 1km to the north of the site center, 20 residential mounds have been identified (Love 2009:2-3). The Joyas Group was a residential complex that included a mound that was approximately 6m tall and
possibly severed a ceremonial purpose (Love 2009:3). At the center of the site, Mound 1 was surrounded by ritual structures to its north and south, and by a 40 x 100m sunken plaza on its eastern side (Love 2009:1-2; Love and Guernsey 2007:923).

The sunken plaza separates Mound 1 from an elite residential mound, known as Mound 9 (Love and Guernsey 2007:924). Of all the mounds of the site so far excavated, Mound 9 contains the greatest density of animal bone, obsidian, and jade, suggesting that domestic activities occurred at this mound and that the inhabitants were wealthy (Love 2007:289; Love and Guernsey 2007:924). Large quantities of jade and obsidian are related to the elite as items of status, while the remains of discarded animal bones are indicative of domestic consumption (Love 2007:289; Love and Guernsey 2007:924). The amount of figurines uncovered at Mound 9 suggests that ritual activities also took place at the mound (Love and Guernsey 2007:924-925).

In addition to the similarities between the scale and style of architecture found at La Blanca and La Venta, themes similar to those of Olmec worldviews were also present within the iconography of La Blanca (Schieber de Lavarreda 2006:26). Love and Guernsey (2007) analyzed the earthen sculpture of the site known as Monument 3, finding that it has connections to Mesoamerican themes surrounding water, elite power, and the underworld. Monument 3, found on the western side of Mound 9, is not only the first known earthen sculpture in Mesoamerica, it is also the first known object to include the quatrefoil symbol, according to Love and Guernsey (2007:920-923).

Quatrefoil symbols have relations to both water and the underworld because they are perceived as representations of openings in the earth, like caves, and therefore, they double as portals to the underworld (Houston et al. 2005:6; Love and Guernsey...
The themes of the quatrefoil are closely related to concepts that were prominent in Olmec expressions of the supernatural, such as imagery related to cave rituals and the idea that the universe was partitioned into earth, sky, and underwater underworld realms (Love and Guernsey 2007:926; Reilly 1994:129). “El Rey” at Chalcatzingo is one Mesoamerican monument that includes both a partial quatrefoil and a prominent figure participating in a cave ritual to receive water (Grove 1968:486-487; Reilly 1991:164-165; see Figure 9). La Blanca Monument 3 is believed to have been a basin that was filled with water to be used within divination rituals, which was a common use of water-filled basins during the time period (Love and Guernsey 2007:926; Figure 20).

![Figure 20 Monument 3, La Blanca (Love and Guernsey 2007:922).](image)

Mound 1 has been argued to be related to Monument 3 because the base of Mound 1 appears to take the same quatrefoil shape identified on Monument 3 (Love 1999:138; Love 2009:1). Excavations and Ground-penetrating radar (GPR) surveys have
confirmed that the base of Mound 1 had inset corners, which are the traits that contributed the base’s resemblance to a quatrefoil symbol (Love 2009:3). If Mound 1 was intended to represent a quatrefoil, then the pyramid would have increased associations to caves and portals that would have enhanced its underworld and watery imagery. Mountains and caves are typically paired aspects of the sacred landscape that can be recreated by human beings to design sacred spaces within communities, especially those that lack natural mountains or cave features nearby. Additionally, Mound 1 was built over a previous architectural feature that contained great densities of shell, which may support the idea that Mound 1 had been designed to draw upon watery themes, including the underworld (Love 2009:9). Shell has yet to be discovered at any other area of the site (Love 2009:9).

The sunken plaza east of Mound 1 may also support watery symbolism within the mound. In the same vein as Monument 3, the sunken plaza may have been constructed as a large-scale ritual basin, or pool, akin to the pools discovered across other Mesoamerican sites, or it may have symbolized a body of still water, like the plazas within Complex A of La Venta are hypothesized to have done (Reilly 1994; Stark 1999:309-310). The coastal plain upon which La Blanca was located averages 3,000mm of rainfall annually with “90 percent of the annual rainfall occurring within the six-month rainy season” (Neff et al. 2006:292; Tejeda 2008:89). The seasonal rains increase the likelihood that the sunken area was filled with rainwater at least during part of the year.

By the Late Preclassic period, ponds or pools were commonly integrated into public spaces within sites along the Gulf Coast, so the existence of a pool feature at La Blanca would not have been unlikely, especially if the site adapted cultural traits of Gulf
Coastal sites as suggested by scholars (Popenoe de Hatch and Schieber de Lavarreda 2001:991; Stark 1999:309). As a pool, the sunken plaza of La Blanca may have served as a catchment area for potable water in addition to functioning as a source of water for ritual use and as an extension of the constructed scared landscape suggested by Mound 1 and the surrounding ritual structures and ritual artifacts.

The sacredness of the areas encompassing Mound 1, the sunken plaza, and Mound 9 is further supported by evidence of feasting. The analysis of the La Blanca diet illustrated patterns in which marine resources that would have been harvested from lagoons or estuaries, such as catfish, turtle, iguana, and snake, supplemented the dominating food sources of dog, maize, and deer (Tejeda 2008:91). The cache of shells found at Mound 1, if used within feasts in addition to being buried as offerings, would have increased the significance of the feasting because aquatic food sources were infrequently consumed at the site in comparison to other fare. The high densities of animal bone found with Mound 9 are also indicative of feasting that was probably sponsored by the elite people that inhabited the mound (Love 2007:289; Love and Guernsey 2007:924).

Love (2007:289) suggests that the ritual activity associated with Monument 3 may have included some of these elite feast activities. An overlap between the ritual activities of Mound 1 that were meant to represent public activities and the rituals of Mound 9 that were more domestic in nature exists because these areas were located in such close proximity to each other and because Monument 3 has an association with both areas in that its themes correspond to those of Mound 1 and it is located on the slope of Mound 9 (Love and Guernsey 2007:924).
The incorporation of elite, domestic rituals with public rituals implies influence by the elite class over public messages. Elite-sponsored feasting within the space shared by these differently functioning ritual areas supports the integration of elite culture within public ideology. The use of watery symbolism, like at other sites, is a means to emphasize underworld themes, communication with the supernatural, and power, while also drawing upon the enrichment provided to the community by the water sources nearby. Río Naranjo, the lagoons, and the possible pool feature within the sunken plaza sustained the lives of the inhabitants with their resources as well as their sacred attributes.

*Kaminaljuyú*

Kaminaljuyú is a Preclassic site located in the Valley of Guatemala in the central highlands that became a major center at around the same time as Takalik Abaj and was part of the same trade network (Popenoe de Hatch et al. 2000:133; Popenoe de Hatch and Schieber de Lavarreda 2001:991; Sanders et al. 1974:97; Valdés 2006:67; Figure 21). Guernsey (2006:6) argues that the success of this site was due, in part, to the ability of the people to manage water to establish a strong agricultural base, which both fostered population growth and contributed to its commercial interests because of the increase in food supplies that would have resulted from hydraulic engineering techniques like irrigation. The initial occupation of Kaminaljuyú may have been as early as c. 1200 B.C., and, by around c. 400 B.C. – A.D. 200, during the Late Preclassic, the site is believed to have become a regional force (Love 2007:286; Valdés 2006:67). The construction of water management features at the site began with the first canals being built during the Middle Preclassic (c. 1000 – 400 B.C.) (Love 2007:292; Valdés 2006:67-68).
Although Takalik Abaj and Kaminaljuyú communicated through common trade routes, were located within the same region, and are believed to have been contemporaneous sites, their natural and human-made water features differ significantly. The first canal built at Kaminaljuyú is known as the Miraflores Canal, which was constructed during the Middle Preclassic period (Valdés 2006:67). The San Jorge canal,
with a length of 1,750m, was built later (c. 300 – 200 B.C.), and ran parallel to the Miraflores Canal (Valdés 2006:75). Unlike the canals at Takalik Abaj, these canals were lengthy and served to irrigate raised fields for intensive cultivation (Valdés 2006:75).

Non-water management related construction projects of monumental scale began to be built around same time period as the construction of the canals of the site (Valdés 2006:67). At its peak, Kaminaljuyú grew to an area as large as 10km² (Love 2007:292). Guernsey (2006:7) suggests that the rulers of Kaminaljuyú had the wealth and power to order the construction of monumental architecture, including the canals, partially due to the conspicuous consumption that was evident at the site. The rich tombs of nobles attest to unequal distribution of wealth at the site, but so does the placement of elite residences near the city’s central water source, Lake Miraflores (Guernsey 2006:7; Valdés 2006:71). Valdés (2006:70-72) argues that the elite not only had the power to mandate the construction of the canals that distributed lake water to other areas of the site, but they also sponsored rituals, the evidence of which has been found in the lake in the form of various offerings.

According to Kaplan (2000:195-196), the sculptural corpus of Kaminaljuyú also supports the existence of a “politico-religious” institution at the site, in which rulers portrayed themselves as benefactors of the citizens by enacting “life-creation” rituals. The central lake of the site and the canals extending from it would have served as significant sacred parts of the site because these features embody the sustainment of life in a direct sense by functioning as a part of the subsistence activities of the site. Owning responsibility over the water management system and sponsoring water-related rituals
would have emphasized the sacred duties of rulers, including their desired status as the axis-mundi from which life sprung for the benefit of the people (Kaplan 2000:194).

The water-related sculptural art of the site, such as its monumental, rounded, toad effigies is also suggestive of the spiritual importance of water because sculptures represent the themes valued within culture (Parsons 1967:183-184). Kaminaljuyú Monument 2, representing a world-crocodile, is one of the water-related monuments that has been recovered and is suggestive of the cultural importance of watery themes (Doering and Collins 2009; Doering and Collins 2010; see Figure 8). Stone monuments of this type are numerous within the polity and provide meaningful context for the site layout because the residents integrated various human-made and natural water features into their community (Doering and Collins 2010).

Centrally integrated into the site plan of Kaminaljuyú, Lake Miraflores appears to have been important symbolically in addition to being important for the expansion of the agricultural base of the site (Valdés 2006:71). The lake is an emblem of prosperity and supernatural power. These important aspects of Lake Miraflores were allowed to flow into the community due to the canals whose construction would have been sponsored and organized by rulers. In a manner similar to San Lorenzo, the monumental architectural features at Kaminaljuyú suggest that a great deal of labor was required to construct them, which may be indicative of centralized power, especially when combined with the evidence of unequal wealth found at the site. The enhancement of the agricultural system made possible by the use of canals was able to provide the resources needed to sustain a larger population that would be quintessential to future construction projects requiring large labor forces (Guernsey 2006:6-7). Economic and spiritual privileges facilitated the
ability of the elite to direct the construction of projects that emphasized and helped to institutionalize their power.

_Cerros_

Scarborough and Gallopin (1991:658) note that a major difference between sites in the Mexico highlands and sites in the Maya Lowlands is that generally lowland sites are concerned with collection and storage of water, while highland sites emphasize canalization and the drainage of water. Cerros, located in northern Belize, is one Late Preclassic (c. 300 B.C. – A.D. 150) Maya lowland site that contains water storage features, such as basin canals and reservoirs, with an emphasis on catchment (Scarborough 1983:737; Figure 22). The water systems at Cerros did function, in part, to drain the surfaces of courtyards and plazas during the rainy season, but the focus of the constructed water features was the retention of water in basins and reservoirs (Scarborough 1983:727-737; Scarborough 2007:169).

According to Scarborough (2007:169), the people at Cerros purposefully settled land that was naturally depressed and modified it to create a “concave microwatershed” that would use the contours of the landscape to capture water. In addition to modifying the landscape to maximize its catchment abilities, the people of Cerros constructed an impressive, 1,200-meter-long canal that encircled the central portion of the site (Scarborough 1983:726). This canal, built at some time between c. 200 B.C. and 50 B.C., is associated with raised fields and seems to be easily accessible, suggesting that this water feature was not tightly controlled (Scarborough 1983:736-737; Scarborough and Robertson 1986:171). The main canal may have also served as a defensive territorial boundary for Cerros (Scarborough 1983:736; Scarborough and Robertson 1986:156).
In contrast to San Lorenzo that had water features integrated into a prominent, elite complex, and Kaminaljuyú, that features several elite residences in the vicinity of Lake Miraflores at the core of the site, there is a much less significant connection between elite architectural features and water features at Cerros. At Cerros, monumental architecture is rare and both residential and public structures are scattered across the landscape in a generally dispersed pattern (Scarborough and Robertson 1986:155-156). Additionally, wealth inequalities between the elite and non-elite were not greatly marked, and both elite and non-elite residences were located at the core area of the site that is surrounded by the lengthy canal (Scarborough and Robertson 1986:156-171).

The equal and unrestricted access to water features, and the lack of integration of water features into large civic and elite areas, suggests that the community, rather than an elite group, managed the water resources (Scarborough 1983:737; Scarborough and
Robertson 1986:171-174). While considerable labor and planning may have been needed for the construction of the canal and the other water features at Cerros, there is a lack of evidence to suggest that water features played a key role in the political dynamics of the site. Unlike the other sites previously mentioned, there is no greater concentration of elite residences or activity areas around water features and there is a lack of iconography to suggest that elites used water-related themes as emblems of power to identify themselves as part of the supernatural realm.

**Palenque**

Palenque is one of the many Classic period (A.D. 250 – 900) sites that has been the subject of water management research. This site is located at the foothills of the Tumbalá Mountains in northern Chiapas, an area that receives a considerable amount of rain—about 3,600mm annually (Lucero 2002:821). Palenque’s uneven landscape is naturally divided by many streams, including the Otolum River, which is arguably the most important natural water feature at the site (French et al. 2006:144-145; French and Duffy 2010:1028; Figure 23). In addition to these water sources, Palenque also has 56 known springs that provided drinking water for the entire year (French et al. 2006:144). Although the site was generally not threatened by water scarcity, water features like aqueducts, bridges, dams, drains, channels, and pools were integral to the planning of the site to allow for the distribution of water, the prevention of flooding, the diversion of water to create more livable space, and the enactment of water-related rituals (Davis-Salazar 2006:125; French et al. 2006:144-145).

The population boom at Palenque that occurred around the beginning of the 7th century increased the necessity of modifying the rugged landscape to provide more flat,
livable space (French and Duffy 2010:1027). The subterranean channels constructed at Palenque to provide more space above them represent an example of the ingenuity of the local engineers and one of the ways in which the control of water was a vital element of site planning (French and Duffy 2010:1028-1030). French and Duffy (2010:1032) postulate that one of the subterranean aqueducts, known as PB-A1, may have also been used to manipulate water pressure to create a fountain for aesthetic purposes.

Figure 23 Site map of Palenque (French and Duffy 2010:1029).

While all of these functions of natural and constructed water features were important, there is much more to the control of water at Palenque, indicted in part by the architecture itself and the spatial relationships of water features to other structures. Houston (1996:132) suggests that the architecture of Palenque should not be interpreted
only for its functionality, but also for possible ideological meanings. “Sweatbaths,” or steam baths, existed at Palenque that appear to have had only symbolic associations with water and related themes (Houston 1996:132). These structures are often referred to as sanctuaries, but are also characterized as symbolic sweatbaths because of their layouts and the fact that they are marked with glyphic references to generating heat or steam (Houston 1996:132-138). These structures were small, around three-by-three meters, but were rich in glyphs and iconography, especially those representing themes associated with creation and divine birth (Houston 1996:134-138; Figure 24).

![Figure 24 Sweatbath in the Temple of the Sun, Cross Group (Houston 2010:134).](image)

Ethnographic studies within the Chiapas region have established a connection among steam baths, caves, healing, purification, and childbirth (Houston 1996:138-139). Drawing from these ethnographic studies and other examples of ancient Mesoamerican steam baths, the steam baths of Palenque are argued to have been representations of the birthplace of the gods because they are located within the Cross Group of Palenque,
which is full of other symbology related to divinity and the relationship of Palenque kings to sacred ancestral gods (Houston 1996:147). Through ritual, these steam bath sanctuaries would have appropriated the same symbolic functions as the birthing ceremonies that occurred in functioning steam baths (Houston 1996:147).

French et al. (2006:144) echo the sentiment that water was used symbolically at Palenque in addition to serving the other important functions previously discussed. At many Maya sites, pyramids are considered analogous to mountains, and are often associated with caves or springs (Scarborough 1998:149-154). Within Mesoamerican worldviews, mountains were sacred homes for the gods and ancestors, but they were also viewed as sources of water (Brady and Ashmore 1999:133). These meanings of mountains are believed to have been extrapolated onto the ancient pyramids that served as symbolic mountains (French et al. 2006:146-147).

In a manner similar to the way in which a sanctuary demarcated as a “sweatbath” can become a symbolic sweatbath based upon the layout and the glyphs upon its surface, the concept of the “water mountain” exists at Palenque through the placement of architectural features (French et al. 2006:146-147). A literal “water mountain” is a mountain with a nearby water source, but this same concept can be manifest in the symbolically charged combination of architecture and nature, represented by a metaphorical mountain—like a pyramid—that is associated with a real or symbolic water source (Scarborough 1998:135-137). This form of construction enhances the connotations of power and sacredness of the buildings.

The temples of the Cross Group at Palenque demonstrate examples of monumental structures that are associated with water features. The spring known as OT-
S1 is located near a mountain directly behind Temple XIX—a temple that faces the Temple of the Cross (French et al. 2006:146). The Temple of the Cross, directly facing OT-S1, possesses hieroglyphs specifying the importance of its position to the spring by claiming it was “before the spring of Lakamha’” (Stuart 2010:43). Lakamha’ is the ancient name for the Palenque, carrying the meaning of “Wide Waters,” which is believed to be in reference to the especially wide Otolum River (Stuart 2010:42). Temple XIX and the Temple of the Cross mimic the water mountains of the natural landscape by being associated with the mountain spring.

OT-S1 is significant not only because of its associations with a mountain range and these temples, but also because it is the source of the Otolum River that passes through the center of Palenque’s ceremonial core (French et al. 2006:146). The Otolum River’s central location among monumental religious structures and evidence suggesting that the core of Palenque was named after this stream supports the idea that this water feature and its source carried a ritual meaning to the ancient inhabitants. The springs around this area also would have served as important water sources of potable water to the ancient inhabitants.

Analysis of the site plan and iconography suggests that Palenque’s rulers tried to hone in on the ritual aspects of water for their political gain. Stuart (2010:42) claims that during palace renovations, the king known as K’inich Janab Pakal was directly involved in the modification of the Otolum River to construct an aqueduct beneath a new plaza. Analysis of the writing and imagery found on a tablet from Temple XIV of Pakal’s son, Chan Bahlum, shows the king laden with water iconography and suggests that he was also involved with the construction of an aqueduct (French et al. 2006:149). Chan
Bahlum commissioned the construction of the Cross Group, which is closely associated with the important water features previously discussed (French et al. 2006:149). It is probable that Chan Bahlum commissioned construction projects like the Cross Group temples that were associated with natural water features and art depicting his close spiritual connection to water to legitimize his rule to his people.

Pakal and Chan Bahlum represent two generations of Palenque rulers that were interested in water management and the sacred role of water in society. Their trend in the political use of water may have been part of a tradition at the site. Lucero (2006:155) suggests that the kings of Palenque may have been responsible for ensuring the maintenance and repair of these water works, as well as settling any disputes regarding the allocation of water resources. Involvement in both the ritual aspects of water and daily water needs of the people would have been beneficial to the office of power because involvement in these areas would have made rulers seem like a vital, indispensable part of the community.

Copán

The ancient Maya site of Copán is another Classic period site located near rivers. The Copán Valley, where the site is situated in western Honduras, has several springs and lagoons spread upon its landscape, which is divided by the tributaries of the Copán River (Davis-Salazar 2006:125-126; Fash and Davis-Salazar 2006:130-131; Figure 25). Various methods of water management were undertaken at different areas of the site, beginning from c. A.D. 400 – 650 (Davis-Salazar 2006:125; Fash and Davis-Salazar 2006:132). Conduits above and below ground surface and the architectural features of plazas and buildings were parts of the water management system that functioned to
distribute water to different areas of the site (Davis-Salazar 2006:125). The ancient inhabitants of Copán also managed their water resources by modifying lagoons to increase the amount of water they could collect (Davis-Salazar 2003; Davis-Salazar 2006:135; Fash and Davis-Salazar 2006:131). Lagoons, which have also been argued to have been used for ritual activity, appear to have inspired iconography at the site as well because lagoon flora and fauna were displayed prominently on various monuments found

**Figure 25** Site map of Copán (Davis-Salazar 2006:126).
in Copán along with other marine creatures and plants (Davis-Salazar 2006:135; Fash and Davis-Salazar 2006:135; Fash 2010:81).

Copán resides in an area that receives just over 1,300mm of rain each year (Lucero 2002:821). To prevent flooding and the health risks associated with stagnating water, the residents of Copán integrated stone-lined “substructure conduits” within the site plan to drain water from partially enclosed courtyards and plazas through the bases of the structures surrounding them and out into other areas (Davis-Salazar 2006:125-128). When water was desired for ritual activity, plazas may have remained flooded and later drained when ceremonies were completed (Fash 2005:116; Schele and Miller 1986).

The ancient inhabitants of Copán constructed these substructure conduits out of dressed stone—not river cobbles—only within civic-ceremonial and elite residential areas, suggesting that these architectural features were limited to elite sections of the polity possibly due to the advantage of the ruling class to control labor and access to the technology and materials needed to construct the conduits (Davis-Salazar 2006:128-129). In addition to the substructure conduits, subterranean conduits were used within the site. Two stone-lined subterranean conduits constructed of cut volcanic tuff with the purpose of carrying water underground, have been identified in association with the Acropolis of Copán (Davis-Salazar 2006:129). Excavations revealed the presence of human remains within one of the subterranean conduits that may indicate that a termination ritual occurred in there (Davis-Salazar 2006:129-134). Superficial water features such as stucco channels, roof drains, splashboards, causeways, and slightly inclined outdoor floors or stone patios helped control erosion primarily by diverting or retaining water to keep areas drained (Davis-Salazar 2006:129). The urban residential areas of the site included every
type of water feature discussed, but only the civic-ceremonial core of the site contained water features exclusively manufactured with dressed stone, which suggests that the elites in control of the civic-ceremonial center may have placed considerable social value as well as considerable resources into the water management system (Davis-Salazar 2006:131).

The rationale behind investing in a water management system could be that the system may have functioned as a representation of the ruling class and their ideals (Davis-Salazar 2006:131). Water may have been a significant asset to the rulers of Copán in a manner similar to those of Palenque because both sites contained evidence to support the idea that water was used to augment power. Fash (2010:81-82) argues that certain symbols used in the iconography of rulers at the site are symbols of the ruler’s ability to effectively manage the city’s water resources (see also Davis-Salazar 2003). The water lily headdress worn in images by rulers and nobles is one example because the water lily is a plant that can only grow in clean water (Fash and Davis-Salazar 2006:136; Lucero 2002:815). A relationship with the water lily suggests that rulers valued not just water, but clean and potable water, as a part of their identity. Clean water, and all the benefits that came with it, could be obtained through the successful management of water via architectural constructions throughout the site.

Roof drains, which were commonly found on elite and civic-ceremonial buildings, were also found with iconographic elements that may have been significant to the image of rulers, such as the witz monster stucco mask found upon the mouth of one of these roof drains (Davis-Salazar 2006:130; Figure 26). Using a witz, or mountain, monster upon a water feature draws upon concepts within Mesoamerican worldviews that
suggest mountains are sources of water (Bassie-Sweet 2008:11; Brady and Ashmore 1999:130-133). The use of only dressed stone for water features within elite areas implies a willingness to spend resources and time on these features, while the incorporation of iconography upon these water features, suggests that they were meant to be viewed and they were meant to express the values of the elite that ordered their construction.

Figure 26 Roof drains discovered in the Principal Group (Davis-Salazar 2006:131).

Conduits or drains designed with iconographic elements were not just functional aspects of the architecture of the site, but they were also works of art and vehicles of elite ideology. They represent the involvement of skilled artisans in addition to engineers and other laborers. The incorporation of water, mountain, and cave imagery on the residences of the elite, on elite activity areas, and on other art forms emphasizes the idea that the
elite identified with the power of sacred mountains and that they were uniquely gifted with the ability to manage and provide water to society.

Lucero (2002:819) suggests that elites may have controlled Copán’s large reservoirs, but the existence of aguadas among the community suggests a degree of autonomy for the populace when the climate was favorable. Davis-Salazar (2006:135) also suggests that these community sources of water were probably ceremonial sites as well. Evidence for water rituals across the community to the highest offices of power implies a shared ideology that may have been advantageous to rulers because the message from rulers would have resonated with communities. If Copán’s rulers did pride themselves on their ability to manage and provide water to their people, they would have also been subject to the effects of the climate and any natural or human-induced degradation of the environment (Lucero et al. 2011:484-486). Rulers would have been vulnerable in situations of environmental change that reduced the amount of resources available. Copán’s portrayal of its elites, the traits of the water management features, the presence of ritual artifacts associated with water features, and the watery symbolism depicted on numerous artistic mediums at the site allude to a society that was highly aware of its water-rich surroundings and that placed special ideological importance upon them.

*Tikal*

Tikal, located in the north-central Petén region of Guatemala, is another site with a Classic period (c. A.D. 250 – 900) example of a water management system (Scarborough and Gallopin 1991:658; Scarborough 1998:141). Unlike the sites previously mentioned that were located near rivers or lakes, Tikal is not located near a
permanent water source and was periodically threatened by water scarcity (French et al. 2006:147; Scarborough 1998:139-141). Tikal’s period of heavy rainfall lasts for about six to eight months and provides the area with an estimated precipitation rate of 1,350 – 2,000mm annually, while the rest of the year experiences drought (Scarborough and Gallopin 1991:658; Scarborough 1998:137-141). To prepare for the dry season, many catchment areas and reservoirs were constructed to enhance the collection of the precious rainwater available during the rainy season (Scarborough 1998:141).

Tikal is divided into six catchment areas containing reservoirs that are separated into different classes according to the areas in which they are located and their purposes (Scarborough and Gallopin 1991:659; Scarborough 1998:141; Figure 27). Scarborough and Gallopin (1991:659) categorize the reservoirs into central precinct reservoirs, residential reservoirs, and bajo-margin reservoirs. Tikal’s central precinct catchment covers approximately 62ha and contains several monumental structures, such as temples and palaces, as well as the central precinct reservoirs (Scarborough 1998:141). The monumental architecture serve to express the wealth and power of the elite at the same time that their various paved areas, plazas, courtyards, and platforms were designed to contain water in areas or to channel runoff into central precinct reservoirs because these flat areas were constructed of impermeable materials and built at angles (Scarborough 1998:141). All of the central precinct reservoirs were located within 100 meters of the major civic-ceremonial structures of the core, suggesting that the availability of water, ritual, and the public stage were intertwined (Scarborough 1998:143-144). Scarborough and Gallopin (1991:661) argue that the centralization of the reservoirs within the core of Tikal, located beside palaces and temples, implies control of the water management
system by the ruling elite. These structures and water features are located at the summit of the site and—when combined—appear to act as sacred “water mountains” because they function in part to distribute water to the lower parts of the site (Scarborough 1998:135).

**Figure 27** Catchment areas of Tikal (Scarborough and Gallopin 1991:659).

This layout, in which elite palaces, temples, and pyramids are located at the apex of the site along with the largest water sources, illustrates a “convex microwatershed” that contrasts with the “concave microwatersheds” demonstrated at sites like Cerros
(Scarborough 1998:139-141). In the convex microwatershed site plan of Tikal, smaller residential reservoirs were located in the residential catchment areas surrounding the site’s core (Scarborough and Gallopin 1991:659). These residential reservoirs may have needed to rely on the large central reservoirs of the city to replenish their stores during dry periods (Scarborough and Gallopin 1991:659). The relationship of the residential areas with the elite core, suggests dependence of the outlying areas, especially on the periphery, to the core. With their lesser holding capacities, the residential reservoirs may have been depleted during prolonged bouts of infrequent rainfall while the central precinct reservoirs would have remained stable because of their greater size (Scarborough and Gallopin 1991:659; Scarborough 1998:144).

_Bajo_-margin reservoirs were further from the center at less elevated areas of the site where they would receive the runoff and “gray water” from the residential areas above them to be repurposed for use within agricultural plots (Scarborough 1998:141). The water management system of the site terminates at these reservoirs, located at the edge of the _bajos_, or swaps, where any remaining water would flow (Scarborough and Gallopin 1991:659). The water management system of Tikal demonstrates a correlation between the cleanest, most abundant waters and elevated elite activity areas and the least abundant, “gray” waters with the low-lying periphery in which agricultural activity is proposed to have occurred.

The integration of water at Tikal correlates with Scarborough’s (1998:146-147) idea that compares the water management systems of the ancient Maya to those at modern Bali, Indonesia. Lansing (1987:331-332) describes the water system at Bali as a network of connected temples, each placed at spots where water first enters a farmer’s
fields, through which planting cycles and the scheduling of water turns are regulated by priests. Locations at higher elevations are considered to be ritually significant because these places are sources of life-sustaining water (Lansing 1987:332). Water originating closer to the sources upstream is considered to be purer than the water downstream, most likely due in part to factors related to cleanliness and the immediate availability of water (Lansing 1987:332; Mulligan et al. 2011:1346; Scarborough 1998:147).

The ruling class of Tikal may have been attempting to legitimize their power by creating a connection between their ritual and public activities and the central precinct reservoirs because the reservoirs are a source of clean water that flows down to the rest of the site at the same time that they are likely sacred symbols of the community (Scarborough 1998:145). In essence, they would act as priests that have the power to regulate the distribution of water. The control of water would have been valuable economically because it was vital to the survival and prosperity of the community and spiritually as a means to prove the exceptional supernatural powers of those that governed the water sources (Scarborough 1998:145). The sacred attributes associated with the water sources of the core of the elite and the bajo area resonates with ethnographic Maya beliefs in which “low-water shrines,” such as lakes or pools, are purified with the water of “high-water shrines” located in the mountains (Scarborough 1998:154). Within modern day Quiche Maya rituals, low-water shrines were organized with one shrine placed at each of the cardinal directions (Scarborough 1998:154). The four bajo-margin reservoirs of Tikal were planned with similar organization, with each reservoir roughly aligned to the cardinal directions, which may suggest that the ancient
inhabitants had water rituals like the modern Maya, using the water of the reservoirs at the apex of the site to purify the waters of the four *bajo*-margin reservoirs below.

Considering an estimated average annual rainfall of 1,500mm, the central precinct reservoirs, residential reservoirs, and the *bajo*-margin reservoirs would have had a combined store capacity of greater than 900,000m$^3$ of water a year (Scarborough 1998:141). The management of the reservoirs, especially the central precinct tanks that held the most water, was crucial to Tikal because of its lack of natural water sources and because of the dryness experienced during much of the year. In this environmental situation, people living furthest from the core of the site may have felt more greatly threatened by a lack of water even if they had residential reservoirs because these reservoirs would have dried during harsher droughts. Processes of maintaining clean water for citizens would have been more fully integrated and better managed in the site center, which would have motivated people to stay at the site, despite being under the rule of the elite (Scarborough 1998:144). The essential function of the water management infrastructure of Tikal to the economic well being of the society also made the water management system an attractive tool for the aggrandizement of rulers, who could promote their involvement in the successful collection and distribution of water.

*Summary of Mesoamerican Water Research*

Research in Mesoamerica on the subject of water management has been diverse and has shown there were many types of water management systems in place across the geographic areas and through time. The way the management of water was connected to labor demands, accessibility to water, concepts of sacred landscapes, and ritual activities was related to the types of political dynamics of each site. The association of political
power with water and its control seems to have been linked to varying degrees at San Lorenzo, La Venta, La Blanca, Kaminaljuyú, Palenque, Copán, and Tikal. Markers for this connection are the proximity of water features to elite and ceremonial architecture, monuments depicting elite rulers with water-related imagery, and “water mountain” imagery in elite and ceremonial architecture.

San Lorenzo features a ruler in association with cave imagery as well as an aqueduct and a well at its elite complex, known as Group E. The site plan of La Venta draws upon Olmec concepts of the universe, with architectural complexes laden with water and underworld symbolism in addition to water features in areas that define the legacy of the ruling class. La Blanca exhibits the coexistence of elite ritual with public ritual in spaces rich with marine remains and artifacts with water-related themes. Residences of nobles surround Kaminaljuyú’s Lake Miraflores that serves as the center of the city and its fountain of spiritual and economic nourishment.

Palenque’s Cross Group temples built in honor of the rulers create “water mountain” symbolism by being correlated to rivers and a mountain spring. The site of Copán has a wide array of water management architectural features that are notably most profuse within elite urban residences. Water-related iconography appears both on Copán’s water features in the urban center and within illustrations of the ruling class. Tikal’s massive reservoirs are also located in close proximity to elite architecture and civic-ceremonial structures concentrated at the highest elevations of the site in a position of power because they are the sources of water for the other reservoirs of the site that depend upon them during times of drought.
Sites that feature elite structures and/or religious structures near prominent water features, especially when these water features are associated with ritual artifacts and iconography, make a case not only for the ritual importance of water, but also for water’s political significance. Mountain-like structures, such as Complex C of La Venta, suggest ideological influence of water when combined with water sources due to Mesoamerican worldviews that suggests mountains are sources of water. In a worldview in which water sources and mountains have a sacred significance, the architectural mimicry of sacred landscapes must be interpreted for potentially symbolic meanings.

Taking the example of Mesoamerican sites with water management systems, especially those of the Preclassic period, Takalik Abaj’s political dynamics may be evaluated in terms of the relationship between architecture and the water features of the site. If Takalik Abaj displays a great connection between elite, monumental, and religious architecture and its water features, the political scene may have been influenced by water because of the importance of water as a resource and as a supernatural connecting element. The same may be said if water-related iconography and ritual objects are located near elite, monumental, and religious structures. The planning of the site and how it may have been constructed to coincide with an idealized sacred landscape may also inform on the role of water within the site.

If, however, Takalik Abaj demonstrates a site layout similar to Cerros, which was the site least likely to have involved the politicized use of water, Takalik Abaj’s political dynamics may similarly not have been greatly influenced by its water resources. Cerros demonstrates a site plan in which elite and non-elite residences are both located by the canal, which is the site’s most significant water source. It also lacks water iconography
and has easily accessible water features. Examining the role of water at Takalik Abaj is most effective with multiple variables. The locations and functions of structures, the site’s topography and landscape features, and its sculpture and iconography are all elements of the site layout that can be analyzed and visualized in a GIS context. Based upon comparisons to the sites described above, some insight may be gained into the political dynamics at Takalik Abaj.
CHAPTER 4:
ARCHAEOLOGICAL HISTORY OF TAKALIK ABAJ

Mesoamerica contains a variety of landscape types, including highlands, karst environments, and coastal plains, which have differing water sources and water availability. The ways in which water was incorporated into site planning at different sites in Mesoamerica reflects the ability of the local people to adapt to their unique settings according to their necessities. Research that has been done on water management in Mesoamerica looks beyond water management as simply an adaptation to the landscape, to consider how the control of water may have affected culture, especially political dynamics and religious practices.

The history of Takalik Abaj extends over almost a 2,000-year period from about the beginning of the Middle Preclassic (c. 1000 B.C.) to the beginning of the Early Postclassic (c. A.D. 1000) (Crasborn and Marroquin 2006:45). Takalik Abaj, like the other Mesoamerican sites discussed, developed a unique society and a water management system molded to the natural and cultural environments of the site. While every site is different, there are threads of similarities between some of them that are helpful in explaining the situation of Takalik Abaj. This chapter explores the environment of Takalik Abaj and the history of research at the site concerning several topics that may be relevant to the use of water at the site.
Environmenal Setting

Takalik Abaj is located in the foothills of the western Guatemala Highlands, between the Xab River, the Ixchiya River, and the Nil River, in the municipality of El Asintal in the Retalhuleu department of Guatemala at about 190km west of Guatemala City (Crasborn and Marroquín 2006:45; Graham et al. 1978:85-88; Jacobo 1999:548). The site’s coordinates are 14°38'45"N 91°44'10"W, placing it just north of the village of El Asintal and about 40km north of the Pacific Ocean (Graham et al. 1978:88; Doering and Collins 2011:3). The approximately 9km² region of Takalik Abaj lies within a humid and subtropical climate that receives an average annual rainfall of 3,284 mm (García 1997:171; Rizzo de Robles 1991:33). The position of Takalik Abaj on a sloped, piedmont landscape differentiates it from sites that are located on flat or depressed land, such as Cerros, which are more likely to have water management systems focused on water catchment (Scarborough 2007:168-169). The mountains surrounding the site, the amount of rainfall, and the types of water sources available to the inhabitants all influence aspects of Takalik Abaj’s water management system, which has an impact upon its society.

The western Guatemala Highlands consist of the volcanic composite cones and domes of the Sierra Madre mountain range that reside to the north of Takalik Abaj (Rose et al. 1977:63). Volcanoes, like the Siete Orejas Volcano and the Santa María Volcano, have had an impact on the ecology of the region because of their unique geological characteristics (Doering and Collins 2011:5-6). The Santa María Volcano, which can be seen from the site of Takalik Abaj, is a composite basaltic andesite cone volcano that is located near Quetzaltenango City (Doering and Collins 2011:6; Rose et al. 1977:85). In 1902, the Santa María Volcano erupted, destroying large portions of Quetzaltenango and
depositing ash on Takalik Abaj that was between 40 – 50cm thick (Garcia 1997:172; Graham et al. 1978:87; Jacobo 1999:551; Mathewson 2006:17; Orrego Corzo 1991:3). The cover of ash left by this eruption continues to limit the archaeological visibility of the area for researchers (Doering and Collins 2011:5).

The volcanic environment neighboring Takalik Abaj also affected the characteristics of the soils of the site, and therefore, the types of flora that could flourish. Based upon evidence of plant samples found at Takalik Abaj, Rizzo de Robles (1991:33) notes that some of the plant life that thrived in the area were the following species: “pascua de montaña (Pogonopus spesiosus), chichique (Aspidosperma megalocarpum), tepecaulote (Leuhea speciosa), caulote (Guazuma ulminofolia), hormigo (Platymiscium dimorphandrum), cedro (Cedrela mexicana), ujushte o ramón (Brosimun sp), tamarindo (Tamarindum indica), papaturria (Coccoloba montaña).” Some of these plants, like the tamarindo and the ramón, produce edible fruits, which may have been incorporated into the ancient diet of Takalik Abaj’s citizens.

Due to its position on the piedmont, the plains and hilly regions that make up Takalik Abaj’s terrain benefited from the accumulation of erosion from the surrounding volcanoes that provided the site with fertile and deep soils (Jacobo 1999:549; Love 2007:277; Rizzo de Robles 1991:33). The soils of Takalik Abaj, like other soils in the Pacific coast, were suitable for the growth of cacao, a highly valued crop in ancient Mesoamerica (Guernsey 2006:20; Love 2007:293; Popenoe de Hatch and Schieber de Lavarreda 2001:990; Rizzo de Robles 1991:32-33). The productivity of the soil of Takalik Abaj would have increased the allure for people to invade or immigrate to the region (Popenoe de Hatch and Schieber de Lavarreda 2001). In addition to cacao, Takalik
Abaj’s soils are suitable for the cultivation of coffee, sugar cane, rubber, bananas, cacao, citrus fruits, maize, beans, and rice (Graham 1979:180-181; Rizzo de Robles 1991:33). The land continues to be cultivated today by the five private fincas, or farms, that cover about 80 percent of the site (Doering and Collins 2011:5). Graham (1979:180-181) remarked that excavations and surveys were difficult to carry out due to the inability of researchers to clear the lands of the fincas, many of which were growing coffee at the time.

The mountain ranges located near the site also influenced the types of natural stone and water resources available. Takalik Abaj is abundant in stone resources, especially volcanic rocks, because of the nearby volcanoes. These resources played an important role within the construction of architecture and art at Takalik Abaj. Andesite, one type of volcanic rock local to the area, was used for the sculpting of monuments at the site, while local river boulders were used in the construction of platforms and buildings (Crasborn and Marroquín 2006:48; Graham 1989:232).

Steyermark (1950:368) notes that springs, mountain lakes, and spring-fed mountain streams are some of the types of water sources that characterize the highlands of Guatemala. The neighboring Chiapas Highlands of the Soconusco region, which share characteristics with the environment of the area around Takalik Abaj, are also known for streams that originate from the piedmont and that travel south to the Pacific Ocean and its estuaries (Coe and Flannery 1967:12). The natural topography of the highlands within the area of Takalik Abaj provides an interesting parallel to Mesoamerican worldviews in which mountains are believed to be sacred sources of water (Brady and Ashmore 1999:133; Scarborough 1998:143). This correlation between prevailing Mesoamerican
beliefs about landscapes and what occurs within the natural setting around Takalik Abaj should be considered in the interpretation of water use at the site because of the potential of these attitudes to influence ritual activity. The streams of Takalik Abaj provide the resources of river stone, but it is the numerous springs of the site that were likely the most important sources of potable water for its citizens.

Diehl (1981:74) suggests that the springs of San Lorenzo would have been such vital resources of potable water that the human-made water features of the site were not likely to have been used for the function of securing more drinking water. A scenario similar to that proposed to have occurred at San Lorenzo may have been realized at Takalik Abaj. This idea is supported by the lack of evidence to suggest that the inhabitants of Takalik Abaj constructed reservoirs like those found at Cerros and Tikal (Scarborough 1983:727-737; Scarborough 1998:141-146; Scarborough 2007:169).

The great quantity of rain, the non-ephemeral sources of fresh water, and the availability of springs as sources of potable water would have played a major role in establishing the function of Takalik Abaj’s water management system. The inclined, sloped landscape would have also influenced the management of land and water because these types of landscapes are vulnerable to run-off and erosion (Marroquín 2005:955). For these reasons, Marroquín (2005:955) argues that one of the top priorities of the water management system at Takalik Abaj would have been the drainage of the great quantities of water received through annual rainfall at the site. Proper drainage of water would have minimized the damage caused by erosion, which is pivotal to the maintenance of the structural integrity of the architectural features of the city (Crasborn and Marroquín 2006:47; Marroquín 2005:955). Without land and water management techniques that
worked to prevent erosion, the platforms, buildings and other features of the site would have been at the risk of being washed away.

The piedmont environment, the availability of water, the type of soil, and the accessibility to other resources would have influenced several areas of ancient life at the site. All of these factors helped to shape the ways in which the city was constructed and the land was modified, in addition to influencing the quality of life of residents at Takalik Abaj. The ready availability of potable water, rain, rich soils, and stone likely contributed in a significant way to the emergence of Takalik Abaj as a major center during the Middle Preclassic period.

**Previous Archaeological Projects**

Takalik Abaj’s water-rich environment is marked by a vast sculptural corpus of 326 registered monuments that has attracted researchers for decades (Doering and Collins 2011:1). The diverse stone sculptures, some of which weigh several tons, drew in many of the initial researchers that studied the site, such as Gustav Brühl who published descriptions of the monuments and the vegetation of the site in a 1888 report (Brühl 1888; Chang Lam 1991:20; García 1997:171; Graham et al. 1978:87). Brühl was only one of the several German researchers drawn to Takalik Abaj in the late 19th and early 20th centuries. Other notable early German pioneers to the site include Karl Sapper, Max Vollmberg, and Walter Lehmann who worked to record and document their findings on the monuments of Takalik Abaj (Garcia 1997:171; Graham et al. 1978:87).

Sapper was a geographer with an interest in archaeology who is notable for many publications, but especially for creating an exact map of Guatemala and for discovering Altar 1 of Takalik Abaj in 1894 (Chang Lam 1991:19; Orrego Corzo 1991:1; Mathewson
Max Vollmberg drew Altar 1 in 1920 and sent this drawing as well as other drawings of various Takalik Abaj monuments to Lehmann, which ultimately influenced Lehmann to visit the site in 1925 (Chang Lam 1991:19; Graham et al. 1978:87). As Lehmann excavated monuments, including Stela 2, he recognized that many of the sculptures of the site were older than previously believed (Graham et al. 1978:87; Lehmann 1926; Figure 28). Following the work done by Lehmann, J. Eric S. Thompson also published information on the chronology of the monuments from his research done during his visit to Takalik Abaj in 1942 (Graham et al. 1978:87).

During the 1960s and 1970s, researchers such as Susan Miles, Lee Parsons, John A. Graham, Robert F. Heizer, and Edwin Shook defined the archaeology of Takalik Abaj (Graham et al. 1978; Miles 1965). Miles (1965:246-247) analyzed Monuments 3 and 6 of Takalik Abaj in her 1965 publication detailing the sculptures and hieroglyphs of Takalik Abaj, Kaminaljuyú, Izapa, and other sites in the Guatemala-Chiapas Highlands. In 1969, Parsons re-evaluated the monuments previously described by Brühl and suggested that some of the monuments bore stylistic similarities to those found at Izapa (Chang Lam 1991:20; Graham et al. 1978:87). Graham, Heizer, and Shook began the first extensive excavations and surveys of Takalik Abaj in 1976, including a large-scale topographic mapping survey, with a focus upon the sculptures of the site (Graham 1979; Graham 1989; Graham 1990; Graham et al. 1978:86). According to Graham (1979:179), the artistic styles of the monuments of Takalik Abaj had been erroneously compared to those of Izapa.
Beginning in 1987, the Proyecto Nacional Tak’alik Ab’aj, directed by Miguel Orrego Corzo and Christa Schieber de Lavarreda, began to investigate the Central Group of the site (Doering and Collins 2011:5; García 1997:171). Research was soon extended to other areas of the site by archaeologists, such as José Crasborn, Elizabeth Marroquín, Marion Popenoe de Hatch, Miguel Orrego Corzo and Christa Schieber de Lavarreda, of
the Proyecto Nacional Tak’alik Ab’aj to expand the knowledge available about Takalik Abaj in a diverse range of topics including the site’s construction patterns, ceramics, cultural change, ritual activity, monuments, and water management (Crasborn 2005; Crasborn and Marroquín 2006; Marroquín 2005; Orrego Corzo and Schieber de Lavarreda 2001; Popenoe de Hatch 2004; Popenoe de Hatch 2006; Popenoe de Hatch and Schieber de Lavarreda 2001; Schieber de Lavarreda 1991; Schieber de Lavarreda 1998; Schieber de Lavarreda 2006; Schieber de Lavarreda and Orrego Corzo 2009). In 2010 and 2011, Travis Doering and Lori Collins used advanced spatial mapping and terrestrial laser scanning and imaging techniques to consider the sculptural corpus in relation to site layout and location (Doering and Collins 2011). These archaeologists shifted away from research focused primarily on the site’s stone sculptures and have contributed to the broader understanding of the site, providing the knowledge available on its construction sequences.

Site Construction

Takalik Abaj is divided into four groups: the Central Group, the North Group, the West Group, and the South Group (Wolley Schwarz 2001:1006; Figure 29). The majority of the excavations at the site have occurred at the Central Group, which is located primarily on Terraces 1, 2, and 3 adjacent to the west bank of the Ixchiya River and east of El Escondite and the West Group (Crasborn and Marroquín 2006:50). Excavations and surveys have also been conducted at sectors of the North and West Groups, but the South Group that is situated south of the Central Group has been far less of a focus within the research done at the site (Crasborn and Marroquín 2006:49-50). These complexes, and El Escondite, were constructed at different time periods for different purposes that may have
the potential to influence the uses of the water features found throughout the site (Crasborn and Marroquín 2006:50).

**Figure 29** Site map of Takalik Abaj, featuring the Central Group, the North Group, the West Group, and *El Escondite* (Crasborn and Marroquín 2006:49).

The first occupation of the site occurred during the end of the Early Preclassic (c. 1000 B.C. – 800 B.C.) in the area known as *El Escondite*, which is found on a natural
ravine at the northern end of a stream called “El Chorro” (Crasborn 2005:696; Schieber de Lavarreda 1998:473). Schieber de Lavarreda (1998:473) describes *El Escondite* as a partially walled-in space, measuring 4m by 4m, which incorporated a system of canals, a plain stela (Stela 56), and a plain altar (Altar 29) within its walls. There are two known residences that have been found in the vicinity of *El Escondite*, which are known as *Casa El Escondite* and *Casa Grande El Chorro* (Marroquín 2005:956). *Casa El Escondite* was discovered approximately 5m southwest of the central ceremonial area of *El Escondite* and *Casa Grande El Chorro* was located about 10 meters south of the ceremonial space (Marroquín 2005:956). Aside from stone monuments, the material culture of *El Escondite* also consists of an enormous river boulder and offerings of ceramics, obsidian, and other burnt offerings that suggest the area had ritual functions (Crasborn 2005:696; Schieber de Lavarreda 1998:475). A total of 151 pieces of obsidian have been uncovered within *El Escondite*, including obsidian prismatic blades from early on, which are significant because these blades could have been used as ritual tools within ceremonies (Crasborn 2005:696).

Throughout the large span of time that people inhabited Takalik Abaj, the physical environment of the site was heavily modified. Following the first occupation at *El Escondite*, significant changes were made to the landscape of the site at the beginning of the Middle Preclassic period (c. 800 B.C. – 600 B.C.) in the form of efforts to level the landscape (Crasborn and Marroquín 2006:50). The nearly coincident leveling of the landscape with the initial settlement of the site, suggests that altering the landscape was a priority to the settlers of the site. The increases made in the investment of labor into land-altering efforts over time supports this proposition. Leveling became extensive around c.
600 B.C. – 400 B.C. in the second part of the Middle Preclassic, during the time in which Takalik Abaj is believed to have become an important center (Crasborn and Marroquín 2006:50; Guernsey 2006:6).

Thus, as Takalik Abaj grew in power, the commitment put into shaping the environment also increased. For the purposes of this research, the redesigning of the landscape by the citizens of Takalik Abaj is relevant because the desired terrain that was produced through the labor of the people represents the types of landscapes that were valued, the needs the people had of their environment, and the role water may have played in society. The nine terraces served as the foundations for buildings and were constructed in sizes ranging from 140 – 220m wide and 4.6 – 9.4m in height, depending on the natural shape of the landscape upon which each terrace was leveled (Wolley Schwarz 2001:1006).

The leveling of the landscape to create flat areas upon the naturally terraced setting would have created several benefits, such as the prevention of erosion that would have been induced by run-off, by the clearing of the landscape to construct structures, and by other factors, which are known to be contributors to soil erosion throughout the world, especially upon hilly and mountainous landscapes like those of the foothills of the Guatemala Highlands (van Andel et al. 1990:379). The soil removed from leveling could also have been used as construction fill for structures, including platforms (Crasborn and Marroquin 2006:50). Notably, it is during the time period of massive leveling that the first ceremonial platforms were constructed at Takalik Abaj (Crasborn and Marroquín 2006:50).
At Takalik Abaj, the use of land and the use of water appear to be harmonious in that they were coordinated to achieve similar goals, such as the prevention of erosion. Springs were the most vital natural sources of water at the site, but canals were the most prominent human-made water features (Marroquín 2005). The Middle Preclassic represented a time period in which extensive land modification and leveling was initiated, and was also the time period during which the first canals of the site were built, exclusively of clay (Marroquín 2005:958). Marroquín (2005:958) suggests that one of the most important functions of the canals that were commonly positioned beside plazas, terraces, and structures was to drain water away from certain areas, particularly during the rainy season. As drains, these canals would have helped preserve the terraces, insinuating that water features and landscape alterations were planned together to prevent erosion, which would have helped protect both the terraces and the integrity of the structures upon the terraces.

Around the Late Preclassic (c. 300 B.C. – A.D. 250), the canals of Takalik Abaj developed from being clay-lined to stone-lined, constructed of river stones, because stone-lined canals are more efficient at channelizing and conveying water than clay-lined canals (Crasborn 2005:696; Marroquín 2005:958). As the society neared the Early Classic period (c. A.D. 250 – A.D. 600), canals increased in complexity and in scale, until stone-lined canals had multiple courses of stone in their walls, and were made of river stones larger than those previously used during the Late Preclassic (Crasborn 2005:969; Marroquín 2005:957-958; Figure 30). Several of the stone-lined canals were created with a square or “U” shape by cutting directly into bedrock, and were buttressed or covered with river stones in the latter stages of their construction (Marroquín
The canals that were made using river stones and that were cut directly into the bedrock have been well preserved over time due to the durability of the rock.

**Figure 30** Drawings of canal construction types through time. Clay canals (top) were replaced by stone canals (a, b) during the Late Preclassic. Stone canals became more complex during the transition into Early Classic (2da) (Marroquín 2005:965).

Many of the stone-lined canals at Takalik Abaj were constructed at downward sloping angles to carry water away from elevated locations (Marroquín 2005; see Figure 31). This construction pattern of the canals mirrors the slight, sloping angles designed within other architectural structures of the site, especially plazas, that were built on angles running north to south to better eject pluvial waters from their surfaces (Crasborn and Marroquin 2006:47). Both of these patterns of construction are consistent with a water management focus on drainage and the prevention of erosion.
Another construction method used to prevent erosion was focused upon lessening the force of the flow of water at the site by constructing canals with meandering, or zig-zag, courses that were intended to decrease the velocity of the currents of water following within them, and consequentially, the ability of this water to wash away soil wherever it was dumped (Marroquin 2005:956). The objective to prevent erosion was an important
one, but canals were valuable for more than their ability to drain surfaces of excessive
water. These water features are believed to have carried potable water to residential areas
as well (Marroquín 2005:955). Additionally, it has been suggested that some of the
features of the water management system of Takalik Abaj had ritual functions (Love
2007:294; Marroquín 2005:955-956). El Escondite is an area in which a variety of these
canal functions appear to have been important (Figure 32).

Figure 32 Photograph of El Escondite, taken from the south facing north. Stela 56 and
Altar 29 are pictured to the west (left) of Canal 1, which is featured in the center (Doering
and Collins 2012).

According to Marroquín (2005:956), a water distribution center consisting of six
stone-lined canals was found in the ceremonial space known as El Escondite. The canals
of El Escondite, one measuring 60.30m long, were situated above stone floors that were
about 8 – 10cm thick (Schieber de Lavarreda 1998:473-475). These canals were all
constructed at various points during the Late Preclassic period (c. 300 B.C. – A.D. 250), and may have been necessary to the performance of certain water-related rituals, which has been suggested because of the many offerings discovered in the area (Crasborn 2005:696; Marroquín 2005:955; Schieber de Lavarreda 1998:475).

One of the canals of *El Escondite*, known as Canal 1, was constructed with a zigzag pattern and is believed to have functioned to provide potable water to *Casa El Escondite* and *Casa Grande El Chorro* and to have had ritual purposes because it is associated with offerings, some of which were burned (Marroquin 2005:956; Schieber de Lavarreda 1998:475). Stela 56 and Altar 29 are also associated with Canal 1, and the other canals positioned within *El Escondite* (Schieber de Lavarreda 1998:473). Also of importance in the area near *El Escondite* is the sculpted Monument 64 that shows a personage wearing a mask and emerging from a niche, which is suggestive of ritual activity of watery undertones (Doering and Collins 2009:8; Schieber de Lavarreda 1994:86; Schieber de Lavarreda and Orrego Corzo 2010:197; Wolley 2002:367; Figure 33).

In addition to the area of *El Escondite*, canals have also been discovered at the Central Group of Takalik Abaj (Marroquin 2005:961). Research done at the South Group, the West Group, and the North Group has yet to reveal evidence for the existence of any human-made water features, such as canals, within these complexes. If surveys and excavations were expanded within these other complexes, such water management features could be discovered in the future. The focus of the research within any archaeological site always has an influence over the materials found and the interpretation of the site. Due in part to the fact that the vast majority of research has been
conducted at the Central Group, this is also the area of Takalik Abaj that has the greatest number of recorded structures, stone sculptures, and canals (Crasborn and Marroquín 2006:49-50; Marroquín 2005). Additionally, this area of the site is managed and protected as part of the national site location, while large portions of the site extent continue on to privately held and owned lands.

**Figure 33** Monument 64 (Schieber de Lavarreda 1994:86).

The Central Group covers around 0.09km² and contains open plaza areas, approximately 39 structures, over one hundred monuments, and a ball court constructed during the Middle Preclassic period (Crasborn and Marroquín 2006:45-49; Jacobo 1999:550; Schieber de Lavarreda 1994:73; Schieber de Lavarreda 1998:473). Two Middle Preclassic clay-lined canals, possibly the earliest canal features constructed at the site, have been associated with a structure to the south of the ball court of the Central
frequently found at ceremonial centers of ancient Mesoamerican cities. If water was an
important aspect of ritual at the site, as suggested by the inclusion of canals within *El
Escondite*, the clay canals placed in association with the structure south of the ball court
might have served a role within ritual activity. The ball court of the complex and other
materials unearthed within the area suggest that the Central Group served as the
ceremonial center of the site.

Structure 7 of the Central Group, located on the southeastern most portion of
Terrace 3, has many monuments on its surface aligned into rows and has been argued to
have been a structure with ritual functions (Crasborn 2005:696-697; Schieber de
Lavarreda 2002:399; Schieber de Lavarreda 2003:784; Schieber de Lavarreda and Orrego
Corzo 2010:194; Figure 34). Structure 7 is a sizable platform with two structures on its
surface, known as Structure 7A to the far north and center of the platform, and Structure
7B that lies southeast of Structure 7A (Schieber de Lavarreda 2003:784). Ritual functions
have been implied for Structure 7 and its substructures due to the numerous offerings that
were discovered during excavations.

Hundreds of vessels were buried in Structure 7 as offerings, and, in some
instances, were spread in patterns that coincided with the arrangements of the rows of
monuments (Schieber de Lavarreda 2002:399). Over one thousand river stones
originating from the Ixchiya River were also deposited as offerings (Schieber de
Lavarreda 2002:404). The ceremonial context of these caches of river stones coupled
with ethnographic analogies between these caches and those produced via modern Maya
ritual practices involving river stones suggest that the stones buried in Structure 7 may
have been imbued with spiritual powers (Schieber de Lavarreda 2002:404). The plethora of artifacts discovered on Structure 7 and Structure 6 to the west displays variety and ceremonial importance, but also wealth (Schieber 2010, 2012; Schieber de Lavarreda and Orrego Corzo 2012).

**Figure 34** Map of the Central Group of Takalik Abaj. Terraces 2, 3, and 4 and Structures 2 – 13 are illustrated. Stone monuments are marked by black dots (edited from Graham et al. 1978).
Structure 7A contained a burial (Burial 1) dating to the transition between the Late Preclassic to Early Classic that was laden with offerings consisting of a large cache of obsidian, a jade fish and other jadeite artifacts, iron pyrite mosaics, and ceramics (Crasborn 2005:697; Schieber de Lavarreda 2003:790; Schieber de Lavarreda and Orrego Corzo 2010:199; Figure 35). A ceremonial jade mosaic mask was uncovered east of a pyrite mirror that was placed over the chest of where the buried individual most likely lain (Schieber de Lavarreda 2003:790). Ceremonial masks of jadeite mosaics have also been found in ceremonial context within Structure 6, a structure that is closely associated with Structure 7 (Schieber 2010, 2012; Schieber de Lavarreda and Orrego Corzo 2012).

Structure 6 is located adjacent to the western wall of Structure 7 (see Figure 34). Recently, excavations at Structure 6 have revealed an additional burial, Burial 2, interred with similarly rich artifacts as the types of artifacts found in Burial 1 (Schieber 2012; Schieber de Lavarreda and Orrego Corzo 2012). Burial 2 predates Burial 1 and contains hundreds of blue and green jadeite beads (Schieber 2012; Schieber de Lavarreda and Orrego Corzo 2012). The similarities in the locations and contents of these two structures may suggest similar functions of the spaces. Wagner (2001:69) claims that jade masks were common burial gifts for rulers and that the placement of many jade objects within a burial context was intended to associate the deceased individual with the god of maize who is known for having the ability to periodically rise from the underworld in a process of cyclical resurrection. The life and death symbolism of jade, when associated with a late ruler, suggests that the ruler’s death is not the end and that he or she will be reborn.
The richness of the artifacts found associated with Burial 1 and Burial 2 suggest they were burials of elite individuals (Crasborn 2005:697; Schieber de Lavarreda and Orrego Corzo 2012). Burial 1 was located behind Stela 13, which is a carved stone monument associated with a plain altar (Altar 10) and offerings of over 500 artifacts that include ceramics, six pieces of jade, and 33 prismatic obsidian blades (Crasborn 2005:697; Schieber de Lavarreda 2002:399-402). Although Stela 13 is weathered and broken into two fragments, the monument has been interpreted as depicting an open-mouthed stylized serpent, carved in an early bas-relief Maya artistic style (Orrego Corzo and Schieber de Lavarreda 2001:788-789; Schieber de Lavarreda 2002:399). Stela 13 and its offerings were uncovered within fill dating to the Late Preclassic, which suggests they...
had already been deposited within Structure 7 before Burial 1 was placed within Structure 7A, behind them during the Late Preclassic to Early Classic transition (Schieber de Lavarreda 2002:402; Schieber de Lavarreda 2003:784). Schieber de Lavarreda (2002:402) argues that Altar 10 was a repurposed throne and that it was positioned upon Structure 7 during the Classic period, following the placement of Stela 13 and Burial 1 within the structure.

Burial 1 was meaningfully placed within a ceremonial context, surrounded by a lavish and abundant swath of materials. The characteristics of the burial harkens back to the burial within Monument 6 at Complex A of La Venta, which is the burial of an elite member of the community associated with a carved monument of a sacred zoomorphic being (Monument 6) and jade artifacts within an area with other massive offerings that is characterized by its sacred connotations (Garber 1993:214; Grove 1997:59-60). The jadeite artifacts of Burial 1 and of its surrounding monuments at Takalik Abaj may have a sacred and cultural importance similar to what has been suggested for the jade artifacts at La Venta, particularly because one of the jade pieces of Burial 1 was carved to represent a fish, which may allude to the association of the stone to sacred aspects of the landscape such as rain, water, and vegetation (Crasborn 2005:697; Grove 1997:59-60; Milliken 1949:53).

The jade fish of Takalik Abaj is similar to jade artifacts of La Venta that were carved to represent similar marine themes. A jade frog, a jade clamshell, and a jade stingray spine were located within Tomb A of Complex A at La Venta, which suggests that the association of greenstones with watery themes is not uncommon in Mesoamerica during the Preclassic period and that watery themes had significance within the lives of
deceased members of the ruling class for these objects to be included within their burials (Reilly 1994:128). There is also a watery significance to the pyrite mosaics, or mirrors, discovered within the burial. These mirrors are not just status symbols of the nobility, but are also often characterized as portals to the watery underworld associated with shamanistic power (Brady and Ashmore 1999:137; Scarborough 1998:151). Pools of water and mirrors are interchangeable as portals to the otherworld because of their reflective surfaces. Since pyrite mosaics and obsidian blades, which may be used for bloodletting rituals, were found within the cache within Burial 1 at Takalik Abaj, an interpretation can be supported that the person interred had spiritual responsibilities that may have been associated with the sacredness of water and the underworld (Garber et al. 1993:215; Taube 2004:122). The importance of ritual as a function of the ruling class is also seen at La Venta in the discovery of jade “awl” bloodletters, which are symbols of the supernatural ability to communicate with the world of spirits and deities (Garber et al. 1993:215; Taube 2004:122).

The serpent imagery upon Stela 13 located in front of Burial 1 also is suggestive of ritual activity (Figure 36). Within Preclassic Mesoamerica, there are many representations of serpents as agents of shamans and rulers to send messages to the gods (Stross 1994:22). The role of these “vision serpents” is symbolized by depicting their long, reptilian bodies winding up to the sky as if they can reach the heavens and the gods (Stross 1994:22). The zoomorphic snake-like figure upon Stela 13 shares these key traits while also having an open-mouthed expression, which is evocative of the concept of the “maw-like” portal to the underworld that originates from the Olmec culture (Reilly 1994:125). The combination of the imagery upon Stela 13 and the types of artifacts
discovered around the monuments and Burial 1 suggest that water, ritual, sacred concepts, and the culture of the privileged elite coincided at Takalik Abaj.

**Figure 36** Stela 13 of Takalik Abaj. The monument is broken in half and located in front of Burial 1 on Structure 7 (Schieber de Lavarreda 2002:401).
Evidence of ritual activity is found throughout the Central Group. Offerings implying ceremonial activity were found at Structure 12, which is located on Terrace 2 between Structure 11 and Structure 13 of the Central Group (Crasborn and Marroquin 2006:49). Vessels deposited at the center of Structure 12, ceramic discs, and the fragments of an obsidian blade were among some of the artifacts recovered (Schieber de Lavarreda 2002:406). Structures 11, 12, and 13 are believed to have functioned as major civic or administrative buildings and not elite residences because they do not contain hearths, burials, or middens indicative of residential occupation (Popenoe de Hatch et al. 2000:135). The distribution patterns of the offerings found at Structures 12 and 7 were found to be similar to the patterns of material culture left after the performance of modern Maya rituals, suggesting that the patterns of artifacts found on these structures may have resulted from similar rituals (Schieber de Lavarreda 2002:404-406).

In addition to Structures 6, 7, and 12, Structures 3 and 4, located west of Structure 7 on Terrace 3, also contained offerings (Crasborn 2005:695; Crasborn and Marroquin 2006:53). A walkway that linked structures 4, 6, and 7 to each other and Stela 49 and Altar 41 has also been suggested to have performed a ceremonial function due in part to the evidence of burnt offerings that were discovered in front of the monuments (Crasborn and Marroquin 2006:52-53). These findings are significant to the control of water at Takalik Abaj because both Structures 7 and 12 were closely associated with water features and water-related monuments.

Monuments of water-related themes include those that display images of aquatic animals, quatrefoils, depictions of rain or water, water deities, cave-niche imagery, water lilies, shell motifs, and other symbols that relate to water (Cyphers et al. 2006; Grove
Monuments of aquatic animals adorn the east and west sides of Structure 12, while drainage features were constructed on the north and south sides of this structure (Jacobo 1999:552). Monument 68, a boulder-style sculpture of a toad or frog, and Monument 66 of a crocodile head, which are both associated with Structure 12, are two of the water-related monuments located within the Central Group (Figure 37).

Figure 37 Monument 68 (left) and Monument 66 (bottom center), located on the west side of Structure 12 (Doering and Collins 2012).

These sculptures imply that water was meaningful to ritual at the site because they were selected to represent a ceremonial structure. While serving to drain and preserve the building, the drainage features around Structure 12 may also have served as symbols of the conscious investment in water infrastructure that is suggestive of the value of water
control at the site. The visualization of a ceremonial building surrounded on all sides by either water-related monuments or architectural features of water control appears to suggest the portrayal of intentional meaning.

Structure 7, which is representative of ceremonial activity and rulership, is also associated with a boulder sculpture of an aquatic creature along with the presence of canals. Some of the canals include monuments as a part of their construction materials (Marroquín 2005:957). The ceremonial contexts of Structures 12 and 7 and the types of artifacts found among their offerings suggest that in addition to draining the terrain of excess water and providing potable water, the canal features associated with these structures may have had symbolic or ceremonial functions as well. The water-themed stone monuments, the jadeite fish unearthed within the burial, and the plethora of river stones that were used as offerings emphasize the importance of watery elements within cultural attitudes, supporting the likelihood that water may have been involved in the ceremonies occurring on these structures.

In addition to containing ceremonial areas, the Central Group of Takalik Abaj has been argued to have possibly contained a market place. Popenoe de Hatch et al. (2000:132-135) describes Takalik Abaj as an important commercial center that most likely traded cacao and other goods for items such as obsidian. Popenoe de Hatch et al. (2000:135) suggest that the areas most likely to have contained a marketplace are Terraces 1 and 2, especially Structures 11, 12, and 13. These areas are long, open, leveled, and contain various canal features and features interpreted as steam baths (Popenoe de Hatch et al. 2000:135). Popenoe de Hatch et al. (2000:135) argue the area of Terrace 1, especially, is likely to have contained a marketplace not only because of the
characteristics of the space, but also because five middens have been discovered to the east of the terrace that were full of Late Preclassic ceramics and other materials that could have been products of the public consumption of items sold at a marketplace.

A mixture of elite and public activity has been found at the Central Group. Burial 1 and its associated material culture within Structure 7 marks the presence of the ruling class in the Central Group, while the activity upon the other structures, including Structures 3, 4, and 6 beside Structure 7 and Structures 11, 12, and 13 to the south of Structure 7 contain evidence of public activity. This pattern resembles what occurs at the site of La Blanca, in which the elite members of the community residing within Mound 9 of the site were directly associated with the core of public ceremony, Mound 1, which suggests that elites may have guided activities within public spaces (Love and Guernsey 2007:929-930).

The characteristics of the Central Group differ from those of the South Group that is located about 500 meters southeast of the Central Group within the modern day finca Santa Margarita (Crasborn 2005:698; Crasborn and Marroquín 2006:49; Wolley 2002:371). The South Group, which has been less intensively studied than the Central Group, consists of a dispersed pattern of about 13 structures and is the smallest of all the complexes of the site (Crasborn 2005:698; Crasborn and Marroquín 2006:49). The South Group is also associated with some monuments, such as Monument 113, which is located 100m south of the group (Wolley 2002:371). Alternatively known as “La Piedra del Tigre,” this andesite monument is marked by a petroglyph etched in a high relief style to represent a jaguar resting on its side that measures approximately 3m in length (Wolley 2002:371; Figure 38).
The activity that occurred at this complex, while disparate from the Central Group, may be related to this complex to the north. Excavations in the South Group have provided evidence to suggest that the southern complex contained a workshop that specialized in the production of prismatic obsidian blades (Crasborn 2005:698). Crasborn (2005:698) argues that these obsidian blades may have been produced specifically to be used as offerings in the caches found elsewhere in the site, including the Central Group. Although lithic production was important to the South Group, there is also evidence for ritual activity within the area. Structure 17 of the South Group, which is located 0.5km from the Central Group, contained offerings and the largest obsidian blades of the entire site (Crasborn 2005:698). The 13 obsidian blades found within Structure 17, with average
measurements of 28.3cm in length and 1.55cm in width, are possibly the longest blades found anywhere in Mesoamerica (Schieber de Lavarreda 2002:405). These findings suggest that further evidence of ritual activity may be discovered in the South Group with greater investigation into the area.

The West Group, located west of the Central Group, is situated between the Nima River to its west and the San Isidro River to the east (Wolley Schwarz 2001:1010). Analysis of the artifacts discovered and the types of clays incorporated into the construction phases of its structures suggest that the West Group was first occupied during the Late Preclassic period (Wolley Schwarz 2001:1010). The West Group contained approximately 21 structures, open plaza areas, and four stone monuments upon Terrace 6, which is a terrace that showed signs of intensive leveling of its terrain comparable to the terraces of the Central Group (Crasborn and Marroquin 2006:49; Popenoe de Hatch et al. 2000:137; Wolley Schwarz 2001:1010).

Of the four monuments located east to west on Terrace 6, one was a boulder sculpture of a toad, reminiscent of the toad and frog effigies of the Central Group (Wolley Schwarz 2001:1010). Nineteen other monuments constructed of andesite or basalt, distinguished by the deep, circular depressions on their surfaces and by their polished sides, were found positioned along the source of the Nima River at a distance of about 200m west of the West Group (Wolley 2002:371-373). The placement of monuments beside the source of the Nima River may suggest that watery themes were a defining aspect of the West Group, much like the Central Group. Wolley (2002:371-373) notes that stone monuments similar to the ones associated with the Nima River were placed along other sources of water at Takalik Abaj, sometimes within ceremonial
contexts. The origin points of streams and other water sources are implied to have had a
cultural, likely ritual, importance because of the ways in which they were marked by
stone monuments not only near the West Group, but at other areas of the site.

Another similarity between the West Group and the Central Group is found within
the richness of the artifacts uncovered. Jade artifacts were uncovered in the West Group,
including various jade masks similar to the jade mask discovered in Burial 1 of the
Central Group (Schieber de Lavarreda 2003:790; Wolley Schwarz 2001:1010). As noted
previously, jade is a marker of wealth and jade masks in particular are often symbols of
individuals with high status and ceremonial responsibilities. The West Group and the
Central Group contain the most extravagant jade artifacts and also the grandest
architectural structures of the site. Structure 32 of the West Group is the largest structure
and is comparable in scale to Structure 5 and Structure 7 on Terrace 3 of the Central
group. The scale of a building is significant because buildings of the largest scale imply
greater investments in labor and other resources.

Crasborn and Marroquín (2006:48) calculate that, in a day, 160 laborers could
have carried the approximately 4,000 small stones needed to construct Structure 12 of the
Central Group, using the estimation that a single laborer working an eight hour day could
carry up to 25 stones from the Ixchiya River daily. These figures would have been
similar, or greater, for the construction of larger architectural projects, like Structure 32
of the West group, and Structure 5 and Structure 7 of the Central Croup. The
transportation of the stone essential to build these large structures is only one factor
contributing to the human toil needed during the construction process. The movement of
considerable quantities of earth to build platforms and the buildings on their surfaces also
would have involved a significant commitment of labor. These expenditures of labor would have been similarly significant in the construction and maintenance of canals at Takalik Abaj, whether they were clay-lined or stone-lined. While canal features have yet to be identified within the West Group, the GPS data available for this project, which is discussed in the following chapters, shows that this group has several springs within its vicinity. The allocation of resources, both material and of human labor, can indicate discrepancies in wealth, and consequently, disparities in power.

The North Group differs from all the other groups because it was occupied after the other areas of the site (Wolley Schwarz 2001:1006-1007). Located on Terraces 7, 8, and 9 north of the West Group, this complex was not occupied until the Late Classic period, where it was occupied into the Postclassic period (Jacobo 1999:548; Popenoe de Hatch et al. 2000:137; Wolley Schwarz 2001:1006-1007). Unlike the Central Group and the West Group, no evidence for extensive leveling has been discovered in the North Group (Popenoe de Hatch et al. 2000:137). The occupants of the North Group also did not use stones in the construction of their structures, and only one carved stone monument has been identified in the area (Popenoe de Hatch et al. 2000:137; Wolley 2002:370). The only monument discovered in association with the North Group was Monument 161, a basalt monument of a human face similar in style to the jade masks unearthed elsewhere at the site (Wolley 2002:370; Figure 39). This monument, measuring 0.3m long and 0.25m wide, was found on the banks of the Ixchiya River (Wolley 2002:370).
The disparate time periods of occupation and the changes in behavior seen through the variances in material culture may suggest that the North Group was occupied by people that were culturally dissimilar to those that had occupied the rest of the site during the Preclassic and Early Classic periods. Popenoe de Hatch et al. (2000:137) argue that a new group of people came to the site following a cultural change that occurred at Takalik Abaj during the Early Classic period and that they settled the area of the North Group.
Group most likely due to the attractiveness of the abundance of springs and the defensive advantage of the elevated location (see also Popenoe de Hatch and Schieber de Lavarreda 2001:993). Terraces 7, 8, and 9 of the North Group are located within the highest segments of the landscape because they are located at the northernmost section of the site and elevations increase at Takalik Abaj travelling northward.

Popenoe de Hatch and Schieber de Lavarreda (2001:992-993) claim that a violent event, initiated by an expansionary group, occurred during the transition from the Terminal Preclassic to the Early Classic. The destruction and disposal of monuments and the appearance of different ceramics styles within the region marked the event of cultural change (Popenoe de Hatch and Schieber de Lavarreda 2001:992-993). During this time period, the traditional ceramic style of Takalik Abaj, known as the Ocosito Complex, was mixed with the Solano ceramic style originating from outside of the area (Popenoe de Hatch and Schieber de Lavarreda 2001:993). Popenoe de Hatch and Schieber de Lavarreda (2001:992-993) postulate that new populations may have desired to occupy Takalik Abaj to seek control over the commercial network of which Takalik Abaj played a role. The influx of new settlers to this area may explain why there is a lack of canals and other human-made water features in the North Group. Human-made water features, architecture that included the use of stone, a variety of styles in stone monuments, and ritual activity that incorporated canals and other water features are traits characteristic of the original settlers of the site that were based in El Escondite and the other groups of the site. These traits were cultivated over a thousand years before the cultural change that is proposed to have occurred at the site.
This thesis will not focus upon the North Group because of the temporal and cultural differences identified between the North Group and the rest of the site. The South Group, the West Group, the Central Group, and El Escondite were not all initially occupied at the same time, but their occupations overlap. They had changes in their construction patterns over time, but they were similar changes in these areas. The inhabitants of these complexes used local river stones to cover the surfaces of their buildings, platforms, and plazas that were made almost entirely of clay, without stone fill (Crasborn and Marroquín 2006:54). Throughout the time these parts of site were occupied, the construction patterns of buildings varied in small ways. The most noticeable change through time from the Middle Preclassic to the Late Classic was the overall growth in size and volume of various structures (Crasborn and Marroquín 2006:51-52). More clay was used to remodel buildings and larger stones were placed on their facades, which is similar to the architectural changes made in canals that transitioned from being clay-lined to stone-lined with increases in their size and the number of stones used over time (Crasborn and Marroquín 2006).

The lack of stone use in architecture and the lack of drains in the North Group as well as the change in pottery styles introduced around the time that the North Group was settled distinguish it from the other parts of the site (Popenoe de Hatch et al. 2000:137). The natural environment of Takalik Abaj provides the entire site with streams, springs, and naturally terraced landscapes, but the complexes south of the North Group showed the greatest amount of human alteration and modification to the terrain. In addition to including human-made water features, leveling of the landscape was more pronounced and more structures were built in these areas. These variances are relevant indicators of
the changing uses of resources and possibly of changes in power and social organization because varying behaviors and pottery styles are suggestive of different populations living at different areas of the site. The people of the North Group may have exhibited distinctive behavior through their material culture in comparison to the other areas of the site because they belonged to a different cultural or economic group, in addition to being separated significantly in time (Popenoe de Hatch et al. 2000:137).

The early modifications of the landscape that were considerably intensified over time illustrate that land use was ever changing at Takalik Abaj. The landscape of Takalik Abaj should at no point be considered to have been in an unmodified or “natural” state during the time period of interest of the Preclassic to the Early Classic. As Lyman and Cannon (2004) suggest, the idea of a pristine landscape is erroneous, and draws upon the concept of an ecologically noble savage. As long as people were living at the site, the terrain—as well as the architectural features of the site—was re-shaped to fit the current needs of the people. In addition to site construction, the research that has been done on sculptural pieces of the site indicates that the sculptural corpus may be associated with ideas of water relevant to the study of land use at Takalik Abaj (Marroquín 2005; Schieber de Lavarreda 2006; Schieber de Lavarreda and Orrego Corzo 2009; Wolley 2002).

_Sculptural Art_

Takalik Abaj has many stone monuments that display a diverse range of styles through time and serve a multitude of practical, political, and ritual functions. The trade network in which the site was involved has been argued to have influenced the types of culturally diverse sculptures that were found at Takalik Abaj (Love 2007). The sculptural
art of the site provides clues into the types of ideas that spread through the social and economic interactions carried out during trade and also the themes used to express ancient worldviews and political narratives.

According to Graham and Benson (1990:78), the most common types of sculpture found at Takalik Abaj are potbelly sculptures and effigies of toads or frogs (see Figure 37 and 41). Potbelly sculpture typically describes sculptures that are representative of humans with prominent, rounded abdomens that are often being cradled by the hands of the figures represented (Graham 1992:326). A broader term used to describe many of the sculptures of Takalik Abaj is “boulder sculpture,” which refers to sculptures crafted of volcanic boulders that retain some of the natural shape of the stones from which the monuments were carved (Graham and Benson 2005:345). In this art style, the contours of boulders are sometimes important details of the work of art illustrated.

Scholars have interpreted many of the sculptures of Preclassic Takalik Abaj to be carved in Olmec styles, leading some researchers to hypothesize that Takalik Abaj traded with Olmec centers or was populated by Olmec settlers during the Preclassic period (Graham 1979; Popenoe de Hatch 2006:39-40; Schieber de Lavarreda 2006). Graham (1989:230) characterizes Olmec sculptural art as being round, simple, compressed, and complete with long, curving lines. The emergence of Maya style sculpture at the site, which came to exist alongside previous traditional styles, occurred during the Late Preclassic period (Love 2007:293; Popenoe de Hatch 2006:37). While sculptors of Olmec style monuments were more likely to have incorporated the curves of boulders into their art works, Maya style sculptors tended to transform boulders into blank canvases upon
which they could tell an elaborate story, often focused upon figures with highly detailed wardrobes (Graham and Benson 1990:83; Graham and Benson 2005:357; Figure 40).

**Figure 40** Maya style boulder sculpture, known as Altar 12 (Graham and Benson 2005:352).

Maya style sculptures were also regularly configured into pairings of stelae and altars, and included details, such as carved glyphs and celestial and basal bands that were used to illustrate the environments or settings represented in the sculptures (Graham and Benson 1990:82). Altar 12, distinguished as a boulder sculpture because of its unfinished edges, presents many common Maya sculptural themes, including glyphs, the portrait of a figure, and bands located at the borders of the central image (Graham and Benson
2005:352-355; Figure 40). The basal band of wavy lines beneath the feet of the figure on Altar 12 indicates water, while the serpents depicted above the figure form a celestial band (Graham and Benson 2005:355). The serpent imagery of this monument, like the serpent iconography of Stela 13, may have been intended to evoke the communication between the person illustrated on the monument and deities residing in the heavens.

Popenoe de Hatch (2006:39) argues that the artwork upon Olmec and Maya style sculptures, as well as other forms of art and iconography, represents ideology, rather than the ethnicities of the sculptors. While the Olmec and Maya can be seen as separate ethnic and cultural groups, the changes made in art, sculpture, and writing at Takalik Abaj more closely reflect intellectual movements, rather than changes in the ethnicities of the people inhabiting the site (Popenoe de Hatch 2006). The alterations in art styles over time suggest that the worldviews held by the ancient inhabitants at Takalik Abaj were initially aligned closely to those originating from the Olmec culture and later shifted to include to Maya concepts near the end of the Preclassic (Popenoe de Hatch 2006:41). Guernsey (2006:6) argues that these monumental sculptures created during the Late Preclassic period were commissioned by the elites of the site to express social, political, and cosmological messages to the people in order to structure society as a whole to their favor. Allusions to the supernatural and to ritual activity, in particular, are potent tools to express power.

In addition to representing ideology and political associations, sculptures at Takalik Abaj had ritual and utilitarian functions. Evidence for the ritual use of monuments has been found in a ritual burning spot associated with Stela 49 and Altar 41 that contained burned offerings (Crasborn and Marroquín 2006:53). Stela 13, of Structure
7, is also associated with many buried offerings that are hypothesized to have had a ritual significance (Crasborn 2005:697; Schieber de Lavarreda 2002:399-402). Stone monuments were also repurposed for use in ways that differed considerably from their original purposes. These changes in the utilization of monuments included the breaking and rearranging of monuments to be reused as construction pieces in platforms and in the canal system (Crasborn and Marroquín 2006:52; Marroquín 2005:957). These monuments may have been broken to symbolize a change in the political atmosphere, as a part of ritual, to provide construction materials, or a combination of these reasons. The use of monuments, manos, and metates in construction was noted to have occurred around the second half of the Early Classic period (c. A.D. 300 – 500), after the cultural change that occurred during the start of the Early Classic period (Crasborn and Marroquín 2006:52; Popenoe de Hatch and Schieber de Lavarreda 2001:992-993).

As previously mentioned, Takalik Abaj exhibits an assortment of sculptures that includes aquatic animals, such as crocodiles, toads, and frogs, within its themes. Monument 47, Altar 48, Monument 68, Monument 66, and Monument 70 are all examples of sculptures representing marine creatures (Graham and Benson 1990:78; see Figures 37, 41, and 67). Figure 41 depicts Monument 70 of the Central Group, which is an andesite monument that represents a frog in boulder sculpture style, much like Monument 68. These sculptures may be the most relevant in a discussion of water management practices at the site because they demonstrate that ideas related to water were valued within the culture. An association between monuments displaying water related imagery and ritual activity or ceremonial areas, like the monuments found surrounding the ceremonial structure of Structure 12, is suggestive of an ideology in
which water is sacred and incorporated into ceremonial activity because of the beliefs surrounding water (Crasborn 2005:695).

![Monument 70 of the Central Group. This andesite monument represents a frog in boulder sculpture style (Doering and Collins 2012).](image)

**Figure 41** Monument 70 of the Central Group. This andesite monument represents a frog in boulder sculpture style (Doering and Collins 2012).

The fact that Takalik Abaj is located in a water-rich environment may have influenced the belief system of the area because people can be defined by or relate to their surrounding environments. The ample rainfall and the wealth of water resources at Takalik Abaj may have encouraged a belief system highly connected to water that inspired the creation of effigies depicting toads, frogs, and other aquatic animals. The coexistence of these water-related monuments with canals located within ceremonial areas suggests that water was important to the identity of the people at the site, and possibly incorporated into their rituals. Appendix 1 gives a brief description of water-related monuments within the Central Group and their nearest structures.
Trade

Takalik Abaj was part of a trade network thriving during the Middle Preclassic that allowed it to communicate and trade goods and ideas with other nearby centers, such as Kaminaljuyú and Chocolá (Popenoe de Hatch and Schieber de Lavarreda 2001:991). Guernsey (2006:4) describes Takalik Abaj as part of a “critically important crossroads of communication” that linked Maya-speakers to Mixe-Zoquean speakers, and the Pacific Coast to the interior. During the Preclassic period, Takalik Abaj was characterized as an intermediary commercial center, or “gateway city,” that was part of a dendritic trade network (Hirth 1978:37-39; Popenoe de Hatch et al. 2000:132-133).

The dendritic model of commerce is defined as a distribution of intermediary commercial centers joined through a linear trade route with smaller communities radiating out from these centers like branches from a tree (Hirth 1978:37-39; Popenoe de Hatch et al. 2000:133; Figure 42). As an intermediary commercial center, Takalik Abaj would have been an autonomous node that received and distributed goods to and from distinct neighboring centers (Hirth 1978:37-39; Popenoe de Hatch et al. 2000:133). Various goods have been proposed to have been transported along this network, including cacao, obsidian, and jade (Crasborn 2005:697; Popenoe de Hatch et al. 2000:135).
Evidence for the processing of cacao has yet to be discovered at Takalik Abaj because it is highly perishable, but it is believed to have been an export from Takalik Abaj to be traded for items such as obsidian (Popenoe de Hatch et al. 2000:135). The archaeological record of Takalik Abaj includes changes in obsidian sources over time at the site, which suggests an altering trade network (Popenoe de Hatch et al. 2000:135). During the Early Preclassic, the major source of obsidian at the site came from the San Martín Jilotepeque source within the Chimaltenango department of Guatemala that is located to the east of Takalik Abaj (Crasborn 2005:696; Popenoe de Hatch et al. 2000:135). Takalik Abaj included more obsidian of the El Chayal source of the Motagua River valley during the Middle and Late Preclassic periods, which are posited to have been transported through Kaminaljuyú (Crasborn 2005:696; Popenoe de Hatch et al. 2000:135). Obsidian from Mexican sources, such as the Tajumulco, Ixtepeque, and Pachuca sources, have also been identified within Takalik Abaj, but in smaller quantities (Crasborn 2005:696). Generally, the presence of obsidian artifacts increases at Takalik

Figure 42 Diagram of a dendritic market network (Hirth 1978:38).
Abaj through the Middle and Late Preclassic periods, but deceases significantly at the start of the Early Classic period (Crasborn 2005:696; Figure 43).

**Figure 43** Chart representing the frequencies of obsidian at Takalik Abaj from the El Chayal (CHY) and San Martín Jilotepeque (SMJ) sources from the Early Preclassic (far left) to the Postclassic (far right) periods (Crasborn 2005:699).

During the Late Preclassic, at a time in which the trade route was extended to reach the Motagua River valley, Takalik Abaj is believed to have become ethnically Maya (Guernsey 2006:6; Popenoe de Hatch et al. 2000:133-134). The ethnic makeup and ethnic influences of Takalik Abaj have primarily been studied through changes in ceramic styles over time (Love 2007; Popenoe de Hatch 2006; Schieber de Lavarreda 2006). The changes in ceramics and sculpture that showed an increased influence from the Maya culture at Takalik Abaj and the alterations in site construction and settlement
patterns are consistent with the patterns of change noted in the trade of obsidian at the site. These cultural indicators suggest that the people of Takalik Abaj flourished during the Middle Preclassic period and achieved a peak during the Late Preclassic period, before a marked event of change occurred in the transition into the early Classic period.

Summary of Previous Research at Takalik Abaj

The research that has been done at Takalik Abaj has been diverse, encompassing areas such as sculpture, the history of site construction, trade, and ethnicity. However, not enough emphasis has been placed on the natural resources that influenced all of these areas of interest. Water was important for the way the site was laid out, which is evident in the patterns of construction seen in buildings, platforms, and human-made water features. Rivers and streams provided the smooth boulders that were important to the creation of monuments and the construction of architecture at the site. Furthermore, the watery environment of Takalik Abaj, was reflected in the works of art that were carved in stone, which may imply that water was an central element of the ancient peoples’ identities and their ritual practices. To supplement information that has already been complied concerning water-related monuments, the construction of architecture, and other archaeological information, this thesis uses spatial data collected by Doering and Collins to expand upon the knowledge of how water flowed across the environment and what significance the use of water may have had at the site.
CHAPTER 5: 
METHODS

Water is a natural part of the environment, but it is also a commodity that can be controlled and contained in such a way that certain individuals are given an advantage over others because the presence or absence of water can affect the livelihoods and behaviors of people. To understand any possible impacts water and its control had on the people Takalik Abaj, the flow of water is examined to aid in the identification of areas of the site that may have had greater quantities of water and greater access to water and those areas that did not. The diversion of water at Takalik Abaj was achieved, in part, through the construction of human-made drains, a privilege representing an economic investment in labor and materials (Crasborn and Marroquín 2006:52; Marroquín 2005). The cost to engineer a landscape to control water, whether the goal was to increase or decrease the flow of water into areas, is indicative of wealth spent by either the occupant of the land, or the community. The functions of the spaces and the types of occupants in the areas in which water management investments were made can allude to the function of the water management system and the values of the people of the community including, possibly, the power relations of the site, because the accumulation of wealth is not equal and the use of wealth and resources is thoughtfully planned.
Under circumstances in which it is desirable to reduce the prevalence of water, such as to prevent erosion, a landscape designed to expel water from areas represents a benefit to the people occupying or making use of the land. A water control system functioning for this purpose has been discovered at La Venta in Complex B of the site (Gonzalez-Lauck 2001:799; Grove 1997:78; Heizer 1967:33-36). The platform mounds of La Venta in which the U-shaped basalt drains were uncovered are believed to have functioned as stages for public, especially ritual, activity (Grove 1999:273-275). The area of Complex B may have been prioritized as an area that needed to be well drained by the channels because it was an area of considerable public importance, situated south of the pyramid of the site (Complex C) and the enclosed ceremonial elite section of the site known as Complex A (Grove 1999:273-275). The attention and labor that contributed to the construction of the sizable platforms are paralleled by the cost of the labor and resources used to create the basalt drains that helped maintain the platforms by keeping them well drained.

Yet, the existence of stone basins associated with the drains at La Venta also implies that some of the water flowing through the channels was collected (Gonzalez-Lauck 2001:799). This water may have been collected for consumption. However, since the Stirling Acropolis and the surrounding platforms around which the drains and basins were located functioned for public ritual, it is possible that the water collected within these basins was also important for ritual activity (Gonzalez-Lauck 2001:799; Grove 1999:273-275). The ritual use of water collection basins within ritual in Mesoamerica occurs at other locations, including La Blanca (Love and Guernsey 2007:926). We also learn from archaeological evidence at the site of La Venta that stone channels can serve
multiple purposes. These channelizing features can convey water away from high profile ceremonial areas to aid in the maintenance of these structures, or they can serve as a method of diversion for retention of water.

The accumulation of water can be desirable for uses including drinking, bathing, enacting rituals, and irrigating agricultural plots. The canals of Cerros also demonstrate how the diversion of water can fulfill a variety of purposes because these canals drained water both into basins near fields for use in agriculture and into reservoirs for human consumption (Scarborough 1983:736). Water diverted into agricultural plots, such as the raised fields of Cerros, suggests the need for greater quantities of water to produce crops, while water carried into the reservoirs near residential structures suggests domestic consumption (Scarborough 1983:727-732).

The changes in elevations of the water management system throughout the site aided in determining the path of water flow of the canal system at Cerros because topographical features of the landscape, particularly slope, guide the water that flows through the system (Scarborough 1983:736). Gravity plays a role in directing water and ancient engineers designed their water management systems with the physics of the terrain in mind. The flow of water at Cerros, guided by the mechanics of the landscape, influenced both the construction of the canals and the overall settlement because the polity was purposefully located within a low-lying basin in order to increase the ability of the settlers to collect water in what has been described as a concave watershed (Scarborough 1998:139-140). Knowing that water collection and storage would be pivotal to their survival in the climate of northern Belize, these ancient settlers took
advantage of the way water naturally flowed into the area when establishing the location of their community (Scarborough 1998:139-140).

The lagoons of San Lorenzo represent another engineering feat in which the ancient inhabitants made use of the natural features of the landscape to influence their access and control over water resources. Lagoons, both natural and human-made, surrounded the height of the San Lorenzo plateau, and gave the residents at the peak of the site increased access to water resources (Diehl 1981:73-74). The modifications of some of these naturally occurring features increased the amount of water they could retain, attesting to the ancient inhabitants’ awareness of the environment and of the alterations that could be made to enhance the desirable aspects of the landscape. One such modification was the use of bentonite within lagoons to make these features impervious and thus, better able to retain water within the water features (Diehl 1981:73-74). The San Lorenzo plateau also contains the only known aqueduct feature that distributes water from a well at the summit (Cyphers et al. 2006:20-26; Diehl 1981:73-74).

Privileged access to water through alterations of the landscape that affect water flow and containment, like that seen at the San Lorenzo plateau and Cerros, can lead to greater stability in agricultural production, a decreased threat of scarcity in supplies of potable water, and greater access to water for use in ritual. The significance of water use can only be interpreted in the context of a study in the function of the structures surrounding the areas affected by landscape engineering and the artifacts and monuments associated with these built landscapes. At San Lorenzo, the aqueduct feature was embedded within an area marked by materials of affluence and by symbols of the
nobility, such as basalt thrones (Cyphers et al. 2006:20-21). The aqueduct, constructed of
expensive basalt, serves as another expression of the power of the elite like that of the
monuments (Cyphers et al. 2006:20-21).

Water does not always collect into immediately noticeable features like rivers or
constructed water features, like the stone basins of La Venta, the reservoirs and
catchment ponds of Cerros, the lagoons of San Lorenzo, and Monument 3 of La Blanca
Scarborough 1983:727-732). Landforms, like sunken plaza areas, can also be interpreted
as areas that may have collected water. The sunken plaza near the most prominent mound
of La Blanca is an example of such a land feature (Love and Guernsey 2007:923; Love
2009:5-6). Low-lying areas of the landscape can be identified using topography maps and
DEM s that provide information indicating changes in elevation, from which changes in
slope across the landscape may also be derived.

To analyze the water collection potential of spaces it is necessary to study the
topography, including changes in slope and elevation across sites. These characteristics
will help identify how water management features, such as drains, moved and managed
water across the landscape. Analysis of water flow aids in recognizing how water may
have been collected and consumed. Thus, understanding landscape modifications for the
purpose of engineering for water flow and collection, can assist in interpreting meaning
and relationships to cultural expression and activities.

Although archaeologists have studied the construction stages of some of the
canals at Takalik Abaj, less emphasis has been placed on how these and other natural and
human-made features fit into the site plan as a whole to affect the movement of water
throughout the settlement (Marroquin 2005). Using spatial location information previously collected (Doering and Collins 2012), I will examine how water may have moved across the site of Takalik Abaj, and look at possible cultural and landscape associations of note. A GIS approach is used to consider the watery topography and to look for spatial patterns and relationships expressed in the built environment, stone monument corpus and other material expression.

This study uses the DEM that was produced for the area of Takalik Abaj through the AIST survey, to derive a slope model from which paths of water flow may be inferred. The AIST survey also utilized sub-meter GPS to record locations of natural and landscape features of note when encountered. These data included natural features, such as springs and water features. The AIST project did not have an objective to map all of these natural features, and primarily focused on structures and monument locations (Doering and Collins 2012). The spatial data from Takalik Abaj are compared to other recorded site layouts in Mesoamerica. Possible functions of the water management system of Takalik Abaj are hypothesized based on how water was integrated into the site plan. Also of interest are the uses of spaces that surround areas with water control features that can also be compared at the site level with other locations.

*The AIST Project*

This thesis builds upon the work that has been done by AIST. AIST has been conducting research at Takalik Abaj using various spatial technologies, such as three-dimensional terrestrial laser scanning (TLS) and sub-meter GPS to document the constructed environment and monuments of the site (Doering and Collins 2011). The Takalik Abaj Monumental Stone Sculpture Project is focused on the high definition
digital documentation and analysis of stone sculptures and architectural features at Takalik Abaj (Doering and Collins 2011:1). These stone sculptures and other features contribute vital knowledge on topics such as the ideologies of the ancient inhabitants of the site.

TLS survey included terrain mapping and modeling, precise GPS location data, and high resolution imagery along with the 3D data acquisition and modeling of the carved stone monuments from the site. 3D visualization of the carved monuments allow researchers to virtually engage with the sculpture and examine in high detail the carved elements and surfaces, as well as examine and analyze the impacts of surface degradation and erosion and other management concerns for the preservation of stone monuments. 3D data capture is affording accurate iconographic analysis and interpretation of monuments and site features as well (Doering and Collins 2012). Landscape features, such as terraces, structures, and canals were also documented as part of this survey, and these data are allowing for precise terrain consideration, measurement, and analysis.

This spatial data provided by AIST are pivotal in the investigation of the role of water at Takalik Abaj. The characteristics and placement of monuments provide context for their surrounding areas, as seen at sites like San Lorenzo, where monuments alluding to elite power and the supernatural qualities of water are located in an elite space in which water features are also present. The locations of water features, such as springs, canals, and steam baths, are also important in determining which areas had greater investments in water control and access to water. GPS coordinates for these features, obtained from the AIST survey, were utilized in my examination.
The physical aspects of the topography, which influence the flow of water, are revealed using the DEM. A DEM, derived from topographical mapping of the site and the AIST TLS survey project, was used in my examination of water movement and slope aspects. Additionally, I have drawn from available archaeological data to inform my hypotheses on water control significance, and have used the spatial information to examine water flow, collection, and control at Takalik Abaj.

Datasets Utilized

This thesis uses GPS points of structures, springs, canals, monuments, and other features that were collected during AIST’s 2006 to 2011 field work (Doering and Collins 2011). Other data used in this research includes a shuttle radar topography mission DEM and georectified aerial imagery of the region encompassing the site that was obtained from Digital Globe. These data were used to digitally render or digitize features of the site and as a way to visualize and interpret topographical relationships to built environment. Additionally, the Berkeley topographical survey conducted in the 1970s at Takalik Abaj was georeferenced to the modern landscape and useful in the site modeling (Graham et al. 1978; Figure 44).

The positions of monuments displaying water-related iconography were examined to evaluate any association that might exist between monuments, water features, and structures. The distribution of water-related monuments may relate to potential ritual functions and use of water. For example, if these monuments were found to be frequently connected to large public architecture, temples, or sacred spaces, there may be a connection with ritual activities.
Figure 44 Site map of Takalik Abaj (Graham et al. 1978).
Methods

Georeferencing

According to Chapman (2006:53-54), georeferencing is a means by which archaeological data, such as aerial photos and site maps, can be positioned within their appropriate coordinate systems. When the 1978 Berkeley map was originally entered into GIS, it had no coordinate system assigned to it, and, therefore, needed to be georeferenced into its appropriate coordinate system. Georeferencing the Berkeley map was the first step necessary in this project because this map served as the base map from which all of the structures of the site were digitized. The structures represented in the map include platforms, mounds, and buildings. Georeferencing set the Berkeley map into the same coordinate system as the rest of the data, and ensured that the map would be at the same scale as the rest of the data. Real world coordinates were assigned through the use of ground truthing of features present on the landscape and on the map, such as buildings, structures, and roads. Sub-meter GPS along with high resolution aerial imagery and the shuttle topographic data assisted in the referencing.

The earliest and most extensive excavations at Takalik Abaj date to the 1970s with John Graham of the University of California at Berkeley (Graham et al. 1978). Since the creation of the map from these excavations, structures have been discovered that will not be represented. Although the map used in this project does not include every structure discovered recently, when combined with other data such as the GPS positions collected in the AIST survey and the extensive site mapping conducted by Christa Schieber de Lavarreda and Miguel Orrego with the Proyecto Nacional Takalik Abaj, a more complete understanding of the site layout emerges. The Berkeley map also provides the basic
layout for the three most prominent complexes of the site: the Central Group, the North Group, and the West Group (Crasborn and Marroquín 2006:49). The map also outlines the Xab River, the Nima River, and the Ixchiya River, which encircle Takalik Abaj, and provided stone resources during ancient times (Crasborn and Marroquín 2006:48). The Berkeley mapping effort used only a local coordinate system and was not related to any known global coordinates. When georeferenced to the spatial data and aerial imagery, this map was projected to real-world coordinates using a Universal Transverse Mercator (UTM) projection for Guatemala (UTM Zone 15N).

The first step in georeferencing was to bring the Berkeley map to the general area of the Takalik Abaj site. In order to do this, I set my target layer to the Berkeley map using the georeferencing toolbar in the ESRI ArcGIS program (version 10.0). I next brought the Berkeley map into the same extent as the aerial photo. Then, I used the measure tool to properly scale the Berkeley map so that it was at the same extent and measure as the aerial photo and the other data (Figure 45). Several attempts at resizing the map were necessary to find the size most accurately matching the rest of the data. Each time I resized the Berkeley map, I used the measure tool across the printed scale to verify positioning. Once the measurement was almost perfectly equal to 400 meters, the Berkeley map was considered to be of the same scale as the aerial photo.
Figure 45 Image of the scale printed on the 1978 map, shown in yellow. The map scale assists in adjusting the map in the georeferencing process.

Although the map was now of the appropriate size and in the general location of the site, it was still not in the correct position. This error was clear when the positions of the GPS points and the aerial photo were examined in relation to the Berkeley map. The GPS points were in the correct position with the aerial imagery, but not with the corresponding structures on the Berkeley map. To line up all three sets of data, it was necessary to rotate the Berkeley map and manually drag it over until the outlines of the structures on it matched the GPS points for the same structures matched and showed proper relationship with the projected and rectified aerial imagery. Upon completing this step it was observed that all of the structures of the Berkeley map still did not match up with the other two sets of data. At this point, it was apparent that the Berkeley map was not spatially accurate. Another step would be necessary to more accurately georeference the Berkeley map.
The Berkeley map had to be split into three sections according to the three major portions of the site: the Central Group, the West Group, and the North Group. The splitting of these areas was necessary due to a spatial scaling error that compounded the further one moved away from the Central Group origination point. These three map sections were then positioned in ArcGIS to their appropriate locations using the shift tool. When this step was completed, all of the existing data had been accurately georeferenced within the same global, real-world coordinate system.

**Digitizing Features**

The existing data that had been entered into a map file in GIS is useful on its own to observe how previous, conventionally mapped, site cartographic renderings compare to more advanced GPS data and projected and rectified aerial imagery. Updated and digitized versions of the structures and rivers were created utilizing data from the GPS survey work by AIST and from a map depicting locations of canals that was also digitized and referenced to the other data (Marroquín 2005:961). These digitized data became viewable spatial layers in the created GIS, and were organized as part of the geodatabase, or container, for the spatial data used in the GIS project, and all in the same coordinate projection.

To create each feature represented in the 1978 Berkeley map and the Marroquín canal map, it was necessary to digitize each structure or water feature using ArcGIS drawing, editing, and cataloging tools. Each individual structure was originally digitized into five polygons to preserve the three-dimensional depiction of the rectangular or square features represented on the map (Figure 46). I used the snapping feature to make sure each of the lines drawn would be attached to the previous lines drawn to create the
polygons of each structure. After I had finished digitizing an entire structure, I then chose a naming convention that related to the structure numbering system used in the Berkeley survey and that is still utilized today to name each structure.

Figure 46 Digitized structures. Lines in red are from the 1978 Berkeley map. Lines in blue are part of the digitized layers.

After I had finished digitizing the structures, I digitized the rivers in the layer labeled “water features.” For this task, I used the “create new features” tool on the editor toolbar. I set the line to streaming to allow for a smoother line and then followed the lines of the rivers that had been drawn on the Berkeley map, using the aerial imagery as a guide. As I was completing this task, I noticed that the lines of the rivers on the Berkley map were not always visible on the aerial photo or that the position of the river was
slightly different from what was visible on the aerial imagery. When possible, I used the 
aerial imagery to digitize the rivers, best reflecting the current condition of the river 
channel and course.

Finally, I used the marker tool in the draw toolbar in ArcGIS to create points for 
the canals in a separate shapefile. GPS points for the springs, steam baths, and 
monuments were already available from the data provided by AIST, so no further 
features needed to be created. With the creation of all of the new shapefiles, my GIS map 
file now included representations of all of the structures from the Berkeley map, the canal 
points from the Marroquín map, and all of the other features for which I had GPS 
coordinates. The data tables for each shapefile were organized and additional attribute 
descriptions were added to allow for more meaningful analysis.

Organizing Data

The layers of data containing information on the structures, water features, and 
monuments were condensed in their simplest forms in the process of organizing the data. 
The elevations of each feature were added to the attribute tables and every feature was 
named to be able to allow for greater ease in the mapping process and in analysis. The 
layer of the digitized structures underwent significant alterations in the process of 
refining the data.

Every structure in the layer of structures was originally composed of five 
components, representing every side and the top of each structure. Using the dissolve tool 
in ArcGIS, each building was simplified into a single digitized feature. While having five 
components per structure was ideal for representing the three-dimensional qualities of 
these structures, a single form per structure was desirable to afford increased clarity in the
mapping and viewing of the topography. After each structure was dissolved into a single feature, they were rounded off to more accurately reflect their true geometric shapes (Figure 47).

Figure 47 Example of final versions of the digitized structures from the Central Group. All structures were spatially updated using GPS data. Other features of note, such as monuments, also appear in this figure.

According to the 1978 Berkeley map, each structure of the site was a perfect square or rectangle, a common cartographic convention for depicting pyramids and structures in Mesoamerica. In actuality, these structures have more rounded edges and corners. The digitized structures were modified to better reflect the geometry of these features evident from the GPS mapping, aerial image analysis, and terrestrial laser scans of the mounded structures. The locations of the structures were also updated based on the GPS location data.
Finally, the elevations of each structure were added by using the DEM for the site, and the identity tool in ArcGIS. After creating a new field in the attribute table for elevation in the layer for the structures, the elevations were taken at the center of each building using the DEM. This information was then added to the attribute table for the structures layer (Appendix 2, 3, and 4). The DEM for the site area distinguished the lowest point at the site to be approximately 370 meters above sea level (m ASL), while the highest elevation point was approximately 800 m ASL. Figure 48 demonstrates the use of the identity tool in retrieving information on elevations for specific points after the digitized buildings had been dissolved and rounded.

Most of the data pertaining to the location of water features was located in a single layer containing GPS points. The springheads had to be selected from this dataset and placed into their own layer to distinguish them from other types of water features. The process of selecting GPS points from the original data layer for water features was repeated to create a unique layer for the GPS points of the steam baths.

The layers containing GPS points for the stone monuments of the site were also broken down into refined categories to reflect separate types of monuments and which moments had water-related imagery. Depictions of aquatic animals, such as toads and crocodiles, were considered to be water-related, but other water-related monuments were also included, such as those that were broken for use in the construction of canal features. Appendix 1 identifies the characteristics of the water-related monuments with GPS points and the distance of the nearest structure to each monument, calculated using a spatial join of data layer information in ArcGIS.
Figure 48 Using the identity tool to assign elevations to the digitized structures. The Berkeley map (red) overlays the now more rounded digitized structures.

Cartography, Analysis, and Visualization of the Site

The product of all the previous steps mentioned is the ability to create maps of Takalik Abaj that provides an overview of how the different parts of the site fit together and how the topography is related to natural and human-made features. Maps of the site were created using the DEM and a slope model derived from the DEM to show the relationship between the topography and canals, springs, rivers, structures, steam baths, and monuments. The topography illustrated through the DEM aides in understanding how
water flowed from one point of the site to the other, assuming that water flows downhill from the northernmost sections of the site and that inclined areas, especially, suggest pathways or conduits for the travel of water.

The slope model is vital in showing which areas are relatively level and which areas of the site are inclined. Figure 49 is a screenshot of the slope model derived from the DEM of the site. The lightest areas of the model, such as those surrounding the Ixchiya River, have the greatest slope, while the darker areas represent terrain that is more level. Indentations in the landscape that would not be perceivable from the DEM alone are visible in the slope model. These details of the topography are analyzed to determine the parts of the site that may have collected water and the possible pathways through which water was likely to have flowed. The canal points, shown in green in Figures 49 and 50, and points for other features added in the completed maps illustrate the connections between the landscape and architectural features and cultural material.

The slope model was adjusted before creating maps to color code the data by the degree of slope represented in the slope model. This process was carried out by adjusting the data within the “symbology” tab of the “layer properties” of the slope model layer (Figure 51). Five ranges of slope degree were utilized to recognize the most level parts of the landscape, the most sloped, and all the slope gradations in between the extremes. The areas of the lowest degrees of slope were color-coded in browns, while the areas of the greatest degrees of slope were color-coded in blues (Figure 50). The dark brown seen in Figure 50 represents all land with a degree of slope between zero and six degrees. These areas are the most level regions of the landscape. Light brown represents areas of the site with a slope from six to ten degrees. Tan signifies parts of the site with ten to fifteen
degrees of slope. Light blue marks areas with fifteen to twenty degrees of slope, and dark blue signifies any area with a slope of greater than twenty degrees.

**Figure 49** Creation of the Slope Model in ArcGIS showing digitized features and slope derived from the DEM values.

**Figure 50** Slope models, before (left) and after (right) adjusting the symbology.
To interpret water flow at the site, maps were made using the slope model and the DEM. Maps were made in ArcGIS for the site as a whole, the West Group, the Central Group, and the North Group. The maps of the West Group area contain numerous natural springs and stream features that are still present today and would have been important sources of water during the time period of interest as well. Maps of the North Group will not be emphasized in analysis because this part of the site was settled beginning in the Late Classic period, making it temporally unrelated to the settlement and management of water occurring at the rest of the site during the Middle and Late Preclassic periods (Crasborn and Marroquín 2006; Jacobo 1999:548; Popenoe de Hatch et al. 2000:137; Wolley Schwarz 2001:1006-1007). Maps of Terrace 2 and 3 were also made because they contain the greatest number of human-made water features and monuments with water-related themes.
CHAPTER 6:
ANALYSIS AND RESULTS

Upon completing the methods described in the previous chapter, the maps created were analyzed to interpret how water flowed across the site. The DEM was used to establish the changes in elevation throughout the site and the slope model was used to study how changes in slope in different areas of the site may have influenced the flow and run-off of water. The manner of integration of the topography of the site with natural and constructed water features, structures, and the various types of monuments at Takalik Abaj is essential in evaluating the function of the water management system.

*Elevation Overview Maps*

The following maps provide overviews of Takalik Abaj, the West Group, and the Central Group. Each map displays the DEM in the background to provide a visualization of the variations in elevations at different locations (Figures 52, 53, and 54). Different levels of elevation are distinguished by color, with the highest areas noted in greens and the lowest regions identified with blues. The water features represented in the maps are springs, canals, rivers, and two features interpreted as steam baths by Takalik Abaj National Project archaeologists due to the similarities these features share in their layouts to the steam baths of Palenque (Houston 1996:134).
Slope Model Maps

The slope model maps produced for this thesis reveal additional detail of the topography of Takalik Abaj (Figures 55, 56, 57, and 58). The slope model derived from the DEM of the site was used to create maps for the Central Group and the West Group. Like the elevation overview maps, these maps display all the natural and human-made water features. The slope maps produced also illustrate the different types of monuments for which GPS positions were available.

The carved stone monuments shown in the slope model maps were separated into three categories: altars, stelae, and monuments. Stelae and altars, which are often paired together, differ considerably from the boulder-style sculpture of the potbellied and effigy carved monuments that are also present at the site (Graham and Benson 1990:82-83). In contrast to boulder sculptures that use the natural contours of the rock as a part of the sculpture, stelae have more standardized, prepared shapes and they stand erect, often with an altar positioned at their bases (Guernsey 2006:15; Graham and Benson 1990:77). All other monuments that were not considered to be either stelae or altars were labeled as “monuments.” These stone monuments were usually of the boulder sculpture or potbellied style most often associated with Olmec styles of sculpture (Graham and Benson 1990:83).
Figure 52 Site map of Takalik Abaj, showing DEM information.
Figure 53 Map of the West Group, showing DEM information.
Figure 54 Map of the Central Group, showing DEM information.
Figure 55: Slope model of the West Group.
Figure 56 Slope model of the Central Group, showing water-related monuments.
**Figure 57** Slope model of Terrace 2 and 3, showing water-related monuments.
Figure 58 Slope model of Terrace 2 and 3, showing all monuments.
Monument data were most important in mapping the Central Group because this area has the greatest abundance of monuments. Terraces 2 and 3 of the Central Group, in particular, have the greatest number of identified monuments and human-made water features, which is why these terraces were selected for additional mapping. Maps were made of the Central Group to distinguish water features and the changes in slope, but also to study the distribution of monuments that were water-related. The Central Group maps focusing on the distribution of monuments contrast the positions of altars, stelae, and monuments that are water-related and those that are not, in order to examine whether or not there was any significance in the placement of monuments displaying watery themes.

The importance of carved stone monuments in conveying the beliefs of communities and the agendas of ruling classes has often been a theme in analysis of sculptures (Guernsey 2006:1-6; Popenoe de Hatch 2006:39). The ways that monuments may have been meaningfully placed to attach certain places with the sacred connotations surrounding watery themes merits investigation. Scholars note that the monuments at Takalik Abaj have been shifted various times throughout the history of the site and were often repurposed, such as for use as construction materials (Crasborn and Marroquín 2006:52; Marroquin 2005:957). Although some monuments were moved and destroyed, the changes in locations, uses, and, possibly the meanings, of these monuments represent the persistent importance of the monuments throughout time at the site. The original uses and meanings surrounding monuments that have been moved or repurposed may be difficult, or impossible, to surmise, but their final spatial location still offers information about space, place, and meaning. The ideology behind these carved stone monuments can provide information on ancient culture and power that can also enrich understandings of
the descendant cultures by providing additional knowledge of ancestral history. The data of this project are a part of how the relationships between architecture, terrain, and monuments can be analyzed to investigate water and its possible influence upon social dynamics.
CHAPTER 7:
INTERPRETATION AND DISCUSSION

Studies on the topic of water management in Mesoamerica have suggested that restricted authority over water use for both religious and utilitarian purposes is more likely to manifest itself in water management systems that are highly centralized (Scarborough and Gallopin 1991:659). When the opposite pattern—decentralized organization—occurs, a lack of authority over water resources is assumed due to the difficulty of regulating the access to these resources (Scarborough 2007:164). Control over water features is implied when the integration of these features into the cityscape allows them to be more easily accessed by the ruling class than the rest of the population due to the close proximity of these water features to ceremonial and civic structures or to other buildings in which elite activities occur.

The distribution of water features and the access to these features is important, but a study of the topography is also necessary to determine the ways in which water was directed across the landscape and how this flow of water may have had implications for the overall function of the water management system. The manipulation of water throughout the site is examined through both the analysis of the placement of water features and changes in elevation and slope in the terrain that have the potential to influence the movement of water. Any possible political implications associated with the
management of water are interpreted when the distribution of water features and the
topography of the site are investigated in conjunction with other forms of material
culture, such as monuments and artifacts.

In polities in which water management is believed to have been a factor relevant
to achieving and maintaining political power, monuments and other art forms displaying
rulers dressed in regalia emphasizing their role in managing water and art works
displaying watery themes in general will be evident throughout the site (Cyphers et al.
2006:17-22; Fash 2010:81-82; Fash and Davis-Salazar 2006; Grove 1968:486-487;
Guernsey 2006:1; Love and Guernsey 2007:926-928; Reilly 1990:14-15; Reilly
1991:164-165). The ritual aspects of water can also be critical factors contributing to the
value of water control to the political power of the elite. The significance of water within
religious beliefs and ritual activities is often suggested when offerings are found within or
around natural or human-made water features or monuments displaying water-related
themes (Valdés 2006:70-71). Water has also been suggested to be significant to the
identities of the ruling elite when artifacts related to marine life, such as shells or effigies
of marine creatures, are present in elite burials (Fash 2010:81; Joyce et al. 1991:3; Reilly
1994:128; Taube 2004:122-125; Zender 2010:84.) These dimensions of Takalik Abaj as
well as its spatial organization are vital to the discussion of how the management of water
could have influenced the political dynamics of the site.

*Water Features and Topography*

The maps and data tables produced for this research provide some preliminary
information necessary to begin examining the potential social implications of the spatial
organization of water at Takalik Abaj at the site-level scale. These data demonstrate a
pattern in which the placement of natural and human-made water features differs throughout the site. The information for use in this study also illustrates the marked, variable landscape of Takalik Abaj, the alterations made to the terrain, and how the settlement was organized to fit the natural and engineered topography. Together, these details create a model for how water features and the topography were intertwined.

The water features available for analysis in this project include natural water features, such as rivers and springs, and human-made water features, such as canals and the features interpreted as steam baths. The fourteen springs that were recorded with GPS for use in this study have an average elevation of 627m ASL, which is near the higher end of the 370-800m ASL range of elevations for the site. The majority of the springs within Takalik Abaj appear to serve as sources for streams that flow southward from them.

The springs of the site are primarily associated with the Xab and Nima rivers and their tributaries, located along the western portion of the site area around the West Group and the North Group. The West Group, in particular, is positioned in an area with easy access to springs on almost all sides of the terrace it occupies. Two springs are located on the Nima River west of Structure 37, four springs are located north of Structure 33, and two springs are located to the east of Structure 32 (see Figure 53). These structures upon Terrace 6 of the West Group would have had a total of eight springs in the vicinity from which to collect water. Considering that the West Group is also an area distinguished by artifacts of affluence, such as jade, it is possible that the people of this group were advantaged in being able to settle the areas of the site with the most plentiful water sources (Schieber de Lavarreda 2003:790; Wolley 2001:1010). The monumental size of
Structure 32 also attests to control over resources because its construction would have required significant investments in labor.

According to Mulligan et al. (2011:1346), the water quality of springs is superior in conditions in which land use by humans is minimal and in which springs are able to recharge in areas of higher elevations. Springs located at lower elevations are more likely to collect runoff and other sediments that negatively affect the quality of the water. No springs were recorded in the vicinity of Terrace 1, 2, 3, 4, and 5 of the Central Group. Any springs that may exist in the area of the Central Group but have yet to be recorded would have potentially suffered in the quality of their water during the site’s occupation because the Central Group was extensively leveled and was settled along the least elevated terraces of the site (Crasborn and Marroquín 2006:49-50). Conversely, the springs located north of the West group are likely to have had the best water quality because they are located north of the heavy landscape alterations that occurred at the West Group and they reside at higher elevations (Crasborn and Marroquín 2006:49; Popenoe de Hatch et al. 2000:137; Wolley Schwarz 2001:1007-1010). These details suggest that the West Group not only had the best access to multiple springs but also may have enjoyed spring water of the highest cleanliness during the Late Preclassic occupation of the site (Wolley Schwarz 2001:1010).

In contrast to the springs, the human-made water features of Takalik Abaj are predominantly situated along the five terraces of the Central Group. As observed on the 1978 hand-drawn map produced by archaeologists of the University of California, the heart of the Central Group lies on Terrace 2 and Terrace 3 (Graham et al. 1978). Structures 3, 4, 5, 6, 7, and 8 occupy the area of Terrace 3, while Structures 9, 10, 11, 12,
and 13 are situated on Terrace 2, just south of the structures on Terrace 3. Of all the nine terraces running north to south, the greatest numbers of canals and all the steam bath features are located in between Terraces 1 through 5 of the Central Group (Schieber de Lavarreda 1991:8; Marroquín 2005:961; see Figure 54).

Marroquín (2005:956) specifies the existence of 25 known canals and provides general map location data for most of them. This study used these general map location data along with more precise GPS positional data for five canal features. Many of the canal GPS points are clustered together near the possible steam bath feature in between Structure 60 and Structure 14 on Terrace 1. Another canal GPS point is located immediately east of Structure 8 of Terrace 3. Canal points for the maps created for this thesis were marked based upon Marroquín’s (2005:961) map delineating the canals, which has many canal points that overlap with GPS points made available by AIST. Sixteen canal points in total were mapped, which suggests at least nine known canals are not represented in this study (Marroquín 2005:956).

According to Marroquín’s (2005:961) map, there are five canal features lined up east to west, following the curve of Terrace 3, just south of Structures 5, 6, and 7. There are two canal features observed on the northeast edges of Terrace 4 and one on the center of the slope of Terrace 5 (Marroquín 2005:961). The map of canals produced by Marroquín (2005:961) also shows that Structure 12 has one canal directly on its north side and one on its south side and that Structure 13 and Structure 9 also have canal features immediately adjacent to their walls. Additionally, two canals are identified surrounding Structure 60 on Terrace 1 (Marroquín 2005:961). The canal features most distant to the nucleus of canals on Terraces 1, 2, and 3 are those located in the area
known as *El Escondite* to the west of the Central Group and those found near Structure 2 of Terrace 4 and Structure 61 of Terrace 5 (Marroquín 2005:961).

The GPS points of the steam baths show that discovered and recorded steam baths are limited to Terrace 1 and Terrace 2 and that these features are associated with canal features. A steam bath exists on the south wall of Structure 12 near the canal that resides on this area of the structure. The other steam bath resides south of Terrace 2 on Terrace 1 near a canal approximately in the center of the space in between Structure 60 and Structure 14. The data collected by the members of AIST and the information on the canals of the site provided by Marroquín (2005:961) indicate an absence of documented steam baths and canal features at the West Group and the North Group. Additional survey and excavation may reveal constructed water features within the West Group and the North Group. Still, a greater frequency of canal features may have been desirable in the Central Group for several reasons, including a more significant need to drain this area because the Central Group structures lie at lower elevations than those of the other site groups mentioned. Terrace 1 is the lowest-lying terrace, with the rest of the terraces ascending from it.

As previously mentioned, Takalik Abaj receives a considerable amount of rainfall—between 3,500mm to 4,000mm annually—so the canalization and drainage of water would have been vital, particularly in areas that are lower in elevation and therefore more likely to accumulate runoff (Crasborn and Marroquin 2006:47; Jacobo 1999:551; Rizzo de Robles 1991:33). The need for drainage features is common throughout Mesoamerican highland sites and is believed to have been one of the primary functions of the canals at Takalik Abaj (Jacobo 1999:552; Marroquín 2005:955; Scarborough and
Gallopin 1991:658). The lack of steam baths in the West Group and North Group correlates with the lack of canals in these areas since steam baths in the Central Group have only been discovered in association with canal features. In addition to expanded excavation within these areas, remote sensing such as magnetochemistry and GPR in this area might reveal more of these features.

The fluctuations in elevation of the site presented in Appendix 2, 3, and 4 and in the elevation overview maps confirm the observations made by scholars that Takalik Abaj’s topography decreases in elevation from the highest and northernmost terrace, Terrace 9, to the lowest and southernmost terrace, Terrace 1, as the site expands southward in the direction of the Pacific coast (Schieber de Lavarreda 1991:8). Based on the elevation data of each structure on the terraces of the Central Group, the West Group, and the North Group, the average elevation of each terrace was calculated. The structures of Terrace 9, 8, and 7 of the North Group have average elevations of 702m ASL, 670m ASL, and 664m ASL, respectively, while the structures of Terrace 6 of the West Group have an average elevation of 632m ASL. Within the Central Group, Terrace 5, 4, 3, 2, and 1 contains structures with average elevations of 623m ASL, 614m ASL, 613m ASL, 601m ASL, and 599m ASL, respectively. The range of change in elevation along the terraces from Terrace 9 down to Terrace 1 is 103m.

These variations in elevations from terrace to terrace noted in Appendix 2, 3, and 4 are noteworthy because these traits of the landscape direct flow of water at the site. The pattern of descending elevations away from Terrace 9 and the Guatemalan Highlands to the north suggests a path of water flow that travels from the north to the south, eventually to be released in the Pacific Ocean. The north-to-south flow of water is an imperative
detail in the interpretation of how water travelled across the site of Takalik Abaj and may be linked to activity and settlement decisions. When analyzed in relation to the general path of water established by the trend in elevation changes, the slope model adds to the understanding of the flow of water at Takalik Abaj by providing detail on the terrain of the site.

Not surprisingly, structures at the complexes were constructed on areas of the landscape that were the most level, typically upon terrain with a degree of slope of less than 10 degrees. This observation is congruent with the findings of archaeologists that have found that the landscape was naturally terraced and that the West Group and Central Group were intensively leveled during the Middle to Late Preclassic occupation to create flat spaces for the construction of structures (Crasborn and Marroquín 2006:45-50; Wolley Schwarz 2001:1007-1010). In the slope model, terraces are often emphasized in the brown color code indicating the least sloped land, while the edges of terraces are generally indicated by the tan color code signifying a slightly greater degree of slope than the brown. The color-coding of the various grades of slope allows the outlines and forms of the terraces to be more apparent.

The slope modeling illustrates a severe incline on the eastern edges of Terraces 1 through 5 of the Central Group. This area exhibits a drastic gradient that increases in steepness as one moves toward the Ixchiya River that lies east of the Central Group. The slope modeling does not show as pronounced a drop in the terrain surrounding the western borders of the terraces of the Central Group, but some areas of increased incline are visible along the eastern bank of the stream that separates the Central Group from El
Escondite, especially near the part of the stream bank that is adjacent to the western side of Terrace 1 (Figure 59 and 61).

The slope model of El Escondite demonstrates an example of another aspect of the topography that is critical in delineating possible pathways of water at the site. In addition to revealing the shapes of the terraces by illustrating the varying gradations of the terrain, the slope model also reveals features of the landscape that denote potential ravines, ditches, or channels. Most commonly, lines of the tan colors represent these narrow lines of inclined landscape, such as shown in modeling for the West Group, El Escondite, and the Central Group. These tan linear areas cut through the more level terrain shown in darker brown. Figure 59 shows a possible channel that appears to link one canal point to another within the area of El Escondite. The possible channel is marked by a tan pathway that connects the canal points that are shown in green. Since water is assumed to be moving north to south, due to the way the landscape decreases in elevation southward, this pattern suggests that water may have been transported from the northerly canal to the canal located to the south. The findings suggested by the slope model are consistent with Schieber de Lavarreda’s (1998:475) postulation that a canal in El Escondite conducts water to a residential structure located south of El Escondite.
Figure 59 Slope model of El Escondite.
The flow of water within the Central Group can be interpreted in a similar manner, taking into account the distribution of water features and the characteristics of the terrain. As noted previously, a high concentration of canal features are located on Terrace 2 and Terrace 3. Another observation of the canals of the Central Group is that the eastern sides of the terraces appear to have been the favored locations for the placement of many of the canals. Of the fourteen canals placed upon the five terraces of the Central Group, nine are located in close proximity to the eastern edges of the terraces, near the regions of the landscape that slope into the Ixchiya River.

The positioning of a majority of the Central Group canals near the eastern portions of the complex may indicate the desire of the inhabitants to redirect water into the streams and away from the terraces to preserve the integrity of the structures constructed by preventing erosion that would have been caused by an accumulation of water on the surfaces of the terraces. The slope model supports the idea that canals were placed on the east to drain water into the stream. The degree of slope of the landscape near the canal feature located directly northeast of Structure 2, in particular, is suggestive of a pathway of water that flows into the nearby stream (Figure 60). In this area, a marked incline radiates from the canal feature in the direction of the stream to the east. It is possible that this canal point served as an outlet into the river and that the two canals directly northwest were connected to it to transport excess water from Terrace 5 into the canal drain on Terrace 4 (Figure 60).
Figure 60 Slope model of Terrace 5, 4, and 3, showing water-related monuments.
**Figure 61** Slope model of Terrace 3, 2, and 1, showing water-related monuments.
Three canal points located south of Structure 6 and Structure 7 on Terrace 3 are also located upon the eastern side of complex on terrain that slopes into the Ixchiya River. These canal points are also noteworthy because they are associated with five water-related monuments Altar 48, Altar 38, Monument 163, Altar 36, and Stela 71 (see Figure 66). The two canals surrounding Structure 12 on the north and south sides of the structure are also found near water-related monuments Monument 68, Monument 66, Altar 26, Monument 70, and Monument 95 (see Figure 37 and 41). The significance of the placement of these monuments is discussed in the following section on monument locations and associations. The canal on the southern portion of Structure 13 is another feature that may have served as a drain that directed water into the Ixchiya River because, judging by the manner that the landscape slopes into the river, the drain may be at a point slightly to the west of this canal feature. A noted feature south of Structure 13 may have been connected a canal just south of Structure 12, near a noted steam bath feature. Any water that may have been used within the steam bath could have been carried away from this feature into the drain to the east.

The other canals found closer to the interior of the Central Group are likely to have served purposes that differ from the canals constructed at the summit of the escarpment leading to the river. The canal point on the center of Terrace 3, to the south of Structure 5, appears to be unassociated with the drains directing water to the east. This canal is associated with the narrow, tan linear feature that is interpreted to be a possible ditch leading in the direction of the canal located on the eastern side of Structure 9. The placement of these two canals features suggests that water was carried from Terrace 3 to
Terrace 2 in a controlled and directed fashion. Additionally, water is likely to have been collected on Terrace 2 for use in the steam bath found adjacent to Structure 12.

The area of Terrace 1 is another portion of the site where water is likely to pool or collect. In this area, a steam bath and a canal are paired together on a level space located between two structures. The association of the canal with the steam bath suggests that water was collected for use at this feature. Notably, slope modeling and photographs indicate that the terrain upon Terrace 1 was inclined around the steam bath and the canal point (Figures 56, 61, 62, 63, and 64). This pattern differs from the other terraces that generally present sloped areas on the edges of the terraces instead of within the terraced area, and is suggestive of the function of storage, collection, and use. The incline present in the portions of land around the steam bath indicates that a sunken plaza or basin is present in the area between Structure 60 and Structure 14. The steam bath and canal are in the center of the depressed area, which would increase water collection potential of the steam bath. This area was subject to detailed topographical modeling using data collected from terrestrial laser scanning instrumentation, allowing a +/-2 mm understanding of elevational differences (Doering and Collins 2012; Figure 64).
Figure 62 Terrace 1 steam bath feature (photo courtesy of Alliance for Integrated Spatial Technologies, University of South Florida, ©2011).
**Figure 63** A segment of the depression feature with associated steam bath and stone canal channel system on Terrace 1 (photo courtesy of Alliance for Integrated Spatial Technologies, University of South Florida, ©2011).

**Figure 64** Screen capture of the 3D data from the TLS survey showing the steam bath feature at Terrace 1, Takalik Abaj (Doering and Collins 2012:47).
Figure 65 shows an overview of the slope model that includes the West Group, *El Escondite*, and the Central Group. This map reveals a possible channel, shown in tans and light blue, descending from Terrace 1 into the area adjacent to Structure 15, which suggests that water from the steam bath area was drained into the land to the south after use. Another depressed area associated with a canal is found in the space southwest of Structure 11. Scholars have identified the presence of a ball court in this area that is associated with a Middle Preclassic clay canal (Marroquín 2005:957). Located on the northwestern wall of Structure 60 to the south of the feature, this canal point is situated on the elevated land on an incline that slopes into the stream in between the Central Group and *El Escondite*, where it presumably carried water away from the ball court.

Figure 65 also shows that the westernmost canal on the edge of Terrace 3 is associated with sloped landscape leading to a possible channel, suggesting that the canal point was used to drain water away from the terrace and into the stream heading toward *El Escondite*. In addition to the line descending into Structure 15, many other possible ditch features that are not associated with mapped canals or other known constructed water features are present on this map. A ditch is visible on the slope model heading south from Structure 24. A pronounced channel is also observed directly west of Structure 3 on Terrace 3. These features on the slope map are important because they may indicate additional areas to ground truth for the presence of canal, ditch and drainage features.
The flow of water interpreted from the distribution of water-related features and the details of the topography suggests that water was used for different purposes across the site. The canals near the eastern edges of the Central Group appear to perform draining functions, but the same cannot be said of the canals on the interior areas of Terrace 3, Terrace 2, and Terrace 1. Some of the canals located on the western extent of the Central Group may also have been used to drain the terraces. The network of canals within El Escondite appears to carry spring water from a source found north of the site.
structures in the south of this area. While human-made structures for water have yet to be recorded, the plethora of natural springs and water sources in the West Group area are suggestive of the importance of this area in the Takalik Abaj water management system.

Monument Locations and Associations

The abundance of water at the site in its various forms may have been an inspiration to the themes of its sculptural art. Takalik Abaj is diverse in an assembly of styles of sculptural art and artistic themes, but this research focuses on those relating to water within the Central Group (Graham and Benson 1990; Love 2007; Popenoe de Hatch 2006). Figure 58 displays a map of all the monuments of the Central Group, including, but not limited to, water-related monuments. The structures with the greatest number of monuments are Structures 7, 9, 10, 11, and 12, but Structures 2, 3, 4, 5, 6, 8, and 13 also have nearby monuments. Water-related monuments are limited to Structures 7, 12, 13, and the spaces around Structure 8 and Structure 2.

Appendix 1 describes each water-related monument that was mapped and its nearest structure. Additional monuments, both water-related and of other themes, have been discovered at the site but are not mapped in this project because they are today no longer present at the site—some are stored at museums—and may be of unknown provenience. Twelve water-related monuments are represented among the sculptures for which GPS locations were available. Of these sculptures, six feature aquatic animals, four were used as reconstruction pieces in canals, and two represent human figures. Ten of the twelve water-related sculptures are located 3m or closer to a structure, suggesting that it may have been important for certain structures to embody connotations and meanings
related to water. Over half of all the water-related sculptures present in the Central Group at Takalik Abaj are most closely associated with Structures 7 and 12.

Altar 6 and Monuments 47, 66, 68, 70, and 95 are all carved monuments of toads, frogs, or crocodiles. Depictions of toads and frogs were the most abundant in this examination, while Monument 70 is the only sculpture to depict a crocodile. Half of these sculptures of aquatic animals are placed directly beside Structure 12 on either its east or west façade. The other toad or frog sculptures are found in association with Structure 2, 7, and 13. These animal effigies are made in the boulder sculpture style that is most consistent with the sculptural characteristics of the earlier occupations of the site, prior to the Late Preclassic (Graham and Benson 1990:78; Popenoe de Hatch 2006:37-40; Love 2007:293). The depiction of amphibians and crocodiles, especially when related to natural or constructed water features, symbolizes a connection to the watery realm of the underworld, the production of rain, vegetative fertility, and power to transition between watery and earthly locales (Houston 2010:69-76; Reilly 1990:32-33; Reilly 1991:161-162; Reilly 1994:129). Every structure around which aquatic animal effigies are found is also closely associated with at least one canal feature typically located adjacent to the southern or northern walls of the structures.

Altar 36, Altar 38, Monument 163, and Stela 71 are considered to be water-related monuments because they were all repurposed as construction materials for the canal adjacent to the southern wall of Structure 7. These monuments, constructed of volcanic stone, were broken and integrated into the canal that served to drain the surface of Structure 7 (Marroquín 2005:957-958). The utilization of stone monuments as construction elements within water conveyance features such as these is suggestive of the
importance of water to the constructed landscape. These monuments vary in sculptural styles with Stela 71 representing a Maya-style bas-relief carving and Monument 163 representing boulder sculpture of a male figure (Marroquín 2005:958; Figure 66).

Notably, the male figure Monument 163 includes representation of male genitalia that may have been intended to correspond to the aspects of fertility associated with water (Cyphers 1999:164-165; Grove 1968:486-487; Guernsey 2002:66; Love and Guernsey 2007:926-928; Reilly 1990:32-33; Reilly 1991:162; Reilly 1994:129-130). The boulder sculpture dates to the Late Preclassic while Monument 71 dates to the Proto-Classic period, which suggests that the canal was constructed during the Proto-Classic period (Graham and Benson 1990:78; Marroquín 2005:958; Popenoe de Hatch 2006:37-40).

Altar 36, located at the beginning of the canal near Structure 7, is one half of an incense burner (Marroquín 2005:957). The other half of the incense burner, Altar 38, features a carved serpent and was placed at the end of the canal (Marroquín 2005:958). The serpent imagery on this monument compliments Stela 13 on Structure 7, which is another broken monument that depicts a stylized serpent in Maya style (Orrego Corzo and Schieber de Lavarreda 2001:788-789; Schieber de Lavarreda 2002:399). The serpent figures and the incense burner fragments are symbols and tools of ritual activity (Stross 1994:22).
Figure 66 Monuments repurposed as construction materials for the canal adjacent to Structure 7 (edited from Marroquin 2005:967).
The monuments associated with the canal of Structure 7 are not the only monuments related to water features. Altar 48, located in closest proximity to the eastern wall of Structure 8, is positioned at the northern end of a drain feature, known as Canal 26 (Schieber de Lavarreda and Orrego Corzo 2009:464; Figure 67). This andesite altar, sculpted in Maya-style, is one of many monuments surrounding Canal 26, but is noteworthy because it displays the image of a human figure seated in an open quatrefoil symbol and contained within the body of a zoomorphic figure, crocodilian-like figure (Schieber de Lavarreda and Orrego Corzo 2009:457-463).

The quatrefoil symbol, also found at the Preclassic site of La Blanca in Guatemala, is considered to be water-related because it was commonly used to represent a portal, opening, or cave, often leading to the watery underworld (Bassie-Sweet 1996:66; Grove 1968:486-487; Love and Guernsey 2007:920; Love 2009:2; Reilly 1991:164-165). The zoomorphic creature on Altar 48 is identified as a caiman or crocodile because of its long tail, clawed feet, sharp teeth within its open maw, and the crevice on its back, a trait often associated with caiman and crocodiles that are intended to represent the floating Earth (Finamore and Houston 2010:227; Houston 2010:70; Schieber de Lavarreda and Orrego Corzo 2009:458). The crocodile theme on Altar 48 is in keeping with the representation of aquatic animals found through the site.
The figure within the quatrefoil on Altar 48 wears an elaborate headdress and is seated upon a throne, suggesting the personage is powerful (Doering and Collins 2011:66; Schieber de Lavarreda and Orrego Corzo 2009:456). The glyphs around the edges of the monument refer to the seated figure, who has been interpreted as representing the Maize God or a ruler that existed at Takalik Abaj (Schieber de Lavarreda and Orrego Corzo 2009:456). According to Guernsey (2002:67-72), the birth of the

**Figure 67** Takalik Abaj Altar 48 of personage seated in quatrefoil (Schieber de Lavarreda and Orrego Corzo 2009:463).
Maize God from an underworld portal, represented by the quatrefoil, is a common Late Preclassic cosmological narrative that was often appropriated by rulers to suggest a unity between rulers and the Maize God in an effort to imply that rulers had a significance equal to the deity associated with the creation of the world. Altar 48 may be a depiction of the Maize God or a ruler evoking the deity. Guernsey (2002:67-72) notes that Stela 4, a monument of unknown provenience carved in a style similar to that of Izapa monuments, has the same themes, which suggests that this sacred narrative is present at Takalik Abaj.

Altar 48 was caved during the beginning of the Late Preclassic and buried ceremonially with Stela 14 placed on top of the monument in the latter half of the Late Preclassic period (c. 200 B.C. – A.D. 150) (Schieber de Lavarreda and Orrego Corzo 2009:459). This sculpture is believed to have been revered, in part, because it was buried carefully, to avoid damaging the monument (Schieber de Lavarreda and Orrego Corzo 2009:461). The association of Altar 48 with the canal to its south emphasizes the watery connotations of the symbols carved upon it. All of the monuments discussed, including Altar 48, and the meaning of their placement near water features and certain structures suggests the significance of the water management system of the site, and the context, meaning, and relationships to function.

The Functions of Spaces

An understanding of the relationships between the human-made and natural water features, monuments, and structures of Takalik Abaj is enhanced considerably when the purposes of the different groups and structures are taken into consideration. Water management systems have meanings that extend to the features and areas where they are
found. The functions of spaces are interpreted according to the types of material culture in the areas of interest, and for this examination, I primarily concentrate on the area within the Central Group, but have also examined areas of El Escondite and the West Group. At Takalik Abaj, it is apparent that the site was constructed with the aim of having convenient access to water sources and integrating a water management system into residential, civic-ceremonial, and elite activity areas for multiple purposes. The settlement also developed in a way to channel and control the movement of water that, without this control, could lead to erosion of the steeped and terraced areas of the site.

The land surrounding El Escondite was the first area of the site to be settled and also is suggestive that the water management system at Takalik Abaj was multi-functional (Crasborn 2005:696; Marroquín 2005:956; Schieber de Lavarreda 1998:473). The positions of the canals and the pathway of water flow suggested by the slope modeling indicate that water was being carried from water sources to the north down into the area of El Escondite. The presence of residential structures in the areas surrounding El Escondite suggests that this water was used to supply these residences with water, but the architectural and archaeological evidence of ritual activity in the area also implies that water was important to spiritual activity and belief (Marroquín 2005:956; Schieber de Lavarreda 1998:475-476).

The canals of El Escondite appear to have been a part of water rituals because they are integrated into a space with monuments and an altar, and they are associated with a wealth of offerings deposited at the south end of Canal 1, some showing signs of having been burned (Marroquín 2005:956; Schieber de Lavarreda 1998:475). Schieber de Lavarreda (1998:476) suggests that El Escondite was dedicated to the birthplace or
origination of water. The ideological importance of a sacred “source” of water has been claimed at other Preclassic Mesoamerican sites, such as San Lorenzo, where a basalt aqueduct was constructed in an elite activity area know as Group E at great cost because the weighty stone needed to be imported from a great distance (Cyphers et al. 2006:20-26). The stone aqueduct trails away from a freshwater well positioned within a platform in Group E (Cyphers et al. 2006:20-26).

The ideological importance of the San Lorenzo water source is implied because considerable expense and labor factored into the construction of the aqueduct and the union of the aqueduct and the well occurred in a place of prominence, with monuments and artifacts of power related to the sacred qualities of water discovered. The water and underworld themes found on the Group E monuments of San Lorenzo, such as the depictions of sacred ancestors emerging from cave-niche portals of the underworld, are argued to have been pivotal in validating the sacred origins of rulers (Cyphers et al. 2006:19-20). The well and the aqueduct are likely to have been meaningfully incorporated into Group E as symbols and extensions of the importance of water and water sources to the divine and to the power of nobility being expressed in the areas around the water features. A niche figure is also found on a carved monument near the Takalik Abaj El Escondite area. Monument 64 contains the depiction of such a personage at the mouth of a niche (see Figure 33).

As previously discussed, the ritual importance of water sources is also evident at Kaminaljuyú, a Preclassic Guatemalan site in which the central water source, Lake Miraflores, contained offerings (Guernsey 2006:7; Valdés 2006:70-72). A network of canals extended from the lake, which was the most important supply of water at the site
The water carried by the canals from Lake Miraflores was eventually used for utilitarian purposes, including the irrigation of agricultural fields, but it is the ritual offerings found at the source suggest water was important to religious beliefs (Valdés 2006:70-75). The offerings placed near the canals of El Escondite may be similarly suggestive of the sacred significance of the water source. The water that flows through the canals of El Escondite could have been used in household settings for utilitarian purposes while also having sacred origins, emphasized by the evidence of ritual found near the canals.

The findings in the Central Group to the east of El Escondite support the idea that water was a component of ritual life at Takalik Abaj. The water features of the Central Group were also multi-faceted in use, varying in function and in their symbolic importance depending upon the architecture and material cultural of the surrounding spaces. One of the earliest canals constructed of clay is located near the ball court north of Structure 60 and west of Structure 11 (Crasborn and Marroquín 2006:45-49; Schieber de Lavarreda 1994:73; Schieber de Lavarreda 1998:473). The slope model reveals a probable course of water flow implying purposeful and planned construction that used the canal to drain water away from the ball court and into the ravine to the west. Although Mesoamerican ball courts typically embody ceremonial and sacred connotations, the canal coupled with the structure is not necessarily sacred by association to the structure (Schele and Miller 1986:243). Unlike the canals of El Escondite, there is a lack of offerings and monuments found near the canal of the ball court, suggesting that the meaning here is likely more functional for drainage than as ritualistic in meaning.
The existence of the ball court within the area of Terrace 2 does aid in establishing the functions of the terrace upon which it was constructed. The other architectural structures and their related material culture, like the ball court, are indicative of civic-ceremonial functions. Popenoe de Hatch et al. (2000:135) note that Structures 11, 12, and 13 lack hearths, burials, and middens that commonly mark residential areas, and are suggestive of these spaces functioning as civic or administrative locales. The public and ceremonial aspects of the structures on Terrace 2 are congruent with the existence of the nearby ball court to the west and provide a context for the water features that have been identified in the area.

Structure 12, in particular, contains material culture that is revealing on the subject of water management at the site. The ancient inhabitants interred considerable offerings upon the structure’s surface in patterns resembling that of material culture deposited after the enactment of modern Maya rituals, alluding to the possibility that similar rituals occurred at Structure 12 (Schieber de Lavarreda 2002:404-406). Structure 12 is also notable for having three human-made water features adjacent to its walls – two canals and one steam bath – and for having four monuments of water-related themes bordering its sides. A canal is found on the northern and southern walls of Structure 12, and aquatic animal effigies in boulder sculpture style are located on the western and eastern sides of the structure. The steam bath is paired with the canal on the southern wall.

The western wall features monuments depicting a crocodile and a toad, while the eastern wall of Structure 12 features a monument of a frog associated with a round altar. The fact that these monuments were among those used to represent the civic-ceremonial
structure suggests that water was significant to the message being conveyed through the ritual activities that occurred on the structure. The canals associated with Structure 12 may have been important for their drainage function, but also may have contributed to the expression of the watery atmosphere expressed on the carvings of the monuments found near the structure. Structure 12 was planned so that every side of it would be associated with water, either through representations on stone monuments or through constructed water features.

The canal on the southern end of Structure 12 possibly served to carry and/or drain water away from the nearby steam bath feature. The location of this steam bath in the context of a structure where ritual activity occurred is notable because it is reminiscent of Houston’s (1996:132-138) study on steam baths that describes these features as symbols important to ritual and themes of birth, including the birth of the deities. The monuments and artifacts in the surrounding areas to the Takalik Abaj Structure 12 imply that the steam bath is likely to have had a similar sacred significance as those noted by Houston. The offerings recovered from Structure 12 allude to ritual while the carved marine creatures depicted on monuments flanking the southern canal and steam bath allude to transitions between the earthly realm and the watery realm symbolic of life and death. This dualistic imagery is in harmony with suggested birth themes associated with other steam baths (Reilly 1991:162; Stocker et al 1980:748). The crocodile, especially, has been connected to rain, vegetation, and fertility at other Preclassic sites, including Kaminaljuyú and Izapa (Stocker et al 1980:745; Stross 1994:33; Valdés 2006:70). Considering that Takalik Abaj contains symbolism common
to other Preclassic sites, the undertones of the aquatic animal symbols on the monuments were likely comparable at Takalik Abaj.

The connotations associated with the types of water-related creatures represented upon monuments and the meaning of the steam bath to the rituals taking place on the structure possibly extends to the integrated canal features. According to my analysis, the greatest number of human-made water features is located at Structure 12. Elsewhere on Terrace 2, Structure 9 and Structure 13 contain one canal each in contrast to the three water features found by Structure 12. A water management system may have been particularly important to be incorporated into Structure 12 to add to the imagery of the spiritual importance of water being illustrated within the rest of the material culture associated with the structure. It should be noted that Structure 6 in the Central Group is the focus of on-going investigative work and excavation by the Proyecto Nacional Tak'alik Ab'aj, and rich findings of ceramic and jade offerings in relation to human burial remains have recently been uncovered (Schieber 2010, 2012; Schieber de Lavarreda and Orrego Corzo 2012). This area may also prove to have significant association with water-related iconographic and architectural features depicting the importance of these themes.

Additionally, the slope model maps reveal that the site was organized so that water was moved onto the areas occupied by Structure 9, 10, 11, 12, and 13 on Terrace 2 from Terrace 3. Since there is a lack of evidence to support a residential occupation or agricultural uses for the land on Terrace 2, it is possible that this water was carried into the area for ritual bathing and other ceremonial activities (Popenoe de Hatch et al 2000:135). Popenoe de Hatch et al (2000:135) propose that Terraces 1 and 2 are the areas most likely to have been sites for a marketplace, but the flow of water into these regions
does not correspond with this explanation. Within Terrace 1, especially, the landscape includes a depressed area and a canal linked to a steam bath within it, and this is suggestive of function relating to the collection of water that would be undesirable in a marketplace (Doering and Collins 2012). The water flow into Terrace 1 and Terrace 2 and the presence of steam baths supports bathing activities rather than commercial activities. The middens discovered near Terrace 1 have also been suggested to be a product of elite sponsored ceremonial activity occurring in the area (Popenoe de Hatch et al 2000:135).

Evidence for comparable elite sponsored ceremonial rituals has been discovered at Kaminaljuyú and at La Blanca in contexts near water features or areas in which water was likely to have collected or been an important theme (Guernsey 2006:7; Love 1999:138; Love 2009:1-3; Love and Guernsey 2007:920-926; Valdés 2006:70-72). Members of the nobility of Kaminaljuyú took up residences next to Lake Miraflores where evidence for ritual activity in the form of offerings has been discovered (Kaplan 2000:195-196; Valdés 2006:70-72). Here, the placement of the offerings in the lake and the fact that artwork of amphibians, fish, and aquatic birds was found within the vicinity of the overlapping elite and sacred spheres support the notion that ritual activities were tied to a watery theme in an arrangement to advance a connection among rulers, life, and the sacred power of water (Kaplan 2000:194; Valdés 2006:71).

A similar relationship between the nobility and ceremony occurs at La Blanca, where the elite residential structure known as Mound 9 is located adjacent to a monumental ceremonial structure, Mound 1, and a sunken plaza in which water may have collected (Love and Guernsey 2007:923-924; Love 2009:1-2). Water-related themes are
derived from the ritual activity that occurred in this area partially because of the existence of a quatrefoil basin, Monument 3, that symbolizes the sacredness of water while also being able to serve as a tool for ritual (Houston et al 2005:6; Love and Guernsey 2007:920-926). The interpretation of the base of Mound 1 at La Blanca as representing a quatrefoil symbol, coupled with the likelihood that the nearby sunken plaza area may have served as a symbolic pool, a literal pool, or both, also support watery connotations to the ceremonies taking place at this site (Love 1999:138; Love 2009:1; Reilly 1994; Stark 1999:309-310). Since collection areas for water, including steam baths and sunken areas, are identified within Terrace 1 and 2 of Takalik Abaj along with ceremonial structures and water-related monuments, it is possible that water was being moved into these areas for ceremonies analogous to those interpreted at La Blanca and Kaminaljuyú, and may have included the type of public activities that would explain midden accumulations that were noted in this area.

Ceremonial activity is well represented in Terrace 2 at Takalik Abaj, but is also present in Terrace 3, along with evidence for occupation by the ruling elite. Structure 12 and Structure 13 of Terrace 2 illustrate the union of aquatic animal effigy monuments and civic-ceremonial structures associated with constructed water features. Located on the northwestern corner of Structure 13, Monument 95 represents a toad, while Monuments 66, 68, and 70 of Structure 12 feature amphibians and a crocodile. North of these structures, upon Terrace 3, monuments that include those of watery themes also exist in ceremonial context.

The areas around Structure 6, 7, and 8 of Terrace 3 contain six water-related monuments and three canal points. Within Terrace 3, interpretations of the various
offerings uncovered argue that ritual activity took place on and around Structures 3, 4, 6, and 7, but the function of these spaces differs from the area of Terrace 2 by also containing a burial within Structure 7 that may indicate occupation (Crasborn 2005:695-697; Crasborn and Marroquín 2006:52-53; Schieber de Lavarreda 2002:399; Schieber de Lavarreda 2003:784). The richness of the over 500 artifacts consisting of jade, ceramics, and prismatic obsidian blades, associated with this burial, Burial 1, suggests that the burial was one of a privileged individual, possibly a ruler (Crasborn 2005:697; Schieber de Lavarreda 2002:399-402).

The connection between the elite and ceremonial space that incorporates Structure 7 and the civic-ceremonial activity of Terrace 2 is found in the similarity of monuments and in the resemblance of the dispersal of offerings in Structure 7 to patterns uncovered on Structure 12 (Schieber de Lavarreda 2002:404-406). A boulder sculpture of an amphibian, Monument 47, was uncovered near the center of Structure 7, and four different monuments were broken to be used in the construction of the drainage canal found near the south wall of Structure 7 (Marroquín 2005:957-958). Altar 36, Altar 38, Monument 163, and Stela 71 (see Figure 66) included incense burner fragments and representations of serpent iconography that are linked to ritual activity, which means they may have been broken and used for the construction of the canal as form of offerings (Marroquín 2005:958; Stross 1994:22).

In addition to the monuments included in the construction of the canal south of Structure 7, Altar 48 appears to have been deliberately interred in a manner to suggest it was placed and buried by the northern end of a canal adjacent to Structure 8 as an offering (Schieber de Lavarreda and Orrego Corzo 2009:461). Altar 48, with its
quatrefoil symbol and undertones of elite power and sacred watery connotations, serves as a parallel to iconography uncovered in similar contexts at other Preclassic Mesoamerican sites (Doering and Collins 2011:66; Schieber de Lavarreda and Orrego Corzo 2009:456). The sites of La Venta and San Lorenzo include the themes of power, water, and niche-portal references within their architecture and upon their monuments in spaces defined by associations to the nobility.

Monument 14 of Group E at San Lorenzo is a throne depicting a sacred ancestor or ruler emerging from a niche-portal that is located across from the aqueduct adjoined to a well (Cyphers et al 2006:20-22). At La Venta, Altar 4 and 5 convey elements expressive of individuals of power emerging from niches within Complex A of that site, an area full of watery iconography and costly socially valued artifacts (Coe 1968:55-57; Cyphers 1999:164; Cyphers et al 2006:18; Diehl 1981:78; Reilly 1990:14-15; Reilly 1994:126-129). The quatrefoil on Altar 48 at Takalik Abaj is another symbol for a niche, and the figure emerging from it is analogous to the figures emerging from other non-quatrefoil niches. A number of monuments containing quatrefoils similar to that seen at Takalik Abaj are known, such as those discussed from the sites of Chalcatzingo and La Blanca (see Figures 9 and 20).

All of these iconographic representations and symbols are important because the monuments selected to be commissioned and placed within elite areas characterize the nature of how rulers wanted their power to be represented (Clark 2007:28; Grove 1968; Guernsey 2006:4-6; Reilly 1991). Altar 48 and the context that it was recovered from, address one of the expectations of this thesis stating that illustrations of rulers on monuments emphasizing the connection of the elite to water or water control would be
present at the site if water ideologies were associated with power (Fash 2010:81-82; French et al 2006:149-151; Love and Guernsey 2007:926-928; Reilly 1994). The inclusion of general water-related imagery, such as aquatic animal effigies, within the monumental civic-ceremonial and elite spaces, especially those associated with water management features at Takalik Abaj, further supports ideas that water was a facet of ritual activity and rulership at this site.

The way in which the landscape of the site was altered to influence water flow corroborates with the observations regarding water-related monuments at the site to further support the proposition that water was involved within ritual. The created slope model demonstrates how water was carried and collected into Terrace 1 and 2 for use in steam baths and a possible pool-like landform. Since these water collection areas exist in spaces surrounded by structures associated with public and ritual activity, the use of the water in the steam baths and in the depressed area on Terrace 1 may allude to another connection between water use and ritual at the site, especially considering that examples found elsewhere in ancient Mesoamerica and in ethnographic analogies, of steam baths being used in ritual locations (Houston 1996).

The Central Group of Takalik Abaj incorporates many water management features in the form of steam baths and canals, indicating that since the first Middle Preclassic clay canal built at the site, water management was a priority to the construction at Takalik Abaj (Marroquin 2005:958). All five terraces of the Central Group include water management features and it is likely that more exist that have yet to be discovered, excavated, or documented. Based on the expectations presented for this thesis, Takalik Abaj is likely to have had a water management system that was controlled by a central
authority because as in other analogs examined, water management features are prevalent within the civic-ceremonial and elite areas in centralized, organized, and carefully planned manner (Scarborough 1983:736-737; Scarborough 1998:139-141; Scarborough and Gallopin 1991:659-660; Scarborough and Robertson 1986:171).

The use of stone in the construction of the canals in a manner that paralleled the incorporation of stone into structures over time also signifies that the water management system was valued enough to invest a similar amount of labor and resources into water management features as that invested into the structures themselves (Crasborn and Marroquín 2006:48). In a method not unlike with the construction of the structures, thousands of stones from the Ixchiya River would have been carried to be used in the construction of the canals (Crasborn 2005:969; Crasborn and Marroquín 2006:48; Marroquín 2005:957-958). In addition to the ritual undertones of the water management system that exist at Takalik Abaj demonstrated in ceremonial as well as public spaces through the presence of incorporated offerings and water-related monuments, the constructed water features appear to have been valued independently, based upon the labor, resources, and the maintenance costs invested into these features.

The signs of ritual surrounding the canals of El Escondite also contribute to the likelihood that the Central Group water management features may have been significant to ceremonial activity and the public image of Takalik Abaj and are noted to demonstrate that water features and ritual spaces intertwine at the site (Marroquín 2005:956; Schieber de Lavarreda 1998:475). The availability of water was also an important characteristic in the region of the West Group, with the numerous springs recorded within its vicinity. The monumental structures of the West Group, that include some of the largest constructions
at the site, have also revealed the presence of archaeologically recovered luxury goods that are typically associated with the elite (Wolley Schwarz 2001:1010). Although springs may be found in association with non-elite regions of the site, the positioning of the structures of the West Group adjacent to springs in this area of highest elevations at the site may suggest an advantage to the occupants of this area during the Preclassic occupation because higher elevations tend to contain sources of cleaner water devoid of downstream pollutants and runoff (Mulligan et al 2011:1346). Areas south of the West Group are lower in elevation and more likely to have water sources that are more significantly impacted by runoff from rainfall, construction, and agricultural activity that would negatively affect the water quality of their sources. Access to the numerous and high quality water sources, may have been a potential factor contributing to the wealth, health, and power of the occupants near the sources in the West Group area.

*Takalik Abaj in Relation to Other Preclassic Mesoamerican Sites*

The Preclassic sites discussed earlier within this thesis included the Olmec sites of San Lorenzo and La Venta and the sites of La Blanca, Kaminaljuyú, and Cerros. With the exception of Cerros, these Preclassic sites contain evidence suggestive of a relationship between water and its control and political authority. This association is expressed via carved stone monuments, the contexts of ritual practices, the expenditures invested into the water managements systems, and the milieu of monumental, elite, and ceremonial structures surrounding water features at these sites. Cerros lacks monuments of watery themes and lacks evidence for ritual behavior being associated with water features. Takalik Abaj most resembles, not Cerros, but the other Preclassic sites that show signs of
having a social organization in which rulers draw and express power using watery symbolism.

Watery symbolism is present at Takalik Abaj, San Lorenzo, La Venta, La Blanca, and Kaminaljuyú within the water-related monuments at the sites, some of which feature rulers characterized by watery themes. Iconography, as a vehicle to convey ideology, is a vital variable necessary to deduce the significance of water to a society because images are carefully selected to be representative of the community, particularly the wealthy who are often the benefactors of artworks (Guernsey 2002:80; Guernsey 2006:16; Reilly 1991:151-152). The existence of various water-related artwork at sites alludes to a societal value of ideas relating to water because these themes were being displayed in association with other culturally valued imagery, while any multitude of other themes were omitted.

The water-related artwork of Takalik Abaj consists of effigy monuments of marine creatures and Altar 48 of a ruler associated with water imagery. Similar types of monuments are found at the other Preclassic sites in meaningful contexts. The quatrefoil represented on Altar 48 of Takalik Abaj corresponds to the earlier representation of the quatrefoil symbol found upon Monument 3 of La Blanca (Love and Guernsey 2007:920-926; see Figure 20). San Lorenzo and La Venta both contain monuments with imagery of rulers or sacred ancestors emerging from cave niches that have the same symbolic functions as quatrefoils (Cyphers et al. 2006:18-22). Monument 14 of San Lorenzo and Altar 4 and Altar 5 of La Venta promote the notion that sacred power and elite power are drawn from water and the ritualistic communication between inhabitants of the earth and the watery underworld because prominent figures are depicted emerging from
underworld portals on all of these monuments (Coe 1968:55-57; Cyphers 1999:164; Cyphers et al. 2006:18-22; Diehl 1981:78; Reilly 1990:14-15; Reilly 1994:126-129). La Venta also portrays aquatic creatures within its sculptural corpus, such as the crocodile carved upon the sarcophagus known as Monument 6 (Garber 1993:214; Grove 1997:59-60; Lowe 1989:64; Reilly 1994:126-128). Kaminaljuyú incorporates monuments of toads, frogs, and crocodiles similar to those of Takalik Abaj (Parsons 1967:183-184).

Independently, the water-related monuments of these sites are important because they express values of the ancient inhabitants at the site—occasionally explicitly in reference to figures of authority. The subjects relating to water being conveyed upon these monuments were important enough to merit considerable expenditures of labor and resources associated with the transportation of materials and the knowledge and time needed to carve each monument (Cyphers et al. 2006:18). The monuments carved of costly basalt imports at La Venta and San Lorenzo, especially, suggest the value of the messages illustrated because the best quality of material of the greatest expense to obtain was selected for use (Cyphers et al. 2006:18). The surrounding structures and artifacts of these monuments further imply the ritual and political importance of water at these sites.

Many of the water-related monuments of Takalik Abaj are positioned in direct association with ceremonial and elite structures, suggesting that these types of structures are intended to be publicly associated with water. Altar 48 of Takalik Abaj is associated with Structure 7, an elite and ceremonial structure, and other surrounding ceremonial structures, while many of the aquatic animal effigies of the site are found related to the civic-ceremonial structures of Terrace 2 (Schieber de Lavarreda and Orrego Corzo 2009:464). Sacred offerings were found upon many of the structures near the water-

Similarly, Monument 3 of La Blanca is found near monumental and elite structures in spaces that contain evidence for ritual activity (Love and Guernsey 2007:920-923; Schieber de Lavarreda and Orrego Corzo 2009:461). One of the earliest temple pyramids in Mesoamerica, Mound 1, an elite residential mound, Mound 9, and other ceremonial structures surround the space where Monument 3 was uncovered (Love and Guernsey 2007:923; Love 2009:1-2). Niche-portal monuments depicting individuals of power were found in the elite areas of Group E at San Lorenzo and Complex A at La Venta (Cyphers et al. 2006:18-22; Reilly 1990:14-15). At Kaminaljuyú, watery animals were a theme prevalent throughout the site, including around temples and plazas that were the locales of ceremonies sponsored by the elite (Valdés 2006:70-72).

At all of these sites, elite areas were marked by at least one water-related monument, which implies the importance of water to the representation of the ruling class. When the functions of associated water features are taken into consideration, the argument that water played a role within the power dynamics of these sites is strengthened. Monument 3 of La Blanca was not only related to the elite and ceremonial structures of Mound 1 and Mound 9, but also to the sunken plaza in between these structures that is likely to have been filled with water or to have represented a symbolic surface of water, which supports the idea that themes of water were important to ritual and authority at the site (Reilly 1994; Stark 1999:309-310). The watery connotations of the sunken plaza compliment the watery iconography of the quatrefoil on Monument 3, and the possible mirror of this quatrefoil built into the base of Mound 1 (Love 1999:138;
Love 2009:1). The fact that this assemblage of watery themes occurs within an atmosphere defined by ceremonial activity and the nobility lends an undertone of ritual and political significance to water at the site.

At San Lorenzo, the elite area of Group E also incorporates the integrated themes of a water source, watery iconography, and elite activities. Here, an aqueduct was located within Group E across from the niche-portal throne of Monument 14 (Cyphers et al. 2006:20-22). The representation of underworld motifs upon Monument 14 emphasizes the ritual and political significance of water by associating the elite activity area and the ruler on the monument with the sacredness of water. The integration of the aqueduct constructed of valuable basalt stone into Group E may represent a physical alteration of the landscape that is a part of this symbolism (Cyphers et al. 2006:20-26). The aqueduct, like Monument 14, may be a representation of how water, life, and prosperity flowed because of the achievements of the ruling class and their supernatural connections to underworld ancestors and gods, which was a common theme within ancient Mesoamerica (Cyphers 1999:164-165; Grove 1968:486-487; Guernsey 2002:66). A certain amount of control and power by rulers is implied through the material resources and labor that would have been necessary to construct Group E and its monuments and water features.

Likewise, the niche monuments of La Venta were found north of the area of Complex A, which was devoted to ritualistic offerings of water-related themes and to elite burials (Reilly 1994). Just south of this area, Complex B of La Venta included various basalt drains as well as additional evidence for ritual (Gonzalez-Lauck 2001:799; Grove 1997:68-78; Heizer 1967:33-36). Complex A and B demonstrate continuous themes in which symbolic notions of water mesh with physical manifestations of water.
through the water management system of the site in areas surrounded by ceremonial and elite structures. Notably, the channels of San Lorenzo and La Venta were constructed of basalt, like many of the water-related monuments, including the niche-portal monuments (Cyphers et al. 2006:20-26; Gonzalez-Lauck 2001:799). In other words, the water management systems would have required an expenditure of resources analogous to what was necessary to create the basalt monuments.

Lake Miraflores of Kaminaljuyú was treated with a different kind of reverence than the constructed water features of La Venta and San Lorenzo, but the theme of regard for water and water features is consistent. Lake Miraflores was the site of ritual activity that resulted in offerings being deposited into the lake, suggesting that the lake had spiritual power important to the community (Valdés 2006:70-72). The tribute paid in ritualistic offerings at Kaminaljuyú mirrors the importance placed upon the channels of La Venta and San Lorenzo within the labor and resource investments of the features. Lake Miraflores was also the chosen place of residence for some of the elite of the site, which parallels the situations at La Blanca, San Lorenzo, and La Venta, in which the nobility, water iconography, and water features coexist (Valdés 2006:70-72).

At Takalik Abaj, water was also physically incorporated into elite and ceremonial spaces along with water-related monuments. The topography and the slope model of the site suggest that the steam baths and the depressed areas of Takalik Abaj were full of water some of the time. These water collection areas and several canals were integrated within the civic-ceremonial core of the site, the Central Group, which provides another Mesoamerican example of water-related iconography being associated with elite and civic-ceremonial structures and water management systems.
These site patterns were significant to the representation of the sites—specifically, to the elites of the sites who funded much of the construction and sculptures. All of these elements combined provide the impression that water and its control were more than a utilitarian aspect of society, but also social and political. While the site layouts, the types of water features, and the types of monuments may differ at each Preclassic site, the union of ritual, power, water features, and investments in wealth was prominent in a manner indicative of centralized power and authority of the elite over water and of the symbolic influence of water. Rulers deliberately defined themselves and their communities by their association with water, both through images on stone and through the expenditure of their wealth into the water management systems that formed a part of the most important locales of civic-ceremonial activity.
CHAPTER 8:
CONCLUSION

A history of land and water use and manipulation is critical to understanding the social complexities of archaeological sites not only because natural landscapes establish key traits that affect the ways in which cultures adapt and grow, but also because interactions with the environment often shape cultural beliefs that, in turn, influence behavior or create possibilities. The biophysical environments within Mesoamerican sites, in particular, served as more than backdrops that provided resources to their ancient inhabitants because, according to many Mesoamerican belief systems, landscapes were spiritually charged (Brady and Ashmore 1999). Within Mesoamerica, spirituality and politics are often inseparable (Schele and Miller 1986). Investigation into the integrated themes of the characteristics of the environment, land and water use, the sacredness of nature, and political dynamics is an area worthy of study because it can expand knowledge on ritual practices, art forms, and the social organization of a site.

The line between the natural environment and human modifications at Takalik Abaj is blurred, and is evidenced by large scale leveling and construction projects that enhanced naturally occurring features, such as terracing of the terrain within the Central Group and the West Group. The intensive leveling done by the inhabitants of Takalik Abaj took advantage of and augmented natural terrain characteristics to benefit the needs
of the site occupants. At Takalik Abaj, the management of water within the water-rich environment of the site was one of the essential functions of landscape modification and canal construction.

In addition to examining previous research regarding the site construction patterns, the topography, and the architecture of Takalik Abaj, I also analyzed the changes in elevation at the site and the variations in slope within different regions to aid in hypothesizing potential paths of water flow across the landscape. Spatial data regarding the positioning of structures, monuments, and constructed and natural water features were studied, considering the traits of the landscape and the water flow. Taking the movement of water into account, the functions of spaces and the surrounding monuments and recovered artifacts were discussed to address the possible functions of the water management system found within the site. The water management system included springs, canals, rivers, steam baths, and depressed landforms.

Analysis of a variety of traits at the site reveals that these water management features had multiple functions. Canals were used as drains and conduits to transport water for use in households, public bathing, and ritual. The slope modeling demonstrates the association of steam baths to canal features and depressional areas of the landscape, assisting with the understanding of the functional aspects of these features. Monuments and the civic-ceremonial structures surrounding the steam bath features also indicate that these features were likely to have had ritual functions as well. Sculptural art demonstrating water-related themes and the offerings left in and around human-made water features at Takalik Abaj supports ritual implications for the water management system.
The manner that water management features were integrated into the Central Group at Takalik Abaj also suggests that the water management system was organized and controlled by a central authority. The West Group, another elite area containing monumental structures and socially valued goods, also may have benefitted from the power derived from the proximity and control over numerous springs with water streams with high water quality. No information was obtained about the water features of the South Group due to the lack of data available on this area of privately held lands at the site (Crasborn and Marroquin 2006:49-50).

The landscape of Takalik Abaj was heavily modified in carefully planned and costly ways to serve both ritual and utilitarian purposes. The imagery selected for display upon stone monuments and the expense put into creating these monuments, implies that the spiritual and ritualistic aspects of water may have been significant to the identities of the elite and to ritual activities. Evidence for differences in wealth and status among individuals at Takalik Abaj are noted in locations such as Structure 7, where an individual was interred along with many elaborate grave items, some buried in ritualistic offering. The location of Structure 7 upon terraces with civic-ceremonial functions implies that the ruling elite managed these areas. The majority of the monuments relating to water within the Central Group area are of frog and toad effigies done in boulder sculpture style, but at least one monument was carved in which a ruler or sacred figure was depicted in association with the sacred aspects of water. The association of these monuments with ritual structures, such as that interpreted for Structures 7 and Structure 12 at Takalik Abaj, suggest that watery themes were relevant to the ritual activities of the community.
The canals of *El Escondite* in particular provide evidence to support the ritual importance of water. At this location, there was a large quantity of offerings found within the canals. The importance of water may have also been evident in non-elite household rituals at this area of the site. Additional excavations of non-elite burials and households would be necessary to investigate if offerings associated with water features existed. Areas of the site distant from the civic-ceremonial core would be optimal to investigate whether or not there is evidence of water management features and water-related ritual activity at non-elite households. This thesis has provided data and analysis that suggests Takalik Abaj contained a water management system and ideas of water that played a role in the social dynamics at the site through influences upon ritual and power, aligning it with other Preclassic sites that appear to have similar relationships to water, such as San Lorenzo, La Venta, La Blanca, and Kaminaljuyú.

Takalik Abaj contains a sculptural corpus representing watery themes like underworld niche-portals, marine creatures, and cave rituals similar to those present within the archaeological assemblages at San Lorenzo, La Venta, La Blanca, and Kaminaljuyú (Coe 1968:55-57; Cyphers 1999:164; Cyphers et al. 2006:18-22; Diehl 1981:78; Love and Guernsey 2007:920-926; Reilly 1990:14-15; Reilly 1994:126-129). Takalik Abaj Monument 48, San Lorenzo Monument 14, and La Venta Altar 4 and Altar 5 convey essentially the same themes of figures of power navigating between the earthly realm and the watery underworld with connotations of spiritual significance. La Blanca Monument 3 illustrates a portal without the elite figure emerging from it, but it is located within a civic-ceremonial complex flanked by the residences of high status citizens (Love and Guernsey 2007:920-926). The portrayal of marine creatures upon sculptures at
Takalik Abaj is similar to those present at Kaminaljuyú that feature frogs, toads, and crocodiles (Parsons 1967:183-184). The representation of aquatic creatures and of the connection between high-status persons and watery iconography establishes the potential for the ideological influence of water within a society because it is inferred that water was powerful and sacred at these sites.

The notion of the societal value placed upon water is bolstered by the integration of water management features and natural water sources near ceremonial, civic, and elite locales at these Preclassic sites. San Lorenzo includes lagoons and aqueducts within its most prominent elite spaces; La Venta incorporated its canal system south of an elite complex laden with watery imagery; La Blanca features evidence for elite sponsored water rituals occurring near a symbolic or functional basin-like landform; and Kaminaljuyú’s central lake surrounded by noble residences functions as an important ritual hub as well as a vital economic resource (Cyphers et al. 2006; Gonzalez-Lauck 2001; Reilly 1994; Valdés 2006). Takalik Abaj, like these other Preclassic polities mentioned, contains evidence suggestive of both the ideological significance of water and of an infrastructure in which water was incorporated into civic-ceremonial and elite parts of the city. This research is unique in that it has focused upon not only the monumental artworks, water features, and artifacts, but also the landscape and how the topographical features of Takalik Abaj may have had an impact on water flow and use.

**Future Research**

There is a great wealth of archaeological research indicating that the Prehispanic populations of Mesoamerica constructed their cities in logical and symbolically significant ways. The environment and the resources available of any given area
influenced the manner in which cities and their water management systems were planned. A GIS approach inherently compliments archaeological study, providing a way of analyzing and visualizing the spatial facets such as city planning and water management systems, and can continue to be a valuable tool for studies in the future. This research has integrated the knowledge gained from excavations with spatial data that has been collected.

An expansion of the spatial data that is available digitally will benefit not only archaeological studies concerned with water management, but also other inquiries that are spatial in nature, including investigations on modern land use. Cultural research being done in the area would benefit if this information were disseminated widely via the web. Distribution of data through the Internet has been one of the goals of AIST’s Takalik Abaj Monumental Stone Sculpture Project (Doering and Collins 2011). AIST has made its data available to the public on platforms such as Meso3D (http://aist.usf.edu/meso3D) and the Foundation for the Advancement of Mesoamerican Studies (FAMSI), now part of the Los Angeles County Museum of Art (LACMA), (http://research.famsi.org/3D_imaging), and this allows information to be made available to researchers, students, and the general public alike.

Takalik Abaj is a Mesoamerican polity that demonstrates a meaningful layout constructed in relation to its water resources. Research at the centers of San Lorenzo, La Venta, La Blanca, and Kaminaljuyú among other sites, have demonstrated that the relationships between water, rulers, and the planned city could be of ritual and political significance (Cyphers et al 2006; Love and Guernsey 2007; Reilly 1994; Valdés 2006). These previous studies at sites with analogous features to those seen at Takalik Abaj,
show that the natural water sources and human-made water features have more than a single purpose. Water features of all kinds may concurrently serve as aesthetic aspects of a community while also serving ritual and utilitarian purposes, such as providing water for irrigation and drinking and demonstrating a connection to expressed spiritual aspects of the culture. Communities were built around water, so the organization of the natural and built landscape of archaeological sites like Takalik Abaj deserves continued consideration.
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Tejeda, Ana S.

Tilley, Christopher

Trigger, Bruce G.

Valdés, Juan Antonio


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Vogt, Evon Z.

Wagner, Elisabeth

Wells, E. Christian, and Karla Davis-Salazar
Wolley Schwarz, Claudia

Wolley, Claudia

Zender, Mark
Appendix

**Table A1** Table presenting the structures nearest to every type of water-related monument.

<table>
<thead>
<tr>
<th>Monument</th>
<th>Monument Description</th>
<th>Nearest Structure</th>
<th>Distance to Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altar 26</td>
<td>Round altar associated with Mon 70</td>
<td>Structure 12</td>
<td>3m</td>
</tr>
<tr>
<td>Altar 48</td>
<td>Personage seated in a quatrefoil symbol</td>
<td>Structure 8</td>
<td>24m</td>
</tr>
<tr>
<td>Altar 36</td>
<td>Reused in the construction of Canal David</td>
<td>Structure 7</td>
<td>&lt;1m</td>
</tr>
<tr>
<td>Altar 38</td>
<td>Reused in the construction of Canal David</td>
<td>Structure 7</td>
<td>2m</td>
</tr>
<tr>
<td>Altar 6</td>
<td>Stylized frog or toad</td>
<td>Structure 2</td>
<td>28m</td>
</tr>
<tr>
<td>Monument 95</td>
<td>Boulder sculpture of a toad</td>
<td>Structure 13</td>
<td>&lt;1m</td>
</tr>
<tr>
<td>Monument 66</td>
<td>Boulder sculpture of crocodile</td>
<td>Structure 12</td>
<td>&lt;1m</td>
</tr>
<tr>
<td>Monument 70</td>
<td>Boulder sculpture of a frog</td>
<td>Structure 12</td>
<td>2m</td>
</tr>
<tr>
<td>Monument 68</td>
<td>Boulder sculpture of a toad</td>
<td>Structure 12</td>
<td>&lt;1m</td>
</tr>
<tr>
<td>Monument 47</td>
<td>Boulder sculpture of a frog or toad</td>
<td>Structure 7</td>
<td>&lt;1m</td>
</tr>
<tr>
<td>Monument 163</td>
<td>Reused in the construction of Canal David</td>
<td>Structure 7</td>
<td>2m</td>
</tr>
<tr>
<td>Stela 71</td>
<td>Reused in the construction of Canal David</td>
<td>Structure 7</td>
<td>1m</td>
</tr>
</tbody>
</table>
Table A2 Table of the elevations of the structures on Terrace 7, 8, and 9 of the North Group. The elevations are measured in meters above sea level.

<table>
<thead>
<tr>
<th>North Group</th>
<th>Terrace 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Elevation</td>
</tr>
<tr>
<td>Structure 66</td>
<td>697</td>
</tr>
<tr>
<td>Structure 67</td>
<td>707</td>
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</table>

<table>
<thead>
<tr>
<th>Terrace 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Structure 46</td>
</tr>
<tr>
<td>Structure 54</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Terrace 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Structure 38</td>
</tr>
<tr>
<td>Structure 39</td>
</tr>
<tr>
<td>Structure 40</td>
</tr>
<tr>
<td>Structure 41</td>
</tr>
<tr>
<td>Structure 42</td>
</tr>
<tr>
<td>Structure 43</td>
</tr>
<tr>
<td>Structure 44</td>
</tr>
<tr>
<td>Structure 45</td>
</tr>
<tr>
<td>Structure 47</td>
</tr>
<tr>
<td>Structure 48</td>
</tr>
<tr>
<td>Structure 49 and 50</td>
</tr>
<tr>
<td>Structure 51</td>
</tr>
<tr>
<td>Structure 52</td>
</tr>
<tr>
<td>Structure 53</td>
</tr>
</tbody>
</table>
Table A3 Table of the elevations of the structures on Terrace 6 of the West Group. The elevations are measured in meters above sea level.

<table>
<thead>
<tr>
<th>West Group</th>
<th>Terrace 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Elevation</td>
</tr>
<tr>
<td>Structure 27</td>
<td>629</td>
</tr>
<tr>
<td>Structure 28</td>
<td>625</td>
</tr>
<tr>
<td>Structure 29</td>
<td>625</td>
</tr>
<tr>
<td>Structure 30</td>
<td>626</td>
</tr>
<tr>
<td>Structure 31</td>
<td>630</td>
</tr>
<tr>
<td>Structure 32</td>
<td>640</td>
</tr>
<tr>
<td>Structure 33</td>
<td>641</td>
</tr>
<tr>
<td>Structure 34</td>
<td>634</td>
</tr>
<tr>
<td>Structure 35</td>
<td>637</td>
</tr>
<tr>
<td>Structure 36</td>
<td>637</td>
</tr>
<tr>
<td>Structure 37</td>
<td>638</td>
</tr>
<tr>
<td>Structure 68</td>
<td>630</td>
</tr>
<tr>
<td>Structure 69</td>
<td>622</td>
</tr>
</tbody>
</table>
Table A4 Table of the elevations of the structures on Terrace 1, 2, 3, 4, and 5 of the Central Group. The elevations are measured in meters above sea level.

<table>
<thead>
<tr>
<th>Central Group</th>
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</thead>
<tbody>
<tr>
<td><strong>Terrace 5</strong></td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Structure 61</td>
</tr>
</tbody>
</table>

| **Terrace 4** |
| Name | Elevation |
| Structure 65 | 611 |
| Structure 1 | 618 |
| Structure 2 | 614 |

| **Terrace 3** |
| Name | Elevation |
| Structure 3 | 613 |
| Structure 4 | 610 |
| Structure 5 | 617 |
| Structure 6 | 615 |
| Structure 7 | 613 |
| Structure 7A | 612 |
| Structure 7B | 611 |
| Structure 8 | 611 |

| **Terrace 2** |
| Name | Elevation |
| Structure 9 | 601 |
| Structure 10 | 602 |
| Structure 11 | 599 |
| Structure 12 | 605 |
| Structure 13 | 600 |

| **Terrace 1** |
| Name | Elevation |
| Structure 60 | 598 |
| Structure 14 | 599 |