The structure of Hawaiian polities worked against the concentration of power in the hands of one ruler. Yet, in the late-18th century, it took Kamehameha – a young ali‘i from Hawai‘i – less than 20 years to unify the archipelago, with the exception of Kaua‘i and Ni‘ihau, under his rule. The timing of this achievement has led a number of scholars to attribute his success to European ideas and European military hardware. Such a viewpoint ignores the significant changes that had taken place in Hawai‘i during the 200 years preceding the birth of Kamehameha. By the late 18th century Hawaiian mō‘i were pushing the limits of sacred power as they strove to enhance their control over subjects and rivals. The history of Hawai‘i between 1778 and 1796 represents a continuation of historical patterns of political struggle that were only partly modified by European influences before unification.

Hawaiian society has, thus far, been studied in a fragmented, discipline-specific way that has produced divergent and partially correct interpretations. When these perspectives are viewed in combination with greater emphasis placed on indigenous traditions, it becomes apparent that Hawai‘i was becoming more politically sophisticated in the centuries leading up to unification, and that mounting competitive pressures between polities resulted in political and military transformations that were already well under way by the time of the arrival of Captain James Cook in the late 1770s. The drama of culture contact, the death of Cook at the hands of Hawaiians in 1779, and the wealth of European eyewitness
accounts have meant that these profound internal transformations have largely been ignored by scholars in favour of the drama of culture contact and adjustment. Archaeological remains and a variety of indigenous traditions provide evidence of the development of sophisticated logistical capacity and arts of government well before Cook’s sails pierced Hawai’i’s horizons. These institutions and practices had sufficient momentum and logic of their own to explain Kamehameha’s successful unification of the archipelago. The unification of the Hawaiian Islands owes more to this indigenous political legacy and a specific set of local circumstances than to the new influences brought by strangers from across the sea.

Sacred genealogies and patterns on the land: Indigenous and archaeological models of political evolution to 1770

Archaeological evidence suggests that humans first settled in the Hawaiian Islands at least 1,000 years ago, and probably came from the Marquesas Islands. Artefacts and words from linguistic reconstructions of the Proto-Polynesian language suggest that these early colonists were skilled mariners, who cultivated tropical root crops and harvested marine resources. It seems likely that they introduced domestic pigs, dogs, and chickens to the chain. They were probably organised into kin groups led by chiefs. The presence of the term toa (warrior) in early language reconstructions implies that, even at this early date, warfare was a fact of life.¹

Patrick Kirch defines the initial colonisation period in Hawai’i as 1000–1200 AD. During this era, small groups established permanent coastal settlements in windward sites with fertile soil and access to permanent streams and marine resources. Bone remains from early sites show evidence of fishing, shellfish collection, bird hunting and animal husbandry. There are also indications of agriculture, including the introduction of

coconut trees. Kirch considers this period as one of consolidation rather than population expansion. Rank differentiation between chiefs and commoners was probably not great, while bonds of kinship continued to be the main social cement.²

The Early Expansion Period of Kirch’s scheme encompasses the next two centuries from 1200–1400 AD. By the close of this period, small settlements were dispersed throughout ecologically favourable areas of all major islands. These early sites became the core areas of what would later become territorially defined political units; and were often separated by mountain ranges and relatively unproductive lands. The elaboration and specialisation of fishing gear in this period suggest a successful adaptation to local marine resources. Increased dog and pig remains suggest the expansion of agriculture, as these animals were fed on agricultural produce at European contact. Excavations suggest that, during this period, agricultural fields began to expand from valley floors onto surrounding slopes. Kirch speculates that, while the total population of the archipelago was expanding, it was still relatively limited.

The Late Expansion Period was followed by a period of expansion and upheaval between 1400 and 1650 AD. Most archaeologists of Hawai‘i agree that the archipelago experienced a major population increase in this era. Kirch’s speculation that the population grew to several hundred thousand is based on evidence of major agricultural intensification and the expansion of settlement into leeward areas and agriculturally marginal, arid zones. Kirch believes this population take-off gave rise to a number of major technological, social and political changes. The concentration of settlement in favoured localities now gave way to dispersed settlement across a variety of ecological zones. This expansion of settlement coincided with the extension and intensification of all aspects of agricultural production. The first clear evidence of agricultural irrigation occurs in this period in well-watered valleys, while vast upland field systems were developed where soils and rain permitted, most notably on the leeward

² The standard accepted archaeological developmental sequence for Hawai‘i is best outlined by Kirch. Timelines developed by other contemporary archaeologists of Hawai‘i, such as Robert Hommon, Timothy Earle, and Ross Cordy are only cited in the following footnotes as they significantly diverge from this standard sequence. The following summary is outlined in Kirch (2010), pp. 126–28.
slopes of Kona and Kohala on Hawai‘i Island. Fishponds were also developed in this period. Embryonic states begin to emerge towards the end of this period and population growth peaked and then stabilised.³

Major changes in social and political organisation occurred, with the structures witnessed by Cook’s expedition in the 1770s evolving in this period. Artefacts used as symbols of chiefly rank at contact became common, which suggests the consolidation of rank differentiation at this time. Settlement expansion is seen as a key factor in the breakdown of kin-group organisation and its replacement with territorial affiliations and class-based social organisation. Robert Hommon suggests that, as all the best agricultural land came into use, it became necessary to define territorial boundaries more precisely. Ahupua’a land units may have begun to develop at this time. Kin-group solidarity may have begun to erode due to dispersed settlement, while the general economic self-sufficiency of most ahupua’a and their increasing populations may have reduced the need for exchanges of food and marriage partners between localities.⁴

Hawaiian traditions confirm that changes to landholding occurred in this era. A council of chiefs on O‘ahu elected Ma‘ilikukahi as mō‘ī, in part, to act as a mediator. According to Abraham Fornander, a Swede who settled in Hawai‘i in 1842, ‘He caused the island to be thoroughly surveyed, and the boundaries between different divisions and lands to be definitely and permanently marked out, thus obviating future disputes between neighbouring chiefs and landholders’.⁵ Maui was also divided into districts, sub-districts and smaller divisions by the kahuna Kalaikaohi‘a in the reign of the Maui mō‘ī Kaka‘alaneo. A chiefly supervisor was assigned to each land division. Within a few generations, a similar process was carried out on Hawai‘i by mō‘ī ‘Umi-a-Liloa.⁶

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Kirch associates these changes to landholding and land administration, which were first initiated on O‘ahu by Ma‘ilikukahi, with a profound change in social organisation that increased chiefly power over commoners. In this period, land units moved from being controlled by genealogical lineages to a situation where commoners, who were known as maka‘āinana, formed a distinct class that was separated from their former lineage chiefs, and worked the land under the direction and control of the chiefly class. Maka‘āinana rights to land resided in the chief who ruled their land at the time, and became divorced from multi-generational genealogical ties to the land that were remembered in family mo‘olelo (histories). Soon maka‘āinana were forbidden from claiming and reciting genealogies greater than two generations. The power of paramount chiefs became increasingly associated with divine status, which justified the demands for more tribute that increasingly came to be used to support paramount chief’s households, warriors and administrative officers. Kirch posits that this pattern of social relations became universal throughout the islands, although the unstable nature of dryland agriculture pressured mō‘ī in leeward Hawai‘i and Maui, who were more reliant on this form of agriculture, to demand more from their subjects and to be more orientated to wars of aggression to seize agricultural land. Kirch, however, sees the period from Ma‘ilikukahi’s reforms until the era of unification of the archipelago under Kamehameha as one of the elaboration of existing sociopolitical structures rather than as a period of significant structural reform. To Kirch, the underlying influences on this elaboration of paramount chiefly power were status rivalry and usurpation between chiefs, elite marriage and endogamy to raise one’s chiefly status, intensification of agricultural production to increase the paramount’s resource base to support his military and administrative forces, elaboration of chiefly ritual and human sacrifice to enhance divine status, and the application of force, war and territorial conquest to increase the paramount chief’s mana and resource base.

The longstanding, evolving and relatively uniform sociopolitical structure of government behind unification suggested by Kirch and others is most comprehensively outlined by Hommon. Society was divided into two socio-economic classes – a producer class of maka‘āinana, whose social links and work were highly localised in orientation, and the ali‘i, who

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maintained kinship links throughout the archipelago and controlled all positions of influence in government and religion, as well as determining makaʻāinana access to land, for which the latter paid a rent to them. Government of moku consisted of either one paramount or two co-rulers, who delegated power to multiple levels of administrators drawn from the chiefly class right down to highly localised levels. These delegated administrators supervised agricultural production, tax collection, military command and the supervision of public works, such as temple construction and irrigation works. Armies of up to 15,000 men were mobilised by individual mōʻi by the 1790s, with the fighting core also drawn from chiefly ranks and supplemented by an indeterminate number of makaʻāinana conscripts or recruits.10

Not all archaeologists and anthropologists adhere to this analysis. Marshall Sahlins’s classical analysis of the problems for domestic modes of production that were caused by increased demands for tribute has already been noted. Archaeologist Michael Kolb asserted that this era on Maui witnessed a move from increased demands for produce as tribute by paramount chiefs to demands instead for corvée labour for use in temple construction, in keeping with the increasing emphasis on the divinity of ruling chiefs. Kolb concluded that this increased the bonds between ruler and ruled as their demands on their followers switched from taking an increasing share of makaʻāinana production as ritual tribute to greater makaʻāinana participation in communal building projects that were shared by the ruler and the ruled.11 Critiquing Kolb, Valerio Valeri noted that this may have in fact had the opposite effect, as such large-scale communal building projects affected the amount of time that was available to be devoted to agricultural production, which was the central focus of makaʻāinana life. Valeri went on to note that:

[Moreover,] a system of ritual consumption allowed the ruler to attract and keep a large number of clients and subordinate chiefs who could be used to stabilise his rule by use of force directed against the ruled but especially against rivals … The sacrificial polity was all the more successful the more it could finance its ritual consumption with plunder and conquest rather than mere ‘taxation’. The Hawaiian political system was not able to transcend its predatory stage completely – at least not until the late 18th century.12

In response, Kolb noted that ‘[P]olitical rule is always a delicate balance between consensus and coercion, and it is clear that the emphasis in Hawai‘i shifted from the former to the latter’.13

Despite the widespread support among archaeologists for this hypothesis, there are a number of problems with its assumptions. Firstly, if all moku contained the same structures of power and governance, why did one succeed where all others failed? Leeward Maui and Hawai‘i are asserted to have had the most effective states because of their ability to conduct expansionary wars of conquest within and between islands, yet neither was able to consolidate conquests until the 1790s. Why? I suggest that the process of consolidation mattered more than the process of conquest, as shown by the contrasting fortunes of Kamehameha and Kahekili in the last decades of the 18th century. Furthermore, the major structural changes in military and political organisation that occurred in the late 18th century can explain why unification occurred in the 1790s and not before. Hawaiian traditions also demonstrate the ongoing strength of local countervailing power structures that limited the power of mō‘i over their subjects, as illustrated by Kanalu Young. Finally, the limits on coercive power to ensure compliance meant that paramount chiefs, by necessity, had to restrict their demands and produce benefits to ensure loyalty. The alliance of interests between ali‘i and maka‘āinana posited by Lilikalā Kame‘eleihiwa and Jon Osorio is a better fit with the realities of power and the course of events than the predominant archaeological models.

As discussed in Chapters 3 and 4, the ongoing strength of local power bases beyond those controlled by ali‘i nui in Kamehameha’s era raises questions about the degree to which class had replaced blood as the prime affiliation for the majority of the population. It is worth noting Hommon’s observation that the ali‘i probably only made up 1–2 per cent of the entire population.14 History demonstrates that no amount of martial ability or sacred legitimacy can keep such a small elite in power if it alienates the rest of the population. Even though it is now acknowledged by archaeologists that the ali‘i classes substantially increased as a proportion of the population in the late pre-unification era, this was still not on a scale where they could alone supply the military and administrative needs of paramount chiefs who had alienated their maka‘āinana subjects. At this early stage, the mō‘i’s control over landholding probably required even more of a consensus than it did in Kamehameha’s early years. The mō‘i

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Maʻilikukahi played the role of mediator, while Maui’s reforms were initiated by a kahuna, with the mō‘i Kakaʻalaneo’s influence unclear. Just prior to ‘Umi-a-Līloa’s unification of Hawai‘i, the dominant ali‘i on the island, Hakau, had offended two elderly men called Nunu and Kakohe. They ‘became angered and gave the land to ‘Umi’. The positions of Nunu and Kakohe are not stated, but their actions were a clear indication of the need for sensitive diplomacy by power brokers. At this stage, local kin groups probably still exercised political influence, albeit on a diminishing scale. Were Nunu and Kakohe lineage heads or ali‘i with armed retinues?

While land reforms may have set in train processes that increased chiefly power relative to commoners, it was warfare that consolidated this power. Competition for arable land precipitated inter-group warfare. Hawaiian traditions mention antagonism between chiefs in leeward and windward areas of Hawai‘i in this era. While the windward areas were based on long-established, stable economies, those to the leeward expanded rapidly, but were unstable because of partial reliance on unpredictable yields from marginal, drought-prone and possibly overused lands. The greater effort required to break in and maintain drier lands served to enhance chiefly power in leeward areas by providing a need for coordinated supervision above the lineage level. Marginal and fluctuating surpluses may have pressured rulers to enhance their logistical base through conquest rather than risk commoner dissent by drawing too heavily on production not normally earmarked for the support of chiefly retinue. There was a noticeable increase in the prominence of leeward chiefs relative to those from windward areas of Hawai‘i from the time that ‘Umi-a-Līloa moved his main residence from Waipi‘o in Hāmākua to Hōnaunau in Kona. This move was preceded by a struggle between ‘Umi and his genealogically senior half-brother Hakau at Waipi‘o. Umi was initially forced to take refuge in the dry tablelands of Hāmākua, where he gathered disgruntled elements of the local population around him until he was strong enough to topple Hakau.16

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To Kirch, this era was a crucial watershed in Hawaiian political evolution. Strong population growth based on irrigated taro and aquaculture that had favoured chiefs from the older western islands of Kaua‘i and O‘ahu reached its limits, and people moved into drier lands as wet taro lands could no longer accommodate the population. The dominant rulers in this era, ‘Umi-a-Līloa of Hawai‘i and Kiha-a-Pi’ilani of Maui, were both usurping younger siblings who moved away from the long-established irrigated taro lands to new dryland sweet potato-based lands in response to this pressure. This dryland agriculture favoured the eastern islands of Maui and Hawai‘i. Around this time larger and more complex temple sites began to flourish, and large royal centres in locations identified as the heartlands and residences of particular rulers occur in the archaeological record. These dryland systems were vulnerable to drought, making them potentially unstable as more and more people would come to rely on their produce unless more land could be incorporated in the realm to allow agricultural expansion. At the same time, these dryland chiefs used ritual and temples to garner more of the harvest to feed their military and administrative contingents and increasingly needed new lands to distribute as incentives to followers.17

In his detailed history of O‘ahu, however, Ross Cordy suggests that the pinnacle of O‘ahu chiefs’ power occurred during the 1600s and 1700s up until their conquest by chiefs from Maui in the 1780s. It is also interesting to record that the chiefs of O‘ahu were considered to be more inclined towards cooperation than competition, unlike their leeward neighbours. This argues against the efficacy of centralised power and in favour of the more localised, counterbalancing power, as argued by modern Hawaiian scholars. As events transpired, Kahekili, the Maui conqueror of O‘ahu, failed to win the loyalty of the long independent O‘ahu lesser ali‘i and this fatally weakened his bid for leadership over the entire chain.18 Further debate on Kirch’s proposed timeline is raised by Hommon’s dating of irrigated taro agricultural systems reaching their capacity to support an expanding population to the period 1680–1790. This is much later than Kirch, and the fact that it occurred on the eve of unification is not really explored by Hommon.19

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Kirch’s final evolutionary phase dates from 1650 to 1778 AD. In the 1980s, Kirch dated the end of this era to 1795 – ahead of Cook’s arrival in 1778 – because Kirch believed the old political order of competing chiefdoms was not structurally altered until 1795, and it was only in the 1790s that visits by trade vessels began to seriously influence Hawaiian culture. As noted in Chapter 1, however, Kirch has recently altered this stance as he believes Hawaiian polities were archaic states by the time Cook arrived, but fails to discuss how these structures enabled Kamehameha to unify the islands, while his rivals, with similar structures of governance and power, could not. In *How Chiefs Became Kings*, Kirch outlines the distinct political histories of each major island, but does not emphasise structural differences in their respective organisation of power beyond the potential ecological instability of those based primarily on dryland agricultural systems, which promoted a need to expand and seize more agricultural land. Kirch proposed that the era after 1650 witnessed the ‘elaboration of the existing social order and of further intensification of the means of production along lines firmly established’. Hawaiian traditions suggest that this period was characterised by intense inter-chiefly rivalry and warfare. This is supported by archaeological evidence, which reveals an increase in the size, and possibly number, of luakini heiau during this period. Luakini heiau first appear in the latter part of the Expansion Period, and may signal the rise of the chiefly adherence to the war god Kū. References to Kū are found in traditions relating to ‘Umi-a-Līloa. Hommon’s analysis of Hawaiian traditions suggests that, in the centuries leading up to contact, accession to political office and the establishment and maintenance of political boundaries were increasingly based on the application of force rather than the exercise of genealogical prerogatives.

Traditions reveal a cyclical pattern of conquests, attempts to integrate conquered lands, followed by the contraction or even disintegration of polities. Wars extended between islands, with Moloka‘i serving both as a battleground and a prize for the chiefs of O‘ahu and Maui, while east Maui was periodically occupied or raided by forces from Hawai‘i. Territorial conquests were rarely retained beyond the lifetime of the conquering paramount, or his immediate successor. Weak or ageing mō‘ī always faced the prospect of being usurped by ambitious subordinates, particularly junior collateral kin. Successful challenges are usually explained in the traditions

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as the result of increasingly oppressive or demanding incumbents alienating their subjects and making them amenable to challenges by rival chiefs who were perceived to be more benevolent and just.\textsuperscript{22}

The administrative and coercive capacity of Hawaiian mōʻi in the 1770s was insufficient for the imposition of effective centralised rule. Political and military structures, however, were far from stagnant. Generations of Hawaiian aliʻi and their advisers devoted much time and energy into enhancing chiefly power. It is important to take this long heritage of political struggle into account when analysing the unification of the islands in the decades following Cook’s discovery of Kauaʻi in 1778.

The importance of geography: Variation between localities

Local differences in resources and geographical barriers to communication played a significant role in shaping the struggle for power between chiefs. The natural environment not only influenced agricultural production and population concentrations, but also the ease of communication between localities. These were important considerations for the essentially decentralised polities of 18th-century Hawaiʻi. They also influenced warfare, as most armies depended on local resources for sustenance. Ecological diversity and barriers to communication also created variation in cultural practices and political coherence between polities (moku) presided over by high chiefs (aliʻi nui) within the broad pattern just described.

The Hawaiian archipelago has a wide variety of environments. The landscape is essentially the result of volcanic activity modified by wind and rain. The islands are the emergent tips of a chain of volcanoes that rest on the Pacific Plate. The oldest islands are to the north-west, while the youngest volcanoes are in the south-east. Many, such as Kilauea on Hawaiʻi, are still active. The older the islands, the more they have been eroded by weathering agents such as rainfall and wave action. Kauaʻi and Oʻahu are heavily dissected by erosion, resulting in well-developed valley floors and coastal plains, while the younger volcanic slopes of Haleakalā on Maui, and Mauna Kea and Mauna Loa on Hawaiʻi have been only slightly eroded. Changes in sea level during the Pleistocene resulted in

high sea cliffs in some places while, at places like Honolulu and ‘Ewa on O‘ahu, drops in sea level exposed coral reefs which formed the base for large leeward plains.\(^{23}\)

The islands’ north-west–south-east alignment means that their mountains block the prevailing north-easterly trade winds to produce a distinct dry leeward, wet windward dichotomy. When the moisture-laden trade winds encounter the steep volcanic ranges they are forced upward, leading to rapid condensation and rainfall. Rainfall is highest on the windward slopes, and then decreases rapidly towards the leeward coasts. On O‘ahu, for example, rainfall in the windward coast near Kāne‘ohe averages around 1,875 millimetres annually, rises to over 6,250 millimetres at the crest of the Ko‘olau Mountains, and drops to less than 500 millimetres on the leeward coast near ‘Ewa. Rainfall is seasonally variable. The months from October to April are generally wetter, while the period from May to August is considerably drier. The wetter months are also a time of stormy seas that curtail inter-island travel. The major exception to this pattern is the Kona district of Hawai‘i, where the peak rainfall months are June to August. This is because of moist southerly winds, known as Kona winds, which are common during this time.\(^{24}\)

Ancient Hawaiian society was unable to cultivate much of the archipelago’s landmass. Rainfall and local geology combine to determine the degree of erosion, vegetation patterns and food crops. The greater part of Hawai‘i’s land area consists of lithosols, either recent lava flows or older, weathered saprolites. All are of limited use for agriculture. The lithosols of the older, more eroded upland slopes have more depth, but the most productive soils for Hawaiian cultivation technology were the alluvial and colluvial soils of windward and leeward valley bottoms. Varying soil fertility and orographic rainfall produced a pattern of dry forest on lower slopes giving way to wet, dense forest on upper slopes, and alpine scrub on the highest peaks. Coastal plains were covered with a variety of grasses, shrubs, swamp and stands of screw pine.\(^{25}\)

The isolation of the chain resulted in a relatively restricted range of terrestrial fauna and flora prior to Polynesian settlement. The endemic fauna, beyond seabirds and native geese, was of limited use for food.

There were no suitable beasts of burden. While the marine resources of the archipelago were less abundant than in other parts of Polynesia, the sea was still a rich reservoir of food. Reef and lagoon complexes were limited, and many areas lacked sheltered inshore fisheries and safe coastal waters to travel in. Large stretches of rugged coastline made access to marine resources difficult, and travel potentially dangerous.  

The physical environment also posed other hazards. Unusually heavy rains in the mountains resulted in flash floods in the valleys, while tsunami in the north Pacific periodically threatened low-lying coastal areas. Volcanic activity is another ongoing hazard, particularly on Hawai‘i. This volcanic regime also provided Hawaiians with a number of potentially useful stone resources for tools and building. Perhaps the most consistent and significant natural hazard to man has been the ever-present threat of drought, particularly in leeward areas. While rich marine environments reduced reliance on agriculture in some localities, local soil and water regimes were the critical determinants of a community’s viability.

Most settlements in the late 18th century were situated within 10 kilometres of the coast. They were dispersed along much of the coastline to varying degrees of intensity. Although early explorers refer to several ‘villages’ of up to 70 or 80 structures each, most residences were more dispersed. In places, they formed an almost continuous ribbon development of individual dwellings set along the coastline or scattered among fields and groves of fruit trees. French explorer Jean François de La Perouse noted such a pattern of dwellings on a fertile section of the coastline of south-east Maui, describing:

> dwellings which are so numerous, that a space of three or four leagues may be taken for a single village, but all the houses are upon the sea shore, and the mountains seem to occupy so much of the island, that the habitable part of it appears to be scarcely half a league broad.  

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The basic local social and economic unit was an ahupuaʻa. These generally consisted of long narrow strips of land extending inland from the coast for a distance of several miles. They incorporated a variety of environments from inshore fisheries to forested uplands, providing residents with access to a wide range of resources. The seaward boundary of ahupuaʻa was defined as the depth the tallest man could wade out to at low water. Beyond that, the six monthly fishing kapu applied.30 This pattern varied to accommodate topographical features, such as steep-walled windward valleys, or to compensate for local scarcity by increasing land area. Districts as a whole tended to centre on resource-rich localities. The ideal was a fertile, well-watered locality with accessible and abundant offshore fishing. District boundaries were often in less well-endowed areas.31

Taro grown in irrigated, well-watered valleys and ʻuala (sweet potato) grown on dry slopes represent the extremes of Hawaiian agricultural practice. A variety of subsistence regimes existed within these parameters. Local production generally involved multiple cropping, with irrigated and non-irrigated fields often sitting adjacent to each other. Dry-field cultivation ranged from swidden to permanent fields with capacity enhanced by mulching. Broadly speaking, two major environmental zones supported the majority of the Hawaiian population. Each had a distinctive crop regime, one based on irrigated fields and the other on dry-field cropping.32 Permanent streams and fertile alluvial soil allowed the year-round cultivation of wet taro in the steep-walled valleys of the windward coasts. Swamps, streambeds and artificially irrigated fields provided suitable areas for cultivation. Sugar cane, banana and ʻulu (breadfruit) were often grown on the banks separating flooded taro fields, and in non-irrigated areas. Larger leeward valleys with reasonable, but less reliable, rainfall in their upper reaches could also support irrigated fields, but tended to have a higher proportion of their land planted in dryland crops.33

The other significant environmental zone was slopes or lowlands that lacked permanent streams, but had sufficient rainfall or humidity to allow cultivation of dry taro and ʻuala. Both crops were planted in non-irrigated fields, often surrounded by low stonewalls to block runoff and covered in mulch to retain moisture. Sugar cane, paper mulberry, banana and breadfruit were often planted in groves or on stone walls separating fields. In some areas, such as the wet, humid lowlands of Puna on Hawaiʻi, breadfruit was a major crop. Beyond these two zones, limited water generally restricted crops grown to ʻuala and occasionally yams, with occasional clusters of sugar cane and bananas when local regimes allowed. Mounds of earth and stone were used to enhance the growing environment. These techniques were also used in drier areas within the two main regimes.\textsuperscript{34}

Variation in cultivation influenced social and political organisation as well as economic organisation. Intensive dry-field cultivation requires a much higher labour input than irrigated taro cultivation. While wet taro systems require limited attention beyond initial field and irrigation ditch construction, dry-field systems need continual mulching and weeding after the fields have been cleared of stones and rocks and the ground broken for planting. The prominence of intensive dry-field systems in leeward areas of Maui and Hawai‘i resulted in the drafting of women into the agricultural workforce. Discussing regional variation within the Hawaiian Islands, Kirch draws attention to a passage in Kamakau, which states that:

\begin{quote}
All the work outside the house was performed by the men, such as tilling the ground … This was the common rule on Kauai, Oahu, and Molokai, but on Maui and Hawaii the women worked outside as hard as the men, often cooking, tilling the ground, and performing the duties in the house as well. At the time when Kamehameha took over the rule from Hawaii to Oahu it was not uncommon to see the women of Hawaii packing foods on their backs, cooking it in the imu, and cultivating the land … On Maui the men showed their wives where their [garden] patches were and while they went to do other work the women brought the food and firewood from the upland … This is why the chiefs of Hawaii imposed taxes on men and women alike and got the name of being oppressive to the people, while the chiefs on Oahu and Kauai demanded taxes of the men alone.\textsuperscript{35}
\end{quote}

\textsuperscript{34} Menzies (1920), p. 75 (dry-field systems); King, in Beaglehole (1967), 3:1, p. 521 (mulching); and Cordy (1972), pp. 395–96; and Handy & Handy (1972), p. 152 (breadfruit).
Kirch notes that the increased demand on female labour in these areas may have negatively influenced female fecundity. This in turn may have influenced the human resources available for agriculture and warfare. Archaeological investigations suggest there was a significant intensification of dry-field cultivation in leeward areas of Maui and Hawai‘i in the two centuries before the age of Kamehameha. While these systems were
capable of prolific yields they were also dependent on rainfall. Increasing yields through intensifying production in existing areas or expanding into areas of less reliable rainfall ran the risk of relying on an unpredictable rainfall regime. It was a shaky basis upon which to expand the population or increase the level of chiefly expropriations. Dry-field systems were potentially more politically unstable than wet taro systems because of the additional labour demands placed on makaʻainana by aliʻi, and the pressure to conquer more lands to increase agricultural output.  

The natural environment also influenced sociopolitical organisation by affecting communications. Wide and often dangerous channels separated some of the main islands. These channels tended to divide the inhabited islands into four distinct areas whose external ties were somewhat weaker than their internal links. These areas were Kauaʻi and Niʻihau; Oʻahu; Molokaʻi, Lānaʻi, Maui and Kahoʻolawe; and Hawaiʻi. The 117-kilometre-wide channel between Kauaʻi and Oʻahu was particularly hazardous. Although the right trade winds allowed the 46-kilometre ʻAlenuihoha channel between Maui and Hawaiʻi to be crossed in either direction in a couple of hours, they could also produce very rough seas. On the other hand, the close grouping of Maui, Molokaʻi, Lānaʻi and Kahoʻolawe provided a partly enclosed, and relatively sheltered body of water that facilitated canoe travel.  

Political groupings were influenced by island alignments. Powerful moku tended to centre on one of the four major islands: Kauaʻi, Oʻahu, Maui and Hawaiʻi. Kauaʻi dominated Niʻihau, and Maui dominated Lānaʻi and Kahoʻolawe. Molokaʻi sometimes served as a battlefield between the forces of Oʻahu and Maui. Neither could establish permanent control over Molokaʻi, which remained largely independent until the latter part of the 18th century. By then, east Maui was also a regular site for confrontations between the forces of Maui and Hawaiʻi mōʻī.  

Religious practices and other cultural differences may also have been influenced by the relative separation of the inhabited islands into four clusters. Fishhooks and food pounders from the material culture of Kauaʻi, for example, are distinct from those of other islands in the chain.Chiefly dynasties tended to be associated with god forms distinct from those of

their rivals. A large number of gods (akua) were worshipped for a variety of purposes. Occupational groupings, localities, families, gender and class divisions all had their own gods, although most seem to have been subsumed under four major gods: Kū, Lono, Kāne and Kanaloa. While the rulers of O’ahu and Hawai’i both worshipped aggressive forms of Kū as their war god, that of the former was Ku-hone’enu’u, while the latter’s was Kū'kā'ili-moku. The hierarchy of Kū, Lono, Kāne and Kanaloa may only have become the pattern for the whole group after Kamehameha’s unification of the islands. Temple types on Kaua‘i suggest that Luakini po‘okanaka were usually dedicated to Kāne and to a lesser extent Kanaloa, rather than to Kū, as was the case on Hawai‘i. Some luakini poʻokanaka on Maui were even dedicated to Kāne. Pele, the goddess associated with volcanoes, was particularly worshipped on volcanically active Hawai‘i. Cultural differences were probably more profound among makaʻāinana than among the more mobile chiefly elite.39

Figure 2: The Hawaiian archipelago
Source: CartoGIS, The Australian National University.

Local resource bases, political traditions and spatial relationships

The decentralised nature of Hawaiian polities and their administrative capabilities restricted their geographical extent. The smaller islands leeward of Hawai‘i were geographically more coherent and each tended to form a single moku, apart from during brief succession disputes. In contrast, Hawai‘i fluctuated between unity under a single mō‘ī and division between rival rulers, with large tracts of forested uplands and lava fields providing a buffer between the core areas of their respective domains. All moku were made up of a number of discrete localities. The resources of each locality, and the relationships between localities played a crucial role in shaping the unification process.

Hawai‘i (see Figure 3) has a landmass greater than that of the other seven inhabited islands combined. It is made up of five overlapping volcanoes, the most prominent being Mauna Loa and Mauna Kea. As the least eroded island in the group, it has sizeable valleys restricted to the windward side of the Kohala Mountains. There is a sharp windward–leeward dichotomy, with no permanent flowing streams on the western side from South Point to Upolu Point. Forested uplands in the interior exacerbated political as well as climatic differences between windward and leeward areas. Canoe travel was often used, although no reefs protected the coastline.40

The saddle between Mauna Kea and Mauna Loa still has traces of ancient trails reflecting its role as a crossroads for windward–leeward communication. These narrow trails were poor avenues for the passage of armies and were ideal settings for ambushes. It was not good country for manoeuvring, as the Welsh naval surgeon on Cook’s third voyage David Samwell noted on a trip inland from Kealakekua Bay. He described how, ‘the Underwood Which grows here render[s] the Woods Impassable everywhere out of the common Paths, many of which we met intersecting each other in various directions’.41

The interior’s main assets for Hawaiians were the extensive basalt adze quarries on Mauna Kea, and the fertile Wai‘e‘a Saddle between Hāmākua and Kohala. The saddle is 790–900 metres above sea level, and also formed the only relatively open corridor between the windward and leeward coasts.

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Fierce rivalry existed between windward and leeward ali‘i nui and their followers. In Kamehameha’s time, the main centre of power on the windward coast was the district of Hilo, home to the important ali‘i nui families of I and Keawe. Hilo hosted a large population, mostly concentrated in the vicinity of Hilo Bay. Here, a number of permanent waterways, nightly showers and moist, warm, north-east trade winds provided a climate that allowed the year-round planting of dry-field crops as well as irrigated field systems. Northern Hilo’s population was based in a number of scattered settlements around gulches with permanent streams that were terraced to grow wet taro. The land from Hilo Bay

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south to the border with Puna was barren and lava strewn, with few permanent waterways. This part of Hilo contained only scattered pockets of agriculture and few residents.43

Puna has no permanent streams, but is blessed with substantial areas of light and fertile volcanic soils and ample rainfall, particularly in its wet, humid coastal lowlands. This allowed year-round planting of dry-field taro and 'uala. Puna was also the main breadfruit-growing area in the chain. Breadfruit trees provided a significant source of carbohydrates and, in good years, could provide food for eight months of the year. Puna was one of the most fertile and populous areas in indigenous Hawai‘i.44 Cook’s expedition found settlement spread along most of the coastline. Samwell commented that from the sea Puna had:

the most fertile & pleasant appearance of any place we have seen at these isles, being almost entirely covered with groves of Coconut and other fruit trees, among which on small green plots stand their Houses near the seaside.45

Puna allied itself politically with Hilo or Ka‘ū in Kamehameha’s time, and never formed the core area of support for any ali‘i nui seeking to rule Hawai‘i.

The inhabitants of Puna’s neighbouring district of Ka‘ū mainly lived inland among their cultivations. Some of these were up to 12 kilometres from the coast. Settlement of the barren lava coast was generally limited to fishing camps used to exploit Ka‘ū’s rich offshore fishing – the waters off South Point were the richest fishing grounds exploited by Hawaiians. The inland fields produced dry taro and ‘uala, and depended on rainfall, especially winter rains brought by the onset of Kona storms. Member of the Vancouver naval expedition to Hawai‘i Archibald Menzies found the interior belt of settlement fertile and heavily populated. Ka‘ū traditions, however, refer to severe droughts that occasionally forced locals to seek temporary refuge in Puna or Kona when reservoirs or dried fish, preserved ‘uala, and famine foods were exhausted. Despite this, Ka‘ū remained

politically independent well into Kamehameha’s time. The rulers of Ka‘ū generally allied with those of Puna and Hilo against the leeward chiefs in Kamehameha’s era.46

The district of Hāmākua extended along the windward coast from Hilo. Most of the eastern Hāmākua coast was lined with cliffs and streaked with spectacular waterfalls as streams from the interior abruptly ended their procession to the sea. These streams formed deep gulches that broke up the relatively wet, forested upland plateau behind the coast. This upland area supported dispersed dwellings scattered among mulched fields of dry-field taro and ‘uala.47 The two great valleys of Waipi‘o and Waimanu at the western end of Hāmākua contained extensive wet taro cultivation and supported substantial populations.48 Hawaiian traditions record Waipi‘o as the ancient seat of the first unifier of Hawai‘i. By the late-18th century, Waipi‘o was no longer a centre of power. Western Hāmākua and the Waimea Saddle now formed a zone of rivalry astride the most accessible land route between windward and leeward spheres of influence.

The populous north Kona coastline from Kailua to Keouhou was the major centre of political power on the leeward coast in the late 18th century. Early European explorers reported a number of ‘villages’ and archaeological remains show the area contained a number of substantial heiau. Relatively high rainfall allowed the cultivation of breadfruit near the coast. Extensive dry-field systems, measuring nearly 5 kilometres in width and extending for 29 kilometres parallel to the coast, were constructed further inland to take advantage of the increased rainfall at higher altitude. This area of the Kona coast also contains rich offshore fishing grounds.49 Further south, Kealakekua Bay supported a sizeable population, despite its arid appearance, because moisture from fog and late afternoon showers allowed the cultivation of ‘uala and dry taro on the slopes behind the bay.50

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South again, beyond Kealakekua Bay, was the major religious complex of Hōnaunau, which housed bones of mōʻi descended from the original unifier of the islands, ‘Umi-a-Liloa. Hōnaunau also supported a sizeable population, again by taking advantage of the more suitable climate of the rain-fed inland slopes. The rest of southern Kona supported only a few coastal settlements of fishermen and appeared to Samwell to be ‘a rugged, barren place almost entirely covered with lava’. These fishing communities were able to supplement their catch with dry-field crops planted eight to 11 kilometres inland.

Kohala was closely allied to Kona by the time Kamehameha rose to political prominence. Beyond the arid and lava-strewn shores of Kawaihae Bay, the Kohala Mountains provided a good environment for intensive cultivation. The upper part of the leeward slopes received enough rainfall to support a considerable dry-field system there. ‘Uala and dry taro was grown along a 24-kilometre strip that was nearly 5 kilometres wide in places. This complex supported a considerable population based in coastal settlements. High rainfall carved five deep valleys into the windward Kohala coast north of Waipiʻo and Waimanu in Hāmākua. Wet taro was grown in their alluvial flats, although their permanent streams were prone to flooding. Rugged bluffs and steep slopes restricted land communication between the valleys. The other major population concentration in Kohala was the previously mentioned Waimea saddle. Its rich soils and local rainfall were supplemented with irrigation channels tapping streams from the Kohala Mountains to water extensive fields of dry taro and ‘uala.

Maui is the second largest island in the chain (see Figure 4), and consists of two shield volcanoes connected by an isthmus formed from the merging of their lava flows. The western volcano is much older than its eastern neighbour, Haleakalā. As a result, the West Maui Mountains are more eroded, with deep valleys radiating out from their central spine on both leeward and windward sides. The geologically younger slopes of Haleakalā are less deeply incised. Haleakalā is now dormant, but was still active as

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late as 1790. Steep, narrow and difficult to negotiate inland trails crossed the central spine of the West Maui Mountains and Haleakalā. Most travel was conducted along the coast, either by canoe or along the Alalōa (Great Road). This was a well-maintained trail that circled the coastline of Maui. Its construction dated to the reign of Kiha-a-Pi’ilani, the mō‘ī who unified Maui in the 16th century. The isthmus also provided an easy route between the windward and leeward coasts of west Maui. There was little or no reef development, and the coastline was particularly rugged in the north-east.56

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Figure 4: Maui
Source: CartoGIS, The Australian National University.

Maui remained unified through to Kamehameha’s time, thanks in part to the relative ease of movement around the island. The seat of power for the ruling dynasty of Maui was the Wailuku area on west Maui’s windward coast. Here four permanent streams issued forth from the mountains to form broad fertile alluvial fans on the coastal plain that supported extensive irrigated taro fields. The small size of local districts suggests this fertile area supported a dense population. The area was known as Nā Wai ‘Ehā (the four streams), and its four districts centred on the streams they

were named after: Waihe’e, Waiehu, Wailuku and Waikapu. There were more permanent streams further up the windward coast of west Maui in Ka‘anapali. These also seem to have supported irrigated taro complexes.57

The leeward coast of west Maui was also heavily populated. The coastal lowlands contained scattered patches of irrigated taro surrounded by dry taro and ‘uala with groves of coconut and breadfruit trees. The importance of water was demonstrated by the arid nature of this coast away from irrigated areas. Even in times of drought, however, water to sustain crops on the coastal lowlands could be drawn from the upper reaches of large leeward valleys like the Olowalu that extended deep into the mountains. There were also coastal springs in places. Lahaina’s rich offshore fisheries and irrigated fields made it a particularly favoured leeward locality that was often used as a residence by Maui mō‘ī.58

Further east along the leeward coast, water was not so readily available. The district of Kula on the south-west slopes of Haleakalā was arid and sparsely populated. Its inhabitants relied on ‘uala and fishing for their sustenance. The remaining leeward districts of Honua‘ula, Kahikinui, Kaupo and Kipahulu contained more substantial populations because of the higher rainfall received by their inland slopes. Dry-field systems dominated by ‘uala occupied the slopes between 400 and 700 metres altitude in all four districts. While fishing was good off Kula and Honua‘ula, it was generally poor along the rest of this coastline. Most settlements were located up the slopes among the cultivation zone rather than on the coast.59

Rainfall increases towards the eastern end of this south-eastern coast towards the start of the windward coast in the district of Hana. The eastern coast of Hana had relatively wet uplands, which allowed the development of extensive fields of mulched dry taro and ‘uala, and almost continuous coastal settlement among fruit trees. The windward coast of Hana and its neighbour Ko‘olau contained permanent streams and supported a dense population practicing irrigated agriculture. The irrigated taro

58 King, in Beaglehole (1967), 3:1, p. 583; Clerke, in Beaglehole (1967), 3:1, p. 570; Vancouver (1801), bk 3, p. 326; Menzies (1920), pp. 103–04; and Handy & Handy (1972), pp. 272, 492–94.
fields of Ke‘anae and Wailua-nui in Ko‘olau were particularly productive. The political significance of this area is suggested by the massive heiau of Pi’ilanihale in Hana, perhaps the largest heiau in the islands.60

Hawaiian traditions concerning Maui do not indicate that east Maui ali‘i ever challenged the rule of mō‘ī based in west Maui. The Maui mō‘ī Kahekili’s ignorance of local springs while besieging Ka‘uiki Head in Hana in 1783, and the apparent cooperation between local residents and ali‘i from Hawai‘i in the 1770s and 1780s, suggest east Maui may not have been as fully integrated into the moku of Maui as is generally accepted. Hana and Ko‘olau were separated from west Maui by the districts of Hāmakualoa and Hāmakuaapoko. Both districts were situated on gently sloping lands that were too low to catch the moist north-easterly trade winds until they were well inland. Rainfall was limited near the coast and only small gulches crossed their slopes. The coastal bays generally provided good fishing and ‘uala was grown further up the slopes with breadfruit and banana trees planted in gulches. The large number of narrow ahupua‘a in these districts suggests a relatively high population.61

The rulers of Maui dominated their leeward neighbours on Lāna‘i and Kaho‘olawe. These two islands were located in a rain shadow area leeward of Maui’s high mountains and their aridity was not helped by their relatively low elevation. Kaho‘olawe is the smallest and most arid of the main islands. It has steep cliffs around most of its coastline and only intermittent rainfall, and seems to have been abandoned by the late 18th century.62 Lāna‘i had some valley development on its windward side, but had no permanent streams and received only seasonal rainfall. Most fell on the island’s central plateau. Despite this, most settlement by Kamehameha’s time seems to have been along the coast. Lieutenant James King, of Cook’s voyage, noted that, in places, ‘the Island look’d very Pleasant, and the borders seemed full of Villages’.63 With generally poor offshore fishing and limited reef development, the population relied on ‘uala, yams and dry taro.

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61 Handy & Handy (1972), p. 498.
Moloka‘i is an elongated island formed from two volcanoes linked by a central saddle (see Figure 5). Its east–west alignment meant that the windward face of the East Moloka‘i Mountains caught most of the moist trade winds, leaving the rest of the island largely deprived of rainfall. Whereas the permanent streams of the windward district of Ko‘olau carved deep, steep-sided valleys that broke up the high sea cliffs of this coast, leeward eastern Moloka‘i possessed only intermittent streams in shallow gulches. Low-lying western Moloka‘i was even drier. While the ocean crashed directly against the rugged windward coast of Ko‘olau, the leeward shore of Moloka‘i was blessed with reefs that enclosed broad shallows in which extensive fishponds were developed, particularly in eastern Moloka‘i.64

![Figure 5: Moloka‘i](image)

**Figure 5: Moloka‘i**

Source: CartoGIS, The Australian National University.

The population of the windward district of Ko‘olau was concentrated in four great valleys and grew irrigated taro, while the population of leeward Kona was dispersed along the central and eastern sections of the south coast and relied on upland dry-field systems and inshore fisheries for sustenance. The only permanent stream on this coast was at Kawela, where irrigated taro was grown.65 The western third of Moloka‘i was used only for fishing camps and the quarrying of basalt for adze production. Few people lived here and the

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64  Kirch (1985), p. 130.
whole area made up only one ahupua’a. Moloka‘i was not a major power in the wars between mō‘ī, but its abundant fishponds and lush windward valleys attracted the attention of mō‘ī from O‘ahu and Maui. The fierce rivalry between Ko‘olau and Kona ali‘i often lead to war, and facilitated the intervention of its more powerful neighbours on O‘ahu and Maui.

The eastern coast of O‘ahu is visible from western Moloka‘i on clear days. O‘ahu was shaped by lava flows from its two volcanoes, resulting in two parallel mountain ranges separated by a plateau (see Figure 6). There was a considerable leeward zone beyond the windward Ko‘olau Mountains. This zone included the unusual feature of large coastal plains in the districts of ‘Ewa and Kona. In contrast, the windward coast was relatively narrow and consisted largely of deep valleys often ending in cliffs at the watershed, whose permanent streams created alluvial fans at the coast. Unlike most of the other inhabited islands, O‘ahu had well-developed reefs around large sections of its windward and leeward coasts.

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**Figure 6: O‘ahu**

Source: CartoGIS, The Australian National University.

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Scottish sailor Archibald Campbell, who became part of Kamehameha’s retinue, considered O‘ahu to be the most fertile island in the archipelago in 1810. The windward district of Ko‘olaupoko was the most bountiful and populous district on O‘ahu. Centred on Kailua and Kāne‘ohe, its heavy rainfall, permanent streams and rich soils in its valley bottoms and flood plains produced one of the most productive wet taro areas in the islands. In addition, its offshore reefs allowed the development of extensive fishponds and provided a sheltered inshore fishery. The great valleys of Ko‘olauloa between Laie and its boundary with Ko‘olaupoko also produced a rich harvest of wet taro. Although the coastal plain here is not as extensive as at Ko‘olaupoko, its reefs and sheltered bays provide good fishing. The Ko‘olau Mountains decreases in height beyond Laie, resulting in a decrease in rainfall. Here the land is less weathered and prone to drought. King still found the area to be full of ‘villages’ in the 1770s.

Across the Ko‘olau Mountains from Ko‘olaupoko lay Kona, the most fertile district of leeward O‘ahu. Despite its leeward climate, Kona’s broad coastal plain sustained wet taro fed by permanent streams from the large valleys behind it that reach deep into the Ko‘olau Mountains. Fishponds lined Kona’s reef-fringed coast, although offshore fishing was relatively poor. Kona supported a large population by the 1770s. The other leeward districts of O‘ahu were noticeably more arid than Kona, and probably less densely populated. The scarcity of water on the ‘Ewa plain meant that most of the population of the district of ‘Ewa lived around the shores of Pu‘u‘loa (Pearl Harbour). Here they were able to tap the rich concentration of fish and shellfish in the harbour. Dry-field agriculture predominated, although some irrigated taro grew on the narrow plain between the harbour and the foothills of the Ko‘olau Mountains along streams that flowed into the harbour. The Wai‘anae coast fell within the rain shadow area of the Wai‘anae Mountains. Enough rain fell to sustain extensive cultivation of dry-field crops, particularly ‘uala. Some irrigation was possible in the upper reaches of larger valleys near the watershed of the

70  King, in Beaglehole (1967), 3:1, p. 610; and Handy & Handy (1972), pp. 271–75.
Wai‘anae Mountains. The Wai‘anae coast provided good offshore fishing but, Wai‘anae was remote from the centres of power, and its ali‘i do not seem to have been influential players in O‘ahu politics.73

The interior of ‘Ewa and Wai‘anae, between the two mountain ranges, was sparsely populated. It was traversed by trails linking Puuloa to the Waialua coast, and the Wai‘anae coast through Kolekole Pass.74 The population of the Waialua district lived mainly on the coastal plain of O‘ahu’s north-west coast. This plain was highly cultivated, despite low rainfall at the coast, thanks to streams that had their sources deep in the Ko‘olau Mountains. Captain Charles Clerke, an officer on the Cook expedition, described the land around Waimea Bay as ‘a fine expanse of Low Land bounteously cloth’d with Verdure, on which were situated many large Villages and extensive plantations’.75 The district did not have good offshore fishing and its coastal waters were largely unprotected by reefs.

The mō‘ī of O‘ahu drew the core of their support in this period from Kona and Ko‘olaupoko. Linked by the Nu‘uanu Pass and the eastern coastal plain, their combined resources provided perhaps the most concentrated resource base in the archipelago. Waikiki, Nu‘uanu and Kailua are mentioned as royal residences or patrilineal estates of 18th-century mō‘ī. The unification of O‘ahu seems to have been a relatively late event and 18th-century traditions refer to armed resistance to O‘ahu mō‘ī from ali‘i in ‘Ewa and Wai‘anae, and, to a lesser extent, Waialua and Ko‘olauloa.76

O‘ahu’s Waialua coast faces Kaua‘i, the oldest of the inhabited islands (see Figure 7). Kaua‘i’s mountainous core was heavily eroded over centuries to form broad valleys that deposited large alluvial fans at the coast. The heavy rainfall in the interior centred on Mount Wai‘ale‘ale, and gave rise to a number of significant waterways.77 Hawaiian traditions suggest the Kahakumakalina family provided most Kaua‘i mō‘ī up until the late 18th century. From an early period, their principal residence was at Wailua in the district of Puna. This was one of the most sacred sites in

GATHERING MOMENTUM

the archipelago, and there were a large number of heiau in its vicinity. Wailua was situated on the lower reaches of the Wailua River, the largest waterway in the islands. The river enabled the large-scale cultivation of wet taro. Breadfruit was another prominent food source in this area. Just north of Wailua was another extensive area of irrigated taro cultivation at Kapa’a. The third major population centre of Puna was at Hulē‘ia in the south where good offshore fishing supplemented fishponds, wet taro and ‘uala. The combined resources of Puna and its political dominance on Kauai suggest it had a considerable population.78

Figure 7: Kauai
Source: CartoGIS, The Australian National University.

To the north and west of Puna were the three windward districts of Koʻolau, Halele’a and Nā Pali. Broad fertile valleys with permanent streams supported large-scale irrigated taro complexes in Koʻolau and Halele’a. Cultivation was particularly concentrated in the Hanalei Bay area of Halele’a, where a number of valleys converged to produce a substantial coastal plain of fertile alluvial soil. The valleys and the plain were

extensively irrigated, and fishponds dotted the coastal plain. In contrast, Nā Pali consisted of deep, but narrow, valleys separated by razorback ridges and coastal cliffs. Most valleys seem to have been cultivated to some degree and, today, many still show signs of ancient irrigation systems. The Nā Pali coast was a rich deep-sea fishing area. While the combined population of these three windward districts was probably large, this does not seem to have translated into political influence. Puna remained dominant, and what opposition there was usually emanated from the large leeward district of Kona.\textsuperscript{79}

The large leeward district of Kona contained the whole south-western part of the island. Although it was significantly drier than the other half of Kaua‘i, it extended into the rain-drenched central plateau and included two large, permanently flowing watercourses. These flowed down the Waimea and Hanapepe valleys and allowed the cultivation of irrigated taro alongside dry-field crops up to 12 kilometres inland. The southern coast, east of Waimea, supported dry-field cultivation, particularly of ʻuala. Breadfruit thrived along most of the coast between Waimea and Wailua. This coast seems to have supported many people, judging from Cook’s observation that it had many villages. The Koloa area may have formed the third significant centre of population in Kona after Waimea and Hanapepe.\textsuperscript{80} The island of Niʻihau lay off the Kona coast and had a relationship with Kaua‘i that was similar to Lāna‘i’s with Maui. Kaua‘i dominated Niʻihau politically. Low-lying and drought-prone, Niʻihau was home to a population who depended on yam cultivation and temporarily abandoned their island during severe droughts and sought refuge on Kaua‘i.\textsuperscript{81} Waimea was a rich resource base for the I‘ihiwalani family, the junior branch of the royal line, to pursue their rivalry with their senior relatives in Wailua.\textsuperscript{82}


\textsuperscript{82} Fornander (1969), p. 293.
The translation of observations on settlement patterns into actual population figures is a difficult task. No accurate census of the Hawaiian population was taken until well into the 19th century, and few areas were visited for any length of time by Cook’s expedition. Regional settlement surveys by archaeologists help fill the gaps in places. Land records from the mid-19th century also help illustrate settlement patterns, although change during the intervening decades must be allowed for. Until recently, most estimates of the Hawaiian population in 1778 were based upon King’s observations. King initially estimated the population to be 500,000, but later revised this down to 400,000. His figures were based on house counts at Kealakekua Bay and Waimea on Kaua‘i. These were then extrapolated to cover the length of coastline that King estimated to be inhabited. He estimated that around a quarter of the coastline was inhabited, with little or no settlement of the interior. Most modern scholars have estimated the Hawaiian population in 1778 at between 200,000 and 300,000. The lack of firm evidence, however, means that these estimates are largely speculation.\(^{83}\)

In 1989, David Stannard proposed a radical revision of the Hawaiian population in 1778 to at least 800,000. He attacked the rather shaky basis of most previous estimates, and suggested King’s figure was a considerable underestimate. More than a quarter of the coastline was occupied, including marginal areas, as were inland zones. He suggests that Kealakekua Bay and Waimea did not represent the most densely populated areas in the islands, as both were in leeward zones where rainfall patterns restricted cultivation. He asserted that windward areas with more consistent rainfall probably supported greater population densities than most leeward areas.

Stannard supported his upward revision of the Hawaiian population by providing evidence to show that this was possible according to the islands’ potential agricultural production and accepted models of population growth. Stannard argues that such growth rates were not significantly curtailed by traditional warfare, infanticide, abortion, sacrificial killings or pre-European disease and general health. He notes that rapid and significant population decline among populations not previously exposed to European diseases usually followed first contacts with Europeans. Stannard points out that to take account of the impact of introduced

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disease, Hawai‘i State statistician Robert Schmitt’s contact population should be much higher, as it is nearly the same as missionary William Ellis’s estimate of the population four decades later (see Table 1).84

Stannard’s study prompted much debate. Most responses have been positive, but a number of valid criticisms have been raised. His negative assessment of the carrying capacity of Kealakekua Bay and Waimea relative to windward areas undersestimates the productivity of these areas, and exaggerates the difference between leeward and windward production. His claim that windward chiefs usually prevailed in battle over leeward chiefs is not supported by Hawaiian traditions in general, and certainly not by the one reference he cites to back up his claim. Stannard tends to rely on average carrying capacity rather than the more significant denominator, the carrying capacity of areas during drought and other hard times. None of these points, however, invalidate Stannard’s criticism of previous population estimates. They suggest that Stannard’s estimate needs modification rather than radical alteration.85

Table 1: Population estimates for Hawai‘i

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<th>Island</th>
<th>1779 (King)</th>
<th>1779 (Schmitt)</th>
<th>1779 (Stannard)</th>
<th>1823 (Ellis)</th>
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</table>


Estimating the indigenous population of Hawai‘i in the era of Kamehameha I with any degree of accuracy is impossible. What is more important for this study is the relative distribution of the population. This study generally supports Stannard’s argument for an upward revision of Hawaiian

population estimates. Deaths resulting from warfare and sacrifice seem to have been relatively low, but estimates of the typical ratio of combatants to total population argue for a population in excess of Schmitt’s figure. The review of settlement patterns supports Stannard’s speculation about the extent of Hawaiian settlement, and of the agricultural potential of the archipelago. However, the fragility of overextending agricultural capacity in areas of unreliable rainfall was also noted. The diversity of settlement concentrations revealed by the above locality survey argues against generalising from particular localities (see Figure 8). Windward localities, such as Hilo Bay, Nā Wai ʻEhā and Koʻolaupoko, were probably more productive than Kealakekua Bay and Waimea, as Stannard claims, but other windward localities, such as eastern Hāmākua on Hawaiʻi and Hāmākuapoko on Maui, were probably not as well populated. Furthermore, North Kona and leeward Kohala were probably more densely populated than either Kealakekua Bay or Waimea. While Schmitt and Stannard agree on the population ratios between islands, this is largely due to their use of Ellis’s 1823 estimates for each island. By this time, disease and increased mobility may have distorted traditional population patterns. Our review of local resources suggests population estimates for Oʻahu and Kauaʻi may err on the low side.

Figure 8: Possible population distribution, 1778
Source: CartoGIS, The Australian National University.
The distribution of resources just described conferred distinct advantages on the occupants of certain favoured localities. But the diffuse nature of power within moku restricted the degree to which such geographical advantages could be converted into lasting political benefits. The expectation of reciprocity underlying maka‘āinana obedience to sacred leaders, and the limited coercive power of those leaders relative to subordinate ali‘i, combined to restrain the concentration of power by mō‘i. The relative power of the leaders of different localities varied over time. The pursuit of status and power by individual mō‘i, and the pressures caused by expanding populations in a variety of local environments, altered the relationship between localities over time. Environmental constraints on economic activity and social and political barriers to the expansion of power by mō‘i were often challenged. Occasionally they were pushed back. Unification was possible, but by no means certain.