

**Wetland Reclamation in England: Medieval Risk Culture and the 1396
Commission of Sewers for Pevensey Levels**

by

Stephanie Suzanne Hartmann

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

This paper examines wetland reclamation in England between the eighth and sixteenth centuries, with a special focus on the Pevensy Levels during the fourteenth century. Coastal marsh communities had access to significant raw materials and resources as well as increased agricultural productivity on sections of reclaimed land. This paper will examine medieval and Early Modern perceptions of wetland environments over time and evaluate scholarly theories of wetland marginality.

Medieval populations could not effectively access the benefits wetlands provided without great exposure to risk factors, including flooding. Medieval coastal marsh communities in England developed a culture heavily influenced by constant exposure to risk that demonstrated high levels of cooperation, resilience, and ingenuity. The medieval risk culture represented in English marshes also produced risk sensitivity that could inform decisions regarding the probable success of reclamation efforts and their potential profitability.

The 1396 Commission of Sewers for the Pevensy Levels, East Sussex demonstrates the negligence of landowners, whose economic interests relied upon successful wetland reclamation and flood defences. This legal case, combined with national and local economic analyses and an investigation into the role of climate change and increased storm activity along the English coast during the fourteenth century, will facilitate a discussion relating to negligence within medieval wetland risk cultures during a period of increased risk.

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INTRODUCTION

The narrative of human adaptation to and alteration of the lands we inhabit, and societies' responses to our natural environments, has long fascinated historians.¹ Environmental historians have spent many decades debating and elucidating the relationship between humanity and nature. Their investigations often prove contentious, for there is great debate over which agent of history has held the upper hand. The current trend in environmental history seeks to represent humanity and nature as separate agents actively involved in shaping history and capable of mutual influence.² Even if, as Richard Hoffman has suggested, traditional historians regard nature as “mere scenery and stage properties for the human story,”³ it is difficult to justify an historical approach that cuts entirely nature from the narrative. After all, no modern history of theatre, could be deemed complete without some analysis of the spaces in which humans engage in performance art, and how the human actors must inhabit that space, whether outdoors or within a structure, having one or many points of entry, or a large or restricted capacity.

Environmental Determinism is the once popular belief that the natural world determines the development of peoples by shaping their habits, including those of diet, dress, agriculture, and the hunt, and therefore their cultural attitudes and processes. The notion of climatic phenomena and physical landscape predisposing humans to follow different developmental lines and potentially achieve diverse levels of advancement has existed from the Classical Era. Hippocrates attributed great power to the four elements in assigning personal characteristics on

¹ Clarence J. Glacken, Preface to *Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth Century* (Berkeley, University of California Press, 1967).

² Richard C. Hoffmann, *An Environmental History of Medieval Europe* (Cambridge: Cambridge University Press, 2014), 3.

³ Hoffmann, *An Environmental History*, 3.

both an individual and nation level.⁴ An individual born into a wild and mountainous region or a variable climate might be more rugged, industrious, and war-like than one born in a fertile valley. A more contemporary academic view is Constructivism, which argues that culture constructs everything that is knowable or useful to human beings. This theory argues that scholars can construct a natural history only by gauging human perceptions about nature through time. The resulting analyses would potentially profit our knowledge of humanity, while the essence of the natural world and its manifestations remain always out of reach.⁵

Neither the determinist nor the constructivist model allows for development of the richest possible environmental history. To privilege either nature or human society is to miss the mark. In the 1980s, environmental historians developed a model based in interaction and interrelationship of the natural and human spheres of influence. This new approach searches for a reasonable balance between natural and human agencies in historical scholarship, and to acknowledge that while humans are subject to natural forces such as climate, humanity also modifies nature, whether deliberately or not, through its interaction with the natural world.⁶ The most recent scholarship tends toward differentiating local from wider histories and investigating human attitudes toward nature, human impacts upon nature, and environmental influences upon human populations.⁷ This thesis engages all three lines of inquiry in its analysis of land reclamation and medieval wetland culture.

Medieval environmental history has taken on added poignancy as modern concerns about climate change have increased. The study of coastal marshes, where the risk of floods due to

⁴ John Aberth, *An Environmental History of the Middle Ages: The Crucible of Nature* (London: Routledge, 2013), 12.

⁵ Hoffmann, *An Environmental History*, 7.

⁶ Hoffmann, *An Environmental History*, 8.

⁷ Hoffmann, *An Environmental History*, 11.

natural weather patterns and climate change is most pronounced, has taken on a new significance for modern scientists and historians. Several reclaimed coastal wetlands in the United Kingdom along the coastline of the North Sea and English Channel have received the attention of an interdisciplinary body of scholars including archaeologists, historians, geographers, and environmental scientists to illuminate the processes involved in reclaiming marshlands during the Late Middle Ages. The Pevensey Levels of East Sussex, however, have received significantly less profound and sustained consideration than larger wetlands including the Fens and Romney Marsh.

The 1396 commission of sewers, the oldest extant record of its kind for the Pevensey Levels, suggests that fourteenth-century landowners showed considerable negligence in defending reclaimed land from flooding. This observation, in some ways, conflicts with developing scholarly narratives about the impetus to reclaim wetlands and the priority placed on these endeavours by landowners. It is perhaps even suggestive of the marginality of reclaimed wetlands, a view that has fallen from favour among scholars, due to the apparent lack of interest in maintaining their wetland acreage. If we are to interpret the documentary evidence from 1396 alongside arguments for the perceived value of marsh reclamation during the medieval period and the social cohesion that allowed medieval English populations to reclaim such lands, we must engage in thorough assessments of perceptions of opportunity and risk, and the economic and social contexts leading up to the commission's findings.

The aims of this thesis are threefold. The first is to utilize information about the Pevensey Levels, as an example of a spatially insignificant marsh region that has received relatively limited scholarly attention, and to provide it a greater role in environmental history relating to marshlands. While some small scale development of the marshland appears to have

occurred between 772 and 947, as attested in royal charters of Offa of Mercia and Eadred of Wessex,⁸ the majority of reclamation efforts took place during the High and Late Middle Ages. This study, therefore, does not consider in any depth any reclamation on the Pevensey Levels before 1086, and will focus primarily on the developments of the fourteenth century. Additionally, the scope of this study cannot adequately cover the events of the Early Modern Period until 1698, by which time the ancient port of Pevensey was no longer fit to function as a naval base due to human efforts and natural processes.⁹ While it is useful and contextually necessary to consider earlier and later periods to discuss the development of reclamation and perceptions relating to wetlands, the fourteenth century is of primary interest.

The second goal of this thesis is to provide evidence for the value of reclaimed marshes during the medieval period while affirming the risks, difficulties, and costs of such enterprises and the evolution of a 'risk culture'. The concept of risk cultures, pioneered by sociologists including Anthony Giddens,¹⁰ Niklas Luhmann,¹¹ and Ulrich Beck,¹² provides a framework for comparing and discussing other wetland regions in England and their reclamation. Risk theories generally apply to modernity and have attracted few historians, yet some scholars have begun to recognize their relevance to the history of natural catastrophes including floods. These theories allow the Pevensey Levels to participate in the larger story of wetlands in Late Medieval England, and to contribute its narrative to the broader whole in turn. The intention in discussing

⁸ Stephen Rippon, *Transformation of Coastal Wetlands: Exploitation and Management of marshland landscapes in North West Europe during the Roman and Medieval Periods* (Oxford: Oxford University Press, 2000), 157.

⁹ L. F. Salzmann, "The Inning of Pevensey Levels," *Sussex Archaeological Collections* 53 (1910), 60.

¹⁰ Anthony Giddens, *Modernity and Self-Identity: Self and Society in the Late Modern Age* (Stanford: Stanford University Press, 1991).

¹¹ Niklas Luhmann, *Risk: A Sociological Theory* (Berlin: Walter de Gruyter, 1993).

¹² Ulrich Beck, *Risk Society: Towards a New Modernity* (London: Sage Publications, 1992).

risk is not to negate to any degree the resiliency, cooperation, or adaptive skills of those people who worked and invested in reclaimed marshland, but rather to demonstrate that risk cultures imbue their inhabitants with a sensitivity to risk that may, in fact, prove beneficial during crises. Although modern proliferations of risk negate traditional rationalist approaches to calculating and countering potential loss, this paper argues that the wetland populations in Medieval England strove to achieve security and reduce uncertainty.

The final aim is to produce a synthetic and multidisciplinary work that draws upon a sometimes unwieldy body of literature to include archaeological, literary, climatological, historical, geographical, economic, and legal contributions. Due to the disparate nature of the available secondary sources, each chapter outlines those monographs and articles that are most relevant to the subject matter examined in each. It is my opinion that this produces the most beneficial arrangement of background information used to craft and support each argument. This thesis, therefore, not only adds breadth to the ongoing research into English marshlands, and ensures that the more rural and less historically accessible regions do not suffer neglect, it also endeavours to break down barriers that exist between disparate approaches to historical wetlands.

Chapter one begins with a discussion of the earliest history of English wetland reclamation efforts and subsequent approaches. Medieval perceptions of wetlands during the Early, High, and Late Middle Ages form the core of this section. This study addresses the importance of coastal regions to English identity in the Middle Ages, and provides an introduction to the history of the Pevensy Levels, within the greater framework of southeastern coastal marshes in England. Reclamation methods here receive a brief consideration that later chapters build upon. The final section argues in favour of the concept of a common medieval ‘risk culture’ shared by all coastal marsh inhabitants as they co-existed within their unique

environment. The existence of a risk concept in the medieval period, a societal feature often assumed by historians without comment, also receives attention in this section.

Chapter two provides details of the natural resources that coastal marshes afforded and also the rewards that medieval people gained by reclaiming marshland. These included salt extraction, hunting and gathering, aquatic power for watermills, grazing opportunities for livestock, and agricultural production. These abundant opportunities for medieval populations demonstrate that marshlands were not marginal areas inhabited only out of necessity, but decidedly areas of growth, development, and profit. As much as possible, this thesis includes information directly relating to the benefits, opportunities, and developments of the Pevensey Levels, and of nearby and comparable marshes. Although the second chapter focuses on the potential for profit that medieval marsh populations enjoyed, the chapter also presents risks directly associated with specific benefits. These are not intended to mitigate potential profitability, but to demonstrate the medieval acceptance of risks related to attaining profit.

Chapter three outlines the costs of reclamation and subsequent maintenance to the ditches and embankments in medieval coastal marshes. It considers incidences of malaria, or malaria-like disease that occurred in English wetlands as a risk of simple habitation. It also describes the frequent perils of storms and flooding, exacerbated in the fourteenth century by changes to weather and climate. The monetary costs of reclamation and the continual maintenance of sea defenses also receive attention. This chapter will discuss those negative characteristics of risk culture, including pettiness and neglect, which scholars tend to discuss less frequently than resiliency, cooperation, and adaptation. I give pride of place to any information relating to specific challenges, conflicts, and expenditures that existed on the Pevensey Levels versus other English marsh sources.

Chapter four concentrates on documentary evidence relating directly to the Pevensey Levels. A record from a Commission of Sewers from 1396 provides evidence that local landholders were negligent in their maintenance of the sewer systems that kept the levels from being constantly flooded. This chapter examines the legal records, the role and prerogatives of the Commissions of Sewers, and the national and local economies in which the case played out. It also interprets this case in light of the theory of 'risk culture' to demonstrate that, while coastal populations withstood considerable adversity in reclaiming coastal marshes, their shared experiences produced a risk sensitivity that ultimately contributed to landholders' indifference to maintaining certain flood defences during periods of increased risk.

Chapter 1: Medieval Perceptions of Wetlands, Reclamation, and Risk Culture

England possesses many reclaimed wetlands, the study of which has provided many research opportunities from varying disciplines. Pure and social scientists, historians, and archaeologists approach the topic of wetland formation, habitation, and reclamation from a variety of angles, producing a host of monographs and articles in the process. The field is now so complex and daunting that it is difficult to read scientific and historical works on the same marsh systems together. Those scholars who study wetlands in diverse ways, however, do form a common narrative that, under the best circumstances, can express the nature of wetlands and their communities from the distant past into their prospective futures. Taken together, they marshal geological records, pollen studies, early medieval documents, and archeological evidence. There is no question that each branch of study offers its own benefits and adds substantially to wetland studies.

It is, thus, no surprise that scholars increasingly embrace interdisciplinary approaches to derive the fullest possible understanding of wetland environments, past and present. As each generation of researchers metabolizes and refines their approaches, they incorporate each other's insights and correct each other's errors. The greatest challenge to a unified scholarship of Medieval English wetlands, both between and within fields, remains the vast scope of potential research sites. Most studies cannot encompass all of England's wetlands, nor would it be reasonable to demand that they do so. In fact, the need to identify and research individual sites is imperative if scholars are to respect the specific character of each region. The most effective method of producing a properly nuanced and cohesive body of literature on wetlands is for scholars to test and employ a variety of useful, established lenses when investigating individual

marshes. While our knowledge of medieval wetlands is as yet incomplete, the field is robust and replete with possibility.

This chapter provides an overview of historical wetland scholarship for medieval England with a specific focus on changes in the medieval perceptions of marshes over time. It also situates the Pevensey Levels as part of a wetland culture in England during the Middle Ages and argues that the societal characteristics of cooperation and risk dominated this shared culture throughout the English wetlands. Although this chapter cannot offer equal attention to scientific and archaeological scholarship as it does to historical and literary sources, I have made every effort to incorporate these narratives throughout wherever they offer insights.

1.1 English Wetlands

The study of medieval English wetlands and their reclamation is heavily indebted to the pioneering work of William Dugdale (1606-1686). Dugdale, best known as a local historian in Warwickshire, produced a comparative and comprehensive analysis of wetland improvement. His 1662 opus entitled *The history of imbanking and drayning of diverse fenns and marshes, both in forein parts and in this kingdom, and of the improvements thereby*, is far from his most famous work. It provides invaluable information on the ancient, medieval, and early modern art of marshland reclamation. Historians celebrate Dugdale both for the volume and quality of his historical works. His talents for research, transcription of manuscript sources, accuracy, and commissioning of quality illustrations for his books earn him pre-eminence as a founder of modern scholarship in this field.¹³

¹³ Christopher Dyer, introduction to *William Dugdale, Historian, 1605-1686: His Life, his Writings and his County* (Woodbridge: The Boydell Press, 2009), 3.

The history of imbanking, while substantial in size and important to the history of wetland studies is in many ways an aberrant work within Dugdale's corpus.¹⁴ It offers wholehearted support to drainers, enumerates the great achievements of reclamation, and waxes poetic on the productivity of improved land:

If then the meer Inclosure and Tillage of that which natureally yielded little profit, doth justly deserve so great a commendation; how much more is the skill and pains of those to be had in esteem, who have recovered many vast proportions of Land, totally overwhelm'd with a deluge of waters? And of these I need not look for examples from abroad, our own Countrey affording a multitude of notable Instances [...]; whereby it will appear, that in sundry parts of this Realm, there are many thousands of Acres, which do now yield much benefit, yearly, by Rape, Cole-seed, Grass, Hay Hemp, Flax, Wheat, Oats, and other Grain; nay by all sorts of excellent Plants, Garden-stuff, and fruit Trees, which in former times were Drowned Lands.¹⁵

Dugdale's description creates an image of land resuscitated, brought back from torpor and death with the breath of life. However, it was no coincidence that an intellectual of Dugdale's stature wrote on wetlands. He admits in his autobiography that Richard, Lord Gorges, a leading member of a drainage company, commissioned the history for £150, a greater sum than some of the company leaders took as an annual salary.¹⁶ While his biases are relatively clear, even without his later admission, his work remains of great importance due to the great number of documents it preserves and the quality and breadth of the historical research it contains.

¹⁴ Frances Willmoth, "Dugdale's History of Imbanking and Drayning: a 'Royalist' Antiquarian in the Sixteen-Fifties" *Historical Research* vol 71 no 169 (October 1998): 282, doi:10.1111/1468-2281.00065.

¹⁵ William Dugdale, Introduction to the Reader to *The History of Imbanking and Drayning of Diverse Fenns and Marshes, Both in Foreigh Parts and in the Kingdom; And of the Improvements thereby*, (London: Alice Warren, 1662), A2.
http://eebo.chadwyck.com.proxy.lib.uwaterloo.ca/search/full_rec?SOURCE=pgthumbs.cfg&ACTION=ByID&ID=11780532&FILE=./session/1503074023_11949&SEARCHSCREEN&SEARCHCONFIG=var_spell.cfg&DISPLAY=AUTHOR.

¹⁶ Willmoth, "Dugdale's History of Imbanking," 297.

There was no shortage of ‘drowned lands’ in medieval England, particularly along its coastline. It is necessarily difficult for contemporary English populations to conceptualize how wet the land was during historical periods including the prehistoric, medieval, and even the modern eras.¹⁷ The Fens, Dagenham Marshes, Plumstead Marshes, Erith Marshes, Romney Marsh, the Pevensey and Somerset Levels, Longdon Marsh, Risley Marsh, and the Shropshire Wetlands were all still present during the seventeenth and eighteenth centuries, testaments to the natural ubiquity of English marshes. Many of these individual wetlands have lately received the scholarly attentions of archaeologists, geographers, and historians. Among the most comprehensive monographs are Michael Williams’s *The Draining of the Somerset Levels*,¹⁸ and more recently the collaborative *The Lowland Wetlands of Cumbria*.¹⁹ The region to receive the greatest scholarly attention, however, is the Fenland, which has benefited from the sustained interest of the prolific H. C. Darby.²⁰

A host of scholars has produced a multitude of articles on the subject of historic English wetlands within the last four decades. T. A. Rowell published on the draining of Wicken Fen in 1986,²¹ and Mark Gardiner wrote on the lost port of Old Romney in 1994.²² A.J. Long, M. P.

¹⁷ Jeremy Purseglove, *Taming the Flood: A History and Natural History of Rivers and Wetlands* (Oxford: Oxford University Press, 1988), 22.

¹⁸ Michael Williams, *The Draining of the Somerset Levels* (Cambridge: Cambridge University Press, 1970).

¹⁹ D. Hodgkinson, E. Huckerby, R. Middleton, and C. E. Wells, eds. *The Lowland Wetlands of Cumbria* (Lancaster: Lancaster University Archaeological Unit, 2000).

²⁰ H. C. Darby, *The Medieval Fenland* (Newton Abbot: David & Charles, 1940). H. C. Darby, *The Draining of the Fens*, 3rd ed. (Cambridge: Cambridge University Press, 1956). H. C. Darby, *The Changing Fenland* (Cambridge: Cambridge University Press, 1983).

²¹ T. A. Rowell, “The History of Drainage at Wicken Fen, Cambridgeshire, England, and its relevance to Conservation,” *Biological Conservation* 35 (1986), doi:10.1016/0006-3207(86)90046-7.

²² Mark Gardiner, “Old Romney: An Examination of the Evidence for a Lost Saxo-Norman Port*,” *Archæologia Cantiana* 114 (1994).

Waller, and A.J. Plater wrote on the Dungeness foreland and Romney Marsh in 2006.²³ Stephen Rippon published papers on the Somerset Levels²⁴ in 2004 and on the Severn Estuary in 2007.²⁵ Duncan Sayer published an article on medieval waterways and hydraulic economies in the East Anglian fens in 2009.²⁶ Although interest in medieval wetlands clearly remains strong, each of these studies is grounded in a single region and very few modern studies strive for the scale, breadth, or universality of Dugdale's early ground-breaking book or attempt to interpret marshes collectively.

1.2 Medieval Perceptions of Wetlands

In 1972, the polarizing economic historian Michael Postan argued for the marginality of nearly all medieval wetlands and in so doing, invited a great deal of scholarly criticism from archaeologists and rural historians. Postan claimed that marshes were marginal in several senses: by virtue of their geographical location, legal and administrative impediments, or the difficulty of effecting drainage using medieval technologies.²⁷ Areas of concentrated habitation prior to the conquest were bound to possess greater fertility than those areas which were reclaimed afterward. Despite his negativity, he was conscious that reclaimed lands in lightly populated areas were often more profitable than those already picked over by larger populations, if “the war

²³ A. J. Long, M. P. Waller, and A. J. Plater, “Coastal Resilience and Late Holocene Tidal Inlet History: The Evolution of Dungeness Foreland and the Romney Marsh Depositional Complex (U. K.),” *Geomorphology* 82 (2006), doi:10.3197/096734011X12922358301012.

²⁴ Stephen Rippon, “Making the most of a bad situation? Glastonbury Abbey and the exploitation of wetland resources in the Somerset Levels,” *Medieval Archaeology* 48, no. 1 (2004).

²⁵ Stephen Rippon, “Waterways and water transport on reclaimed coastal marshlands: the Severn Estuary and beyond,” (eds) *Early Medieval Water Management*, ed. Blair J. (Oxford: Oxford University Press, 2007).

²⁶ Duncan Sayer, “Medieval Waterways and Hydraulic Economics: Monasteries, Towns and the East Anglian Fen,” *World Archaeology* 41, vol. 1 (2009), doi:10.1080/00438240802655278.

²⁷ M. M. Postan, *The Medieval Economy and Society: An Economic History of Britain, 1100-1500* (Berkeley: University of California Press, 1972), 18-23.

of conquest” that humanity waged against them proved successful.²⁸ While Postan does not, however, entirely reject the value of marshland, he qualifies it drastically and stresses that these areas were on the margin of usefulness, desirability, and productivity.

Postan highlights the difficult work of drainage, the impermanence of defensive walls and ditches, and the potential problem of drainage within reclaimed, clay-rich soil itself.²⁹ He attributes the slowing expansion of arable land between the late fourteenth and fifteenth centuries, or even a reduction in arable land, to these factors. Yet even at this stage of his arguments, he notes that certain reclamation efforts continued in certain places into the fifteenth century, including those taking place in wetlands.³⁰ The overall picture Postan presents is grim, almost ruthlessly logical. Indeed, the casual reader would find it difficult to challenge his graceful exposition. His analysis, however, includes marginal soils, forests, and other wastelands and is not precisely targeted at marshes, an approach which risks oversimplification. Just how marginal were wetlands during the Middle Ages and how can we comprehensively assess such marginality?

Some of the strongest evidence for Postan’s thesis of the marginal marshland in England exists in literary sources composed between the eighth and eleventh centuries. Justin T. Noetzel’s study of the Latin and Anglo-Saxon lives of St. Guthlac, a famous saint and hermit of the Crowland fens, provides compelling evidence that the Anglo-Saxon population of Lincolnshire did indeed perceive the surrounding fens as a marginal landscape “suitable only for

²⁸ Postan, *The Medieval Economy*, 21-23.

²⁹ Postan, *The Medieval Economy*, 24.

³⁰ Postan, *The Medieval Economy*, 25.

prisoners, exiles, monsters, and demons,”³¹ yet even then, not wholly irredeemable. The fens dominated the landscape of Lincolnshire, covering approximately a million acres and spilling over into Cambridgeshire and parts of Suffolk and Norfolk. St. Guthlac settled in Crowland in or about the year 700 following an early life of brigandage in the Welsh marches of Mercia and joining a monastic house at Repton when he reached his mid-twenties. The isolation and harshness of the landscape, coupled with attacks from phantoms, foul spirits, and beasts, provided Guthlac with opportunities to prove his devotion to God and was therefore a location imbued with spiritual opportunity.

As Noetzel himself notes, Guthlac’s life in the fens is in some ways a departure from older Anglo-Saxon depictions of marshlands and their perils. In *Beowulf*, there is a clear association of monstrosity with wild and swampy places as the titular hero approaches the lair of Grendel’s mother:

Then the man of noble lineage left Heorot far behind,
followed narrow tracks, string-thin paths
over steep, rocky slopes—remote parts
with beetling crags and many lakes
where water-demons lived. [...]
The water boiled with blood, with hot gore;
the warriors gaped at it. At times the horn sang
an eager battle-song. The brave men all sat down;
then they saw many serpents in the water,
strange sea-dragons swimming in the lake,
and also water-demons, lying on cliff-ledges,
monsters and serpents of the same kind,
as often, in the morning, bring sorrow to ships
on the sail-road.³²

³¹ Justin T. Noetzel, “Monster, Demon, Warrior: St. Guthlac and the Cultural Landscape of the Anglo-Saxon Fens,” *Comitatus: A Journal of Medieval and Renaissance Studies* 45 (2014): 105, doi:10.1353/cjm.2014.0000.

³² Heather O’Donoghue, ed, *Beowulf: The Fight at Finnsburgh*, trans. Kevin Crossley-Holland (Oxford: Oxford University Press, 1999), 1408-1412a, 1421-1430a.

While the marsh is intensely perilous to the ultimately victorious Beowulf, St. Guthlac spiritually reclaims the fen by building a hermitage and displacing a demonic swarm.³³ While the demons use all their power to persuade Guthlac to abandon his home and use rough marsh vegetation to harm his body, the saint prevails by holding fast to the clay barrow upon which he had settled and invoking the aid of St. Bartholomew.³⁴ In this way, the fen becomes a stabilized location, a sanctified battleground, and a site of pilgrimage.³⁵ It is likely that intimate knowledge of a marshland effectively redeems it in the secular realm just as its isolation might provide a perfect setting for a life of religious devotion.

Because so little is known of St. Guthlac's biographer Felix, and less regarding the author of Beowulf, it is difficult to assess how widespread Anglo-Saxon fear of marshland may have been, or whether it was taken seriously beyond outside of literary sources. Marshes did not always play as negative a role in Anglo-Saxon history as in its literature. For example, King Alfred the Great was reported to have fled into the marshes of Wessex, an area he had known well from childhood, to evade capture and regroup.³⁶ If wetlands, despite their perils, harboured both kings and hermits, then the pessimism that surrounded them must have had finite limits even during the Early Middle Ages. While this assessment cannot ultimately rule out marginality, it does much to temper such an assessment. If a marginal space is useful in itself, then it is not universally marginal; its value is merely dependent upon the needs of the individual.

³³ Noetzel, "Monster, Demon, Warrior," 124.

³⁴ Noetzel, "Monster, Demon, Warrior," 124-27.

³⁵ Noetzel, "Monster, Demon, Warrior," 129-31.

³⁶ Purseglove, *Taming the Flood*, 25.

John Aberth argues that the High Middle Ages (c. 1000-1300) witnessed a dramatic shift in opinions about nature and proved to be one of the more optimistic stages of medieval environmental thought. He calls this a collaborative stage, during which time medieval people became confident in their abilities to affect their surroundings to extract the maximum benefit from nature. The creation of a network of Cistercian houses in wastelands including marshes is indicative of the new optimism regarding nature.³⁷ It is possible to find many high medieval exultations from several polities within Europe regarding the glories of lands “cleared, plowed, redeemed from wood and marsh, and converted to the production of food.”³⁸ This optimism led to significantly greater levels of reclamation and habitation of marshlands in England. While Postan concedes that an apparent increase in wasteland and marsh reclamation during the twelfth and thirteenth centuries is attested in documentary sources, he defends his assessment of marginality by suggesting both that society had skipped over these areas in previous centuries and that not all attempts at reclamation would have been successful due to soil depletion and flooding.³⁹ His arguments do not entirely convince, yet they cannot be read without feeling unsettled by the suggestion that accepting the documentary evidence without appropriate pedological knowledge leads to inflated notions of medieval marshes’ value.

If Postan is correct in his assertions, one would expect that the English deemed only the most fertile and easily drained sections of marsh suitable for human habitation and development during the Early Middle Ages. Instead, while we find that while fertility was an important factor

³⁷ John Aberth, introduction to *An Environmental History of the Middle Ages: The Crucible of Nature* (Abingdon: Routledge, 2013), 6.

³⁸ Roberta Magnusson and Paolo Squatriti, “The Technologies of Water in Medieval Italy” in *Working with Water in Medieval Europe: Technology and Resource-Use*, Paolo Squatriti ed. (Leiden: Brill, 2000), 227.

³⁹ Postan, *The Medieval Economy*, 18-26.

in reclamation, it also becomes apparent that Early Medieval society in England did not shun its marshes. In fact, the Anglo-Saxon Chronicle offers scattered references to marshes and to ‘marshlanders’ in Kent in entries for the eighth and ninth centuries.⁴⁰ This being the case, it is equally probable that early successes with reclaimed land did provoke a new wave of optimism relating to reclamation during the High Middle Ages which would uphold Aberth’s views. Again, however, Postan anticipates his critics and freely admits that parts of the Kentish marshes were reclaimed under the Romans, particularly Romney Marsh and the Isle of Thanet. He counters this point by arguing that Romney Marsh is the sole example of a fully reclaimed marsh in Kent before the end of the thirteenth century and therefore not indicative of medieval wetland reclamation as a whole.

In recent decades, one of the strongest opponents to Postan’s views has been the archaeologist Stephen Rippon. He argues that medieval society’s perception of marshland potential, reckoned both in natural resources and agricultural productivity after reclamation, was high during the medieval period.⁴¹ Rippon suggests three divisions of profitable interaction with wetlands: exploitation, modification, and transformation.⁴² The first represents the uses of unaltered marshes coastal for gathering comestible plants, salt, crafting materials, and fuel, and for fishing and snaring wildfowl.⁴³ Wetlands modified with drainage ditches or low embankments provided an extended grazing season for animals, while more intensive drainage techniques transformed the marsh into arable or habitable terrain.⁴⁴ Although the value of the marsh increases with each stage there is no point at which the land is profitless.

⁴⁰ Rippon, *The Transformation of Coastal Wetlands*, 7-8.

⁴¹ Rippon, *The Transformation of Coastal Wetlands*, 7.

⁴² Rippon, *The Transformation of Coastal Wetlands*, 1.

⁴³ Rippon, *The Transformation of Coastal Wetlands*, 260-61.

⁴⁴ Rippon, *The Transformation of Coastal Wetlands*, 260-261.

The consistent potential for profit that even unaltered marshes provide conflicts dramatically with Postan's position on the marginality of wetlands. Mark Baily strongly opposed Postan in his monograph, *A Marginal Economy?: East Anglian Breckland in the Later Middle Ages*, on the grounds that the definition of marginality depended heavily upon fallacious economic theory and generalizations.⁴⁵ Even so, the work of reclaiming marshes required significant time, labour and expense. Postan's thesis of wetland marginality remains useful to Rippon so long as it is properly defined and understood. Ultimately, Rippon defines coastal wetland reclamation as a "high cost, high risk, but high return" enterprise:

[...] high cost in terms of the loss of natural resources, the capital investment in flood defences, and the subsequent maintenance they required; high risk in terms of the constant threat of flooding and disease; yet high return in terms of their agricultural yields and connections to market structures through water transport that a coastal location offered.⁴⁶

Rippon's comparative approach to wetlands, encompassing Romney Marsh, the Thames Estuary, Fenland Britain, and the western Netherlands, encourages the scholars to consider marshes corporately as well as singly.⁴⁷ It leaves room for each region to approach the utilization of their wetlands as their circumstances demand while participating in a united desire to manage their marsh resources in the best way possible.

The late medieval period witnessed a general deterioration in popular perceptions on the environment due to the experiences of the Great European Famine (1315-22), the concurrent Great Bovine Pestilence (1319-20), and the Black Death (1348-51). Considered together, these events broaden any perceived hostility of nature that destroyed plants, animals, and human

⁴⁵ Mark Bailey, *A Marginal Economy?: East Anglian Breckland in the Later Middle Ages* (Cambridge: Cambridge: University Press, 1989), 1-24.

⁴⁶ Rippon, *The Transformation of Coastal Wetlands*, 6.

⁴⁷ Rippon, *The Transformation of Coastal Wetlands*, 12-13.

beings. John Aberth describes these events as reminders that nature is inconstant and adversarial.⁴⁸ William Chester Jordan estimates that the Great European Famine affected a population in excess of thirty million.⁴⁹ While a large European population and crop yields substantially lower than those in the present-day produced a situation of extreme vulnerability to crisis, medieval chroniclers identified years of excessive rains as the despoiler of good lands, including those reclaimed since the 1000s.⁵⁰ The great incidence of starvation and malnutrition during these years would have been inescapable for the lower classes and could hardly have been ignored by elites. Ten to fifteen percent of the English population perish as a result of the famine.⁵¹

The Great Bovine Pestilence, a pathogen that likely originated in the Far East and whose identity has so far eluded scholars, reached England around Easter 1319.⁵² The progression of the pestilence was rapid: the Scottish border had encountered it by late summer of the same year and Wales began to suffer its effects in 1320, followed by Ireland by 1321.⁵³ Philip Slavin's analysis of manorial accounts suggests an average loss of 62% of the bovine population of England and Wales between 1319 and 1320. The availability of oxen for ploughing, manure for

⁴⁸ John Aberth, introduction to *An Environmental History of the Middle Ages: The Crucible of Nature* (London: Routledge, 2001).

⁴⁹ William Chester Jordan, *The Great Famine: Northern Europe in the Early Fourteenth Century* (Princeton: Princeton University Press, 1996), 8.

⁵⁰ Jordan, *The Great Famine*, 12-25.

⁵¹ David Routt, "The Late Medieval Countryside: England's Rural Economy and Society, 1275-1500" *History Compass*, (2013), 475.

⁵² Philip Slavin "The Great Bovine Pestilence and its economic and environmental consequences in England and Wales, 1318-50, *The Economic History Review*, 65 4 (2012), 1240. Slavin identifies the three most commonly cited causes of the pestilence as anthrax, foot-and-mouth disease, and rinderpest. Contention over the 'diagnoses' has centred on imperfect attention to contextual details, however, Newfield's recent work has argued convincingly for rinderpest.

⁵³ Philip Slavin "The Great Bovine Pestilence, 1240.

the fields, dairy production, and the price of cattle all experienced significant declines.⁵⁴ Reeves in Kent and Middlesex would occasionally slaughter sick animals, rather than attempt to sell them cheaply, though these actions accounted for only 1% of the bovid fatalities.⁵⁵ Slavin argues that cooler temperature that had precipitated the Great Famine played a part in weakening bovine populations by depriving them of their usual fodder.⁵⁶ The dire consequences of this famine were compounded by the fact that, while animals were lost in a matter of weeks, restoring herds would have taken many years of assiduous work.⁵⁷

The Black Death destroyed, at minimum, one third of the English population⁵⁸ within the space of four years and fresh outbreaks occurred sporadically until the close of the seventeenth century.⁵⁹ The pandemic shook some sectors of the medieval economy to its core and imposed a demographic crisis in England.⁶⁰ Although some historians including J. L. Bolton have suggested that the Black Death may have averted a disastrous level of overpopulation in England,⁶¹ the sudden demographic shift, and struggles to make sense of the carnage and to dispose of the dead, had a dramatic effect on the population in fourteenth-century England. Estates in southern and central England generally suffered less upheaval than other parts of the British Isles, although at Ramsey and Battle Abbeys, debts levels increased, profits thinned, and

⁵⁴ Slavin “The Great Bovine Pestilence,” 1242.

⁵⁵ Slavin “The Great Bovine Pestilence,” 1242-43.

⁵⁶ Slavin “The Great Bovine Pestilence,” 1246.

⁵⁷ Slavin “The Great Bovine Pestilence,” 1249.

⁵⁸ Mavis E. Mate, introduction to *Daughters, Wives and Widows after the Black Death: Women in Sussex, 1350-1535* (Woodbridge: The Boydell Press, 1998), 1.

⁵⁹ Colin Pratt, Preface to *King Death: The Black Death and its Aftermath in Late-medieval England*, (Toronto: University of Toronto Press, 1996).

⁶⁰ Harry Kitsikopoulos, “The Impact of the Black Death on Peasant Economy in England, 1350-1500 (*Journal of Peasant Studies*, Vol 29, no 2, (Jan. 2002): 74, doi:10.1080/714003952.

⁶¹ J. L. Bolton, *The Medieval English Economy, 1150-1500* (London: J. M. Dent & Sons, Ltd., 1980), 192.

the labour supply became problematic in the decades following the initial wave of plague.⁶² By the 1370s, wages and prices began to diverge in earnest, taxes increased, and the Peasants' Revolt sprung up in Kent, Sussex, and Essex.⁶³ The Black Death hit hard and engendered chaos and violence toward the end of the fourteenth-century. Whether the English interpreted the plague as a natural event, or as divine judgement, it brought home the inevitable mortality of man.

Aberth also presents a counterpoint to the late medieval view of nature as adversary: the recreational view of nature. He affirms that a certain alienation evolved between humanity and nature as urban populations grew. Aberth presents St. Frances Assisi's *Canticle of the Sun* with its familial imagery, the goliardic and troubadour traditions of France and Germany, and the Robin Hood tales in England as evidence of a longing for increasingly estranged natural environments.⁶⁴ These basic views created in the medieval mind a sense of kinship with the natural world that competed with the growing mistrust of the physical environment. While nature at its best was a beautiful and desirable thing, nature at its worst had the potential to wield death on an immense scale.

The Early Modern perceptions of wetlands were among the most negative of any period in England. Jeremy Purseglove collected a number of these impressions in his monograph "Taming the Flood: A History and Natural History of Rivers and Wetlands. In 1576, William Lambarde, an Elizabethan archivist, pronounced Romney Marsh "evil in winter, grievous in summer and never good," an anonymous commentator noted in 1629 that the air of the Fens was

⁶² Bolton, *The Medieval English Economy*, 211.

⁶³ Bolton, *The Medieval English Economy*, 214-17.

⁶⁴ John Aberth, introduction to *An Environmental History of the Middle Ages: The Crucible of Nature* (London: Routledge, 2001).

“nebulous, grosse and full of rotten harres (gases); the water putrid and muddy, yea full of loathsome vermine; the earth spuing, unfast and boggie,” and Samuel Pepys recorded in 1664 his experience of the “most sad fennes.”⁶⁵ Even Shakespeare utilized the poor public opinion of marshes for the sake of imagery when King Lear invokes the “fen-suck’d fogs” to harm his daughter.⁶⁶ It is certain though that many of men forming and expressing these opinions were not native to the regions upon which they commented. Wetland populations often received harsher reviews from drainage engineers than those visited upon the marshes themselves. In 1586, William Camden labelled the men of the Fens “rude, uncivil and envious to all others” while Lieutenant Hammon, in his 1635 *Short History of Western Counties*, described the inhabitants of Ely in Cambridgeshire as having “a turfy scent and fenny posture about them, which smell I did not relish at all with any content.”⁶⁷ English wetland culture seems not to have won much praise from outside observers.

It is not surprising that a certain hostility developed between marsh folk and urban critic, particularly those in favour of or employed in the service of drainage. William Dugdale’s commission in the Restoration period and other apologetic pamphlets attest to the need for encouraging wetland transformation projects in the Early Modern Period. A commissioned pamphlet published in London in 1629 entitled *A Discourse Concerning the Drayning of Fenns and Surrounded Grounds in the Six Counteys of Norfolke, Suffolke, Cambridge with the Isle of Ely, Huntington, Northampton, and Lincolne* argues passionately for draining efforts to take place. The author conducts his investigation in three phases:

⁶⁵ Purseglove, *Taming the Flood*, 25.

⁶⁶ William Shakespeare, *King Lear*, eds. David Bevington and David Scott Kastan (New York: Bantam Dell, 2004), 103, Act 2, scene 4.

⁶⁷ Purseglove, *Taming the Flood*, 34.

The first, whether it would be honorable and profitable to the King, and Common-wealth in general, and to those Countreys in particular, if it might be effected. The second, whether it be Feasable. The third, how a competent reward may be apportioned for them that should undertake so great a worke.⁶⁸

The findings are, as one might expect, that the work is honourable and beneficial, that the work is most likely feasible, and that those who undertake the project should receive a reward commensurate to the value of their work for the crown. The author describes a programme of drainage as the only cure for “those Countries, having beene grievously afflicted with the continuance and increase of Inundations.”⁶⁹ The plight of marsh inhabitants, who might suffer at the hands of rich landowners and also lose their livelihoods from fishing and hunting wildfowl, provokes only mild concern since the rich oppressed the poor in many places and because the state could surely be trusted to safeguard the welfare of vulnerable subjects as necessary.⁷⁰ While the author expresses remarkably little malice toward the fen population, he certainly does not suppose that they fully grasp a project that he feels will ultimately serve their common interests.

Beyond the natural and mutual antagonism that grew up between those who lived in marshlands and those who did not, disease influenced opinions that demeaned unaltered wetlands and praised their transformation. Rippon notes that post-medieval wetland inhabitants suffered a mortality rate that could be up to three times higher than those outside of marshland districts.⁷¹ Malaria, mainly *Plasmodium Vivax*, or “ague,”⁷² carried by certain mosquito strains, was particularly rife in wetlands, however, marshes also suffered increased incidences of

⁶⁸ H. C., *A Discourse Concerning the Drayning of the Fennes, London, 1626* (Amsterdam: Theatrum Orbis Terrarum, Ltd., 1976), A2.

⁶⁹ H. C., *A Discourse Concerning the Drayning of the Fennes*, C3.

⁷⁰ H. C., *A Discourse Concerning the Drayning of the Fennes*, B1-B2.

⁷¹ Rippon, *The Transformation of Coastal Wetlands*, 146.

⁷² Purseglove, *Taming the Flood*, 27.

bubonic plague and smallpox.⁷³ England's successive encounters with plague bred a certain exhaustion in dealing with disease and perhaps in turn the types of physical locations most associated with them. Any such exhaustion, however, did not dampen reclamation zeal in England, and may well have been utilized as a pretext for reclaiming potentially valuable land.

Early Modern perceptions of wetlands are not directly applicable to the Late Medieval period. It would be dangerous to ascribe later attitudes to former centuries; it would, however, be equally imprudent to ignore the Early Modern period entirely. Much of the widespread contempt for marshfolk and much of the drive for reclamation evidenced in the sixteenth and seventeenth centuries may have originated and developed during the fourteenth and fifteenth centuries. Champions of reclamation in each historical timeframe gravitated naturally to the same goals of increasing crop yields and limiting flood damage, but in the Early Modern period the focus shifts somewhat toward the intolerability of wetlands. The drive to improve marshes, and thereby eradicate undesirable and unpleasant conditions from the land, was likely also stronger than in earlier centuries. If a similar distaste for fens existed, however, as it seems to have done, during the Early Medieval and Early Modern periods, it is conceivable that the spectrum of opinions on wetlands has remained constant. While environmental optimism or pessimism, which Aberth has broadly sketched out, may have the upper hand for a certain span of years, the human experience of wetlands does not shift wildly. As Rippon suggests, each age assesses potential and risk out of its own needs and experiences,⁷⁴ attempting to maximize the former and minimize the later while coping with disease, sinkholes, and noxious fumes to the best of their abilities.

⁷³ Purseglove, *Taming the Flood*, 27. Rippon, *The Transformation of Coastal Wetlands*, 146.

⁷⁴ Rippon, *The Transformation of Coastal Wetlands*, 6.

Just as each period of history might assess their wetlands differently, depending on their immediate circumstances, each community or region within England had to develop an approach to reclaiming their marshland that suited their physical surroundings, financial means, and the agendas of community leaders. Mark Gardiner's work on the profound transformation in two of the largest wetland areas in England, the Fens of St. Guthlac and Romney Marsh, suggests that medieval people were developing their marshes on a large scale and maximizing the resources available to them. Medieval reclamation techniques required the digging of drainage channels and the building of embankments to defend against flooding, although the requirements of these varied depending upon marsh composition and salinity. Salt marshes received regular inundations at high tide and occasional wide scale flooding during storms; as such they required a system of channels and sluices for drainage and embankments designed to suppress the inflow of tidal water. Freshwater wetlands, particularly those composed of silt, could be drained by means of ditches and, particularly in the fens, maintained best with banks built along the unimproved areas.⁷⁵

1.3 Pevensey Levels

The Pevensey Levels are situated along England's southern coast in East Sussex. Eastbourne and Willingdon mark the boundary on the western side, Hailsham in the north-west, Herstmonceux and Wartling in the north-east, and Hooe and Bexhill-on-Sea mark the easternmost edge.⁷⁶ This area between Eastbourne and Bexhill in fact consists of a collection of smaller Levels known as Willingdon Level, Pevensey Level, and Hooe Level, since each

⁷⁵ Mark Gardiner, "The Transformation of Wetlands in Anglo-Norman England" in *Anglo-Norman Studies XXIX: Proceedings of the Battle Conference 2006*, ed. C. P. Lewis (Woodbridge: Boydell & Brewer, 2007), 36-39.

⁷⁶ Salzmann, "The Inning of Pevensey Levels," 31.

contained a separate drainage system.⁷⁷ The total area of this relatively small marshland is just over 3,500 hectares.⁷⁸ Compared to the much larger fens, measuring well over 200,000 hectares, the Pevensey Levels are effectively dwarfed and are unlikely to stand out as a valuable topic of wetland research. The reclaimed Pevensey Levels, however, have not been significantly built up over the centuries and their compact size may in fact offer a more manageable field of study than many other wetlands afford.⁷⁹

L. F. Salzmänn produced one of the most thorough surveys of the history of the Pevensey Levels in 1909. As a local historian, he incorporates geographical information and documentary sources to offer the fullest possible assessment of the region. The levels are situated beneath a ridge of higher ground known to the Anglo-Saxons as the Weald. It is a testament to Salzmänn's skill that he remains the most frequently cited authority on the levels' history. A. J. F. Dully, author of "The Level and Port of Pevensey in the Middle Ages," even goes so far as to declare that Salzmänn had amply expounded upon the documentary sources relating to the "changing relationship between land and sea and the use that man made of each of them."⁸⁰ Salzmänn provides the foundation for all subsequent studies of the Pevensey Levels and the quality of his research has yet to be surpassed.

According to Salzmänn, the easterly drift of the English Channel is likely to have played a large role in the eventual draining of the Pevensey Levels on account of the sediments and

⁷⁷ Salzmänn, "The Inning of Pevensey Levels," 35.

⁷⁸ "Pevensey Levels SSSI Designation," Natural England, http://www.englishnature.org.uk/citation/citation_photo/1000914.pdf.

⁷⁹ This sentence draws upon my personal impressions of the Pevensey Levels from a period of three months during the summer of 2014 spent studying at Herstmonceux Castle and participating in archaeological work at Mota Piece. Much of the area remains quite open and exceedingly rural.

⁸⁰ A. J. F. Dully, "The Level and Port of Pevensey in the Middle Ages," *Sussex Archaeological Collections* 104 (1966), 26.

shingle that the currents continually deposit along the coast.⁸¹ Although the Romans constructed the fort of Anderida at Pevensey (later the site of the Norman Pevensey Castle) in the late third century,⁸² there is no evidence for any Roman drainage of the levels. According to Salzmann's conservative estimates, all of the land below 12 ft. would have transformed into a lagoon at high tide during Roman occupation.⁸³ The Romans engaged in reclamation efforts elsewhere in Britannia, particularly at Romney Marsh and even in portions of the Fens at some point in the third century.⁸⁴ The Pevensey Levels, however, attracted insufficient interest during the Roman Period, either because of its size and condition or because of other pressing concerns including the construction of the Saxon Shore Forts.

The Domesday survey commissioned by William the Conqueror in 1086 recorded that water still covered much of the Pevensey Levels.⁸⁵ Historians have only found two extant charters from the Anglo-Saxon period that hint at reclamation efforts prior to the Norman Conquest. The first is a charter of King Eadred dated 947 CE, which grants a certain Edmund marshland on the north side of the Pevensey peninsula.⁸⁶ The second, a charter by which King Offa of Mercia granted land at Bexhill to the bishopric of Selsey in 772 C. E., is almost certainly a forgery.⁸⁷ The forgery, however, would require a veil of plausibility to be useful. The charter's identification of several dykes on the levels, one of them known as the "ealdan dic" or

⁸¹ Salzmann, "The Inning of Pevensey Levels," 34.

⁸² A. F. Pearson, "Building Anderita: Late Roman Coastal Defenses and the Construction of the Saxon Shore Fort at Pevensey," *Oxford Journal of Archaeology* 18, no. 1 (1999), 97-99.

⁸³ Salzmann, "The Inning of Pevensey Levels," 31.

⁸⁴ Peter Salway, "The Roman Fenland," in *The Fenland in Roman Times* ed. C. W. Phillips (London: The Royal Geographic Society, 1970), 16.

⁸⁵ Salzmann, "The Inning of Pevensey Levels," 38.

⁸⁶ Rippon, *The Transformation of Coastal Wetlands*, 157.

⁸⁷ Salzmann, "The Inning of Pevensey Levels," 34-5.

old dyke, suggests that reclamation efforts may have begun in earnest prior to the Norman Conquest.⁸⁸

While most scholars agree that there was no extensive reclamation during the Anglo-Saxon period, the absence of evidence is not necessarily conclusive. The Domesday survey often serves as evidence for the unaltered state of the Pevensey Levels due to the large number of saltworks and paucity of meadow assessed.⁸⁹ In light of the charter evidence above, however, it may be prudent to admit that limited reclamation had already begun, though perhaps unsuccessfully. S. H. King noted that the Pevensey Levels were not the only location lacking meadow; many coastal areas in Sussex were nearly devoid of meadows.⁹⁰ This absence may have been due to the normal tidal floods in unaltered coastal settlements or may also indicate wide-scale coastal flooding from storm surges that potentially could have erased whatever drainage may have begun before 1066. The evidence is insufficient at the present time to offer anything other than speculation regarding Anglo-Saxon activities in the Pevensey Levels.

1.4 Risk Culture

In recent years, scholars have begun to combine the study of risk with environmental history. Uwe Lübken and Christof Mauch have asserted that natural hazards and catastrophic events persist in human memories producing a population imbued with the ability to predict future crises and a desire to produce permanent, rather than temporary, defenses.⁹¹ Greg Bankoff argues that the wetlands on the Eastern coast of England from East Yorkshire to the Pevensey

⁸⁸ Salzmann, "The Inning of Pevensey Levels," 35.

⁸⁹ Rippon, *The Transformation of Coastal Wetlands*, 157.

⁹⁰ S. H. King "Sussex" in *The Domesday Geography of South-East England*, H.C. Darby and Eila M. J. Campbell eds. (Cambridge: Cambridge University Press, 1962), 499.

⁹¹ Uwe Lübken and Christof Mauch, "Uncertain Environments: Natural Hazards, Risk and Insurance in Historical Perspective", 1-2.

Levels represent an expanse of risk culture similar to that found on the continental coasts of the North Sea Basin, whose society has been marked by a shared imperative for drainage and history of storms.⁹² Although sociologists have developed a formal definition of risk culture predicated on the rapid development of complex risk factors specific to modernity, historians are beginning to develop their own nascent theory of medieval and Early Modern risk cultures.

Not only does Bankoff argue for a medieval coastal risk culture, he also contends that much of the medieval English population constituted a ‘water culture’ due both to dependence on the seas for trade and to the ongoing work of reclaiming large expanses of marshland. He suggests that the struggle to manage water itself, even in places where water was perceived more as threat than resource, produces social characteristics closely related to those identified by Karl Wittfogel as “hydraulic civilizations.” Managing both water excesses and water shortages requires tremendous co-operation and social organization and in England and in true hydraulic civilizations, irrigation and flood control often co-existed. Bankoff regards water management in England as both cooperation-dependent and risk-oriented due to the extreme effort required to shut the sea out of marshy lowlands.

Bankoff was not the first scholar to suggest that England’s inability to match the technical definition of hydraulic civilization was largely irrelevant. In 2009, Duncan Sayer also noted the close relation between Wittfogel’s descriptions of hydraulic cultures and the realities of medieval wetland reclamation in the Fens:

Recently archaeologists have become aware of the scale and coverage of the canals or medieval water systems found in many areas of England, particularly the fens, and, while these systems were not irrigation channels, they were often depended on for subsistence; [...] The construction of the East Anglian Sea Bank as well as the building and maintenance of canal systems and the increasing use of drainage and land reclamation

⁹² Greg Bankoff, “‘The English Lowlands’ and the North Sea Basin System: a history of shared risk,” *Environment and History* 19 (2013), doi:10.3197/096734013X13528328438992.

meant that these fenland communities had a similar dependence on water management and channel maintenance in order to access the fertile silt and peat fens as irrigation-dependent societies may have had.⁹³

In a generalized form, Witfogel's identification of large scale water management with cooperation is both appropriate and compelling; however, while many historians acknowledge the cooperation as the principal factor of wetland existence, Bankoff is not content to identify the English lowlands as a cooperative society. It is the interplay of risk and cooperation in the English lowlands that produces and differentiates coastal marsh culture.

Risk is commonly defined as "the possibility of loss, injury, or other adverse or unwelcome circumstance" and the exposure to these situations.⁹⁴ Some scholars have questioned whether the concept of risk existed during the Middle Ages, suggesting that the level of predeterminism in a highly religious era might have been too high to allow constructs including *possibility* and spontaneous natural occurrences to develop.⁹⁵ The preferred date for the development of a 'risk concept' among these scholars is the Early Modern period. On the surface, this argument is plausible. Indeed, 'risk' did not even join the ranks of English terms until the early seventeenth century,⁹⁶ although it is equally true that a strong case exists for the word's development and use in late medieval France. Terminology aside, it is more difficult to determine whether a concept analogous to the current understanding of risk existed in Medieval Europe. Furthermore, it is equally important to investigate whether the Early Modern period

⁹³ Duncan Sayer, "Medieval waterways and hydraulic economics: monasteries, towns and the East Anglian fen," *World Archaeology* vol 41 (1) (2009), 137.

⁹⁴ "risk, n." OED Online. June 2017. Oxford University Press.
<http://www.oed.com.proxy.lib.uwaterloo.ca/view/Entry/166306?rskey=7eWU3X&result=1> (accessed July 27, 2017).

⁹⁵ Lübken and Mauch, "Uncertain Environments," 2.

⁹⁶ "risk, n." OED Online. June 2017. Oxford University Press.
<http://www.oed.com.proxy.lib.uwaterloo.ca/view/Entry/166306?rskey=7eWU3X&result=1> (accessed July 27, 2017).

was, in fact, sufficiently free of predeterminism to warrant the current academic theory of a conceptual progression toward risk.

The Bible contains some very strong suggestions of a modern risk concept. One of the most powerful of these passages is found in the book of Ecclesiastes:

Send out your bread upon the waters, for after many days you will get it back. Divide your means seven ways, or even eight, for you do not know what disaster may happen on earth. When clouds are full, they empty rain on the earth; whether a tree falls to the south or to the north, in the place where the tree falls, there it will lie. Whoever observes the wind will not sow; and whoever regards the clouds will not reap.

Just as you do not know how the breath comes to the bones in the mother's womb, so you do not know the work of God, who makes everything. In the morning sow your seed, and at evening do not let your hands be idle; for you do not know which will prosper, this or that, or whether both alike will be good.⁹⁷

Although a biblical passage of this type may never have trickled down to an illiterate laity, the indication of an unforeseeable predeterminism in the passage is striking. If humanity cannot comprehend or anticipate the divine will, then the knowledge that events are predetermined becomes hollow. Humanity's ability to participate in sin with full volition was an important element of Catholic teaching during the Middle Ages and the rituals of confession and penance likely drove home some conception of human choice resulting in the consequences of sin.

Therefore, if human action is free and foreknowledge of natural events impossible without divine revelation, the conditions exist for *possible* outcomes to emerge.⁹⁸

⁹⁷ Eccles. 11:1-6 (NRSV).

⁹⁸ Christopher M. Gerrard and David N. Petley have recently argued that the term 'risk society' is appropriate in a medieval context and that medieval societies acted pragmatically toward disasters and environmental risk. Christopher M. Gerrard and David N. Petley, "A risk society? Environmental hazards, risk and resilience in the later Middle Ages," *Natural Hazards* 69 (2013), doi:10.1007/s11069-013-0750-7. Will Hasty has also described a theory of risk culture in medieval literary sources relating to perceptions of self in contests, games, adventure, and love, which while beneficial in essence does not speak well to the environmental risk or risk assessment. Will Hasty, *The Risk-Reward Society: Courts, Adventure, and Love in the European Middle Ages* (Columbus: The Ohio State University Press, 2016), 1-7. The history of usury also

From a secular perspective, it would not have been possible to plead innocence of theft before a court by claiming that God had willed for property to be stolen. Moreover, one could not sit idly by in the planting season and expect that a kindly providence would sow the fields. There were real, practical limits to deferring to the heavens, even within human societies that strongly acknowledged an omnipotent deity. When medieval commissions of sewers heard evidence relating to breached coastal sea defences, they did not throw up their hands and concede that God had willed an inundation. More often than not, the commissioners placed the blame for coastal floods squarely on human populations and individuals, citing their negligence to defend against the sea.⁹⁹ While it is impossible to resist the force of waves sent by Almighty God, it is possible to hope that human effort might avail against an impersonal and natural tidal phenomenon.

In the Early Modern period, Protestant teaching included a strong sense of predestination. Even medieval thinkers believed that God ‘chose’ which humans would receive salvation; God’s sovereignty and the experience of having large portions of the population fail to apply Church teaching provided evidence for this position.¹⁰⁰ The primary difference between the medieval Catholic and early modern Protestant approaches to predestination was in whether such a

acknowledges the identification of risk as a method by which medieval investors could avoid prosecutions for usurious loans during the twelfth and thirteenth-centuries by formulating contracts that emphasized the uncertainty of profit and with sea loans. Mark Koyama, “Evading the ‘Taint of Usury’: The usury prohibition as a barrier to entry” *Explorations in Economic History* 47, no. 4 (2010): 423-425, doi: 10.1016/j.eeh.2009.08.007. The history of insurance contracts in Italy during the fourteenth-century, demonstrates that the merchant classes to whom sea loans were not available innovated with legal formulations in order to simultaneously create and disguise insurance transactions, which had no official standing under the law. Humbert O. Nelli, “The Earliest Insurance Contract – A New Discovery” *The Journal of Risk and Insurance* 39, no. 2 (June, 1972): 215-220, <http://www.jstor.org/stable/251881>.

⁹⁹ Bankoff, “The English Lowlands,” 22.

¹⁰⁰ Euan Cameron, *The European Reformation*, 2nd ed. (Oxford: Oxford University Press, 2012), 155.

difficult and easily misunderstood doctrine ought to be discussed and taught among the laity.¹⁰¹ For most of the major reformers, including Luther, Calvin, Bucer, and Zwingli, proper understanding of predestination would prove beneficial; however, these same teachers tended to reject double-predestination (to heaven and to hell), and to reject utterly the notion that the elect could know or deduce from their own behaviour that they had received God's grace.¹⁰² The same belief in an inscrutable divine will that existed during the Middle Ages, therefore, progressed into the Early Modern period, although public awareness of formal predestination doctrines increased.

John Emrys Morgan's recent article "Understanding flooding in early modern England" chronicles strong predeterminist perceptions. He recounts the response of an anonymous author to a devastating storm in 1607 that struck the southwestern coast of England and Wales, destroying sea walls and killing large numbers of humans and livestock. This author interpreted the storm and flooding as punishment for human sin and he urged his countrymen to prepare for:

[...] some tempest in one kind or another, as terrible unto us as that hath been to time, knowing that these prodigious overflowings of the waters, howsoever natural causes (as God's instruments do claim their parts in them yet they proceed from the Lord's own direction), who by His punishing of others with them, doth threaten grievous calamities, even against our vice, unless I say speedy repentance and amendment do avert his fearful wrath and judgement from us.¹⁰³

Early Modern society in England relished tales of disastrous floods in ballads, chapbooks, and published firsthand accounts, which served the purposes of continuing religious reform efforts through parallels with the biblical narrative of the Noachic Deluge.¹⁰⁴ As Morgan points out,

¹⁰¹ Cameron, *The European Reformation*, 156-9

¹⁰² Cameron, *The European Reformation*, 156-9.

¹⁰³ John Emrys Morgan, "Understanding flooding in early modern England" *Journal of Historical Geography*, 50 (2015), 37.

¹⁰⁴ Morgan, "Understanding flooding," 39-40.

however, a large and popular corpus of providential literature does not necessarily indicate a “providentially minded readership.”¹⁰⁵ In fact, Early Modern parish records and transcripts from the commissions of sewers continued narrating the facts of flooding simply, noting their local destructive force and highlighting human responsibility for allowing the sea’s encroachment. Despite the diversity of Early Modern interpretations of floods, practical secular approaches to flooding are demonstrated to have at least coexisted with providentialism.

The question remains, can historians assume the existence of a risk concept in medieval society? It is reasonable to believe so, especially because of the secular practicality of the courts that were most directly connected to wetland reclamation and sea defense. It is not necessary for English society to have rejected religion in order to apprehend risk, nor must risk apprehension have been universally accepted within societies to have existed. The commissioners of sewers, local landowners with royal authority to mediate disputes relating to flooding and drainage, likely demonstrate the prevailing views of coastal residents, namely that humans could and should work to protect their lands from floods with the understanding that these events could not be predicted, but could be assumed. The possibility and probability of storms held danger, or risk, and required preparation. Happily, the concept of danger, as exposure to loss and punishment, is found in Langland’s *Peirs Plowman* in 1377: “For he that is ones a thef is euermore in daungere, And as the lawe liketh to lyue or to deye.”¹⁰⁶ Whether expressed as danger or risk, the potentiality of outcomes or events in the human mind seems to have been established by the fourteenth-century, if not sooner.

¹⁰⁵ Morgan, “Understanding flooding,” 44.

¹⁰⁶ “danger, n. and adj.”. OED Online. June 2017. Oxford University Press. <http://www.oed.com.proxy.lib.uwaterloo.ca/view/Entry/47183?rskey=efHO3A&result=1&isAdvanced=false> (accessed July 27, 2017).

CHAPTER 2: The Rewards of Wetland Reclamation

The potential of medieval English wetlands is evident in the number and quality of resources available, whether humans left the land unaltered, or whether they modified or transformed it. Human habitation and resource extraction progressed at differing paces and with specialized goals specific to each region, though, most marshlands had access to similar natural resources and potentialities for land use. This chapter examines many of the resources that medieval populations recognized in their marshes including subsistence level resources and those that became available through reclamation efforts. Because some of the resources possessed their own prospective risks in certain situations and over time due to factors including weather, innovation, and reclamation efforts, it is important to assess these challenges and the potential depreciation of certain resources. What sets these risk elements apart from those perils of reclamation covered in chapter three is typically human involvement or action, although this will not hold true in every case. It is important, however, to acknowledge that resource extraction requires investment, and that investment involves uncertainty. While these resources were important factors in the decision to reclaim English marshes, very few if any revenue streams were consistent over time. Indeed, each stage of wetland ‘improvement’ jeopardized many of the resources available at previous stages of its development.

Reclamation projects could progress along a range of vectors. The first was disorganised settlement by independent farmers, the second involved lords renting marshland cheaply to tenants to improve the quality of their land in a slightly more systematized fashion, and the third was planned colonization by lords to improve both their land and their political power.¹⁰⁷

Stephen Rippon argues that for much of the medieval period, lords and wealthy landowners were

¹⁰⁷ Rippon, *The Transformation of Coastal Wetlands*, 246.

most likely to involve themselves with reclamation programmes.¹⁰⁸ Rippon argues that the excellent record keeping in religious houses has potentially distorted our understanding of wetland reclamation in England and obscured lay participation. The medieval Church, although heavily involved in drainage, did not necessarily embark on reclamation projects with any more organization than did its lay counterparts, and it often employed similar rental techniques to drive improvement during the High Middle Ages.¹⁰⁹ While Ecclesiastical involvement was substantial, new research on lay roles in reclamation projects suggest that the latter was not as heavily or systematically invested as scholars once assumed.¹¹⁰

Reclamation by the laity could take several forms. Rippon suggests that fenland reclamation exemplifies communal efforts and that improvements at Walland Marsh followed entrepreneurial lines, although the models can shift over time. In the Lincolnshire fens, embankments protected one or two parishes, which is highly suggestive of communal action. In the Norfolk fens, the earliest embankments follow the same model of safeguarding entire parishes, and later dykes constructed before 1207, served several adjacent communities. In the Cambridge fens, a single landowner's oversight resulted in one system of fen-banks that protected five settlements.¹¹¹ Although the draining of Walland Marsh demonstrates a similar style of communal involvement, tenant investors played a much stronger role in building sea-

¹⁰⁸ Rippon, *The Transformation of Coastal Wetlands*, 247.

¹⁰⁹ Rippon, *The Transformation of Coastal Wetlands*, 253.

¹¹⁰ Rippon, *The Transformation of Coastal Wetlands*, 253. While Rippon acknowledges the church as an active party in wetland transformation and a major landowner in England, he notes that ecclesiastical record survival may have produced a disproportionate picture of their role in land reclamation that excludes important contributions by the laity. He notes that a number of Bishops, holding lands in Howdenshire, Walland Marsh, and Henbury, delegated responsibility for wetland reclamation and improvement to tenants and freeholders during the twelfth and thirteenth centuries.

¹¹¹ Rippon, *The Transformation of Coastal Wetlands*, 256-7.

walls to protect drained lands in collaboration with lay and ecclesiastical landowners.¹¹² In some cases, a lord's reclaiming interests could even be constrained by communities that felt their rights might be threatened by ambitious lords.¹¹³ Although marshes provided opportunity, there were many interests involved in wetland transformation, which could either accelerate or limit reclamation efforts.

2.1 Salt

Salt production was among the earliest, most important, and necessary occupations in England. The manifold uses of salt included leather production, medicine, and most importantly the preservation and flavouring of food. The curing of meats every autumn, and of fish in their seasons, depended upon large quantities of salt, as did the production of butter and cheese. A. R. Bridbury noted in his monograph *England and the Salt Trade in the Later Middle Ages* that Overton manor used one pound of salt for every ten pounds of butter or cheese produced in the dairy in 1305.¹¹⁴ Few excavations have yielded Anglo-Saxon salterns, but archaeological evidence points to boiling of brine and seawater in open pans as the primary production method.¹¹⁵ The English produced their salt both in cities with nearby brine springs including, Worcestershire and Cheshire, and along the coasts and could trade their salt more cheaply than their competitors on the continent.¹¹⁶

¹¹² Rippon, *The Transformation of Coastal Wetlands*, 257-8.

¹¹³ Rippon, *The Transformation of Coastal Wetlands*, 259.

¹¹⁴ A. R. Bridbury, introduction to *England and the Salt Trade in the Later Middle Ages* (Oxford: The Clarendon Press, 1955).

¹¹⁵ Peter Murphy, *The English Coast: A History and a Prospect* (London: Continuum, 2009), 38.

¹¹⁶ Bridbury, *England and the Salt Trade*, 16-25.

The Domesday survey recorded a large number of salt pans along the edge of the Pevensey Levels: thirteen at Hailsham, four at Bowley, four at Hooe.¹¹⁷ Bridbury reports that Sussex possessed the greatest number of coastal *salinae*.¹¹⁸ He is one of the only historians to outline the method of salt extraction in southern England, namely to collect salt water in shallow pools along beaches or in marshes and allow it to evaporate until a concentration is reached that renders further boiling in shallow pans economically viable.¹¹⁹ Bridbury insists that the first step would have been essential since ocean water has a far lower salt concentration than salt springs, only 30g per litre compared to 200g, and will crystallize only once it reaches 330g per litre.¹²⁰ More recently, Peter Murphy has described the Lincolnshire method of collecting solid sediment deposits from mud flats and sand, which were then dissolved in water and filtered. The resulting brine was highly concentrated and did not require as much fuel for the final boiling stage.¹²¹

The English exported salt widely from the south-eastern coasts to destinations including Norway, Zealand, Flanders, Normandy, and Germany. Bridbury identifies the Petty Customs, taxes introduced on products of foreign trade in 1303, as useful sources of data on salt imports and exports.¹²² Unfortunately, no such taxation records exist to indicate patterns of internal trade and consumption for the Later Middle Ages. According to Bridbury's estimates, the value of salt leaving England with foreign traders during the first decade of the fourteenth century was between £500 and £600 while imported salt was worth no more than £80 to £90. He also

¹¹⁷ Salzmann, "The Inning of Pevensey Levels," 38.

¹¹⁸ Bridbury, *England and the Salt Trade*, 19.

¹¹⁹ Bridbury, *England and the Salt Trade*, 16-17.

¹²⁰ Olivier Weller "First salt making in Europe: a global overview from Neolithic times," in *Archaeology of Salt: Approaching an Invisible Past*, ed. Robin Brigand and Olivier Weller (Leiden: Sidestone Press, 2015), 68.

¹²¹ Murphy, *The English Coast*, 39.

¹²² A. R. Bridbury, introduction to *England and the Salt Trade in the Later Middle Ages* (Oxford: The Clarendon Press, 1955), 27.

suggests that the salt export trade began to decline around the year 1335 and may only have continued on a large scale as late as the 1350s. As a result of the fourteenth-century textile revolution and the Black Death, it appears that wages rose sufficiently to destroy the advantageous margins that English salt production had enjoyed and that salt-welling became a much less attractive career.¹²³

2.2 Flora

There can be little doubt that human populations have used wetlands to forage throughout history. Unfortunately, there is little evidence for the medieval use of marsh herbs and other edible plants. On the basis of the continued use of marsh samphire in modern cookery, however, it is reasonable to assume that medieval populations made good use of the vegetal bounty surrounding them. Inedible plants were also valuable for crafts. Willow served the needs of basket weavers, waterlilies were sold to for use in gardens, purple moor grasses functioned as cattle bedding, and reeds made ideal thatching material.¹²⁴ Medieval settlements could harvest seaweed and kelp for use both as fertilizer and fodder, and archaeologists have found evidence at Colchester for Roman cultivation of seaweed for these purposes.¹²⁵

Wetlands also provided an ideal setting for the hemp industry, since *Cannabis sativa* thrives in deep, wet soil. Hemp was an essential product for ship building, providing ideal material for sails and ropes, and in areas with few sheep it could provide the basis for a weaving industry.¹²⁶ Alder grew abundantly in many medieval marshes and provided wood for fuel and

¹²³ A. R. Bridbury, introduction to *England and the Salt Trade in the Later Middle Ages* (Oxford: The Clarendon Press, 1955), 37-38.

¹²⁴ Purseglove, *Taming the Flood*, 30.

¹²⁵ Murphy, *The English Coast*, 41.

¹²⁶ Purseglove, *Taming the Flood*, 31.

handicrafts.¹²⁷ Wood resources would have allowed communities to engage in charcoal burning in order to provide fuel and to support local metalworking. The examples above indicate clearly that medieval plants served surrounding communities beyond providing vegetables. Resourceful populations easily augmented their incomes, and, in some cases, supported themselves, with marsh plants and through those industries fueled by wetlands.

2.3 Fauna

Life in coastal marshes also provided excellent access to ocean fish. Fishing was an important industry in Medieval England and by the late Middle Ages fish were eaten almost 40% of the days in the year.¹²⁸ Despite the Church's strict fasting laws, upper class households could and did amend their practice of fasting and abstinence from meat. Certain households in the Wash that followed a more lenient dietary practice regularly prepared meat dishes on certain restricted days; some households, however, also consumed fish on days when the Church permitted meat.¹²⁹ Whether these variations resulted from distinct levels of piety, availability of victuals, exemptions due to illness, or a combination of these factors, fish made up a substantial part of the medieval diet. Overall, the demand for fish was high and coastal marsh populations were profitable.

¹²⁷ Mark Gardiner, "The Transformation of Wetlands in Anglo-Norman England" in *Anglo-Norman Studies XXIX: Proceedings of the Battle Conference 2006*, ed. C. P. Lewis (Woodbridge: Boydell & Brewer, 2007), 38.

¹²⁸ Maryanne Kowaleski, "The Seasonality of Fishing in Medieval Britain" in *Ecologies and Economies in Medieval and Early Modern Europe: Studies in Environmental History for Richard C. Hoffmann* ed Scott G. Bruce (Leiden: Brill, 2010), 117.

¹²⁹ Christopher Woolgar "Diet and Consumption in Gentry and Noble Households: A Case Study from around the Wash" in *Rulers and Ruled in Late Medieval England: Essays Presented to Gerald Harriss* (1995), 19.

While early medieval populations relied heavily on local freshwater species, the importance of marine fishing expanded from the twelfth century.¹³⁰ The seasonality of marine fishing, described by Maryanne Kowaleski in 2010, dictated the actions of fishermen. Fishing conditions are most favourable when large mature fish shoal together and migrate to their spawning grounds. Different species prefer higher or lower water temperatures at spawning time and specific weather conditions can disturb their typical patterns or the timing of migrating or spawning. These same weather conditions can also affect the quality of the fish through the quality of plankton available for consumption prior to spawning and during the larval stages of larger fish species. Kowaleski also notes that the temperature needs of fish species vary and that a good year for fish with a preference for colder water, including herring and cod, could also produce poor catches of red mullet and pilchard, which prefer warmer temperatures.¹³¹

Fishermen constructed fishing bases and landing areas in order to take advantage of migrating herring shoals moved down the coasts of the North Sea toward Kent. Maryanne Kowaleski describes three distinct herring runs along the eastern coast of England each year. The first run of herring began their journey at the Shetland Islands and arrived in northern England between August and September each year before moving toward Norway. The second herring run proceeded from the coast of Northumberland down to the Wash in September and October. The third and most substantial of these events moved past East Anglia in October and November and by December and January had reached the Channel.¹³² The herring catch was

¹³⁰ Richard C. Hoffmann, "A brief history of aquatic resource use in medieval Europe," *Helgol Mar Res* 59 (2005): 23, doi:10.1007/s10152-004-0203-5.

¹³¹ Kowaleski, "The Seasonality of Fishing," 119.

¹³² Kowaleski, "The Seasonality of Fishing," 120.

enormous and important fairs developed to take advantage of the sea's bounty, and attracting international participation by the fourteenth century.¹³³

Kowaleski notes that taxation of the fishing industry by lay and ecclesiastical lords could be lucrative. Snape Priory received 10s. each year for each fishing boat in Aldeburgh, Suffolk and the clerics at Blythburch collected tithes of each major catch. At Dunwich, foreign fishermen had to pay a fee of 5s. to the local church, while native fishermen paid 2s. for their activities between Lent and Pentecost.¹³⁴ The fishing trade was subject to many risks, including the loss of boats and nets, negligible catches in some years, and long distance operations. The English and French crown were accustomed to issuing safe conducts to international and 'enemy' fishermen during the Hundred Year's War in order to support their national fishing industries.¹³⁵ No matter what other business occupied the government, fisheries were too valuable to jeopardize. The royal shares of fish caught at Winchelsea in the late thirteenth century, made up of at least ten major species, suggest a yearly value of £240-£400 for local inshore fisheries.¹³⁶ Fishermen even gained papal permission to fish on Sundays and holy days during the seasonal migrations.¹³⁷

English authorities had, on occasion, to reign in fishermen when they seemed intent on practices harmful to fish populations. In the fourteenth century, Royal and local authorities issued restrictions in Rye and along the river Eden regarding what equipment the fishing community could use at certain times of the year, particularly during breeding seasons and when

¹³³ Kowaleski, "The Seasonality of Fishing," 122.

¹³⁴ Kowaleski, "The Seasonality of Fishing," 123-4.

¹³⁵ Kowaleski, "The Seasonality of Fishing," 131-2.

¹³⁶ Kowaleski, "The Seasonality of Fishing," 133.

¹³⁷ Kowaleski, "The Seasonality of Fishing," 133.

the fish were tightly packed and vulnerable in rivers and estuaries.¹³⁸ Some regions and authorities during the thirteenth and fourteenth centuries also found it necessary to restrict dredging gear, which could destroy young shellfish and deprive them of food, and to outlaw fishing at times when salmon and other fish were still immature.¹³⁹ Fishermen evidently flouted laws meant to protect their livelihoods with regularity, likely in part due, to fierce competition, the seasonal nature of their work, and the looming threat of a poor catch the very next year.

Wetland resources certainly did not end with fishing. Purseglove lists an enviable abundance of fauna available for those willing to collect them. Fishing, however, was particularly profitable and feasible, not just along the coasts, but also in the midst of the marshes themselves. Medieval populations could count on their marshlands for eels that they harvested with multipronged eel glaives, or their medieval progenitors. Eels were often the currency of choice for paying rents in the Fens and the Somerset Levels, and the name “Ely” identifies the town as an eel district.¹⁴⁰ Constance H. Berman, in “Reeling in the Eels at La Trinquetaille near Arles,” attributes the medieval abundance of eels in France and England directly to wetland reclamation, which provided new habitats conducive to eels and even to eel farming.¹⁴¹ Drainage channels provided ideal habitats for large populations of eels, which could then provide a reliable source of food for local consumption and for export to major cities. In medieval

¹³⁸ Kowaleski, “The Seasonality of Fishing,” 131-2.

¹³⁹ Kowaleski, “The Seasonality of Fishing,” 132.

¹⁴⁰ Purseglove, *Taming the Flood*, 30.

¹⁴¹ Constance H. Berman, “Reeling in the Eels at La Trinquetaille Near Arles” in *Ecologies and Economies in Medieval and Early Modern Europe: Studies in Environmental History in Early Modern Europe*, Scott G. Bruce Ed. (Leiden: Brill, 2010), 157.

Holland, eeling near dams constituted a major fishery between 1400 and 1600 and smoked eel exports found their way to London,¹⁴² where the demand for eels was high.

Wildfowls and their eggs also provided food and income for marsh folk, although damp ground conditions could imperil those who participated in hunts and snaring. Among the species favoured in the Early Modern period were pewits, godwits, knot, and dotterel, while the eggs of swans, cranes, and bitterns were sufficiently popular to warrant protections by Edward VI's reign.¹⁴³ Archeological finds for a Middle Saxon settlements in the Fens included the bones of wild geese, duck, coot, small waders and a harrier.¹⁴⁴ Hunting methods likely included a combination of netting for small birds and bow and arrow for larger species. The frequent inclusion of game birds such as swan on menus for royal banquets suggests that consuming these animals implied status and wealth. Peasant consumption likely involved stealth and required special knowledge of marshlands.

2.4 Peat

Peat was an important fuel commodity in medieval England. Peat operations existed in many marshes along the southern and eastern coasts, including Romney Marsh and the Fens. Salzmann notes that Otham Abbey received the right to extract sixty cartloads of peat each year from Gilbert of L'Aigle's moor at Pevensey.¹⁴⁵ Reclamation helped to facilitate the process of cutting peat, but peat cutting introduced extensive risks to the very reclamation efforts upon which they depended. Reclamation itself can increase the rate of sediment erosion as previously waterlogged soils become increasingly dry and vulnerable to the action of tides, rain, and rivers.

¹⁴² Petra J. E. M. van Dam, "Eel Fishing in Holland: The Transition to the Early Modern Economy," *International Journal of Maritime History*, vol XV, no 2. (December 2003), 163.

¹⁴³ Purseglove, *Taming the Flood*, 30-1.

¹⁴⁴ Murphy, *The English Coast*, 45.

¹⁴⁵ Salzmann, "The Inning of Pevensey Levels," 38.

Drained peat marshes are subject to even greater dangers, including significant reductions in the height of land with relation to the sea.¹⁴⁶ Once the level of the reclaimed land suffered reductions, keeping the sea at bay often became a practical impossibility. Intensive reclamation of peat rich areas could, therefore, prove disastrous in the medieval period and most marsh populations limited their efforts.

2.5 Harbours and Ships

Proximity to harbours ranks highly among the benefits of coastal marshland life and did not require full transformation of the wetland landscape. The port of Pevensey existed during the Roman occupation of Britain and served as the 1066 landing site for William the Conqueror. Pevensey also functioned as a corporate member of the Cinque Ports, a group of south-eastern port cities established to provide ship service to the crown in exchange for certain privileges.¹⁴⁷ The terms of service stipulated that fifty-seven ships, each with a crew of twenty-one men, must serve the crown. These privileges concentrated on the fishing industry and included rights to fish and market the catch, to dry nets on beaches, and to arbitrate disputes during the major fishing season.¹⁴⁸ The Cinque Ports also received significant tax concessions, parliamentary representation and recognition at court for their service.¹⁴⁹

King John granted Pevensey its association with the Cinque Ports in 1207:

Johannes Dei gratia rex Anglie, dominus Hibernie, dux Normannie Aquitanie, comes Andegavie, [...] salutem. Sciatis nos concessisse, et praesenti carta nostra confirmasse baronibus nostris de Pevenesel et Langeneye, quod est infra libertates quinque portuum

¹⁴⁶ Gardiner, "The Transformation of Wetlands," 36.

¹⁴⁷ K. M. E. Murray, *The Constitutional History of the Cinque Ports* (Manchester: Manchester University Press, 1935), 1.

¹⁴⁸ Kowaleski, "The Seasonality of Fishing," 122.

¹⁴⁹ G. M. Draper "Failing Friaries? The Mendicants in the Cinque Ports" in *The Friars in Medieval Britain: Proceedings of the 2007 Harlaxton Symposium*, ed. Nicholas Rogers (Donington: Shaun Tyas, 2010), 298-9.

maris, habendam et tenendam per libertates quas homines nostri de quinque portibus habant.¹⁵⁰

John, by the grace of God king of the England, Lord of Scotland, Duke of Normandy and Aquitaine, Count of Anjou, [...] greetings. Know ye that we have granted, and confirmed by our present charter to our barons of Pevensey and Langeneye, which is within the liberties of the cinque ports of the sea, to be held and kept by the liberties by which our men of the Cinque Ports hold.

Craig Lambert admits in his study of the Cinque Ports' ship service during the fourteenth century, that surviving source material for the Cinque Ports does not often encompass the entire membership beyond the original ports of Hastings, Romney Hythe, Dover, and Sandwich. Between 1322 and 1360, however, these five communities, along with seven additional members, including Pevensey, provided the crown with as many as 468 manned vessels, approximately 12% of all the ships produced in England's 190 ports.¹⁵¹ The Cinque Ports also possessed enviable trading links with the continent, especially with the Low Countries, Gascony, and by the fifteenth century with numerous Italian city-states.¹⁵² The region attracted foreign craftsmen from the Low Countries and several of the Cinque Ports served as prominent pilgrimage way stations and could therefore assist the crown in limiting the removal of plate and coin from the realm by pilgrims.¹⁵³ The coastal life of major harbours in medieval England presented many opportunities for profit, industry, and service to the kingdom and the Cinque Port populations would have relished their strong connections to the crown and their privileges.

Reclamation efforts could seriously damage ports if carried out with insufficient care and forethought. Salzmann reports that the increased number of reclamation projects near the castle,

¹⁵⁰ "Charter of John to Pevensey, 1207" in *The Constitutional History of the Cinque Ports* by K. M. E. Murray (Manchester: Manchester University Press, 1935), 235.

¹⁵¹ Craig Lambert, "Contribution of Cinque Ports to the Wars of Edward II and III" in *Roles of the Sea in Medieval England* ed Richard Gorski (Woodbridge: The Boydell Press, 2012), 68-70.

¹⁵² Draper, "Failing Friaries?," 300.

¹⁵³ Draper, "Failing Friaries?," 300-301.

near Lampham, in Wyldemerssh, and in proximity to the port of Pevensey around the year 1342 resulted in a restricted flow of water that proved damaging to the port.¹⁵⁴ Salzmann attributes the damage to the scouring of tidal waters against dry sections of land and subsequent silting up. New drainage channels cut in 1402 and 1455 did little to reduce the continual effects of land erosion, which led to the Pevensey Castle's eventual abandonment.¹⁵⁵ Pevensey ceased to be a port in any meaningful sense in 1698. Further reclamation and silting had drastically limited the size of ships that could take on cargo at the Pevensey town bridge and it was no longer fit to accommodate naval vessels.¹⁵⁶

Water transport within wetland regions was also widely used and economically beneficial to marsh folk. Mark Gardiner argues that drainage ditches and limited numbers of bridges often complicated and delayed overland travel in marshy areas.¹⁵⁷ In addition to human transportation, livestock and firewood were among the chief items moved over water. Hay, coastal sand, timber, and straw all moved from the Pevensey Levels to Pevensey Castle to ensure that animals received food and that construction projects could advance.¹⁵⁸ Ferries were good sources of profit for manorial lords, who would either lease them for an annual fee or who would sometimes utilize unfree tenant labour for their operation.¹⁵⁹ The lords of Pevensey leased their ferry for around £4 per annum in the late thirteenth century, whereas the cost to replace a boat replacement in 1283-1284 was a mere 40s.¹⁶⁰ While demand for local transportation may well

¹⁵⁴ Salzmann, "The Inning of Pevensey Levels," 44.

¹⁵⁵ Purseglove, *Taming the Flood*, 44-5.

¹⁵⁶ Salzmann, "The Inning of Pevensey Levels," 60.

¹⁵⁷ Mark Gardiner, "Hythes, Small Ports, and Other Landing Places in Later Medieval England" in *Waterways and Canal-Building in Medieval England* ed. John Blair (Oxford: Oxford University Press, 2007), 93-4.

¹⁵⁸ Gardiner, "Hythes, Small Ports, and Other Landing Places," 94.

¹⁵⁹ Gardiner, "Hythes, Small Ports, and Other Landing Places," 97.

¹⁶⁰ Gardiner, "Hythes, Small Ports, and Other Landing Places," 97.

have fluctuated over the course of a year, the need for transport did provide regular and reliable income for major landowners beyond what they could expect from their livestock and fields.

2.6 Mills

The watermill was the most important piece of technology that allowed humans to collect and use energy from the motion of water. Watermills appeared and caught the attention of the Roman engineer Vitruvius in the Mediterranean around the year 25 BCE. Their primary function was to turn large millstones, thereby increasing flour production and rendering handmills obsolete. The scarcity of literary sources for watermills once caused historians to assume that the new technology did not make an immediate or extensive impact on Roman society. Scholars like Richard Holt now argue, however, that the technology was much more widespread throughout the Roman Empire than previously assumed. The excavation of at least eight watermills at sites stretching from Hadrian's Wall to Kent indicate that the Romano-British population utilized the technology.

Holt suggests that if the watermill fell into disuse in England after the Romans abandoned Britannia, it was readily embraced again by the Anglo-Saxons.¹⁶¹ Dendrochronological evidence for a mill at Windsor points to a date in the late seventh century, and references to mills in royal charters begin in 762 with King Ætheberht of Kent and occur regularly thereafter. English millwrights built both the vertical watermills familiar to Vitruvius and horizontal mills, which did not require iron gears. While the relative popularity of the competing designs in England is unclear, both were almost certainly disseminated by the Romans. By 1086 and its Domesday survey, it is clear that watermills were ubiquitous, so common, in fact, that the only usual point of interest to the surveyors was the value of each mill.

¹⁶¹ Richard Holt, *The Mills of Medieval England* (New York: Basil Blackwell, 1988), 3.

Medieval populations frequently took advantage of the tides to power their mills by constructing a channel system in to capture incoming tidal water and to power the mill as they released the water during low tide. Adam Lucas, author of *Wind, Water, Work: Ancient and Medieval Milling Technology*, notes that either a horizontal or vertical mechanism could be adapted for tidal use and that, despite lacking a constant source of flowing water, well situated and constructed tide mills could provide between six and twelve hours of work.¹⁶² Tide or sea mills proved uniquely suited to coastal areas, estuaries, and marsh regions prone to regular tidal inundations. Most required at least some modification of the environment, particularly in marshy areas. Scholars generally agree that tide mills were common in England although specific references to these mills are limited. At least one such mill, located at Dover, was noteworthy in 1086 for the significant turbulence that it caused in the port, an effect that Walter Minchinton explains results naturally when the port serves as a basin for mill water.¹⁶³

Despite the likely prevalence of these mills in medieval society, detecting them in documentary sources often proves difficult, and causes strife between scholars, because records rarely distinguish between types of watermills.¹⁶⁴ By 1300, it seems that the number of tide mills experienced a decline, and Holt suggests that their limitations had become problematic to medieval populations. Not only were tide mills less efficient than other watermills and windmills, they also proved exceptionally vulnerable to volatility of the seas on which they relied.¹⁶⁵ Tide mills were expensive to produce; the total cost for the mills at Lydden, Kent, and

¹⁶² Adam Lucas, *Wind, Water, Work: Ancient and Medieval Milling Technology* (Leiden: Brill, 2006), 86-7.

¹⁶³ W. E. Minchinton, "Early Tide Mills: Some Problems" *Technology and Culture* 20, no. 4 (Oct., 1979), 779-780.

¹⁶⁴ Holt, *The Mills of Medieval England*, 134.

¹⁶⁵ Holt, *The Mills of Medieval England*, 34.

Southwark in the early fourteenth century exceeded £100, many times the cost of the typical water or wind mill.¹⁶⁶ Repairing sea mills would also have been a costly endeavour, particularly for those that were chronically underpowered, ill-placed, and less profitable than other mills.

Holt notes that Henry of Eastray (1285-1331), a Prior at Christ Church Canterbury restored a tide mill at Lydden on the Isle of Thanet, which a storm had destroyed sometime during the 1290s. The cost was a staggering £143 13s, and the mill's rents would have numbered among the very highest in England if Prior Henry was determined to profit from his investment. In 1316, however, floods damaged the new mill, and a series of high tides ruined it again in 1326.¹⁶⁷ Because of the mounting costs involved in keeping the mill operational, Prior Henry eventually abandoned the site. Holt provides numerous additional examples of tide mill replacement and abandonment. Walton manor in Suffolk, replaced two separate tide mills with windmills in 1276 and 1289 due to sea damage. Milton Hall in Essex likewise replaced a ruined tide mill with a windmill in 1299, and a tide mill built in Norfolk in 1325 received no repairs after its destruction in 1369.¹⁶⁸ Environmental conditions did not consistently work in favour of tidal power in many regions of medieval England.

Estuaries often proved no safer than the coastline for tide mills. Flooding along the Thames in 1309 ruined a number of mills in Southwark.¹⁶⁹ James Galloway notes that suitable sites for tide mills in the Fen and Holderness went unused in the 1300s and that these areas were

¹⁶⁶ John Langdon, *Mills in the Medieval Economy: England 1300-1540* (Oxford: Oxford University Press, 2004), 179.

¹⁶⁷ Holt, *The Mills of Medieval England*, 88-89.

¹⁶⁸ Holt, *The Mills of Medieval England*, 136.

¹⁶⁹ James Galloway, "Coastal Flooding and Socioeconomic Change in Eastern England in the Later Middle Ages," *Environment and History* 19 (2013): 200, doi:10.3197/096734013X13642082568615.

among the early adopters of windmills.¹⁷⁰ The East Yorkshire Abby of Meaux could never rely on their tide mills to operate correctly, and rising sea-levels may have compounded the pre-existing operational issues.¹⁷¹ In those places where tide mills worked effectively, particularly in the south, they persisted beyond the Middle Ages. Galloway mentions a tide mill in operation near Sandwich during the 1530s¹⁷² and Rex Wailes begins his article “Tide Mills in England and Wales” with a quotation from Carew’s 1602 *Survey of Cornwall*:

Amongst other commodities afforded by the sea, the Inhabitants make use of diverse creekes, for griste-mills, by thwarting a bancke from side to side, in which a foude-gate with two leaves: these the flowing tyde openeth, and after full sea, the waight of the ebbe closeth fast, which no other force can doe: and so the imprisoned water payeth the ransome of dryving an under-shoote wheele for his enlargement.¹⁷³

While tide mills were no longer as common in the seventeenth-century as they had been in the thirteenth and fourteenth, they remained functional in certain areas and provoked considerable admiration.

Salzmann reports that in the latter half of the twelfth century reclamation efforts were threatening at least one tide mill at Langney near Eastbourne. Richard, the porter of Pevensey, agreed “that the sea water may have free entrance and passage [...] through my marsh, which is close to that mill [...] so long as the mill stands, for 12d” in order to assist the monks at Lewis, who owned the site and felt that recent developments had threatened their access to the tides. Because different courses of modification and transformation occurred concurrently, it is likely that the tide mill was eventually replaced by one suited to more reliable sources of power.

¹⁷⁰ Galloway, “Coastal Flooding and Socioeconomic Change,” 200.

¹⁷¹ Galloway, “Coastal Flooding and Socioeconomic Change,” 200.

¹⁷² Galloway, “Coastal Flooding and Socioeconomic Change,” 200.

¹⁷³ Rex Wailes, “Tide Mills in England and Wales” *Transactions of the Newcomen Society* 19, no. 1 (1938), 1.

The number and type of mills in England at the beginning of the Late Medieval period has been a point of contention among scholars. In 1979, Minchinton argued that there were at least eighty-nine verifiable tide mills constructed in England between the Domesday survey and 1600, and at least thirty of these set up in the sixteenth century.¹⁷⁴ Richard Holt distrusted Minchinton's analysis, suggesting that the increase was not due to intensified construction, but rather improvement in record survival. John Langdon's recent study *Mills in the Medieval Economy: England 1300-1540*, demonstrates the rate of investment in mills between 1300 and the advent of the Black Death was virtually static.¹⁷⁵

Langdon found that, in the decade following the Black Death, the total number of mills decreased by 10% of their total in 1300 and that grain mills decreased by 15% by the 1370s due to a lack of tenants and demand for milled products.¹⁷⁶ A thirty year period of stabilization immediately followed these events as lords adapted their mills for different industries, including fulling, and converted certain tide mills to other power sources, as Holt described. By the last decade of the fourteenth century, another more serious decline occurred, perhaps due to persistently low grain prices and high mortality rates, yet stabilized and recovered again between 1450 and 1540.¹⁷⁷ The profitability of mills in the late fourteenth century is difficult to assess for southern England, due to the high variability of profits for each year, mill function, and the number and management of mills. There is good evidence that the Black Death decreased mill revenues throughout England;¹⁷⁸ specific estimates of profitability by region, however, remain elusive.

¹⁷⁴ Minchinton, "Early Tide Mills, 781.

¹⁷⁵ Langdon, *Mills in the Medieval Economy*, 26.

¹⁷⁶ Langdon, *Mills in the Medieval Economy*, 26-8.

¹⁷⁷ Langdon, *Mills in the Medieval Economy*, 28-31.

¹⁷⁸ Langdon, *Mills in the Medieval Economy*, 57-63.

2.7 Grazing

While mills were useful, necessary, and generally profitable for much of the medieval period in England, they were not the most profitable enterprise conducted on modified marshlands. Farming was by far the most important and ubiquitous occupation. Mavis Mate in *Trade and Economic Developments, 1450-1550: The Experience of Kent, Surrey and Sussex*, examines the practice of mixed farming in coastal marshes on small tracts of arable acreage. Livestock made up a large percentage of estates' value, and on the Pevensey Levels and Romney marsh there were large numbers of young cattle, horses, and sheep.¹⁷⁹ P. F. Brandon attributes the great success of "sheep-and-corn" farming in coastal Sussex to auspicious physical geography, accessibility of tides, and proximity to foreign markets.¹⁸⁰

Wetland grazing, an activity that required at least modest reclamation efforts, has been a great benefit to English farmers since before the Roman conquest. Clues to Anglo-Saxon grazing patterns in marshes appear in place names as important as Somerset from *Sumorsaetan*, which indicates summer occupation of the region for grazing.¹⁸¹ The Fens in particular are noted for the rich grazing produced in the silt belt that helped to finance great churches and allowed the region to prosper. The medieval open-field system often resulted in high summer grass shortages that communities in the Fens and other wetlands could avoid because of the regular inundations their lands experienced in the winter months. Intensive reclamation stripped away the land's capacity to support large numbers of grazing animals, and in the end, the fenland

¹⁷⁹ Mavis E. Mate, *Trade and Economic Developments, 1450-1550: The Experiences of Kent, Surrey and Sussex* (Woodbridge: The Boydell Press, 2006), 170.

¹⁸⁰ P.F. Brandon "Demense Arable Farming in Coastal Sussex during the Later Middle Ages" *The Agricultural History Review* 19, no. 2 (1971), 113.

¹⁸¹ Purseglove, *Taming the Flood*, 28.

cheese industry did not survive the enclosure of the common fen in the nineteenth century.¹⁸² While not all drained land lost its fecundity when deprived of tidal access, reclamation did not always suit the entire community's needs.

Purseglove describes the need for cooperation in wetland communities with respect to grazing. Proper maintenance of sea defenses was key to the successful use of reclaimed land and, to avoid perilous overgrazing landowners, farmers had to restrict their ambitions and the number of animals they pastured.¹⁸³ Not all community members could embrace such restraint. In 1242, the Abbot of Glastonbury had to summon Geoffrey de Langelegh to explain why he had “one hundred and fifty goats and twenty oxen and cows beyond the number which he and his ancestors were wont always to have, to wit, sixteen oxen only.”¹⁸⁴ In light of some farmers' excesses, it was common practice to round up all pastured livestock yearly and impound excess animals until the owner paid a fee.¹⁸⁵ Overstocking carried additional risks for animal welfare in partially reclaimed or ill-maintained marsh regions. Purseglove notes a late example from 1770, when then thousand sheep rotted in damp fields in a Somerset parish.¹⁸⁶ The viability and profitability of grazing lands, however fertile, depended heavily on the wisdom and circumspection of farmers, character traits they seemed inclined to avoid if they sensed opportunities for profit.

2.8 Arable Farming

Some medieval wetland communities used a high proportion of their reclaimed land for arable farming during the thirteenth century, a strategy that could both maximize profit and

¹⁸² Purseglove, *Taming the Flood*, 29.

¹⁸³ Purseglove, *Taming the Flood*, 31.

¹⁸⁴ Purseglove, *Taming the Flood*, 31.

¹⁸⁵ Purseglove, *Taming the Flood*, 31.

¹⁸⁶ Purseglove, *Taming the Flood*, 32.

increase risk. James Galloway noted that the Fens tended toward this type of land use with some regions in Lincolnshire devoting at least two thirds of their land to crop production in the 1270s.¹⁸⁷ Grain crops in reclaimed fields consisted of wheat, oats, and barley, although regional preferences for one crop or another were not uncommon. In 1469, for example, Battle Abbey's manor at Barnhorn sowed more than 57% of its acreage in oats.¹⁸⁸ The reasons for favouring one grain crop over the others would have varied for each location and likely involved considerations including the suitability of land resources, grain prices and needs, types of seed available locally, and which crop most frequently met with success. Middle-Saxon sites demonstrate a predilection for 'four-row' barley in the Fens and recent research has shown that this strain was particularly resistant to undesirable effects of saline environments.¹⁸⁹ Fen populations, and marsh populations generally, also cultivated cabbage, peas, horse-beans, flax, hemp, rye, and wheat.¹⁹⁰

P. F. Brandon has repeatedly stated that the land along the Sussex coast was well suited to cultivation due to the exceptional properties of the soil. In 1971, he described the region's manors as "federated grain factories."¹⁹¹ Sussex court rolls provide few insights on topics of cropping common fields and grazing regulations, and Brandon conjectures that the majority opinion would have held sway.¹⁹² Local co-operation on this scale to protect rights to common land while maximizing grain production implies that the opportunities afforded by arable

¹⁸⁷ Galloway, "Coastal Flooding and Socioeconomic Change," 180.

¹⁸⁸ Mate, *Trade and Economic Developments*, 171.

¹⁸⁹ Murphy, *The English Coast*, 44.

¹⁹⁰ Murphy, *The English Coast*, 44.

¹⁹¹ P. F. Brandon, "Late-medieval weather in Sussex and its agricultural significance" *Transactions of the Institute of British Geographers* no. 54 (Nov., 1971), 1.

¹⁹² Brandon, "Demesne Arable Farming," 119.

farming on reclaimed land were sufficient to mitigate minor land disputes in much of coastal Sussex.

Reclamation could increase land values significantly. In 1311, upland portions of the Battle Abbey estate at Barnhorn commanded prices between three and six pence per acre, and reclaimed portions could command 12 pence, while unimproved marsh cost only 4 pence when flooded and 10 pence when drained.¹⁹³ The costs of reclaiming land were significant and increased grazing land did not provide sufficient profit to justify the initial costs. Reclaimed land was most profitable under cultivation; most regions, however, preferred mixed farming to intensive arable farming, perhaps in order to diversify their investment and mitigate risk.¹⁹⁴ When leasing land, the owner often stipulated that only a limited number of acres could be put under the plow. For example, in the 1480s, John Hallok leased more than 400 acres of drained marshland and agreed not to utilize more than 80 acres for crops. He broke his agreement.¹⁹⁵ On the Pevensey Levels, newer tracts of reclaimed land served as pasture, while older fields produced crops. Between 1283 and 1294, the Pevensey Castle demesne reserved over 63 percent of its acreage for grazing 25-30 cattle and 400-600 sheep, while dedicating 34.5 percent to oats, 19.7 percent to wheat, 16.4 percent to legumes, and 0.7 percent to barley.¹⁹⁶

Following the Black Death, seasonal wage labourers served on some of the ecclesiastical estates on those Sussex manors that produced large amounts of grain. In the eastern communities of Lewes and Seaford, migratory reapers from as far as fifteen miles away regularly found employment for five week terms.¹⁹⁷ These reapers, though necessary for large-scale grain

¹⁹³ Rippon, *The Transformation of Coastal Wetlands*, 230.

¹⁹⁴ Rippon, *The Transformation of Coastal Wetlands*, 230-1.

¹⁹⁵ Mate, *Trade and Economic Developments*, 171.

¹⁹⁶ Rippon, *The Transformation of Coastal Wetlands*, 233.

¹⁹⁷ Brandon, "Demesne Arable Farming," 118.

production during a period of decreased labour force and diminishing work services for peasants, held a great amount of power over their employers. During the years 1463-1464 when wheat prices were low, the reapers withheld their labour until their employers agreed to offer generous provisions at the lord's table instead of their usual grain payments.¹⁹⁸ In situations when labour, prices, and weather were favourable, the potential for profit ran high on reclaimed marshland. Unfortunately, no one could guarantee that each of these variables would work in landowners interests, and investments could only proceed on the basis of probability and personal and communal experiences.

2.9 Conclusion

Despite the risks of mill and harbour damage, overgrazing, and coastal raiding, marshland reclamation projects remained popular during the high and late Middle Ages. The overall profitability of wetlands depended largely on the types of reclamation and land use employed by local communities. Unimproved wetlands and those with minimal alterations could provide an abundance of marine life, edible plants, and fuel sources. Seaweed, wildfowl, and grasses all served the needs of local industries. Waterways and the tides themselves provided power to mills, and coastal marshes enjoyed easy access to harbours and shipping, which attracted lucrative trade from the continent. Transformed marshlands, which provided fewer raw materials and occasionally harmed shipping ports, nevertheless yielded fertile ground for livestock and cultivation. Investments in land reclamation had every potential to return profit, and Sussex and the Pevensey Levels possessed particularly fertile soil for mixed farming operations. While major landowners were best positioned and equipped to invest in and profit

¹⁹⁸ Brandon, "Demesne Arable Farming," 119.

from wetlands, tenants and communities could also profit from reclaiming small tracts of land and sharing in the benefits of common pasture and sea defense.

CHAPTER 3: The Risks of Wetland Reclamation

Having examined common marshland resources and sources of profit that medieval populations exploited in modified and transformed wetlands, it is important to acknowledge the pervasive risk involved in wetland utilization. These risks included malaria, incidents of storms and flooding involving the destruction of livestock, reclaimed arable land, and whole communities. It is the regularity of loss that produced coastal risk culture in south-eastern England and along the North Sea coast. This chapter investigates each source of environmental risk in turn alongside historical incidents of loss. It demonstrates how these risks evolved during the course of the fourteenth century, and how they contributed to risk culture and risk sensitivity.

Risk sensitivity is not risk aversion. It is simply a heightened awareness of risk developed from a pervasive exposure to risk elements. A single storm may or may not make a long-lasting impression on a population, but a series of violent storm cycles will doubtless have an impact on society. Risk populations or subcultures exist in a liminal space or between the collective and personal memories of past traumatic events and the expectation that there will be more in the future. The unpredictable and recurring nature of natural events that humans experience as disastrous, in particular outbreaks of epidemic diseases, earthquakes, and extreme weather phenomena, increases the need for human beings to reflect upon their circumstances.¹⁹⁹ During the Middle Ages, long-term and short-term risks were abundant, and an understanding of those risks most likely to occur in a certain region provided options to mitigate disasters. Environmental risk, under relatively normal periods, would sit in the mind as a reminder to be

¹⁹⁹ Christopher M. Gerrard and David N. Petley, "A risk society? Environmental hazards, risk and resilience in the later Middle Ages in Europe," *Natural Hazards* 69 (2013): 1071-1072, doi: 10.1007/s11069-013-0750-7.

vigilant. It might also provide a small measure of comfort when disaster struck, knowing that the community had survived similar situations.

It is reasonable to expect that populations facing constant risk and grievous disasters would either seek to escape danger and hardship or gain strength and solidarity in the face of adversity. It is the contention of this paper that both played an integral part in the lives of marsh populations during the medieval period. While few sought a literal escape, they did act to distance themselves and their lands from destructive events by building and maintaining sea defenses and drainage systems. More importantly, communities often worked together in these endeavours and rebuilt whenever their efforts proved ineffective. In some circumstances, communities would work around any member who would not contribute to important projects. Drainage agreements required a degree of caution and stipulations to address any breeches or unneighbourly conduct. With regard to risk, medieval wetland populations often demonstrated great co-operation and resilience.

3.1 Malaria

Of course, not all risk factors in marsh life invite human remedies as readily as embankments and drainage ditches. Malaria is an infectious disease spread by mosquitos that thrive in wetland environments. The disease is not only unpleasant, marked by recurring fevers and chills, vomiting, diarrhea, headache, and energy loss,²⁰⁰ but also costly with respect to lost labour and, potentially, to lives. There are three species of human malaria, but only the milder *plasmodium vivax* and *plasmodium malariae* occurred in Northern Europe where they were

²⁰⁰ R. L. Gowland and A. G. Western, "Morbidity in the Marshes: Using Spatial Epidemiology to Investigate Skeletal Evidence for Malaria in Anglo-Saxon England (AD 410-1050)," *American Journal of Physical Anthropology* 147 (2012): 301, doi:10.1002/ajpa.21648.

spread by the mosquito species *Anopheles atroparvus*.²⁰¹ In 1980, Leonard Jan Bruce-Chwatt and Julian de Zulueta produced a history of the disease entitled *The Rise and Fall of Malaria in Europe*. This work outlines what is known of malaria from its origins in Africa to modern techniques developed to prevent outbreaks. In the chapter dedicated to malaria in the United Kingdom, the authors concede a probable link between malaria and the historical ‘ague,’ yet remain very conservative in their attempts to identify the early history of epidemic fevers in England with malaria.²⁰²

More recent scholarship has proved less reluctant to make such identifications as academic and popular interest in pandemics has increased. Most scholars acknowledge the Roman occupation in Britain between the first and fifth centuries as the most likely period for malaria’s introduction.²⁰³ R. L. Gowland and A. G. Western have employed skeletal evidence to assess malaria in Anglo-Saxon England. Malaria is known to cause severe anemia, which in turn causes bone lesions called foramina to form on the skull.²⁰⁴ An analysis of Anglo-Saxon remains allowed Gowland and Western to conclude that there is strong indirect evidence for endemic malaria in coastal regions during the Middle-Saxon warm period (700-800).²⁰⁵ While the skeletal evidence is compelling, scholars do not yet regard it as conclusive, and recent studies have demonstrated a link between foramina and vitamin deficiencies.²⁰⁶

²⁰¹ R. Sallares, “Role of environmental changes in the spread of malaria in Europe during the Holocene,” *Quaternary International* 150 (2006), 21, doi:10.1016/j.quaint.2006.01.005.

²⁰² Leonard Jan Bruce-Chwatt and Julian de Zulueta, *The Rise and Fall of Malaria in Europe: A historico-epidemiological study* (Oxford: Oxford University Press, 1980), 131.

²⁰³ R. L. Gowland and A. G. Western, “Morbidity in the Marshes: Using Spatial Epidemiology to Investigate Skeletal Evidence for Malaria in Anglo-Saxon England (AD 410-1050): 301, doi:10.1002/ajpa.21648.

²⁰⁴ Gowland and Western, “Morbidity in the Marshes,” 302.

²⁰⁵ Gowland and Western, “Morbidity in the Marshes,” 309.

²⁰⁶ Timothy P. Newfield, “Malaria and malaria-like disease in the early Middle Ages,” *Early Medieval Europe* 25, no. 3 (2017): 264-5, doi:10.1111/emed.12212. Sonya Pihura has recently

Timothy Newfield argues that historians must depend upon medieval references to cyclical fevers or fevers in marshy areas during the medieval period. His work provides in depth analyses of cyclical fevers and “malaria-like disease” among the Merovingians and Carolingians. Though the diagnosis of malaria is difficult to prove from source materials alone, it is also unreasonable to believe that malaria ceased to effect populations between the Roman and Early Modern Periods.²⁰⁷ Newfield concludes that the occurrences he has been able to glean indicate the bare minimum rate for malaria in Early Medieval France.²⁰⁸ Although strong evidence for the precise course of malarial history in Medieval England has yet to appear, continued interest in the disease is likely to provoke such studies. Until then, it is relatively safe to make general assumptions of its existence and disruptions to life and the economy during the fourteenth century, and that it represents a regular and recurring experience of risk for coastal marshland populations.

3.2 Storms and Floods

Storms and flooding were the most pervasive threats faced by coastal wetland inhabitants. Because they regularly occurred together, it is difficult and perhaps even unprofitable to consider them separately. The most beneficial way to analyze them is by level of destruction, whether storms and flooding destroyed crops and animals, arable tracts of land and sea defenses, or rendered entire communities uninhabitable. To be sure, not every flood caused large-scale losses, but those weather phenomenon which medieval populations felt inclined to record are usually among the most severe examples. Although historians frequently include

produced an MRP at the University of Waterloo, dealing with interdisciplinary approaches to the study of medieval climate change and the transmission of malaria in medieval England.

²⁰⁷ Newfield, “Malaria and malaria-like disease,” 253.

²⁰⁸ Newfield, “Malaria and malaria-like disease,” 299-300.

storms as events of interest in narratives concerning coastal life, wetland reclamation, and farming, the scholarship of storms themselves in English is somewhat limited. In 1991, Hubert Lamb and Knud Frydendahl published *Historic Storms of the North Sea, British Isles and Northwest Europe*. Their study included 166 noteworthy storms, though it does not address any that occurred prior to the sixteenth century.

This omission should not, and was not intended to, suggest that storms and floods of unimaginable power did not occur before 1500. Greg Bankoff lists a number of European storm and flood events of sufficient power to displace populations, change coastlines, and kill thousands of human beings. The Cymbrian flood in Jutland and northwestern Germany between 120-114 BCE spurred a Celtic migration from the region. Many of the Dutch islands of Zeeland owe their existence to severe floods in 1134 and 1163 and further floods resulted in the transformation of freshwater lakes into a sea called Zuiderzee. In 1164, a flood that helped to form the Jade Estuary on the German coast cost thousands of lives and in the winter of 1362 a flood remembered as *Grote Mandränke* (the great man-drowning) submerged the Frisian city of Rungholt and claimed huge numbers of victims.²⁰⁹ Similar events took place along the English coast and doubtless left an indelible mark upon the communities they devastated. Although human casualties are arguably more important, Salzmann describes the deaths of 172 sheep and tegs on the Pevensey Levels following floods in 1287, and the costly necessity of gathering the bodies for preservation with salt.²¹⁰ The cost of decimated flocks and herds could be substantial and the rebuilding of livestock resources would have required time as well as money.

²⁰⁹ Bankoff, “The English Lowlands,” 7.

²¹⁰ Salzmann, “The Inning of Pevensey Levels,” 45.

3.3 Damage to Reclaimed Arable Land

Storms and flooding could result in huge losses of formerly reclaimed lands, rendering them useless for agricultural purposes until repairs could be made. Lincolnshire lost thousands of acres to storm flooding in 245 CE, storms breached the sea wall at Romney Marsh between 1286 and 1288, and the sea covered 10,000 acres of the Cambridge fens in 1439. Barnhorn manor, a possession of Battle Abbey and situated at the edge of the Pevensey Levels, had expanded and in the twelfth century and held 450 acres of arable land by 1306. In the late fourteenth-century, however, the manor suffered greatly from flooding and much of the land could not be sown and was suitable only for the abbots' recreations of riding and hawking.²¹¹ It was only in the 1380s that the previously drained Hooe Level was restored after flooding between 1291 and 1340, and it is likely that similar flooding during this period resulted in at least some permanent land loss.²¹²

P. F. Brandon examined the significance of late medieval weather and flooding in coastal Sussex between 1340 and 1444. He utilized lay and ecclesiastical manorial records, including those for Battle Abbey's manors, for references to weather patterns and grain yields. Brandon found that while floods were common between 1340 and 1367 in areas including Apuldram, Barnhorn, and Dengemarsh, the damage was not overly severe. He detected a substantial increase of disastrous floods between 1368 and 1400, during which time winter flooding remained common. The most severe storms and flooding occurred in 1369, 1374-75, 1378-79, and 1386, and during these years planting crops on former marshland would have been decidedly hazardous.²¹³ At the low-lying, or "precariously drained" manors at Barnhorn and Apuldram,

²¹¹ Eleanor Searle, *Lordship and Community: Battle Abbey and its Banlieu: 1066-1538* (Toronto: Pontifical Institute of Medieval Studies, 1974), 254-5.

²¹² Brandon, "Late-medieval weather in Sussex," 5.

²¹³ Brandon, "Late-medieval weather in Sussex," 5.

there was a strong correlation between poor wheat harvests and floods, and at Barnhorn, variable yields were most prevalent between 1382 and 1388.²¹⁴

Many factors determine crop viability; excessive or insufficient rain, soil depletion, and ineffective drainage all threaten yields and harvests. Marine flooding in reclaimed coastal areas, however, is a special case. In Sussex, the frequency of damaging floods in the late fourteenth century was very high. Storms and high tides occurred regularly, and valuable land might be unusable for substantial periods of time depending on the flood severity. In order to combat the sea's effects, medieval populations had to maintain vigilantly their drainage ditches and sea walls. The regularity of floods suggests that medieval populations generally understood the risks associated with coastal farming and persevered; periods of exceptional storms and catastrophic floods, however, are likely to have caused considerable stress even within those populations accustomed to storms and flood damage.

3.4 Destroyed Communities

Coastal changes during the last two millennia have been much less dramatic than those experienced during the Pleistocene and early Holocene; as human populations invested in coastal settlements, however, it has become increasingly difficult to abandon these areas.²¹⁵ Throughout English History, there have been incidents along the coasts that have resulted in total destruction and abandonment of coastal assets. Peter Murphy, author of *The English Coast: A History and a Prospect*, offers several historical accounts of these events. Archaeological evidence at Nordelf in the Norfolk fens demonstrates that the Romans abandoned a major road, a symbol of their power and authority, due to a sea flood.²¹⁶ In fact, the modern English coast is profoundly

²¹⁴ Brandon, "Late-medieval weather in Sussex," 9.

²¹⁵ Murphy, *The English Coast*, 33.

²¹⁶ Murphy, *The English Coast*, 34.

different than it appeared in the Roman era, having lost as much as a kilometer of ground in some areas due to erosion.²¹⁷

Particularly damaging medieval storms and floods could destroy entire communities. Greg Bankoff again provides a considerable list of English disasters for the High and Late Middle Ages. One of the largest and best known examples of a port destroyed by storms is Old Winchelsea, whose founders had built on a shingle bank, and whose town the sea almost entirely submerged in 1280.²¹⁸ Promehill, in Kent, fell victim in 1287 to the same storm system that ultimately destroyed Old Winchelsea, which had previously survived the loss of 300 homes in 1250²¹⁹ and which had been struggling fruitlessly to recover from the 1280 flood. The storms of 1250 and 1287 altered the course of the river Rother, which shifted away from New Romney, causing silting in the harbour, and at Rye. The people of Dover lost their original port near the Dour River due to silting and were forced to create a new harbour in 1495 at the Archcliffe embayment that also required ongoing sediment removal.²²⁰

The sizable town of Dunwich in Suffolk, which contained eight churches, was represented by two members of Parliament, and possessed as many as eighty ships in 1279, declined following storm surges in the 1286 or 1287 until its abandonment in the mid-1700s.²²¹ Peter Murphy comments regretfully on the fate of such a substantial town. Dunwich's significance stretches back the Early Middle Ages, being the probable base from which the Burgundian St. Felix (dead c. 647) converted the East Anglians. Prior to the Domesday survey it already possessed three churches, and 290 burghers, and it provided 40 ships to Henry III in

²¹⁷ Murphy, *The English Coast*, 34.

²¹⁸ Bankoff, "The English Lowlands," 20.

²¹⁹ Murphy, *The English Coast*, 36.

²²⁰ Murphy, *The English Coast*, 36.

²²¹ Bankoff, "The English Lowlands," 20.

1229 for his wars with France.²²² In the case of Dunwich, it was a progression of storms rather than a single destructive event that led to the town's downfall. Following the initial storm system, another spate of fierce weather destroyed the town in 1326, and cliff erosion precipitated major losses in 1328 and 1347.²²³

The lost village of Shipden-justa-Mare in Norfolk lost its church, which now lies submerged 400m off shore, and fishing pier to erosion in the Late Middle Ages.²²⁴ In 1391, the town of Ravenspur on the Humber River, described in 1305 as one of England's most thriving and affluent ports, had virtually disappeared. Several other communities in Holderness marsh including Tharlethorp, Redmayr, and Penysthorp, documented in 1343, ceased to exist in any meaningful way within 14 years.²²⁵ It is difficult to say how many other small coastal and wetland communities may have existed and been washed away without leaving a documentary trail, however, the destruction of those that Bankoff has identified would certainly have made an impression on inhabitants of neighbouring marshes.

As many as 173 documented coastal settlements, many of them wetland-adjacent, suffered severe damage or disappeared altogether between 1250 and 1600.²²⁶ During these three centuries, Holderness is estimated to have lost twenty-three villages and even Berrow in Somerset experienced significant sand dune migration. Lowland regions found themselves vulnerable not only to sea surges, but also to heavy rain. The Anglo-Saxon Chronicle lists many episodes of intense rain between 1087 and 1124, which the rainfalls of the fourteenth and

²²² Murphy, *The English Coast*, 35.

²²³ Murphy, *The English Coast*, 35.

²²⁴ Murphy, *The English Coast*, 35.

²²⁵ Bankoff, "The English Lowlands," 20.

²²⁶ Murphy, *The English Coast*, 34.

fifteenth centuries evidentially surpassed.²²⁷ Heavy rain usually accompanies storms activity, and does not, therefore, merit a separate discussion. It is interesting to note, however, that flood events could involve freshwater sources including rivers and precipitation that might devastate the countryside singly or in conjunction with sea water. Coastal populations could not simply defend their lands from the encroachment of the sea, but had to prepare for a multitude of hydrological risks.

3.5 Climate Change

It is common to find commentary regarding medieval climate change in recent scholarship, due, no doubt, to the pressing climatic situation in which the world finds itself in the twenty-first century. The path toward consensus on the role of climate in the crises of the fourteenth century has been long and laborious. In 1975, Richard Ring published “Climatic Change and its Historical Significance in the Middle Ages” to counter the prevailing academic trend of neglecting environmental history, and when addressing it, privileging human agency over nature’s. Ring argued that substantial periods of climatic change could not fail to have an effect on the economy and the welfare of historical populations. Ring’s main priority is the supply of food. He argues that, in consideration of a substantial population increase during the High Middle Ages, stable and consistently warmer weather patterns enabled England to feed itself.²²⁸

Soon afterward in 1978, W. T. Bell and A. E. J. Ogilvie began to challenge the longstanding approach to medieval climate study. The disparate nature and partial

²²⁷ Bankoff, “The English Lowlands,” 21.

²²⁸ Richard R. Ring, “Climatic Change and its Historical Significance in the Middle Ages,” *Wisconsin Academy of Sciences, Arts and Letters* 63 (1975), 215-216.

inaccessibility of documentary sources, compounded by the lack of systematic weather analysis and multitude of data sets including those derived from dendrochronology, palynology, and ice cores, produced a number of sources for error.²²⁹ Bell and Ogilvie highlighted many instances of nineteenth and early twentieth century historians using sources indiscriminately, making no attempt to validate spurious material, to avoid reliance on faulty translations and compilations, to assess sources by genre, or to prioritize firsthand accounts.²³⁰ In light of these transgressions, Bell and Ogilvie recommend an intensified rigour among researchers so that the field of medieval climate studies would not undermine itself.

Many subsequent researchers attempted to make historical climate analyses more scientific. In 1994, Jean Grove and Roy Switsur published “Glacial Geological Evidence for the Medieval Warm Period,” (MWP) wherein they discussed improvements in dating methodologies and argued that the climatic event, now called the Medieval Climate Optimum (MCO) or Medieval Climatic Anomaly (MCA), occurred between 900 and 1250. Their study required the dating of moraines, formed by glacial expansion and revealed by recent glacial retreat, using radiocarbon dating because other dating forms may not be reliable. For instance, dendrochronological analysis of moraines is problematic due to difficulties in finding the oldest tree growing on the site, determining that the oldest tree represents the first generation of trees, and estimating the lag time between moraine formation and tree growth.²³¹ Profitable application of lichenometry is likewise problematic on account of the length of the medieval

²²⁹ W. T. Bell and A. E. J. Ogilvie, “Weather Compilations as a Source of Data for the Reconstruction of European Climate during the Medieval Period” *Climatic Change* 1 (1978), 331.

²³⁰ Bell and Ogilvie, “Weather Compilations,” 366-8.

²³¹ Jean M. Grove and Roy Switsur, “Glacial Geological Evidence for the Medieval Warm Period,” *Climatic Change* 26 (1994): 144-45, doi:10.1007/BF01092411.

timeframes involved. Based upon international data from both hemispheres, Grove and Switsur concluded that the Little Ice Age began around the thirteenth century and that the MCO appears to have been global, but lacked climatic uniformity.²³²

J. L. Jirikowic and P. E. Damon published also published “The Medieval Solar Activity Maximum” in 1994, which briefly discussed the return of solar activity in the 1990s to that of the Medieval Climatic Anomaly after 650 years of reduced output. Jirikowic and Damon relied upon cosmogenic isotope measurements of ¹⁴C for tree-rings and ¹²B for ice cores to demonstrate that the Medieval Solar Maximum (1100-1250) roughly coincided with the typical dating for the MCO and was close to modern levels of solar activity. Despite these findings, the MCO generally remained a matter of academic contention. Another 1994 article authored by Malcolm K. Hughes and Henry Diaz challenged the existence, scope, and timing of the Medieval Climate Optimum Period.²³³

Warming was not the only point of contention. The general association of the fourteenth century with falling European temperatures also required attention in order to define its timing and magnitude. In the 1996 article “Winter Severity in Europe: The Fourteenth Century,” C. Pfister, G. Schwarz-Zanetti and M. Wegmann argued that Central Europe and Northern Italy experienced harsher than normal winters between 1303 and 1328, followed by average winters until 1355 and winters with extreme variances until 1375.²³⁴ From this data, they concluded that the beginning of the fourteenth century was the transition point between the Medieval Warm

²³² Grove and Switsur, “Glacial Geological Evidence,” 166.

²³³ Malcolm K. Hughes and Henry F. Diaz. “Was There a ‘Medieval Warm Period,’ and if so, Where and When?” *Climatic Change* 26 (1994): 110-111, doi:10.1007/BF01092410.

²³⁴ C. Pfister, G. Schwarz-Zanetti and M. Wegman, “Winter Severity in Europe: The Fourteenth Century,” *Climatic Change* 34 (1996): 91, doi:10.1007/BF01092410.

Period and the Little Ice Age (LIA) and that a combination of solar radiation and North Atlantic Deep Water (NADW) variations as possible inciting factors.²³⁵

In the decades that followed, scholars began to turn greater attention toward the social consequences of environmental change and the scope of medieval climate change and its causes rather than its existence. In 2008, Richard Oram and W. Paul Adderley produced a study on environmental factors relating to lordship in central Scotland between 1300 and 1400. Though there has been less sustained interest in the effects of the Little Ice Age in Scotland, there is evidence for a drop in summer and winter temperatures in the first three decades of the twelfth century, and there are references from this time to a severe famine likely to have coincided with the Great Famine (1315-22).²³⁶ Although Oram and Adderly concede that a number of Scottish clans may have resorted to territorial expansion to offset losses due to shortages in grain and fodder for animals, they suggest that the war bands that are so often identified with fourteenth century crises likely developed during the previous century. They also suggest that the burden of paying for mercenary services put substantial strain on lords in a troubled economy.²³⁷ Although the social consequences of climate change in Scotland cannot accurately reflect those in England, this paper supports the existence of growing uncertainty and fear of financial failure during the later fourteenth century in much of Europe.

Today, the fact of medieval climate change is not much contested, although scholars continue to discuss its impacts and societal influence in increasingly nuanced ways. The beginning of the Little Ice Age corresponds with the heavy rains that caused the Great Famine

²³⁵ Pfister, Schwarz-Zanetti and Wegman, "Winter Severity in Europe," 103.

²³⁶ Richard Oram and W. Paul Adderley, "Lordship and Environmental Change in Central Highland Scotland c. 1300-c. 1400," *Journal of the North Atlantic* 1 (2008): 77, doi:10.3721/J080716.

²³⁷ Oram and Adderley, "Lordship and Environmental Change," 81-82.

and the increased severity of storms in the fourteenth-century. While the number of storms and flood events during this time was not necessarily greater than in previous centuries, the weather was markedly more destructive than during the Medieval Climate Optimum that Europe had so recently enjoyed. Recurring weather-related disasters, exacerbated by climatological phenomena, would have promoted both innovation and new measures by which to assess risky ventures including wetland reclamation.

3.6 Reclamation and Maintenance Costs

The type and scale of wetland reclamation determined the costs in labour and capital, which were generally substantial. The work of draining salt marsh was generally more difficult than that for freshwater marsh, and the consequences of salt-water floods were higher with respect to sown crops.²³⁸ In most regions, full reclamation of wetlands was a protracted process involving a succession of landowners, victories, and setbacks. Greg Bankoff provides descriptions of medieval reclamation methods. During the Early Middle Ages on Romney Marsh, workers utilized the clay retrieved from drainage ditches for embankments and often lined these earthworks with hedges and topped them with straw. The initial construction materials for walls was wood and woven bramble that could later receive brick or stone reinforcement. Enclosed or inned lands then required a series of drainage ditches for water removal. By the later Middle Ages, landowners and communities had acquired a good understanding of reclamation by means of embankments, drains, sea-walls, diversion channels and self-acting sluices.²³⁹ The scale of drainage projects and sea defences determined construction and maintenance costs. Some of the largest drainage ditches could measure twenty

²³⁸ Bankoff, “The English Lowlands,” 25.

²³⁹ Bankoff, “The English Lowlands,” 25.

metres in width and over one and a half kilometers in length.²⁴⁰ Such a project could not have been achieved without great expenditures.

Textual variations in the twenty-third section of Magna Carta²⁴¹ have caused some scholarly speculation regarding forcible maintenance of bridges, and potentially embankments, during John's reign (1166-1216). In 1922, Sidney and Beatrice Potter Webb theorized that the baronial demands regarding maintenance of bridges and banks suggested significant interest in reclamation projects in which the barons did not wish to invest.²⁴² This interpretation depends upon whether the phrase *pontes aut riparias* (bridges and banks/embankments) rather than *pontes ad riparias* (bridges at river-banks) is the more accurate rendering of the charter.²⁴³ William Stubbs' *Select Charters and other Illustrations of English Constitutional History* favours the version featuring *ad*, as do several other modern editions.²⁴⁴ On account of the dispute regarding the passage's wording, it would only be reasonable to assume that Magna Carta protected settlements and individuals from embanking if the charter were cited in medieval legal disputes. Since no evidence of this legal strategy has come to light, it is probable that Magna Carta refers to bridge maintenance alone, or that if the passage does touch on embanking, that no one felt threatened by maintenance orders in the following centuries.

²⁴⁰ Galloway, "Coastal Flooding and Socioeconomic Change," 200.

²⁴¹ *Nec [Nulla] villa nec homo distringature facere pontes ad [aut] Riparias, nisi qui ab antique et de jure debent.* David Carpenter, trans., *Magna Carta: With a new commentary by David Carpenter* (London: Penguin Books, 2015).

²⁴² Sidney Webb and Beatrice Potter Webb, *English Local Government: Statutory Authorities for Special Purposes*, (London: Longmans, 1922), 17.

²⁴³ William Penn and William Bradford, *The Excellent Privilege of Liberty and Property: Being a Reprinting and Facsimile of the First American Edition of Magna Carta, Printed in 1687* (Philadelphia: The Lawbook Exchange Ltd., 1897), 137.

²⁴⁴ William Stubbs, *Select charters and other illustrations of English constitutional history* (Oxford: The Clarendon Press, 1913), 300.

Subsequent maintenance of sea defenses in marshy areas was costly and required a certain amount of vigilance. In Kent, regular maintenance could cost 10-14 percent of a community's yearly revenue, while in exceptionally stormy years, repairs might cost as much as 60 percent.²⁴⁵ Salzmann recounts a night in 1283 when thirteen men were assigned to watch a retaining wall at Ylond, on the Pevensey Levels, because of higher than normal tides. He also reminds his readers that some regions were more liable to damage than others. At Ylond, in the year before the alarming tides, two furlongs of the wall were repaired for 7s. 4d., and three rods of the wall and a gutter also required mending. The next year the tide had damaged one furlong of wall, two rods, and a gutter, which all received attention. In 1285, sixteen rods of wall and thirty-three of ditches required mending and in 1290, 90 perches of the wall needed heightening because of a breach the previous year.²⁴⁶ Clearly maintenance in many places caused great stress, and the exact costs could be difficult to estimate from year to year.

In some cases, the presence of sea walls actually decreased the value of reclaimed lands. It was on account of sea walls and the associated costs of maintaining them that a reclaimed marsh at Burnham, Essex held a value of 10s. per annum and a salt marsh pasture at Thurrock could command only 33s. 4d in 1344.²⁴⁷ Some manors fared better than others and recorded only modest yearly maintenance costs, including a marsh at Tillbury that spent 10s. on wall upkeep in 1362; James Galloway has suggested, however, that the burden of organizing labour might well have significantly outstripped the monetary cost of maintenance work.²⁴⁸ The

²⁴⁵ Bankoff, "The English Lowlands," 22.

²⁴⁶ Salzmann, "The Inning of Pevensey Levels, 42-43.

²⁴⁷ James A. Galloway, "Storm flooding, coastal defence and land use around the Thames estuary and tidal river c.1250-1450, *Journal of Medieval History* 35 (2009): 183, doi:10.1016/j.hmedhist.2008.12.001.

²⁴⁸ Galloway, "Storm flooding, coastal defence and land use," 183.

struggle to maintain defenses was compounded by floods and, around the Thames estuary, flood damage in 1334 caused considerable devaluation of reclaimed land. Between 1310 and 1339, the prices of reclaimed arable dropped by half while non-marsh arable retained three quarters of its original value.²⁴⁹ Contemporary estimates for repairs and restoration of inundated fields at Great Wakering, Essex exceeded seven years, during which time the land could not serve its accustomed uses.²⁵⁰

Scholars who specialize in medieval flooding frequently note cases of negligent maintenance during the fourteenth century. In England, commissions of sewers heard disputes relating to flood damage, assessed guilt, and determined who was responsible for the necessary repairs. They might also recommend augmenting flood defenses if a fierce storm had caused large scale damage. These courts often found that human error had resulted in destruction and might choose to assign blame to groups or to individuals. Bankoff notes several such cases in England. Commissioners found that repeated flooding in Lincolnshire's Spalding marsh in 1349 had been the result of the community's neglectful attitude toward dyke maintenance.²⁵¹ In 1375, commissions found the Abbot of Kirkstead responsible for frequent floods in the Fens. On one occasion in 1439, Thomas Flower was convicted of facilitating the inundation of at least twelve thousand acres through his negligent care for the Wisbeach fen-dyke. Especially in places where many individuals each reclaimed their own adjoining sections of land on their own initiative, a single individual could cause huge damages to many properties beyond his own.

In at least one case, the enormity of a drainage project resulted in hesitation. Salzmann records the case of Robert de Sapy and his wife Alina, who received royal permission to reclaim

²⁴⁹ Galloway, "Storm flooding, coastal defence and land use," 183.

²⁵⁰ Galloway, "Storm flooding, coastal defence and land use," 183.

²⁵¹ Bankoff, "The English Lowlands," 22.

the flooded Godleasesond marsh on the Pevensey Levels in 1318. Their reclamation licence cost one pair of gilt spurs yearly, the estimate for enclosing the property was £200, and the estimate of the value each reclaimed acre could command was 12d; the exact number of acres the couple possessed, however, would remain unknown until the water could be drained.²⁵² Robert and Alina appear to have had second thoughts about their venture and cancelled their contract after four years, having reclaimed none of the property. The 300 acre property was later drained in 1353 by an Ayna de Sapy, either Robert's wife or possibly a descendent, by right of a new charter for which she paid 50s. 2d. in yearly rent.²⁵³ Although Robert and Alina may not have chosen to proceed with reclamation for a number of personal reasons, it is probable that the costs of completing and maintaining the work played a part in their decision.

²⁵² Salzmann, "The Inning of Pevensey Levels," 43.

²⁵³ Salzmann, "The Inning of Pevensey Levels," 43-44.

CHAPTER 4: THE PEVENSEY LEVELS, THE ECONOMY, AND THE 1396 COMMISSION OF SEWERS

The previous chapters situated the Pevensey Levels within the larger context of English coastal wetlands, described observable changes in medieval perceptions of wetlands, and challenged the traditional academic theory of marsh marginality. They have also assessed marsh resources and the major sources of risk that accompanied reclamation efforts over time throughout the England's coastal marshes. Scholars will often acknowledge those most positive characteristics of water and risk cultures, including resilience and co-operation, which previous chapters have noted. The 1396 Commission of Sewers, which found certain landowners of the Pevensey Levels guilty of negligence in defending reclaimed areas from incursions of the sea, offers a tantalizing glimpse of the darker side of water and risk cultures.

4.1 Co-operation

In recent academic literature, water cultures are noteworthy for their co-operation. As discussed in Chapter 2, many reclamation movements depended upon communal effort and, in some regions, would not likely have succeeded as well if undertaken in isolation. Especially in marshes with many landowners, if anyone decided not to work with his neighbours or failed to maintain his section of walls or dykes, the entire reclamation effort was jeopardized and could ultimately fail, to everyone's cost.²⁵⁴ Since co-operation was essential to success, the customary coast law recognized a penalty called "bisket et trisket" to deal with neighbours who failed in their duty to each other.²⁵⁵ The specifics of this penalty are no longer known, however, some

²⁵⁴ Salzmann, "The Inning of Pevensey Levels," 41.

²⁵⁵ Salzmann, "The Inning of Pevensey Levels," 41. Salzmann asserts that references to the customary law relating to drainage, referenced in an assize roll for the marshes at Icklesham, would apply to the Pevensey Levels as well. Even if this is not the case, the fact of such customary practices at Icklesham suggests that concerns regarding repair costs and repayment were longstanding in certain marshlands. Darby, *The Medieval Fenland*, 162-3. Darby finds similarly named penalties for withholding funds necessary for repairs. In the Norfolk Marshes,

land agreements survive which indicate a high level of consequence for transgressors. A contract between the Abbot of Battle and William de Codyng specifies that, if either party failed to maintain the dykes that they shared jointly, the other should undertake repairs. If the defaulter did not immediately pay his share, he would have to pay double, and if he delayed a further two weeks, pay triple.²⁵⁶ Clearly, these sorts of operations could not be left to chance, and suspicions of a neighbour's propensity for neglect had the potential to run high.

Though not all co-operative efforts ended badly, reclamation endeavours could be delayed or complicated by reluctant parties. Salzmann records a co-operative venture on the Pevensey Levels involving Agnes, widow of William Montacute. She received a third of her husband's lands upon his death and found herself in possession of portion of a swamp. Two-thirds of this swamp belonged to Ralph de Mankesey, and, in 1263, Agnes, William de Northeye, and others with property in the same area collectively set out to enclose their holdings with a sea dyke. Ralph refused to participate in the venture and so Agnes paid to have his portion enclosed with her own and retained his portion until she recovered the cost of investing in his land according to the coastal custom. Eventually, Ralph granted his share of the property to Agnes and her new husband for their lifetime for the sum of 20 marks.²⁵⁷ These two cases demonstrate that co-operation and communal action were essential for the success of reclamation projects. They also indicate that there were procedures in place on the Pevensey Levels during the thirteenth century to prevent neighbours from undermining each other's investments in wetlands. Distrust and self-interest seem to have been equally indispensable for success.

dike-reeves collected *bylaw* from those landowners who did not contribute to repair. *Biscot* and *triscot* followed if the initial fine went unpaid. Wronged neighbours could also collect an additional recompense called *wopeny* each time the recalcitrant individual refused to pay.

²⁵⁶ Salzmann, "The Inning of Pevensey Levels," 41.

²⁵⁷ Salzmann, "The Inning of Pevensey Levels," 40.

Even though proper maintenance of sea defenses was essential to the productive use of reclaimed land and a lack of proper upkeep could result in devastating losses, many landowners and tenants shirked their responsibilities. Salzman provides an example of negligence from the court of the Lowey in 1357 when the Abbot of Bayham failed to repair a bridge at Brokebrigge and a wall at Rockland, and to keep a ditch at Moorbrook and another between Boreham and the Pevensey sluice clear of debris.²⁵⁸ His fines for these offences totaled £2.5s.4d. Maintenance issues of this type regularly appeared in local courts and suggest either a hesitance to effect appropriate repairs in a timely manner or otherwise incompetent management of reclaimed land.

4.2 The Commissions of Sewers

Improper maintenance posed a severe threat to coastal regions, and, thus, it fell under the purview of Commissions of Sewers. These were royal commissions headed by local landowners in each district. The first Commissioners of Sewers for the Sussex coast in 1289 were Roger Lewkenor and Luke de la Gare, who held their appointment for six years.²⁵⁹ By 1290, the abbots of Battle and Bayham issued a formal complaint against their commissioners claiming that they were involved in a repair scheme with the Michelham Priory that would result in fresh water flooding. Salzman records that John de Lacy and William de Etchingam were then appointed to investigate the commissioners' conduct and address any harm that their work had generated.²⁶⁰ Even those in positions of authority to improve drainage and sea defenses could make mistakes, or proceed in a biased manner, and incur the wrath of their neighbours.

²⁵⁸ Salzman, "The Inning of Pevensey Levels," 44-5.

²⁵⁹ Salzman, "The Inning of Pevensey Levels," 45.

²⁶⁰ Salzman, "The Inning of Pevensey Levels," 45-6.

Commissions of Sewers had broad powers to effect necessary repairs, reform coastal drainage systems, and protect the land from the sea.²⁶¹ The crown began to utilize these commissions _ in substance if not in form _ beginning in 1257 when Henry de Bath was charged to adjudicate disputes between the twenty-four jurors of Romney Marsh and other local landowners concerning wall and watercourse repairs.²⁶² H. G. Richardson, author of “The Early History of Commissions of Sewers,” argued that Henry III’s charter of 1252 concerning the Ordinance of Romney-Marsh set a pattern for the commissions to follow. In the charter, Henry approves the custom of electing jurors enforce good maintenance for reclaimed areas:

[...] Distresses ought to be made upon all those which have Lands and Tenements in the said Marsh, To repair the Walls and Watergages of the same Marsh, against the dangers of the Sea. [...]. We have granted to the same four and twenty, that for the safety of the said Marsh, they cause those distresses to be done, so that they be made equal, according the portions greater and lesser, which men have in the same Marsh, and according to that which some are bound and charged. And Therefore we will and grant, that none of our Sheriffs of Kent or any Bailiffs, do in any wise intermeddle touching those Distresses made by consideration of the same four and twenty Jurors to avoid the same danger. For whosoever shall bring Complaint unto us, of the consideration of those Distresses, we will cause Justice to be done unto him in our Court, and that Justice we reserve specially to our self, or our special Commandment.²⁶³

This document effectively captures the crown’s views on the importance of reclamation and appropriate sea defense and the perceived effectiveness of the system in place at Romney Marsh. In those places where similar governing bodies for the upkeep of reclaimed land did not exist,

²⁶¹ Thomas Stuart Willan, *River Navigation in England, 1600-1750* (London: Frank Cass & Co. Ltd., 1964), 16.

²⁶² H. G. Richardson, “The Early History of Commissions of Sewers,” *The English Historical Review* 34, no. 135 (July, 1919): 389, <http://www.jstor.org/stable/551072>.

²⁶³ *The Charter of Romney-Marsh or the Laws and Customs of Romney-Marsh* (London: 1686), <http://gateway.proquest.com.proxy.lib.uwaterloo.ca/openurl?ctxver=Z39.88-2003&resid=xri:eebo&rftid=xri:eebo:image:103270>.

the commissions of sewers often purposefully imposed them, no doubt because the practices at Romney Marsh were among the oldest and most comprehensive.²⁶⁴

Commissions of Sewers continued until the seventeenth century and court procedures did not substantially change from the medieval template. A jury appeared before the commissioners and offered testimony regarding the state of local flood defenses, and this evidence informed the commission's decisions.²⁶⁵ Geoffrey Chaucer himself served on a commission appointed in 1390 to assess the dykes and embankments in the Thames marshes stretching between Greenwich and Woolwich.²⁶⁶ Because commissions of sewers provided local testimony to reasonably local judges, the recommendations they provided regarding maintenance and repair had the potential to suit the local conditions and serve the local community well. In spite of their royal authority and sweeping powers, the commissions could not blatantly ignore local custom or precedent and could not order drastic landscape alterations including the making of new rivers.²⁶⁷

4.3 The 1396 Commission of Sewers for Pevensey Levels

The earliest extant report from a Commission of Sewers on the Pevensey Levels dates from the feast of St. Matthew the Apostle in the 20th year of Richard II's reign, September 21st 1396. William Dugdale included a copy of this commission's proceedings in his *History of Imbanking* and Salzman revisited the text in his "Inning of Pevensey Levels." Salzman noted the original document's poor condition in 1910 and sometime after his research was completed, the account of these events appeared to have been lost. The document resurfaced in 2017, due to an investigation begun by Dr. Stephen Bednarski and the diligence of Christopher Whittick,

²⁶⁴ Richardson, "The Early History of Commissions of Sewers," 390.

²⁶⁵ Morgan, "Understanding Flooding," 47.

²⁶⁶ Purseglove, *Taming the Flood*, 44.

²⁶⁷ Willan, *River Navigation in England*, 16.

Senior Archivist at The Keep, and his colleague Suzanne Brand. Salzmänn's interpretation of translated excerpts from the report are of particular value due to his expertise on the Pevensey Levels' medieval history, geography, local settlements, and the progression of place names in the region.

The evidence that the jury presented to the abbot of Bayham, the prior of Michelham, Sir William Fiennes, William Makenade, and John Broke was damning.²⁶⁸ According to the testimony offered, many prominent landowners had neglected their sea defences, for which their ancestors had taken responsibility "time out of mind," (a tempore quo non existit memoria)²⁶⁹ so that the properties had flooded in a cascade, each estate crippling the flood preparedness of its neighbours in turn. Beyond the frankly devastating losses of individual estates, a major sewer running between the Squabber and Wyllyndonstrow (see Appendix 3) had suffered major obstructions of marsh vegetation and other detritus that prevented fresh water drainage from a large part of the levels, approximately 6,358 acres. The court judged that a substantial enlargement and repair of the drainage system, financed by those lords whose properties would benefit directly from the function of the sewer, would provide "full security" to the adjoining estates. The cost of increasing the sewer's depth by three feet and its width by two perches or rods (15-16.5 feet each) is not recorded; however, the estimated cost for a new length of sewer recommended for the common marsh on the far side of Wyllyndonstrow measuring twenty perches in length, eight feet in breadth, and two and a half feet in depth with enlargement of the connecting gutter was £200.

²⁶⁸ Salzmänn, "The Inning of Pevensey Levels," 45-47.

The landowners contested the commission's finding of widespread negligence by denying their responsibility for the damaged sewer. They even went so far as to deny the sewer's usefulness to their properties, claiming instead that it was the Mankesyestrem sewer between Herstbolt and the port at Coding (see Appendix 3) upon which they depended and for which they were responsible. The fact that the damaged sewer system and the Mankesyestrem sewer serviced completely different sections of the Pevensey Levels cannot have worked in the landowners' favour. Their effort to deflect guilt is unlikely to have deceived local judges or outweighed legitimate testimony from local jurors and suggests, therefore, a high degree of stubbornness or desperation to avoid responsibility for costly repairs. It is unlikely that the landowners immediately or diligently undertook any repairs required by the commission without further argument, though they may have grudgingly applied themselves to the task at length. By 1402, another commission investigated further damage on the Hooe Level,²⁷⁰ so repairs to the original damaged sewer may already have been underway allowing attention to rest on other areas. The courts, however, may have decided simply to push ahead with other pressing maintenance issues on the Pevensey Levels regardless of the initial landowners' cooperation.

4.4 Accounting for Negligence

As discussed in Chapter Three, the costs of regular maintenance of sea defenses during uneventful years was high. In years with catastrophic flooding, repair costs could necessitate vast expenditures above half of the yearly revenue in coastal communities. Drowned livestock, ruined crops, and fields that remained unusable for extended periods of time also represented significant losses. With or without maintenance, the costs of farming in coastal wetlands were

²⁷⁰ Salzmann, "The Inning of Pevensey Levels," 48-51.

not trivial. Under most circumstances, medieval marsh populations worked together to ensure reasonable precautions protected their land investments. Laying out immense sums to reclaim land logically demands that the investment be protected insofar as is possible. Pervasive risk and naturally induced disasters taught these populations resilience and innovation; if co-operation and vigilance were among the strongest cultural traits in marsh settlements, however, how do we account for negligent attitudes toward maintenance?

With large amounts of property in jeopardy when maintenance was lacking, why did vigilance not prevail in all cases? It is possible that, in some cases, a lack of personal investment among certain landowners was problematic. Individual circumstances and fortunes are rarely static. Illness, business ventures abroad, and other properties might all have competed for attention and contributed to a degree of neglect on one or more occasions. Maintenance needs could also vary greatly from year to year, as could agricultural profits, and individual management styles could have resulted in resources being spread too thinly to preserve land adequately in some cases. Landowners who found their resources stretched may have even maintained their lands strategically, prioritizing some areas over others, maintaining only those areas most immune to damage or, perhaps, those most at risk. Of course, when one neighbour took on repairs and improvements in spite of another, custom dictated immediate repayment in full for these expenditures, or perhaps double or triple payment after a specified length of time.²⁷¹ Under such circumstances, individuals can hardly have believed that it would serve their

²⁷¹ Salzmann, "The Inning of Pevensey Levels," 41. Salzmann's argument for the applicability of 'bisket and trisket' on the Pevensey Levels is credible due to the fact that at least one primary source utilizes the phrase in Kent. N. Neilson, "Customary Rents" in *Oxford Studies in Social and Legal History, Vol. II: Types of Manorial Structure in the Northern Danelaw*, ed. Paul Vinogradoff (Oxford: The Clarendon Press, 1910), 106 <https://archive.org/details/customaryrents00neil>. Neilson identifies *byscot* as an East Anglian custom, and suggests that a lord would receive half of any such fine collected. An East Anglian origin, coupled with at least

best interests to delay repairs and hope for good weather. Neglecting maintenance for lack of funds would not have been a reasonable landowner's first choice and would only have occurred *in extremis*.

Lax, irresponsible, and disinterested landowners may have regularly invested less time and energy in the upkeep of their lands, but would still have been subject to additional fees if their neighbours were forced to act on their behalf. If negligence was not as common as medieval records seem to suggest, then the fear and expectation of it would not find expression so frequently in drainage agreements. Which social characteristic _ negligence or co-operation _ applies more to medieval marsh communities during the fourteenth century? Was co-operation more honoured in the breach than in the observance? This cannot have been the case; the evidence of advanced communal reclamation in medieval English marshes is too strong. Both societal features are likely to have continually coexisted, with co-operation in ascendance during those times that the lure of marsh profitability was greatest. The prevalence of negligent behaviour must generally have increased when maintenance expenditures did not seem likely to return much benefit to local landowners and external investors.

4.5 Economic Context

To appreciate fully how the 1396 Commission of Sewers fits into the narrative of risk culture, it is also necessary to gain a sense of the state of the local economy, as this would certainly influence how landowners interpreted the costs and profitability of the lands under their control. In a good economic climate, a high risk and high reward enterprise might seem much more attractive than in a time of recession or instability. The costs and benefits of medieval

one thirteenth-century usage in Kent, indicates that the term was widely applicable in combatting unneighbourly conduct regarding flood defense.

wetland reclamation have demonstrated that profitability was dependent on good planning and cooperation and was also vulnerable to climatic factors. Because the landowners responsible for reclamation and maintenance on the Pevensey Levels apprehended the risks involved in their operations, it is possible that increases to perceived risk levels encouraged deferral of maintenance or abandonment of less profitable areas of marshland.

There are two subsets of economic research that require analysis: the first is the scholarship relating to the overall economic standing of medieval England in the late fourteenth century and the major historical incidents that influenced the economy while the second is scholarship relating specifically to economic activities throughout Sussex and especially in the vicinity of the Pevensey Levels. Considering both the national and local economies in turn allows for a properly detailed analysis and helps to limit the assumption that economically significant events at the national level dictated experiences in specific rural contexts. A chronological approach is particularly useful, as it demonstrates how economic historians utilized primary sources over time and how the perceived trustworthiness of economic records has developed.

Before unpacking the history of economic scholarship relating to England in the later Middle Ages, it is useful to review some of the contextual and economically relevant material presented in previous chapters. The Little Ice Age brought cooler temperatures and heavy rains that precipitated wide scale famine and starvation. The cattle in England fell victim to disease immediately afterward, further damaging the food supply and reducing the number of plow animals available to rural populations. The frequency of highly destructive storm surges increased due to the same climatic shift that precipitated the famine. The Black Death claimed a large percentage of the population in England and precipitated wide scale labour and wage

crises. Two recurrences of the plague between the 1360s and 1370s claimed lives on a scale sufficient to “impress” chroniclers who had survived the initial outbreak in 1348.²⁷² The fourteenth century, therefore, presented formidable economic challenges on a significant scale that would have applied pressure on surviving populations regardless of their specific location in England or financial circumstances.

Economic historians have utilized several approaches for medieval economic studies. In 1947, B. H. Putnam championed the cause of common law records from ordinary courts. He lamented the neglect that these sources suffered:

To the layman such records seem dull and difficult; to the economic historian in particular they do not seem worth examining for economic data such as prices or wages or labour problems; to the historian of law they seem valuable chiefly for legal theory and practice in law, to the relative exclusion of criminal law and of the much-scorned statute law.²⁷³

Putnam argued that common law records provide useful economic information for several reasons: the lack of a central government department, the extreme litigiousness of the English population, and the court’s notations of the value of goods involved in criminal activities.²⁷⁴ The courts, then, necessarily dealt with all kinds of persons and their economic matters. From these records, Putnam was able to produce a list of illegal pay rates during the fourteenth century for a number of English counties. He was also able to make assessments of labour unrest, valuations of farm equipment and livestock, and market speculation. Sussex, unfortunately, is not among these regions.

²⁷² Postan, *The Medieval Economy*, 37.

²⁷³ B. H. Putnam, “Records of Courts of Common Law, Especially of the Sessions of the Justices of the Peace: Sources for the Economic History of England in the Fourteenth and Fifteenth Centuries,” *Proceedings of the American Philosophical Society* 91, no. 3 (Aug. 29, 1947), 258.

²⁷⁴ Putnam, “Records of Courts,” 26-261.

Putnam's documents represent Kent's prices for farm animals, equipment, foodstuffs, grain, and certain household goods, and since Kent has substantial marshlands and borders on Sussex, these prices at least provide a starting point for assessing the economic climate of the fourteenth century. From Putnam, we know that, in Kent, a fertile ewe commanded a price between 1s. 6d. and 10d. and a capon cost 3d. in 1316. In 1317, a capon's value may have been as much as 4d., a pig cost between 1s. and 5s., a beehive cost 1s. 6d, and a sheet cost between 4d. and 8d. It should be noted that these prices coincide the beginning of the Great Famine, and precede the Great Bovine Pestilence and are, therefore, useful only in comparison to similar figures from the later part of the fourteenth century. Although Putnam's figures defy any attempt at statistical analysis, Putnam is clearly justified in his approach to research. It is unclear how many historians he inspired with his unorthodox approach to medieval economics, but it is clear that he set a high standard for utilizing unpopular sources. Putnam serves as a notable example of the manner in which economic historians have struggled to access important information, and to utilize extant sources innovatively during the last century.

4.6 Attempts to Calculated the Geographical Distribution of Wealth in England

A major trend among economic historians of the later Middle Ages was the use of tax records. As early as 1950, E. J. Buckatzsch published what he called "an experimental study of certain tax assessments" in which he attempts to demonstrate the distribution of wealth for the years between 1086 and 1843.²⁷⁵ This ambitious project utilized thirty tax assessments beginning with the Domesday Survey, and employed a comparative methodology. Buckatzsch

²⁷⁵ E. J. Buckatzsch, "The Geographical Distribution of Wealth in England, 1086-1843: An Experimental Study of Certain Tax Assessments," *The Economic History Review, New Series* 3, no. 2 (1950): 180, <http://www.jstor.org/stable/2590767>.

began with the assumption that tax assessments are reliable indicators of wealth distribution and proceeded to rank counties by wealth over time and to calculate how much richer certain counties were in comparison to others.²⁷⁶ Feeling ill-equipped to assess the validity of his founding assumption, he chose to offer that task to other scholars. From his analysis it is possible to determine that the economy of Sussex was twenty-fifth out of thirty counties in 1332 and 1334, sixteenth in 1341 and, twenty-fourth in 1453.²⁷⁷ Over the period between 1283 and 1503, Sussex consistently belonged to the middle ranks of counties, never appearing at any point economically to excel. Kent consistently ranked in a range of 6-15 out of thirty except for 1283, when it ranked among the top five counties included in the study.²⁷⁸ Buckatzsch ultimately concludes that the geographical distribution of wealth in England did not fluctuate wildly over time.

In 1965, R. S. Schofield took up the challenge of assessing Buckatzsch's work in "The Geographical Distribution of Wealth, 1334-1649," and argues that there was indeed a significant redistribution of wealth during the Late Middle Ages. Schofield first questions the suitability of the majority of Buckatzsch's selected tax assessments, citing suspicious applications and forms of assessment that undermine the spirit of the initial research.²⁷⁹ The assessment of 1334, however, meets with approval because it reviewed the earlier work of commissioners who had surveyed movable wealth two years previously and worked with local inhabitants in each vill. The Tudor subsidies of 1514 and 1515, although assessing annual salaries in addition to movable

²⁷⁶ Buckatzsch, "The Geographical Distribution of Wealth in England," 181.

²⁷⁷ Buckatzsch, "The Geographical Distribution of Wealth in England," 186.

²⁷⁸ Buckatzsch, "The Geographical Distribution of Wealth in England," 197.

²⁷⁹ R. S. Schofield, "The Geographical Distribution of Wealth in England, 1334-1649," *The Economic History Review, New Series* 18, no.3 (1965): 484-89, <http://www.jstor.org/stable/2592561>.

property and having mandated different rules for tax exemptions, are the next most suitable taxations for comparison in Schofield's opinion.²⁸⁰ Including data for both lay and ecclesiastical wealth, he produces a ranking of wealth that places Sussex twenty-fourth and Kent eleventh out of thirty in 1334 with Kent's lot having improved in 1514 while Sussex moved down two places.²⁸¹ Using the new set of taxes, the distribution of wealth did shift significantly, the south of England outpacing the north, and the south-eastern and south-western areas surpassing the Midlands.²⁸²

In 1977, Gerald Gunderson challenged the 'received doctrine' that thirteenth- and fourteenth-century medieval economies suffered from diminishing returns that restricted, or even prevented, economic growth. Gunderson argues that the traditionalists based their analyses on faulty assumptions, including a lack of technological development during the Middle Ages, and that population growth indicates a standard of living above subsistence.²⁸³ Gunderson also proposed several new variables that traditional economic historians had failed to recognize, not least of which are the fertility of land, which humans can improve, and growth of the wool industry and its relation to the value of arable land.²⁸⁴ In short, traditionalists had not accounted for a number of factors in the English economy and had underestimated the strength of the late medieval economy. Gunderson counts Michael Postan as chief among the traditionalists, and specifically challenges his views on marginal lands and economic behaviour.²⁸⁵ He argues that

²⁸⁰ Schofield "The Geographical Distribution of Wealth in England," 490-92.

²⁸¹ Schofield "The Geographical Distribution of Wealth in England," 1334-1649," 504.

²⁸² Schofield "The Geographical Distribution of Wealth in England," 509.

²⁸³ Gerald Gunderson, "Real Incomes in the Late Middle Ages: A Test of the Common Case for Diminishing Returns," *Social Science History* vol.2 no 1 (Autumn, 1977): 91-93, <http://www.jstor.org/stable.1171084>.

²⁸⁴ Gunderson, "Real Incomes in the Late Middle Ages," 97-104.

²⁸⁵ Gunderson, "Real Incomes in the Late Middle Ages," 97.

when land is expensive, there is a greater incentive to invest it and maintain its productivity; Postan's instances of soil depletion and land abandonment are more suggestive of disinvestment in land and cannot support the view of diminishing returns.

In 1979, a team of scholars including the venerable H. C. Darby, proposed to use tax assessments to differentiate areas of economic change that occurred in 1086-1334 and in 1334-1525. Their findings suggested that wealth increase before 1334 occurred in the Fens, in the north, and in scattered marshes and woodlands throughout England. Following 1334, however, wealth increased primarily in the south-west, cloth producing regions including Essex, Suffolk, and parts of Wiltshire and Gloucestershire, a portion of the West Riding, London and its surrounds, and the peat regions of the Fens.²⁸⁶ Because of Darby's great familiarity with wetland geography, land use, and drainage, he and his fellow researchers were more willing to attribute growing prosperity to reclamation activities, and in particular, the appearance of new arable land possessed of superior fertility.

Regional marsh economies, including that of the Wash, that were poor in comparison to nearby dry areas in 1086, demonstrated a remarkable reversal in their fortunes by 1334; however, few wetlands managed to achieve the dramatic increases in wealth that the Wash enjoyed.²⁸⁷ Variation in wealth creation may have depended upon the specific land use in each marsh. In Somerset, the priority for reclamation efforts was the creation of meadow for grazing while the Wash produced more arable land by virtue of the quality of silt deposits. The coastal marshes in Lincolnshire showed improved wealth ratios while the nearby marshes at Hull and Holderness

²⁸⁶ H. C. Darby, R. E. Glasscock, J. Sheail and G. R. Versey, "The Changing Geographical Distributions of Wealth in England: 1086-1334-1525," *Journal of Historical Geography* 5, no. 3 (1979): 1, doi:10.1016 /0305-7488(79)90071-9.

²⁸⁷ Darby, Glasscock, Sheail and Versey, "The Changing Geographical Distributions of Wealth," 249-50.

displayed much less growth.²⁸⁸ While the study mentions reclamation activity on the Pevensy Levels, no suitable data were available for analysis. Some marshes failed to benefit in any substantial way from “the enterprise of the age,” including coastal marshlands in Essex and much of the Thames Estuary.²⁸⁹ The study demonstrates that, although conditions in wetlands were likely to improve economically between 1086 and 1334, great improvement was far from assured.

In 1980, Michael Stanley authored an article that challenged the viability of earlier analyses on the distribution of wealth in medieval England. Stanley argued errors in data interpretation and viability and differences in English taxation methods over time account for large scale economic variations during the fourteenth century outlined in Buckatzsch’s, Schofield’s, and Darby’s publications.²⁹⁰ He argues that, while marshland reclamations may have produced wealth in the Fens, taxation data likely privileged marsh improvements over major woodland transformations, including those in the Midlands, Feckenham, Arden, and Charnwood.²⁹¹ Stanley also argues that economic historians must approach taxation data with a high standard of academic rigour, since governments seek revenue from the most profitable sources that their tax collectors can efficiently access. Although previous historians had almost universally acknowledged their data’s limitations and fine-tuned previous approaches, Stanley remained convinced that their analyses forced comparisons, concealed wealth, and overemphasized the role of marsh reclamation.

²⁸⁸ Darby, Glasscock, Sheail and Versey, “The Changing Geographical Distributions of Wealth,” 252.

²⁸⁹ Darby, Glasscock, Sheail and Versey, “The Changing Geographical Distributions of Wealth,” 252.

²⁹⁰ Michael Stanley, “Debate: The Geographic Distribution of Wealth in Medieval England,” *Journal of Historical Geography* 6, no. 3 (1980): 315-316, doi:10.1016/0305-7488(80)90084-5.

²⁹¹ Michael Stanley, “Debate,” 318.

In 1983, J. F. Hadwin revisited the relationship between taxation and the economy in “The Medieval Lay Subsidies and Economic History.” Hadwin acknowledges the limitation of these tax records, noting their propensity for undervaluing taxable goods, and suggests that historian who utilize a comparative approach must “cross their fingers and trust that all areas cheated to roughly the same degree.”²⁹² Nevertheless, Hadwin admits that the lay subsidies number among the most comprehensive extant sources for personal and national wealth in the medieval period. There were twenty-three lay subsidies between 1290 and 1332, during which time medieval populations paid their own taxes, followed by two further assessments in 1334 and 1336 when responsibility for tax payment fell to towns and villages.²⁹³ Surviving tax records include detailed local rolls, county rolls with lists of taxpayers by township and their individual and collective liabilities, and accounts belonging to the office of the Exchequer that list the amounts each county owed and paid.²⁹⁴

Hadwin recognises several sources of potential error, including incomplete records, the customary assessment season’s coincidence with large grain supplies and low grain prices, the question of fair valuation for goods, and the apparent lack of currency in towns.²⁹⁵ He concludes that, because of the lay subsidies’ deficiencies, it is only possible for historians that take the utmost care in mitigating error by careful analysis and limiting assumptions, to use them. Hadwin commends restraint in drawing definite conclusions from the lay subsidies, stating his preference for provisional conclusions. He does not say that the study of these tax records is without merit; his easy cynicism and exposition on the difficulties of approaching such historical

²⁹² J. F. Hadwin, “The Medieval Lay Subsidies and Economic History,” *The Economic History Review* 36, no. 2 (May, 1983): 200, <http://www.jstor.org/stable/2595920>.

²⁹³ Hadwin, “The Medieval Lay Subsidies,” 201.

²⁹⁴ Hadwin, “The Medieval Lay Subsidies,” 202.

²⁹⁵ Hadwin, “The Medieval Lay Subsidies,” 203-4.

documents, however, does not inspire much confidence in their value. In his conclusions, Hadwin suggests that the historical tendency “for explanatory babies to be thrown out with their critical bathwater” has obscured past identification of substantially correct medieval trends in a haze of over-cautious terminology.²⁹⁶ From this statement, it is clear that he understood that his position would prove problematic for further research, but that discouraging careless and trusting use of the lay subsidies was more important than preserving the reputation of the documents themselves.

Stuart Jenks reacted to Hadwin’s sentiments in 1998, when he published “The Lay Subsidies and the State of the English Economy (1275-1334).” He even quotes one of his fellow scholar’s most beautifully crafted, if negative, opinions: “The lay subsidy rolls rarely tell the whole truth and do not even lie consistently.”²⁹⁷ Because interpretations of the English economy and the crises it faced in the Late Middle Ages hinge on the lay subsidies, their reputation as useful documents required rehabilitation. Jenks first establishes that the types of persons liable to taxation and the methods by which they were assessed did not change significantly between 1275 and 1334. He then moves on to try and reconcile the historical geographers and the financial historians by proposing a new interpretive approach: determining the correlative degree between the taxes assessed in London and in the counties.²⁹⁸ While Jenks manages to demonstrate that the lay subsidies are broadly accurate measures of the economy, what exactly they measured remained unclear. Attempting to interpret the lay subsidies alongside data sets for

²⁹⁶ Hadwin, “The Medieval Lay Subsidies,” 214.

²⁹⁷ Stuart Jenks, “The Lay Subsidies and the State of the English Economy (1275-1334),” *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte*, 85, no. 1 (1998): 3, <http://www.jstor.org/stable.20739025>.

²⁹⁸ Jenks, “The Lay Subsidies,” 15.

international and domestic did little to indicate what historians could glean from the records, though the conclusion that the lay subsidies taxed surpluses remained most probable.²⁹⁹

In 2004, Pamela Nightingale proposed a comparison between the lay subsidy data and debt certificates from across England. Merchant certificates of debt would provide information on the availability of credit during the medieval period and the levels of wealth that generated it. Since taxation produced a picture of wealth in surpluses of crops and animals and ignored measures of wealth including credit and coin, debt certificates are particularly useful, particularly because most registered debts required repayment in currency.³⁰⁰ Nightingale found that debt certificates and lay subsidy records showed similar patterns of economic growth; however, this pattern did not appear to continue beyond 1294.³⁰¹ She stresses caution in approaching the 1334 lay subsidy, which does not accurately reflect the economic recovery during that year, and the urban rankings, since the figures for port towns are distorted by taxable shipping imports. While scholars must still employ caution in dealing with taxation data, Nightingale's efforts have done much to rehabilitate them as data sources and to encourage new approaches and comparisons with other medieval data sets in order to mitigate their deficiencies.

The problems of the lay subsidies remain, and it is clear that scholars must use them with the utmost caution and ingenuity. They are, however, too important to ignore. It appears that their utility during the late 1300s is suspect, especially for coastal trading centers and wool producing communities. Although the Pevensey Levels were not involved in large-scale imports and exports, there were large numbers of sheep. Under these circumstances, can any of the

²⁹⁹ Jenks, "The Lay Subsidies," 29.

³⁰⁰ Pamela Nightingale, "The Lay Subsidies and the Distribution of Wealth in Medieval England, 1275-1334," *Economic History Review* 57, no. 1 (2004): 19, doi:10.1111/j.0013-0017.2004.00271.x.

³⁰¹ Pamela Nightingale, "The Lay Subsidies," 28.

taxation data provide a reasonably accurate picture of the local economy with respect to the overall national economy? Perhaps, however, the tax records themselves tend to show that the economy was growing prior to the Black Death. Additional insights from the debt certificates suggest, as one might expect, that the famine and pestilence during the early 1300s placed great strain on the economy, that mortality rates among creditors were high, and that wool exports dropped.³⁰²

Frequent economic challenges and social crises during the fourteenth century limited, but did not destroy, profits and growth. The national economy likely experienced more disorder than small local economies by virtue of its size. Some communities and counties would be better positioned to adapt to changing circumstances than others, and any measure of the national economy will reflect both strong and weaker regions' progress. Although all regions suffered somewhat during each crisis event, they would have suffered unequally and recovered at differing rates with limited awareness of a national state of crisis. Christopher Dyer has argued that historians who assess fourteenth-century crises do so with little regard for the complexity of experience and breadth of variables, preferring to privilege a single event rather than discuss multiple points of economic weakness and their resolutions.³⁰³ Howard Kaminsky has even contended that historians' analyses of a crisis era are not reflective of surviving evidence and are rather anachronistic and "pre-emptive constructions of the dialectic of lateness and the Waning model" proposed by Huizinga in 1924.³⁰⁴ While it is prudent to acknowledge economic

³⁰² Nightingale, "The Lay Subsidies," 17.

³⁰³ Christopher Dyer, *Making a Living in the Middle Ages: The People of Britain, 850-1520* (New Haven: Yale University Press, 2002), 262.

³⁰⁴ Howard Kaminsky, "From Lateness to Waning to Crisis: The Burden of the Later Middle Ages," *Journal of Early Modern History* 4, no. 1 (2000): 86, 120, doi:10.1163/157006500X00141.

weakness in the fourteenth century, it is counter-productive to impose a sense of crisis upon the period beyond local experience.

4.7 The Economy in Sussex

Unfortunately, assessing the local economy in Sussex and in the Pevensey Levels presents its own challenges. Nightingale's analysis of credit and debt helps to raise the economic valuations for Sussex in 1290, 1309, and 1334, although, according to her own estimation, only the data for 1290 approaches reliable accuracy.³⁰⁵ In 1290, though the addition of debt provides modest improvements both in Sussex and Kent, Kent still ranks much higher than Sussex. If marshland reclamation drove profits in south-east England during the thirteenth century, then the proportion of marsh found in Kent may have provided a significant economic advantage that Sussex could not match. While comparisons in profitability between two adjoining counties is somewhat useful, it is preferable to gauge the experience of economic and environmental crisis in Sussex alone in order to assess the conditions leading up to the 1396 commission of sewers. Comparisons to Kent will not necessarily reflect how the negligent lords in Sussex viewed the conditions in their own county or the economic viability of their land.

The Black Death claimed a high proportion of lives in Sussex, but economic disruption does not appear to have been overwhelming, and women, and more distant kin, took over vacant landholdings in Sussex, continuing to administrate personally their lands and collect traditional fees including merchet, chevage, and heriot.³⁰⁶ Those Sussex families that held land suffered less than those dependent upon wages, especially the lower wages that women commanded. In

³⁰⁵ Nightingale, "The Lay Subsidies," 28.

³⁰⁶ Mavis E. Mate, *Daughters, Wives and Widows after the Black Death: Women in Sussex, 1350-1535* (Woodbridge: The Boydell Press, 1998), 12.

the 1360s, prices of grain, wool, and livestock allowed for comfortable profit margins. The pressures of supplying as many as fifty-seven crewed ships³⁰⁷ to the crown during periods of conflict with France may have been perceived as burdensome to Cinque Port populations in spite of the privileges they received, but may also have functioned to spur the local economy. Fear of raids would have run high, although it is difficult to gauge whether an unlikely target such as Pevensey felt any real anxiety about the war.

Certain events along the southern coast are suggestive of the chaos that the fourteenth century witnessed. Well before the Hundred Years war in the 1320s, the men of Winchelsea embarked upon a career of piracy on “the pretext of controlling the seas” and burned seventeen ships at Southampton; some men of the Cinque Ports did not restrict themselves to officially sanctioned maneuvers if they could profit by other means.³⁰⁸ The unwillingness of Southampton’s leading men to allow proper fortification of their coastline led to the port’s sacking by the French in 1338, great losses of goods and property, and finally royal intervention.³⁰⁹ The larger Cinque Ports and their confederates would have been prime targets during the Hundred Years’ War because of their special status, but French raids threatened many more ports. Those that were unwilling or unable to defend themselves, even from other Englishmen, risked royal anger and interference.

While the exact state of the economy in Sussex during the later half of the fourteenth-century has yet to crystalize, historians make a powerful case for the resilience of the population in adverse conditions. A succession of individual crisis events negatively affected life but did

³⁰⁷ Susan Rose, “The Value of the Cinque Ports to the Crown, 1200-1500, in *The Roles of the Sea in Medieval England*, ed. Richard Gorski (Woodbridge: The Boydell Press, 2012), 43.

³⁰⁸ Bolton, *The Medieval English Economy*, 203.

³⁰⁹ Bolton, *The Medieval English Economy*, 203.

not catastrophically destabilize Sussex or its economy. The experiences of the fourteenth-century, however, must have produced a new and abiding sense of insecurity and uncertainty in the population. Levels of risk that might have been perceived as comfortable in the 1200s would have carried much more weight. Difficulties in marshalling labour resources, particularly in reclaimed areas, combined with the increasing violence of the sea could well have persuaded landowners on the Pevensey Levels to re-evaluate their priorities. The climate change, frequent storms, and wide-scale floods are likely to have exerted the greatest influence on risk evaluation. Paying burdensome maintenance costs would have seemed less and less rational if storms that could erase any investments in the physical landscape seemed particularly imminent. If landowners could reasonably expect that the money spent on sea defenses would no longer provide safety, or ensure profitable land use, then they may have thought their funds better spent elsewhere.

CONCLUSION

This study has situated the Pevensey Levels within a broader English wetland culture strongly marked by narratives of co-operation and risk. Although the existence of a modern risk concept during the Late Middle Ages cannot be assumed lightly, there is sufficient evidence to suggest the probable existence of various forms of personal and communal risk or potential danger. Although medieval perceptions of wetlands have shifted throughout the medieval centuries and into the Early Modern period, marshes were not marginal spaces fit only for occupation when preferable locations had already been claimed. True contempt for marshes appears to have developed in certain circles during the Early Modern era, yet this same contempt not only prompted major reclamation efforts after the fourteenth-century, but also acknowledged the substantial agricultural benefits of embanking. This contempt, then, was directed only at unreclaimed lands that had not reached their maximum potential in serving society's needs.

Wetland habitation and reclamation carried both a high degree of risk from a multitude of sources and a substantial list of potential resources for exploitation during the medieval period. Between the eighth and fourteenth centuries, populations understood that wetlands could serve many functions from physical and spiritual refuge, to food and fuel, to highly profitable farmland. Complete transformation of marshland was not a necessary precondition for profit, but greater levels of reclamation tended to yield greater profitability, even as they limited income from pre-reclamation activities. Tide mills, though less efficient than other types, could be profitable if the landscape features suited or necessitated their construction. Harbours could support vast networks of fishermen and facilitated international trade. The abundance of opportunity allowed marsh residents to draw income from multiple sources, and investment in marshland reclamation remained popular among wealthy families in the fourteenth-century.

Marshland communities were generally comfortable with the complex levels of risk involved in marsh life and reclamation. Risk did not cause marginality of certain land types; indeed, experience with risk adds value to human populations and fosters preparedness. While lords, monasteries, and communities generally understood the value of wetland drainage, co-operation was dependent upon a number of variables. Drainage agreements allowed investors to hold each other accountable. When crisis events including famine and plague destabilized the economy and workforce, communities generally absorbed any increases in risk. Because the costs of reclamation and regular maintenance were high, however, changes in weather patterns and highly destructive storm events could present sufficient risk to cause reassessment of maintenance's efficacy. During the great storms of the fourteenth century, wetland investors would have profited somewhat less from their reclaimed land and landowners would have felt a keen expectation that sea defenses would not hold. Under these circumstances, the landowners of the Pevensey Levels in 1396 may well have regarded their initial investments in the land as sunk costs and determined that paying for regular maintenance was not in their best interests.

While this thesis has examined risk culture through the eyes of rural wetland investors, its limited scope does not allow for a full examination of similar legal cases throughout many late medieval communities. It is my hope, however, that this thesis will generate greater interest in the Commissions of Sewers and in further comparative analyses of attitudes toward drainage between the thirteenth and the fifteenth centuries. While it may well be impossible to prove which thought processes landowners used to evaluate the risks and rewards of their endeavours, it is reasonable to expect that there was some form of formal or informal risk-benefit analysis at play. Certainly, sufficient contextual information exists to suggest certain responses to risk,

investment, and resource extraction during the Middle Ages, and to furnish further refinements in years to come.

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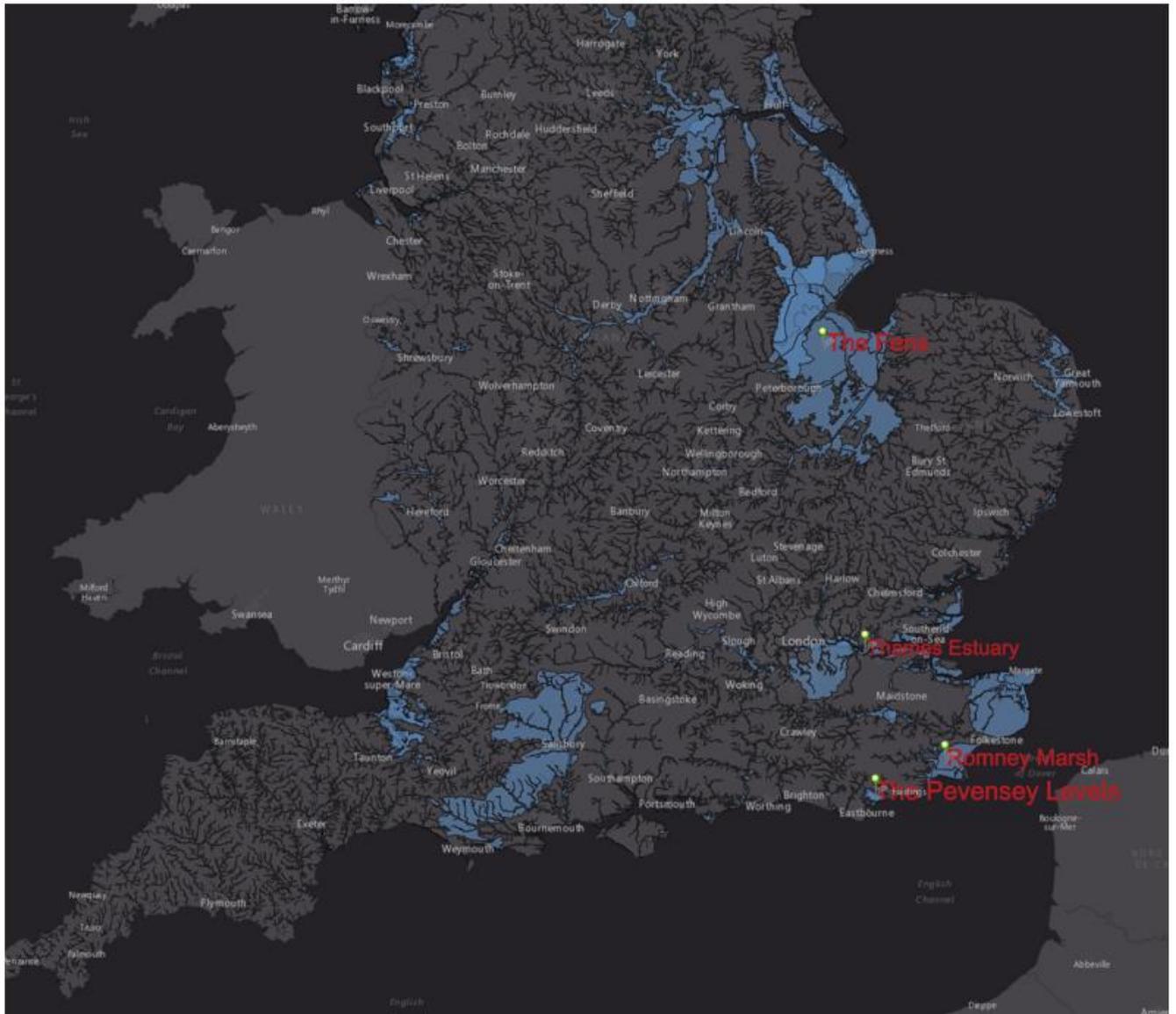
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Appendix 1: The Pevensey Levels Prior to Reclamation

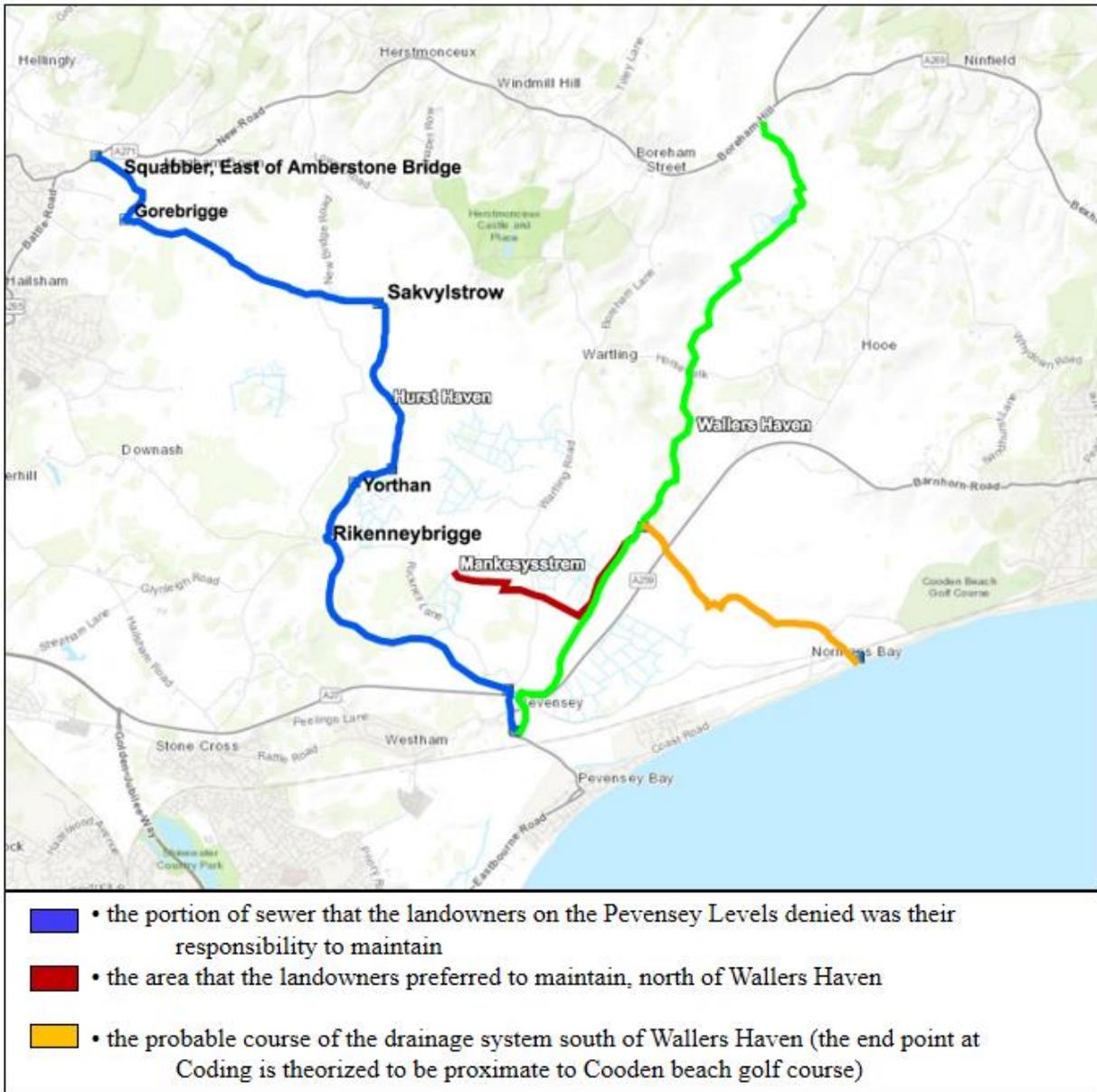


Image source: UK Environmental Agency's Flood Warning Areas, Pevensey Levels

Appendix 2: The English Lowlands



Appendix 3: Major Sewer Systems on the Pevensey Levels in 1396



Map courtesy of Steven Bednarski and Zach MacDonald; it figures into their forthcoming article on the sewer inquest of 1396.