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Seeing like a colony: The virginia land surveyor☆

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ABSTRACT

Surveyors in colonial Virginia were among the wealthiest members of society, with a social status rivaling that of members of the House of Burgesses and plantation owners. Many received large land grants from the Governor's Council, which directly led to their wealth. We argue that allowing surveyors to acquire extensive land holdings advanced the colonial government's ambition to expand the boundaries of the colony, most effectively achieved by settling people on the frontier. Surveyors, who had a comparative advantage in knowing the geography, location, and quality of unclaimed land, could reduce the measurement and search costs associated with locating fertile tracts. By granting property rights to the western frontier to surveyors, the government enabled them to identify the best lands and sell them to settlers, thereby lowering transaction costs in land markets. Using newly constructed data on Virginia surveyors, land grant records, and maps of surveyors' land, we provide evidence of how surveyors acquired agriculturally productive land to sell to incoming settlers.

1. Introduction

Surveyors in colonial Virginia were among the wealthiest members of society, with a social status rivaling that of members of the House of Burgesses and plantation owners. In her authoritative work on colonial Virginia surveyors, Hughes (1979) documents their material wealth at the time, reflecting this status:

> these men wore no crude frontiersman's buckskins when they sat on the county court or rode into Williamsburg. Their satin waistcoats, brocaded vests, patent slippers, and powdered wigs were of the latest English fashions. County surveyors were also in the forefront of the movement to bring to Virginia that British taste in housing which was an architectural expression of social rank as elaborate as their clothes. Even on the far frontier, surveyors built mansions which, if sometimes less imposing than the grand Palladian edifices built along the lower James, were of impressive style within their own regions. Gentlemen surveyors displayed by plural offices, by wealth, by daily lifestyle, and by family connections their membership in the ranks of the exclusive county gentry that was the bulwark of Virginia's exceptionally stable ruling class. (p. 156)

Their mansions often included glass windows, imported brass fittings, decorative bannisters, fine furniture, and ample supplies of linen, china, and silver. Surveyors owned voluminous libraries that ranked among the best collections in the colony. The most accurate representation of their wealth was the number of children they were able to house, feed, clothe, and educate. Most had five

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to eight, but some more successful surveyors raised exceptionally large families, such as John Henry with eleven, William Preston with twelve, Thomas Lewis with thirteen, and John Wright Jr. with eighteen (Hughes, 1979, p. 161).

Many sons of surveyors either followed in the footsteps of their fathers' profession or pursued more profitable careers such as law. For example, Patrick Henry, the son of surveyor John Henry, studied law and played an instrumental role in raising a militia in Virginia to start a revolution against Great Britain, famously proclaiming "give me liberty or give me death!" Thomas Jefferson, son of surveyor Peter Jefferson, completed some surveys before pursuing a legal career and eventually becoming president. For others, surveying served as a stepping stone to more desired careers. Such was the case for George Washington, who made substantial earnings as a surveyor before entering the military and ultimately becoming the first president of the United States (Hughes, 1979, pp. 90, 93, 162).

Why were colonial Virginia surveyors as wealthy and politically influential as they were? Many other political offices were profitable, as evidenced by the prices at which such offices were bought and sold (Williams, 1959, pp. 260–262). Yet surveyors in neighboring colonies such as Pennsylvania, Maryland, and the Carolinas never reached the same levels of political influence and professional independence as those in Virginia, and surveyors in the northern New England colonies were nowhere near as wealthy. Even in England, where surveyors were technologically more advanced than their Virginian counterparts, they did not achieve the same wealth or social standing (Hughes, 1979, p. 3). From later centuries through modern times, surveyors never regained the prestige and recognition enjoyed by Virginian surveyors in the eighteenth century. What, then, allowed them to achieve such success?

To answer this, we must identify the commodity that enabled many Virginians to pursue the prosperous lives they imagined when crossing the Atlantic. That commodity was land, as Williams (1959) observes, since ownership conferred political rights, agrarian independence, and social status derived largely from estate size. As he puts it, "to this age the pursuit of happiness was the pursuit of property" (p. 4). Land was the representative asset of wealth in the colony. One reason surveyors in Virginia acquired more wealth than their counterparts in other colonies and England was their much greater access to land ownership (Hughes, 1979, p. 68). At the time, the conquest and acquisition of land was "the greatest economic endeavor on the continent" (Gallo, 2012, p. 9), and thus "[w]herever unclaimed acres remained plentiful in the Old Dominion, surveyors can be found who were powerful figures in their society" (Hughes, 1979, p. 3). George Washington, for instance, was able to climb in status and accrue wealth by acquiring large landholdings in the backcountry (Gallo, 2012, p. 10).

Why were surveyors able to capture so much land relative to their colonial peers? Many of their grants were approved by the Virginia Council, the upper house of the colony's government. These grants often carried privileges that waived or delayed payment for the land. Why would the Council extend such favorable terms to surveyors? Presumably, many others in the colony would have been interested in acquiring similar holdings but could not rise to the same rank as surveyors.

We argue that allowing surveyors to acquire large tracts of land was an intentional strategy that made use of local knowledge to lower the transaction costs of frontier settlement. One of the primary goals of the colony at the time was to expand its westward limits. Achieving this required individuals to settle on the frontier so that the colony could establish stronger economic property rights over its territory. However, settlers were reluctant to claim unfamiliar land on the periphery of the colony: they did not know the best routes of access, where the most fertile tracts were located, or where it was safe to settle. Surveyors, who had a comparative advantage in understanding the geographical layout, neighboring inhabitants, and qualities of the land, could identify plots most conducive to successful settlement and sell them to land-seeking Virginians. By assigning property rights on the western frontier to surveyors, the government was able to reduce transaction costs in the land market and encourage greater settlement on the frontier.

The work of James C. Scott provides a key lens for understanding the relationship between surveyors and the colonial Virginia government. Scott (2017) recognizes that states seek to expand their territory to control more resources, grow their population, enlarge the tax base, and thereby increase state power. Yet, as Scott (1998) shows, these ambitions are frequently undermined when states ignore localized knowledge in their efforts to simplify, standardize, and render legible land ownership, settlement patterns, and agricultural practices. A further obstacle is what Scott (2009) calls the "friction of terrain"—the ways in which difficult geography impedes a state's reach and administrative control. States thus face both information and implementation problems: distance, rugged terrain, and local complexity limit the effectiveness of a purely centralized approach to expansion. Our contribution is to show how a state was able to overcome these obstacles by harnessing local knowledge. Instead of sending distant bureaucrats with grand plans, the colonial government empowered local entrepreneurial experts — the surveyors — to facilitate expansion.

We provide evidence for this theory using colonial statutes, archival land grants, and georeferenced maps of surveyors' tracts. First, we use William Hening's *The Statutes at Large; Being a Collection of All the Laws of Virginia, from the First Session of the Legislature in the Year 1619* (Volumes 3-7, 1684–1763), to show how the colonial government promoted frontier development and required landowners to develop their land through various acts in the first half of the eighteenth century. Then we construct an original dataset of Virginia Council grants to surveyors from the early eighteenth century through the Revolution using the *Executive Journals of the Council of Colonial Virginia* (Volumes 2–6, 1699–1776). These records reveal how the Council actively approved surveyors' petitions for land and how those in western counties bordering the frontier received larger grants than their eastern counterparts. Finally, we georeference maps of surveyors' tracts from contemporary plats and patent books to show that surveyors consistently selected land with greater agricultural potential relative to surrounding tracts. We interpret these patterns as evidence that surveyors relied on local information to identify and bring to market productive land, thereby reducing search and measurement costs for settlers.

By studying the relationship between surveyors and the colonial Virginia government, we contribute to the economics of property rights literature on frontier formation. This research has shown how property rights emerge under high transaction costs when state authority is absent or weak (Anderson and Hill, 1975, 2004; Umbeck, 1981), and how states formalize and enforce property rights when land values rise and political coalitions contract over titles (Alston et al., 1996, 2012; Libecap, 1990). Within this

tradition, Allen (2019) argues that governments often relied on targeted land transfers, such as homesteads and railroad grants, as a low-cost means of rapidly establishing economic property rights across unsettled territories. Yet such programs frequently failed when states lacked reliable information about local conditions, as with the Homestead Act's rigid acreage allotments (Libecap and Hansen, 2002). We build on these insights by showing that the colonial Virginia government pursued a distinct strategy that relied on local expertise: allocating land rights to surveyors, who held a comparative advantage in measurement and search, to accelerate frontier settlement.

We also contribute to the literature on colonial America, specifically pre-Revolutionary America. Previous work has been done by Lindert and Williamson (2016b,a) to estimate income and inequality in colonial America. Lindert and Williamson (2013) found that the more southern colonies had higher incomes relative to northern colonies. The southern colonies also had a lower number of poor white people, pointing to a potential lower level of inequality. Engerman and Sokoloff (2005) suggests that a possible reason for the higher levels of equality was a climate that favored mixed farming and a lack of Indigenous people in the Northeast. While we do not disagree that colonial Virginia may have had higher incomes relative to the north and overall other colonies (like those in Latin America), we focus on the potential land inequality among settlers. Land inequality can present problems for economic growth, as it has been linked to less growth in the long-run (Adamopoulos, 2008; Baten and Hippe, 2018; Frankema, 2010). While a lack of Indigenous people may have contributed to higher equality, we are focusing on a potential reason for land inequality within the white-settler group.

The paper proceeds as follows. Section 2 uses the work of James Scott to formulate a theory to explain the allocation of lands to surveyors in colonial Virginia. Section 3 provides institutional and historical background, situating the county surveyor within the colony's broader objectives of territorial expansion. Section 4 uses evidence from land grants and georeferenced surveyor tracts to demonstrate that surveyors acquired productive arable land and sold it to incoming settlers. Section 5 concludes.

2. Theory

James Scott identified a set of core objectives that systematically structure state organization. One of these objectives is to convert non-state space — spaces from which the state cannot reliably extract resources — into state space, a campaign that only became feasible with the state capacity possessed by colonial states (Scott, 2009, pp. 4, 10–11). Because fiscal extraction in early modern states relied heavily on the taxation of commerce and land, states sought to make land legible through cadastral mapping, standardization, and measurement (Scott, 1998, pp. 2–3, 11–13, 33–34). Accordingly, one of the main administrative goals of early modern states was to "measure, codify, and simplify land tenure" (Scott, 1998, pp. 36–38).

The frontier of the state, especially an open frontier, limits the state's ability to bring non-state space into its domain and to make that land legible. In studying Southeast Asia, Scott (2009) shows how rugged terrain impedes state penetration into new areas, a constraint he terms the "friction of terrain" (pp. 40–63). This characterization applies directly to the obstacles faced by eighteenth-century colonial Virginia. The colonial government sought to expand westward, but the ruggedness of the terrain increased with westward expansion, ultimately culminating in the Appalachian Mountains.

For the state to expand its territory and increase land tax revenue, it must secure economic property rights over frontier lands, especially when those lands are contested or vulnerable to appropriation by rival states, societies, or other land-seekers.[1] Securing such rights requires going beyond mere exploration or cartographic claims to frontier lands and instead establish some means that discourage appropriation by others. One straightforward method is the stationing of military forces along contested borders. In Colonial Virginia, where no standing professional army was maintained by the colonial government for most of the seventeenth and early eighteenth centuries, sustaining permanent garrisons along a long and shifting frontier would have been extremely costly. Encouraging private settlement on the frontier therefore served as a low-cost alternative. Once settlers obtained property rights in frontier land, they had strong incentives to defend it against encroachment.

If left to the free will of settlers, the frontier would remain largely underdeveloped. This is because of the high transaction costs associated with settling on frontier land.[2] Although the colonial government sought to grant land within its boundaries to settlers, measuring the quality of that land was costly.[3] There exist high transaction costs in measuring the attributes to the land: quality (agricultural productivity), accessibility and transport routes, availability (conflicting or overlapping claims), and safety (distance from competing settlers, Indigenous groups, or rival states). These high costs made individual settlers reluctant to claim land on the frontier. In a world with zero transaction costs where measuring the attributes of land is costless, settlers could easily find the optimal land for settlement and establish themselves on the frontier. But in a world of positive transaction costs, where measuring land quality, safety, availability, and locating this land is costly, settling on frontier lands becomes less economically viable.

It is left to the state, then, to create settlements on the frontier. The central challenge the state faces in this endeavor lies in identifying which frontier lands are likely to support successful settlement—a task that requires information the state does not readily possess. Such lands are typically remote from urban centers and thus lack ready access to public goods, markets, and legal institutions. For individuals to find settlement on the frontier desirable, the land must support sustained subsistence, offer security from rival claimants, be physically accessible and navigable, and have clearly defined boundaries. Absent these conditions, frontier settlements are unlikely to survive. Identifying land capable of sustaining durable settlements requires local geographic knowledge of terrain, land quality, neighboring communities, and routes to and from the frontier.

[1] We conceptualize an economic property right as the ability to consume an asset (Barzel, 1997, p. 3).

[2] We define transactions costs as costs associated with "defining, protecting, and enforcing the property rights to goods" (North, 1990, p. 28).

[3] For the seminal work that shows how measurement costs shape the organization of contractual arrangements and market exchange, see Barzel (1982).

Through cases of high-modernist urban planning and compulsory villagization, Scott (1998) shows that the state's reliance on centralized, legible knowledge leaves it unable to identify where durable settlements and functioning social order can emerge. For instance, in selecting new village sites for the ujamaa villagization campaign in Tanzania between 1973 and 1976, the Tanzanian state relied on centralized, map-based criteria and administrative convenience rather than local geographic knowledge, explicitly disregarding soil quality, rainfall patterns, and topography (p. 229). Village locations were often chosen by identifying "blank spots" on official maps (p. 232), producing settlements that were far from water and fuelwood (p. 235), and situated on infertile land (p. 240). Deprived of the ecological and logistical conditions necessary for subsistence, these villages failed to function as viable settlements. Scott (1998) concludes that planned settlements are inherently unable to reproduce the complex, emergent social organization characteristic of successful communities (pp. 256, 261, 309–310), which explains why state-led settlement schemes have "rarely gone as anticipated" (p. 191).

According to Scott (1998, p. 340), these attempts failed because states ignored or suppressed the local, practical knowledge — what he calls *mētis* — necessary for their success. *Mētis*, an ancient Greek concept, is defined by Scott as "a wide array of practical skills and acquired intelligence in responding to a constantly changing natural and human environment" (p. 313). This knowledge can only be learned through practice, experience, and repeated engagement of the activity itself, and cannot be acquired through written or oral communication. It is most useful in settings where facts are unknown and particular, and where practical judgment must be continually adapted to situations that are similar but never exactly the same. *Mētis* gives the practitioner the ability to influence and improve outcomes in a particular situation (p. 313–318).

Importantly, then, *mētis* reflects local knowledge that is spatially and temporally contingent, and specific to the particular context in which it is exercised (Scott, 1998, pp. 317–319). For example, Scott emphasizes that practices such as farming are carried out in spatially and temporally unique settings: "all farming takes place in a unique space (fields, soil, crops) and at a unique time (weather pattern, season, cycle in pest populations) and for unique ends (this family with its needs and tastes)" (p. 318). It is the farmer's development of *mētis* through repeated engagement with that setting that makes successful cultivation possible. Thus, *mētis* is not monolithic or standardized, but instead varies across practitioners and localities (p. 332).

In colonial Virginia, one group possessed the *mētis* necessary to identify suitable frontier lands for settlement: surveyors. Because all land claims required an official survey, surveyors encountered far more plots of settled land than any other individuals in the colony. They were assigned to a single county and, as a result, developed detailed expertise in its local lands. Surveyors in frontier counties were required by law to reside in the county in which they surveyed. By surveying the lands that individuals chose to claim, surveyors learned which tracts were relatively desirable for settlement and which remained unclaimed in the public domain. No other individual in the colony possessed comparable knowledge of the lands within a given county. Moreover, because surveyors were responsible for mapping frontier lands, they possessed the most detailed knowledge of the colony's frontier.

By assigning the property rights of frontier lands to surveyors, the colony enabled them to act as land speculators, seeking out and selling the best tracts on the frontier. They could leverage both their intimate knowledge of the land and the institutional benefits of their official positions to lower the transaction costs in land markets associated with measuring and locating good land for settlement. This led to more people settling on the frontier than would have been the case with land speculators alone. As a result, the colony secured stronger economic property rights over its border and newly claimed lands, thereby advancing its goal of territorial expansion.

We argue that the colonial government allowed surveyors to amass large landholdings, sometimes granting them the land directly, as a way of settling the colony's borders more effectively than would otherwise have been the case. This institutional arrangement created distinct incentives for surveyors, leading to predictable patterns of behavior. Drawing on historical sources and the existing literature, we derive four theoretical predictions from the institutional environment in which Virginian land surveyors operated.

1. Surveyors accumulated more land than non-surveyors.
2. Surveyors operating in frontier counties accumulated more land than surveyors in non-frontier counties.
3. Due to skill, surveyors are able to determine the most productive land.
4. Surveyors are able to leverage their unique position in order to profit off access to land.

Prediction (1) establishes that surveyors had more access to readily purchasable land, and were indeed purchasing that land. This follows from our theory that land was used to incentivize surveyor involvement in the establishment of frontier settlements. Prediction (2) follows directly from prediction (1). Due to the goals of the colonial state in legitimizing specifically frontier lands (in an effort to expand boundaries), we theorize that there will be within-surveyor differences in land grants. Specifically, we make the claim that frontier surveyors are in a unique position as their involvement in the establishment of property rights has additional value to the colonial state. We predict that this additional benefit will be observed as additional land grants.[4]

Prediction (3) moves from incentives provided by the state to the abilities of the surveyor. Regardless of how the state incentivizes surveyors to take part in legitimizing non-state lands, the state only benefits if surveyors do indeed possess *mētis*. If surveyors do possess *mētis* then they should have the knowledge necessary to identify the most productive, or valuable, land within the colony. Surveyors are additionally incentivized to make sure they keep valuable land for themselves. Surveyor land tracts should thus be agriculturally productive relative to surrounding lands.

Prediction (4) builds on this by connecting surveyor ability back to state incentives. If surveyors are incentivized by profit by the state, and have the ability to capitalize on these incentives, then we should observe surveyors profiting from their land claims. We test predictions (1) and (2) in Section 4.1, (3) in Section 4.2, and (4) in Section 4.3.

[4] We also acknowledge that less settled (frontier) counties will have more available land, so that even without any state involvement, surveyors benefit from increased land choice.

3. Surveying in colonial Virginia

This section introduces the institutional and political context of surveyors and the colonial government in eighteenth-century Virginia. Sections 3.1 and 3.2 provide background on the legal process of securing land and the county surveyor's role in that process. Section 3.3 establishes that a central focus of the Virginia colony was territorial expansion through frontier settlement. Section 3.4 then shows how assigning property rights to surveyors functioned as an effective strategy for achieving this goal.

3.1. From grant to patent: Securing land in colonial Virginia

Obtaining a legal title to unclaimed land generally consisted of four steps: (1) obtaining a grant; (2) choosing the boundaries; (3) having a surveyor conduct the survey; (4) securing a patent. After obtaining a grant, typically through purchase, for a specified quantity of land, the settler would select the land they wished to settle. As long as no one else had previously claimed it, the settler was free to choose whichever land they wanted in whatever shape or parcel they desired. These tracts did not have to be continuous, adjacent, or of uniform shape. The most fertile land went to "whoever first registered entry claims", while marginal areas "often remained in the public domain as wastelands for a generation or more", as settlers sought to "encompass only the best arable fields, meadows, stands of timber, springs, or creeks within a specified acreage" (Hughes, 1979, pp. 4–5).

This system of land distribution, known as "indiscriminate location", distinguished the southern colonies from middle and northern colonies, which relied on a more centralized distribution. Poor-quality land was left in the public domain, while "first entrants to a newly opened frontier area enjoyed a considerable advantage over latecomers, because they could select the best lands, in whatever configuration they chose" (Gallo, 2012, p. 49).[5] After choosing what land to settle, the next step was to have the surveyor conduct the survey, which could only legally be done by the appointed county surveyor or one of his assistants. The surveyor certified the size of the tract and ensured there was no previous claim (McCleskey, 1990, p. 461). The final step of the process involved securing a patent from the governor and Council. This required sending the survey to the secretary's office so the land title could be recorded.[6]

While anyone could go through this process to obtain land, the majority did not. Instead, they purchased privately held land, often from land speculators or surveyors. For example, McCleskey (1990, p. 467) finds that in Augusta County before 1770, 61.1% of the land transactions were private sales and only 35.1% were patents. Surveyors were responsible for recording these land sales (Hughes, 1979, p. 126).

3.2. The county surveyor

In 1695, the authority to appoint surveyors was granted to the College of William and Mary as part of its endowment.[7] By 1699, sixteen surveyors were serving twenty-three counties with a population of 62,000 settlers in the colony. The county surveyorship — the practice of having a surveyor for every county — was further solidified at the turn of the century with the college's appointees. In the following decades, the county surveyor became the prominent form of structural organization for Virginia land surveyors.[8] The College of William and Mary retained its right to appoint county surveyors until 1779, when the authority to "nominate, examine, and commission" surveyors was transferred to the county courts (Hughes, 1979, pp. 27, 72, 105).[9]

The eighteenth century brought a series of significant acts aimed at standardizing and regulating survey practices to improve the legitimacy and legibility of landownership in a rapidly expanding colony. The first major law, which laid the foundation for surveyor regulations up to the Revolution, was the 1705 *Act directing the duty of Surveyors of Lands, and ascertaining their Fees* (Hening, 1823/1705, pp. 329–332). This act required surveyors to maintain a record book, bound in vellum or leather, documenting each survey by name, acreage, date, and location. It regulated surveyor fees, prohibited overcharging, and imposed a fine of 2000

[5] This type of land distribution is often avoided when those allocating land are also its owners. In Pennsylvania, for example, William Penn surveyed his holdings into rectangular plots before selling to settlers, thereby maximizing sales and preventing haphazard settlement that left unwanted tracts unused. In Virginia, by contrast, the land was technically owned by the crown. Because the officials granting rights had no ownership stake, they were less inclined to survey and demarcate plots to ensure all land was settled.

[6] See Beverley (2013, p. 222), Hughes (1979, p. 62), McCleskey (1990, p. 461), and Voorhis (1940, p. 62) for more details on the patenting process. Settlers did not need to travel to the secretary's office in Williamsburg themselves, since surveyors routinely handled this step on their behalf for an additional fee. It was not uncommon for settlers to delay completing this step in order to avoid paying quitrents (Hughes, 1979, pp. 126, 130), which were to be paid to the crown and acted as a tax of two shillings on every hundred acres owned (Voorhis, 1940, p. 74).

[7] The school's charter, which included the right to the office of surveyor general, was issued February 8th, 1693, but it was not until May 8th, 1695 that the college was first given permission to execute the authorities of the office (Hughes, 1979, pp. 24–25). See also Gallo (2012, pp. 45–46) and Beverley (2013, pp. 197–198).

[8] The number of surveyors at a given point in time can be approximated by the number of counties in existence, as colonial law established one county surveyor per county. On this basis, Virginia had approximately 25 county surveyorships in 1704, 29 in 1724, 50 in 1754, 62 in 1774, and 87 by 1794. This likely underestimates the total number of practicing surveyors, since surveyors commonly employed assistants, but may overestimate the number of active county surveyors, as newly created counties sometimes faced delays in appointment and vacancies were occasionally covered temporarily by surveyors from neighboring counties.

[9] Surveyors in colonial Virginia were not formally trained technicians in a modern sense. Entry into the profession did not require standardized mathematical or engineering instruction, but rather involved skills acquired through reading or brief apprenticeship. Colonial law explicitly tolerated substantial measurement error, reflecting the practical and discretionary nature of surveying in this period (Hughes, 1979, pp. 64, 118, 127).

pounds of tobacco for violations. Surveyors who refused or delayed a survey after reasonable notice were fined 4000 pounds of tobacco, half payable to the government and half to the petitioner.

Under the act, all surveyors to be sworn in by the court of the county in which they served, formally embedding them within local governance.[10] The legislation also required surveyors to submit their record book annually each June to the county court clerk. Failure to record or report a survey correctly incurred a fine of 2000 pounds of tobacco, divided between the government and any informant. Because only sworn, county-appointed surveyors could produce the legally recognized surveys required for land patents, and only surveys entered into the official county book were valid claims, the act effectively granted county surveyors a monopoly over surveying services in their counties.[11]

3.3. State expansion in Virginia

In the eighteenth century, the Virginia colony resembled the kind of expansionary state described by Scott (1998, 2009), one focused on extending territorial claims and incorporating frontier land into the state's administrative domain. This shift in priorities is reflected in the change in land-granting policy at the turn of the century. In the seventeenth century, the colony had been focused on growing the population. To encourage new settlers, it granted land through the "headright" system, which allocated fifty acres to each person transported to the colony, whether by another individual who paid their passage or by immigrants who financed their own (Voorhis, 1940, p. 44).[12] Southern colonies adopted similar policies as these neighboring governments competed for immigrants. A sizable population was essential for building a sustainable and prosperous economy and has historically been a central concern of states (Scott, 2017).

As the colony shifted its focus to settling more land, it made land rights easier to obtain by offering them for purchase. In 1699, the receiver general's office was officially authorized to sell land at the rate of five shillings for every fifty acres (Voorhis, 1940, p. 90). These land-granting rights, known as "treasury rights", became the dominant method of distribution in the colony by the early 1720s.[13] In the eighteenth century, obtaining treasury rights through the county surveyor was one of the primary ways to acquire land.

As early as 1716, Governor Spotswood led an expedition over the Blue Ridge Mountains — later known as "The Knights of the Golden Horseshoe" — to explore the land beyond Virginia's colonial boundary, assert the claims of the English crown, and encourage future settlement on the frontier (Glanville, 2013, p. 52). The expedition revealed that the lands west of the Blue Ridge were vast, fertile, and accessible, but also exposed to potential incursions from French forces and Indigenous groups. In 1720, the General Assembly of Virginia passed an act "for erecting the Counties of Spotsylvania and Brunswick" (Hening, 1820a/1720, pp. 77–79) aimed at securing the frontier. Spotsylvania County was strategically drawn to include the northern passage through the Blue Ridge Mountains, serving as a key choke point to assert control over westward movement and deter encroachment by competing groups.

This law paved the way for the largest territorial expansion in Virginia's history. In 1734, the Assembly passed *An Act for dividing Spotsylvania County* which created Orange County (Hening, 1820a/1720, pp. 450–451). Glanville (2013, pp. 44, 48) denotes this year — the year Orange County increased the politically defined area of Virginia nine-fold — as the start of the "Great Virginia Land Grab". Fig. 1 illustrates this dramatic increase in Virginia's politically defined area. From 1763 to 1776, the Virginia colony claimed that its boundary with North Carolina extended to the Mississippi River and that its northern border ran above the Ohio River, encompassing parts of present-day Kentucky, Ohio, Indiana, and Illinois. This move into the interior furthered Virginia's long-term goal of expanding the size of the colony (McCleskey, 1990, p. 486).

Exploring the western frontier and claiming the wilderness lands was not good enough for conquering land, as other groups such as Indigenous people and the French were also seeking control over land in America. In order for the colony to establish firm economic property rights over these lands, it needed individuals to settle on them.

As early as 1713, the colonial government addressed this concern by passing legislation that required settlers to actually inhabit and improve the lands they claimed, outlining what constituted "sufficient seating, planting, cultivating, and improving of lands" (Hening, 1820a/1713, pp. 37–42). Land was divided into categories — e.g., plantable, barren, rocky — and the statute specified the improvements settlers were required to make within three years of patenting the land. Surveyors were responsible for classifying the land according to these categories at the time of survey. The legal distinctions and corresponding improvement requirements are summarized in Table A.1. Section XII further required settlers to prove their "seating, planting, cultivation, and improvement,

[10] This marked a major shift in the governance of surveyor appointments. In the seventeenth century, the deputy surveyor general appointed surveyors, but in the eighteenth century, appointments came under county control. The county court appointed the surveyor along with nearly all other county officials (McCleskey, 1990, p. 483). Surveyors themselves often served as magistrates and maintained close ties to the county courts, which contributed to the rise of powerful, nearly autonomous county surveyors (Hughes, 1979, p. 55).

[11] See Appendix B for a summary of laws regulating and defining surveyor duties following the 1705 Act.

[12] Headrights were transferable and frequently bought and sold, particularly in the later part of the seventeenth century (Beverley, 2013, p. 221; Voorhis, 1940, pp. 46, 65). See Voorhis (1940, pp. 13–21) for the origins of this method dating back to 1619, with the London Company of Virginia. For more detailed discussions of this system, see Hughes (1979, p. 4) and Voorhis (1940, p. 62).

[13] Hughes (1979, p. 107) claims that treasury rights surpassed headrights in importance by as early as 1715. Voorhis (1940) provides more details on this transition: "At first the use of treasury rights grew slowly. In 1699, headrights were presented to secure about four-fifths of the patents issued. Between 1700 and 1706 some three-fourths of the people offered these certificates. By 1715 the treasury and headrights were used in about equal proportions. During 1718... the headrights suddenly dropped to about one-seventh of the total, and between 1725 and 1726 only one-tenth of the patents were issued on the old basis, the rest being five shilling treasury right grants. Soon afterward the headright was practically forgotten" (p. 90). See also Voorhis (1940, pp. 116–117) and Williams (1959, pp. 18–19) for more on the introduction and transition to treasury rights at the turn of the century.

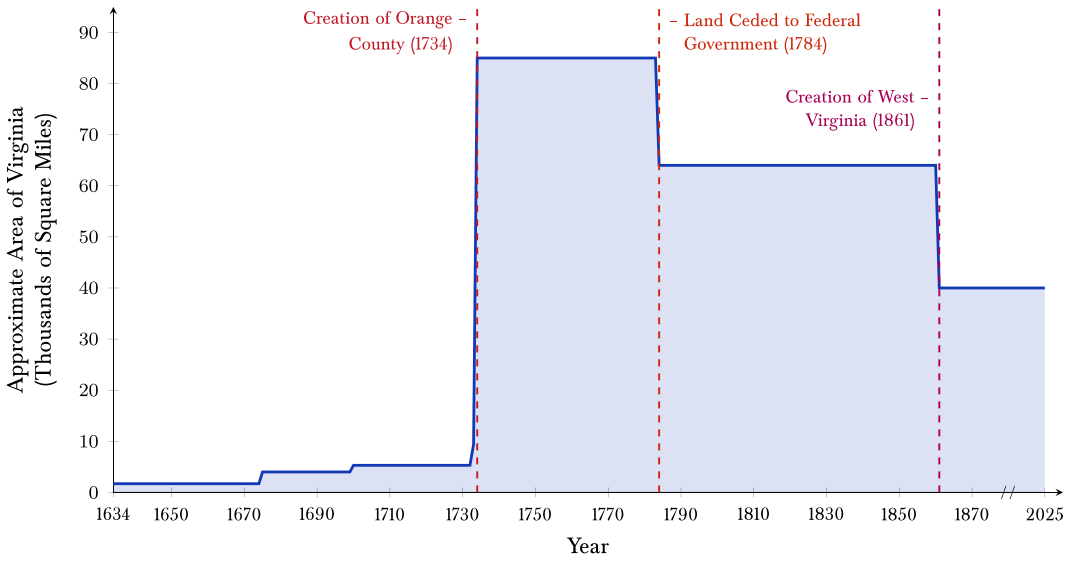


Fig. 1. Virginia's politically defined territory, 1634–Present.
This chart was constructed using data and notable events from Glanville (2013, p. 47) Table 1. The area figures are rounded approximations based on data from the *National Atlas* and the *Atlas of Historical County Boundaries*. The 1734 value, reflecting Orange County's creation, is a conservative estimate. As Glanville (2013, p. 71, Endnote 14) notes, some historians argue that Virginia's legal claims extended as far west as the Pacific.

in the general court, or in the court of the county where such land shall lie", or risk forfeiture of title (Hening, 1820a/1713, p. 41). Although enforcement appears to have been loose in practice, the statute reflects the colony's interest in settling people on the land they claimed.[14]

After this, the Assembly passed many more acts to further encourage settlement, specifically on the frontier and at the boundaries of the colony, and their goals were made explicit. For instance, the 1738 act *To encourage Settlements on the Southern Boundary of this Colony* stated:

> I. WHEREAS the lands lying upon Roanoke river, on the southern boundary of this colony, are for the most part unseated and uncultivated; and a considerable number of persons, as well of his majesty's natural born subjects, as foreign protestants, are willing to import themselves, with their families, and effects, and to settle upon the said lands, in case they can have suitable encouragement for their so doing: and whereas the *settling that part of the country, will add to the strength and security of the colony* in general, and be a means of augmenting his majesty's revenues of quit-rents: therefore, for encouraging the said intended settlement, (Hening, 1819a/1738, p. 57, emphasis added)

Very similar phrasing was used in the act sectioning off most of Orange County to the new Augusta County:

> whereby the strength of this colony, and *it's security upon the frontiers*, and his majesty's revenue of quit-rents, are like to be much increased and augmented: For giving encouragement to such as shall think fit to settle there... (Hening, 1819a/1738, p. 78, emphasis added)

Similar language also appeared in later acts encouraging settlement on the Mississippi River (Hening, 1819b/1752, p. 258; Hening, 1819b/1753, pp. 355–356). Across these acts, the colonial government repeatedly and clearly framed frontier settlement as a means of strengthening the colony's boundaries and enhancing its security at the frontier.

In order to encourage settlement, these acts often exempted both current and new settlers in these territories from public levies (taxes) for at least three years, but more often ten. Such was the case for acts encouraging settlements in frontier counties Spotsylvania, Brunsiwck, and Augusta (Hening, 1820a/1720, p. 78; Hening, 1820a/1738, p. 80), west of the Shenandoah River (Hening, 1820a/1734, p. 450), on the southern boundary (Hening, 1819a/1738, p. 58), and "westward of the ridge of mountains, that divides the rivers Roanoke, James, and Potomack, from the Mississippi" (Hening, 1819b/1752, p. 258; Hening, 1819b/1753,

[14] Follow-up legislation in 1720 (Hening, 1820a/1720, pp. 81–83) loosened the requirements from the 1713 Act by recognizing a broader range of improvements on the land.

p. 356). In encouraging settlements on the southern boundary, the colony also agreed to grant "letter[s] of naturalization to any alien[s]" who had already been settled on the land (Hening, 1819a/1738, p. 58).[15]

The colony also made efforts to arm the frontier settlers in order to defend their land. In the 1720 Act erecting Spotsylvania and Brunswick, each settler was to receive £1000 in arms and ammunition, including "one firelock, musket, one socket, bayonet fitted thereto, one cartouch box, eight pounds bullet, two pounds powder" (Hening, 1820a/1720, p. 78). Then after the French and Indian war started in 1754, the colony passed multiple acts throughout the war which raised and allocated resources to encourage and protect settlers on the frontier (Hening, 1819b/1754, pp. 417–420; Hening, 1819b/1754, pp. 521–530; Hening, 1820b/1756, pp. 9–25; Hening, 1820b/1758, pp. 171–179; Hening, /1759, pp. 282–283). These laws all served the Virginia colony's central aim in the eighteenth century: to strengthen its security, increase tax revenue, and expand its territorial reach by encouraging settlement on its peripheral lands.

3.4. Assigning property rights to surveyors

Despite the many legal efforts of the Virginia colony to expand its borders, it still faced major hurdles in creating settlements on the frontier. Many Indigenous tribes lived and hunted on the land. Spotswood encountered them during his expedition.[16] Conflicts with these groups sometimes led to surveyors being attacked while working on the frontier. The French and Indian War epitomized this broader struggle, involving not only Indigenous peoples but also rival European colonists (Glanville, 2013, p. 61; Hughes, 1979, pp. 94–95, 121, 149; Peyton, 1882, pp. 3–4).

Not only did this prevent the colony from claiming the land, it also left incoming settlers uncertain about where it was safe to live. Attempting to settle unfamiliar land on the outskirts of the colony was intimidating, risky, and challenging even for the most capable individuals. No less of an obstacle was the need to locate and claim land sufficiently fertile to support one's household.[17] Even if such land could be identified, settlers had to determine whether they could reach it through undeveloped, uncleared, and often pathless terrain and woods. And if they did find it, they still had to determine whether it was available. As McCleskey (1990) summarized the problem: "[t]he real difficulty for newcomers lay... in finding their way to patentable land. For strangers confronted with vast expanses of unfenced and apparently unmarked territory, the task was all but impossible without assistance from established inhabitants and county officials" (p. 463). Together, these challenges made settlement on the colony's peripheral lands an extremely formidable task, especially for the majority of land-seekers who were just arriving in the colony.

This meant there were high transaction costs in the market for frontier land. Positive transaction costs create profit opportunities for entrepreneurs. In colonial America's land market, these entrepreneurs were land speculators. Acting as middlemen, speculators bore the search and measurement costs associated with securing good land. By hiring surveyors or undertaking expeditions, they identified and claimed the most desirable tracts (Williams, 1959, p. 298) and often served as the primary means by which newcomers to the colony acquired property. The colonial government pressured speculators to settle their holdings. For example, the Council required larger grant-holders to establish at least one household for every thousand acres (McCleskey, 1990, p. 460, 467).

Although land speculators were an asset to the colony in settling lands, surveyors had a unique comparative advantage in settling the frontier. Surveyors were responsible for mapping the colony's boundaries for the government, from the southern border with North Carolina, to the Northern border with Pennsylvania, and most important, the expanding western border (Hughes, 1979, pp. 143–145). As new western regions were being opened, colonial officials were in desperate need of maps, for which surveyors became "Virginia's chief cartographers in the eighteenth century" (Hughes, 1979, p. 153).[18] With their intimate knowledge of the colony's unclaimed borderlands, surveyors often traversed untouched landscapes and created the first pathways, trails, and roads that made these territories accessible.

From their experiences in newly claimed and uncharted territories, surveyors knew which lands were safe from French and Indigenous groups, where the most productive tracts lay, and how to get to them. Even when land speculators possessed similar knowledge, surveyors retained unique advantages in claiming and selling land because of their official roles. From the record books they maintained, surveyors knew which parcels remained unclaimed and in the public domain. They also avoided the need to track down another surveyor and pay surveying fees during the land acquisition process, as they were often claiming land in their own counties and could conduct the surveys themselves.[19] In 1717, as part of his reforms to settle more of Virginia's claimed territory, Governor Spotswood assigned surveyors the task of selling treasury rights (Hughes, 1979, p. 107; Voorhis, 1940, p. 119). This allowed surveyors to record such purchases directly, without having to buy treasury rights from another public official.

Allowing and actively facilitating surveyors' land claims turned out to be a highly successful strategy in settling frontier lands. From 1607 to 1700, only 5000 square miles had been surveyed and settled, but in the eighteenth century more than 45,000 square miles of new land was surveyed (Hughes, 1979, pp. 72, 106). More land was patented between 1728 and 1748 than in the colony's

[15] The claiming of this frontier territory followed a similar pattern of state territorial growth outlined by Maltsev (2021), arguing that states may deliberately tolerate or encourage extra-legal frontier settlement when the costs of direct colonization are high. Up until 1738, colonists had lived on the land without English authority or law, relying on customs such as corn rights, tomahawk rights, and cabin rights to establish property claims (Peyton, 1882, p. 62).

[16] The Shawanese, Tuscaroras, Senedos, Catawbas, Delawares, Susquehanoughs, Cinelas, Pascataway tribe, and the Cherokees all resided in Valley of Virginia in Augusta County (Peyton, 1882, pp. 4–6).

[17] The variability of land is evident in the geographically specific settlements that arose in the colonies during this period (Gallo, 2012, pp. 120, 132, 134). See also McCleskey (1990, pp. 481–482) for an example of a settler's preference for particular land.

[18] Hughes (1979) notes that "[e]very important Virginia map drawn in the eighteenth century was the work of a surveyor" (p. 155).

[19] In an often credit-deprived colony, land speculators were limited to those with sufficient capital to pay surveying fees for their large holdings.

Table 1
Land granted in 5000 acre tracts.

Year	Acres patented	
	Total	Per year
1695–1706	116,206	9684
1716–1732	1,113,350	65,491
1733–1743	1,233,600	112,145
1744–1756	3,131,922	240,917

The data for total acres patented was taken from Voorhis (1940, p. 155), and this data was used to calculated acres patented per year. Voorhis (1940, p. 156) notes that from 1744–1756, only 993,426 acres of these 5000 tracts were actually patented while the other ran into complications due to the French and Indian War.

first one hundred years (Voorhis, 1946, p. 512). Table 1 captures this growth in the patenting of large tracts in the first half of the eighteenth century, with the average acres patented per year increasing nearly twenty-five-fold between 1695–1706 and 1744–1756. Much of this was tied to the establishment of Orange County in 1734, as shown in Fig. 1, which became Augusta County in 1738. By 1770, settlers had patented 657,566 acres of land in this county (McCleskey, 1990, p. 449). Hughes (1979, p. 84) attributes this growth to the colony's "generous" land grant policy during this time, with the council frequently granting tracts of more than 400 acres—many of them to surveyors.

4. Surveyors as land speculators

This section examines the nature of surveyor land speculation by showing that they acquired land 4.1, targeted productive land 4.2, and sold their land 4.3. In doing so, it highlights the ways in which surveyors were able to effectively settle people on previously unsettled lands, specifically in frontier counties.

4.1. Surveyors acquired land

One of the primary benefits of being a surveyor in Virginia was the ability to identify and claim the most agriculturally productive and valuable lands. Their extensive time spent surveying lands near the colony's boundaries enabled them "to spot the best acres to patent for themselves" (Hughes, 1979, p. 3). Land acquisition often comprised a substantial share of a surveyor's wealth alongside their surveying fees, as claiming land "was the most accessible path to riches open to an ambitious surveyor" and was "practically built into the definition of the role of surveyor that evolved in the seventeenth century" (Hughes, 1979, p. 64). While both fees and land speculation contributed to their fortunes, the size and quality of their landholdings best reflect the success of a surveyor's pursuit of wealth:

> acquisition of land remained a key indirect source of wealth in the eighteenth century. Opportunities to become wealthy were inherent in a frontier surveyorship and even possible farther east. How successfully those opportunities were pursued depended upon each individual's energy and diligence in managing his surveying business, his farms, and often other enterprises as well. Hughes (1979, pp. 156–157)

As historian Robert Beverly observed in the eighteenth century, "[t]he profits of the surveyors of land are according to the trouble they take" (Beverley, 1855/1720, p. 199).[20]

Surveyors could acquire land through the same channels available to other colonists, yet they enjoyed a major advantage in knowing precisely which tracts remained in the public domain. As Hughes (1979, p. 64) notes, "[n]o one knew better than the surveyor what desirable lands in his district remained unpatented". The public was well aware of the surveyors' advantage in acquiring land and reported instances of surveyors exploiting their positions to claim land at the expense of other land-seekers. In 1711, complaints were raised that "a Surveyor ought not to enter land for himself" (McIlwaine, 1930/1711, p. 268). The Council responded by defending the right of surveyors to claim land:

> This Board are of opinion that the *Surveyors ought not to be restrained from taking up land in the Countys whereof they are Surveyor*s provided they do not give themselves any undue preference in their Entrys to the prejudice of any other of her Majestys Subjects And for preventing any indiscreet practices which may hereafter be used by Surveyors in the entering land in their own names. It is ordered that all Surveyors who shall at any time hereafter be desirous to enter for any parcell of land in the Countys whereof they are Surveyors, shall make the said Entry in their books before two of the Justices of the said County who shall accordingly certify the time of making the said Entry under their hand... (McIlwaine, 1930/1711, pp. 269–270, emphasis added)

[20] Surveyors often acquired land not only for themselves but also for close family members and friends (Hughes, 1979, pp. 148–159).

In 1748 this requirement was relaxed to one justice of the peace (Hening, 1819b/1748, p. 34). Hughes (1979) contends that the 1711 ruling and the 1748 law "probably offered surveyors more protection of their reputations than hindrance in acquiring land", since they did not "[pose] any hardship for surveyors in counties with unclaimed land because such men were, almost without exception, members of their county courts. If they did not choose to approve their own entries it was simple enough to have it done by a fellow justice" (p. 109). Indeed, almost all surveyors in western counties were members of their county courts (p. 163).

By the middle of the eighteenth century, public criticism had cooled. It became "generally assumed that surveyors would use their opportunities to patent or purchase land to their advantage" such that the "acquisition of real property can best be considered an indirect source of additional income" (Hughes, 1979, p. 158). Eventually "[c]olonial society recognized the surveyor's power over the disposition of public land", and "the system of county surveyorships was not attacked" (Hughes, 1979, p. 136). Whether this shift reflected legislation designed to placate public criticism of surveyors or simply the expanding opportunities to acquire land as the colony grew, surveyors' large landholdings came to be generally accepted.[21] The colonial government had an interest in preserving surveyors' right to claim land, especially in their home counties, where they knew the terrain best.

The colonial government not only defended surveyors' land-claiming rights; it actively granted them land. The Council of Virginia — the upper house of the colonial legislature, also known as the Governor's Council — regularly approved surveyors' petitions for land grants exceeding 400 acres. After 1713, anyone seeking more than 400 acres was required to petition the governor and Council for such a grant, which was commonly referred to as a Council grant (Glanville, 2013, p. 54; McCleskey, 1990, pp. 461–462; Voorhis, 1940, pp. 126–127).[22] Rarely were surveyors' petitions denied (Williams, 1959, p. 345). The Council sometimes justified these approvals by referencing the surveyors' ability to develop the land, writing, for example, "This Board being satisfied of their Ability to Cultivate", such was written in grants to surveyors Robert Bolling for 700 acres, Arthur Allen for 3000 acres, Drury Stith (McIlwaine, 1928/1720, pp. 448–449, 516, 526), and Christopher Jackson for 2000 acres (McIlwaine, 1930/1721, p. 3). The Council held the surveyors to this cultivating expectation, as surveyors, like other Virginians, could have their land forfeited for failing to settle it. Such was the case for Robert Bolling, who lost 4000 acres in 1721 (McIlwaine, 1928/1721, pp. 553–554) and 1500 acres in 1741 (Hall, 1945/1741, p. 79) for failing to develop his claims. Without holding surveyors accountable for settling their granted land, the Council would have undermined its broader goal of expanding the colony's territory.

To better understand the nature and scope of these grants, we compiled all the Council grants to 18th-century appointed surveyors using the *Executive Journals of the Council of Colonial Virginia* (Volumes 2–6, 1699–1776), which recorded all such grants during this period. We used the *List of Surveyors for William & Mary* (Special Collections Research Center et al., 2025) as an index of appointed surveyors. Our dataset includes 103 surveyors, of whom only 25 received grants.[23] It records 131 total grants of land across 17 counties, with a median grant of 5000 acres and an average grant of 28,937 acres. Just over half of these grants (56%) were joint, involving more than one grantee, and about a third (32%) were in the same county where the grantee served as surveyor. In total, the grants comprise 3,790,759 acres, or 5923 square miles of land—about 13.84% of the current state of Virginia.

Our theory predicts that surveyors on the frontier, or in the western counties, would have petitioned for and been granted more land than their eastern counterparts. The western border offered the primary — and indeed only — opportunities for the Virginia colony to expand, as the northern boundary was shared with Pennsylvania, the southern with North Carolina, and the eastern with the Atlantic Ocean. The expanding state gave rise to new counties. Nineteen new counties were formed between the years 1730 and 1756, increasing the number of surveyorships by almost 60% (Hughes, 1979, p. 94). The creation of these counties fueled a booming land market and opened opportunities for individuals to step into these surveying positions and transform their socioeconomic status.

The western county surveyors had the advantage of often surveying county boundaries, thereby gaining intimate knowledge of the land, especially its most productive tracts. The men who were fortunate enough to become county surveyors "in counties on the edge of settlement could command, and expected, handsome rewards in wealth, political power, and social status" (Hughes, 1979, p. 72). As Glanville (2013, pp. 44, 59) notes, surveyors such as William Preston could use their position to secure prime lands for themselves and their associates, since they were the first to know where the best tracts lay. This was evident in how counties matured. The best and most cultivatable lands were first taken, seated, and planted while the less fruitful lands lay unclaimed in the public domain, and could remain so for many years (Hughes, 1979, p. 131).

As counties developed, opportunities for surveyors to claim fertile lands diminished, limiting their chances to rise in class and wealth. Surveyors in the eastern counties had fewer opportunities to acquire land and elevate their socioeconomic standing, though many already belonged to well-established Virginia families with wealth and political connections. By contrast, what distinguished the frontier surveyors was that they were often immigrants new to the colony. These men rapidly rose in the social hierarchy from "newcomers" to "gentlemen" (Glanville, 2013, p. 44; Hughes, 1979, pp. 85, 90).

With more to gain, we should expect western surveyors to have submitted more petitions to the Council for land than their eastern counterparts. And since the Council's incentives were to settle people on the frontier, we assume that these petitions were granted more frequently. Using our data on Council grants, we run several regressions on our grant data to test whether a grant being in a frontier or secondary county affected the size of a grant or if the grant was larger when going to the country surveyor. A

[21] Enacted laws in 1705 (Hening, 1823/1705, pp. 329–332), 1736 (Hening, 1820a/1736, pp. 511–513), 1742 (Hening, 1819a/1742, 170–171), and 1748 (Hening, 1819b/1748, pp. 33–38), referenced in Section 3.2 and Appendix B, sought to curb fraudulent behavior by imposing steep penalties on surveyors who violated the regulations, though in practice they may have served more to reassure the public than to meaningfully constrain surveyors.

[22] Gallo (2012, pp. 123–125) highlights how one often needed political connections or to engage in political exchange in order to receive large grants in this form.

[23] Each surveyor's full name and surname was searched across all five volumes to locate grants. Common alternate or misspellings were also checked.

Table 2
Effects of county & frontier surveyor on grant acreage.

	Total acres		
	(1)	(2)	(3)
County surveyor	27,432.6**		
	(11,872.6)		
Number of grantees	19,291.5***	3920.2***	3914.8***
	(1321.5)	(1017.7)	(997.4)
Frontier county		2216.8**	
		(958.9)	
Secondary county			−1868.6
			(1847.4)
Fixed-effects			
Surveyor ID	✓	✓	✓
Grant year	✓	✓	✓
Observations	128	106	106
R^2	0.94988	0.78106	0.78152
Within R^2	0.89564	0.55599	0.55691

Clustered (SurveyorID) standard-errors in parentheses.
Significance levels: *** – 1%, ** – 5%, * – 10%.

Table 3
Effects of frontier or secondary county surveyorship on grants.

	Total acres		Grants	
	(1)	(2)	(3)	(4)
Frontier surveyor	124,571.300***		2.450***	
	(41,500.940)		(0.809)	
Secondary surveyor		27,981.030		1.687**
		(36,488.400)		(0.694)
Constant	17,452.600	30,011.970*	0.862***	0.833**
	(16,356.840)	(17,976.540)	(0.319)	(0.342)
Observations	103	103	103	103
R^2	0.082	0.006	0.083	0.055
Adjusted R^2	0.073	−0.004	0.074	0.046
Residual Std. Error (df = 101)	152,566.400	158,764.500	2.975	3.020
F Statistic (df = 1; 101)	9.010***	0.588	9.170***	5.906**

Standard errors in parentheses.
Significance Levels: *** – 1%, ** – 5%, * – 10%.

frontier county is defined as a westernmost or western-facing county in a given year, while a secondary county is any county that bordered a frontier county. All regressions include surveyor and year fixed effects, denoted by i and t, respectively.

Additionally, we believe that the number of grantees on a Council grant is an important variable. More grantees on a council grant could theoretically cause larger grants as the acreage must be split among more individuals. We control for the number of grantees in the following equations with our results in Table 2.

$$TotalAcres_{i,t} = \beta_0 FrontierCounty + \beta_1 Numberof Grantees + i + t + \epsilon \tag{1}$$

$$TotalAcres_{i,t} = \beta_0 SecondaryCounty + \beta_1 Numberof Grantees + i + t + \epsilon \tag{2}$$

$$TotalAcres_{i,t} = \beta_0 CountySurveyor + \beta_1 Numberof Grantees + i + t + \epsilon \tag{3}$$

Both the county surveyor and frontier county coefficients being positive supports our hypothesis. The grant is larger when it is being awarded to that county's surveyor and larger when that grant is in a frontier county.

We run several more regressions by taking our data and creating surveyor-level observations rather than grant-level observations. We create two new variables, $FrontierSurveyor$ and $SecondarySurveyor$, which indicate whether a surveyor ever served as a county surveyor in those types of counties. In addition to total acres as an outcome variable, we use the number of grants a surveyor is recorded as having been awarded in the grant dataset (see Tables 3 and 4).

$$TotalAcres = \beta_0 FrontierSurveyor + \epsilon \tag{4}$$

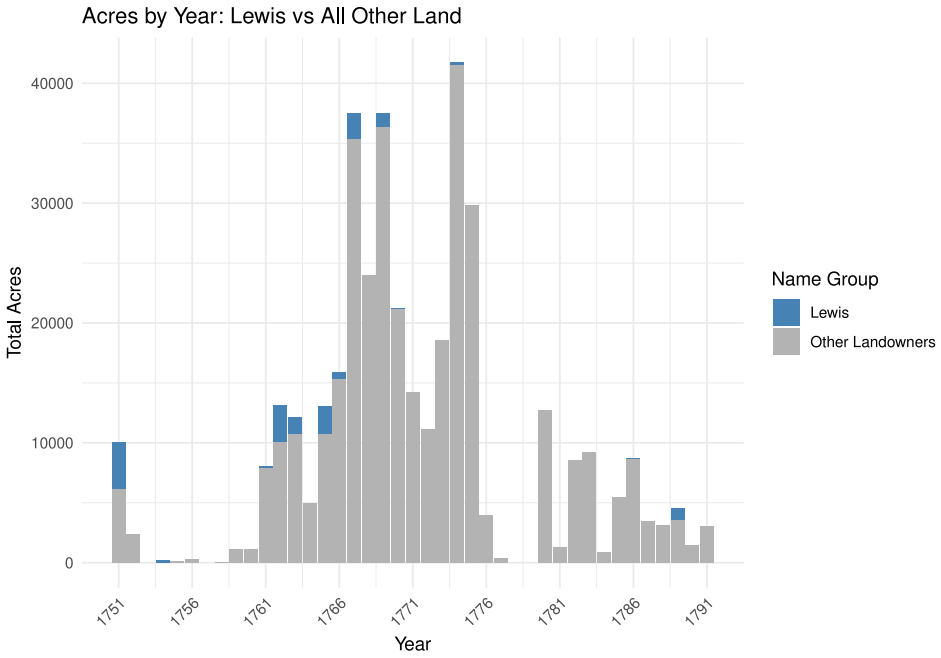


Fig. 2. Acres for Thomas Lewis vs. others per year.

Table 4
Summary statistics for surveyors (N = 103).

	Mean	Std Dev	Min	Max
Grants	1.242718	3.091627	0	16
Total acres	36,803.49	158,443.6	0	940,500

$$TotalAcres = \beta_0 SecondarySurveyor + \epsilon \tag{5}$$

$$NumberofGrants = \beta_0 FrontierSurveyor + \epsilon \tag{6}$$

$$NumberofGrants = \beta_0 SecondarySurveyor + \epsilon \tag{7}$$

Being a frontier or secondary county surveyor at any point is correlated with having higher total grants and acres.

The analysis of our Council grants data shows that frontier surveyors pursued more Council grants than their peers. To give a better understanding of how active these frontier surveyors were, and the scale at which they were acquiring land on the frontier, we investigate the land acquisitions of a surveyor in the largest frontier county: Augusta County. Thomas Lewis, son of a Scots-Irish immigrant, was appointed county surveyor of Augusta county in 1745 and held that position until 1777 (Glanville, 2013, p. 58), and served as a surveyor for Rockingham County in 1787 until his death in 1790. Thomas engaged in family land-speculating ventures with his brother Andrew. His career was so successful that he was able to have thirteen children and acquired a vast library (Hughes, 1979, p. 89, 161).

Data availability allows us to analyze in-depth data for the number of patents per year, who the patents were for, and how many acres each patent was. We have land grant survey records from April 23, 1751, to February 22, 1782; when Thomas Lewis was surveyor for frontier counties Augusta and Rockingham (Kaylor and Chappelear, 1976). We digitized the entire book of abstracts and were able to pull out information on who the survey was for, the number of acres for the survey, and what year the survey took place. Fig. C.1 shows the number of grant entries and number of acres surveyed per year.[24]

Survey grants for August and Rockingham spike in the late 1760s and post-Revolution they never reach such high numbers. The number of acres surveyed per year follow a similar pattern except in 1774 and 1775, there are not many grants but many acres surveyed. This is indicated of a few large surveys acre-wise. Large grants in these years are also supported by Fig. C.2 which looks at the maximum, average, and minimum acres for land grants that year.

[24] The figure extends until 1791, but surveys done from 1782 to 1791 were done by Rockingham county surveyor Alexander Herring.

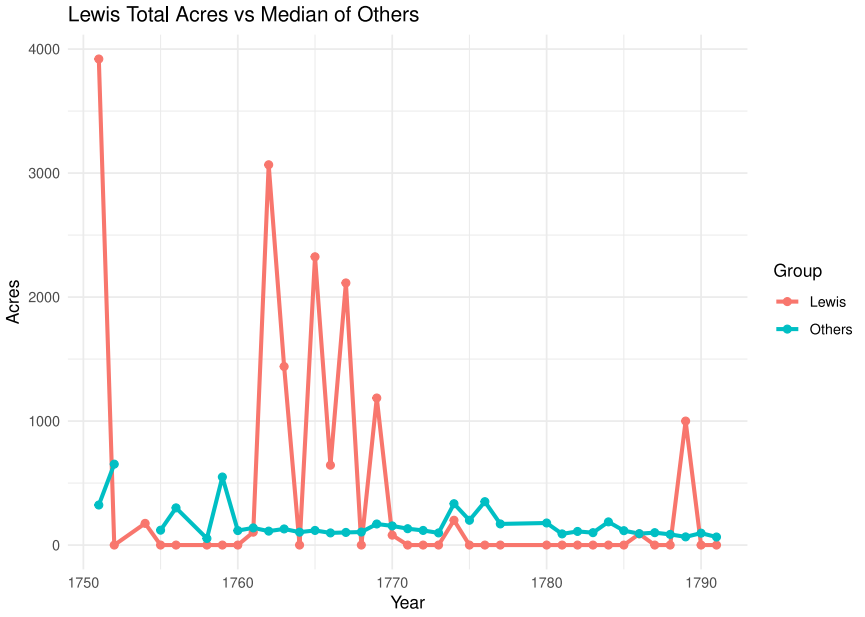


Fig. 3. Lewis total acres vs. Median of other landowners.

Our focus is whether Thomas Lewis is able to collect any rents being the surveyor. So we then focus on surveys where Thomas Lewis is who the survey is for. Fig. 2 show the number of acres surveyed for Lewis and his family relative to others.

To investigate further, we restrict our sample from 1751 to 1782 and check Lewis against others. This allows us to see whether Lewis is suffering from too-little-land, or if there is just a large number of individuals in that specific year. If it is the latter, Lewis would still be getting large amounts of land relative to the average man, even if it is a low percentage of total acres surveyed that year.

When we restrict the sample and look at the data, we can see that Lewis is indeed still coming out above-average. Lewis's total acres surveyed for himself from 1751 to 1782 are 4160 acres. The average acres for others in the dataset is 363 acres. Lewis has more than eleven times the amount of acres an average person in Augusta or Rockingham county has. Lewis's average acreage per survey grant is 1387. The average acreage for other survey grants is 187. That is more than seven times the average survey for Lewis relative to others. So while Lewis may not have a large percentage of acres per year, his surveys are very large relative to the others for the same counties.

Lewis does not survey land for himself or his immediate family every year. Lewis surveys only take place in thirteen years and only in eight of those is he surveying more acres relative to the average for any other individual landowner. In one year he is the only land patent, but that is an outlier compared to other years. We additionally compare Lewis's total acres and the median of all other landowners.

Fig. 3 shows that Lewis's land patents are even more pronounced when we examine the median acreage for all other landowners. In order to show that Lewis's holding are not overinflated, we also compare Lewis's median acreage for patents relative to the median for others in Fig. 4. Our analysis holds even when using the median for Lewis. It should be noted that we only use Lewis's landholdings for two frontier counties, with one being the county he is surveyor for. Lewis had land in other counties and was perhaps able to leverage his political capital as surveyor in another county to purchase land. Lewis's skills as county surveyor in Augusta meant that he was trained to spot the best land, even outside his county.

4.2. Surveyors acquired productive land

A key reason why the colonial government assigned property rights to surveyors was their ability to identify fertile lands for settlement. Surveyors across the colonies had a general reputation for locating arable land. For example, Gallo (2012, pp. 56–57, 205–206) discusses how surveyors in Pennsylvania knew where the best lands were in the western backcountry and, because of this knowledge, they were able to help land speculators claim the most productive tracts.

This skill was not unique to Pennsylvania surveyors. Hughes (1979, p. 141) notes that experienced Virginia surveyors could evaluate soil quality by observing the types and sizes of trees in an area. In our Council grant dataset, 43% of the grants mention the word "river", indicating that surveyors often petitioned for fertile lands near riverbeds. For example, surveyor William Cabell was granted 6000 acres along the Fluvanna (James) River (Hall, 1945, p. 145) and George Carrington 5000 acres along the Willis River (McIlwaine, 1930, p. 380). As a surveyor for the Ohio Company, Christopher Gist helped the Virginia land speculation company

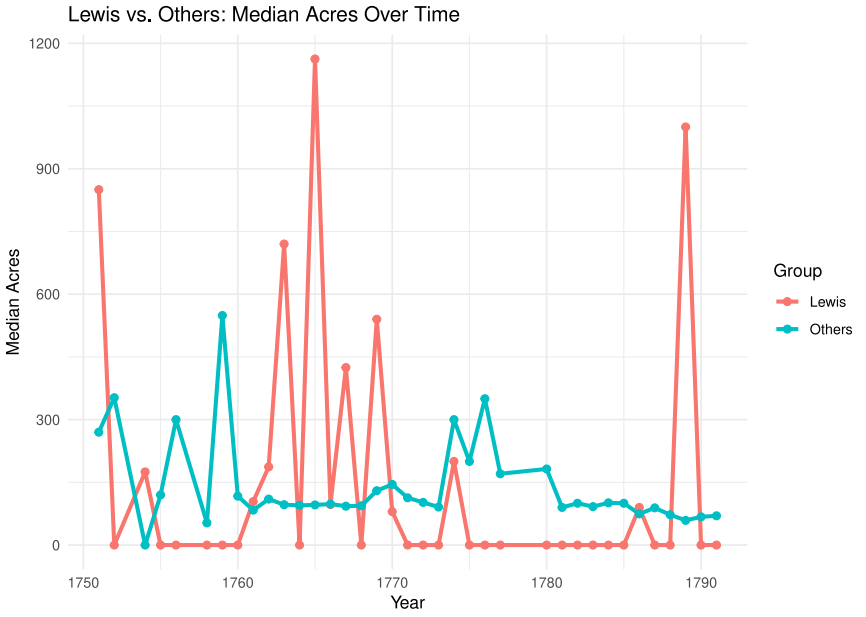


Fig. 4. Lewis total acres vs. Median of other landowners.

settle modern-day Ohio through his ability to "assess quality land and accurately map both desirable tracts and the best routes to them" (Gallo, 2012, pp. 142–143). Because of Gist's expertise in locating the most desirable lands, the Ohio Company was able to patent tracts that would be in high demand among settlers and successfully profit from speculation.

We empirically investigate whether surveyors were able to identify and acquire agriculturally productive land by digitizing maps of three tracts purchased by surveyors: George Washington, Peter Jefferson, and William Cabell. These individuals were chosen as case studies as they are the only surveyors for whom we could find sufficiently detailed geographical maps that allowed us to conduct spatial analysis.[25] The case studies span several counties, leading us to believe the results are not idiosyncratic to an individual or geographic location.[26]

We use caloric productivity as a measure of the land's value, as agriculture would be one of the main industries for these land-magnates. In the maps chosen, we favor land tracts where we know the surveyor was present and able to see the land. Due to limited data availability, some of the land tracts used do fall outside the time period or county where an individual may have been operating as a surveyor. However, it should be noted that they were acting as land speculators and due to connections with current surveyors, they may have been able to purchase the land before others. It is also possible that the speculators may have been one of the few able to spot productive land while other speculators were less-trained.

We use the same method for each empirical case study. We use a reference image of a land tract to create a shapefile. We then create a 100 km buffer around these shapefiles to compare the quality of the tract versus land outside of it. We then plot two values that we use for comparison. The first is the maximum calories possible, the values being taken from the Caloric Suitability Index by Galor and Özak (2015, 2016) and Özak (2015). The second is a value of terrain ruggedness taken from an index (hereafter referred to as TRI). If our theory that surveyors are able to accumulate wealth through their abilities holds, we should observe that maximum calories are higher inside the tract relative to the outside buffer.

4.2.1. George Washington

George Washington had a long history in surveying. His older half-brother Lawrence, whom he spent a great deal of childhood with, was a founding member of the Ohio Company. The Ohio Company was a land speculation company focused on settling Virginians. He eventually became involved with the Fairfax family, taking part in several expeditions in the Shenandoah Valley on their behalf. He started surveying when he was fifteen. His surveying experience eventually culminated in a county surveyor appointment for Culpeper county in 1749 (Hughes, 1979, p. 93). He would resign a year later but would go on to continue land speculating.

Washington's history as an appointed surveyor gave him political clout that combined with his expertise in land speculation, made him an expert at determining the most valuable land. One such example was his purchase of several land tracts along the

[25] Our selection is driven by data availability. While there is a concern that this may introduce selection bias, we believe that using all available cases possible minimizes intentional selection bias.

[26] Reference images for each tract are shown in Appendix D.

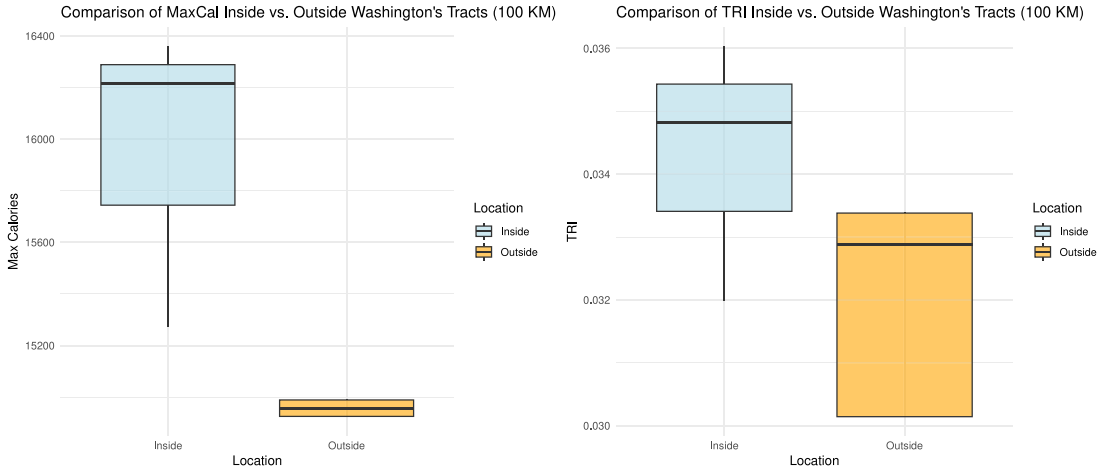


Fig. 5. Washington's Kanawha river tracts.

Kanawha River. The land along the Kanawha River had been promised to veterans of the French and Indian War (Chernow, 2010). Difficulties arose when the land promise interfered with other rules regarding settlement beyond the Appalachian Mountains, keeping Washington from his acreage for approximately a decade. Eventually overcoming these challenges, George Washington used surveyor William Crawford and his own expertise in land speculation to purchase several tracts of land along the river. In addition to his initial allotment, Washington warned several others their lands were unsuitable for farming and agreed to purchase them, to the later chagrin of some sellers (Ferling, 2000). Washington's ownership of land along the Kanawha would eventually reach over 23,000 acres (Calloway, 2018).

Even with the help of Crawford to officially partition out plots, we use Washington to demonstrate that his desire for the best land was supplemented with his knowledge as a speculator. We use Washington's own maps of his land cross-referenced with a title map by Swann of the coal fields in the valley, to figure out three of Washington's land tracts (see Fig. 5).

If we compare both the maximum calories possible and TRI, we can see that both of Washington's tracts are higher than the surrounding 100 km. While Washington's land is more rugged, its maximum productivity is also higher. Washington's tracts are evidence in favor of the idea that even with increased ruggedness, he was able to figure out the land with the highest possible value. While land can be equated with wealth during this time period, the fact that it is also productive is important.

4.2.2. Peter Jefferson

A second example of a surveyor, acting as a speculator, being able to buy up the most productive land is Peter Jefferson, father to later founding father and president Thomas Jefferson. Thomas Jefferson described Peter's education as lacking, but the lack of formal education did not stop Peter from securing appointments as county surveyor in both Albermarle and Goochland counties in 1754 and 1756 respectively. By the mid-1750s Peter had already established a reputation for successful surveying. He was responsible for the Fairfax-line survey with Thomas Lewis (Lewis, 1925) which helped to establish the boundary of the Northern Neck Grant . He was also well known for working with Joshua Fry, whom he worked with to create the Jefferson-Fry map. Fry and Jefferson would be a well-regarded duo throughout the rest of the late 1740s and 1750s with several other projects (Harrison, 1924).[27]

Peter Jefferson was familiar with Albermarle county prior to his appointment as surveyor, as in 1734 he purchased a plot of land that we use for our analysis. The Jeffersons would later expand their landholdings to nearby tracts such as the famous Monticello, but we confine our analysis to Shadwell for the simple reason that it represents the first-move into a new areas and represents the cleanest example of Jefferson's ability to spot productive land. It is possible that Jefferson spotted the land on early surveying trips along the Rivanna River (Kern, 2010).

Fig. 6 plots both maximum calories possible and TRI for the Shadwell tract relative to a 100 km surrounding buffer area. An interesting difference is apparent from Washington's case study. Jefferson, like Washington, is able to secure land that is calorically productive relative to the surrounding area (which does include what would later become Jefferson-owned land). Different from Washington, Jefferson's original tract is less rugged than the surrounding area. Jefferson's ability to survey rough land wise may matter less than his knowledge about farming practices in purchasing Shadwell. Regardless, Jefferson is able to survey and speculate the most productive land.

[27] For more on Peter Jefferson's surveying career, see Hughes (1979, pp. 87, 90, 94, 143, 154, 159).

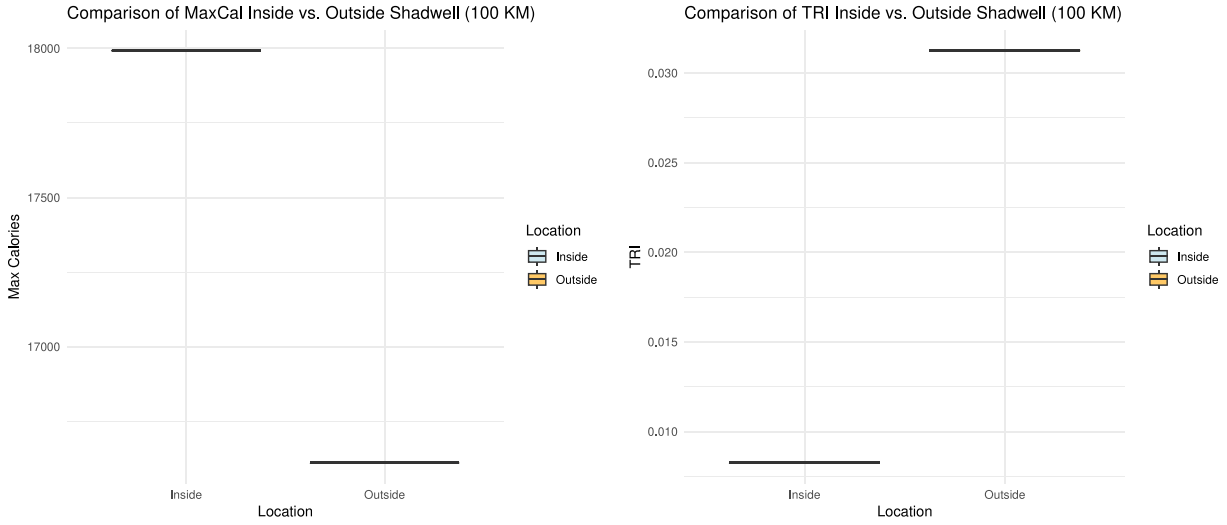


Fig. 6. Jefferson's Shadwell tract.

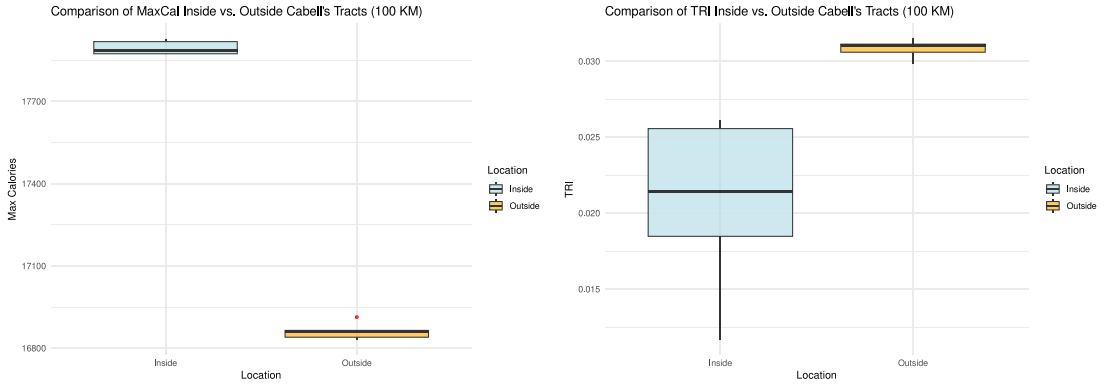


Fig. 7. William Cabell's tract.

4.2.3. William Cabell

We choose an additional surveyor to empirically demonstrate that surveyors had the ability to spot the best available land, even when not being the officially listed surveyor. The Cabell family originally arrived in Virginia in 1723 after traveling from England. While arriving in Goochland, the Cabells became interested in expanding westward into Virginia. Cabell learned surveying skills assisting his cousin William Mayo in his capacity as surveyor of Goochland county (Hughes, 1979, pp. 85, 87, 89). Cabell was skilled enough to eventually become assistant surveyor of Albemarle County from 1746 to 1754, and county surveyor of Amherst county in 1761 (Nelson County, 2005; Special Collections Research Center et al., 2025). Cabell used these skills to acquire land, principally along the James River (Tanner, 1948). We use Cabell's initial land grant along the James River for our analysis in Fig. 7.

Similar to both Washington and Jefferson, Cabell's land is more calorically productive relative to the surrounding area. Similar to Jefferson, it seems that terrain ruggedness was not a main hindrance to finding productive land. Cabell went on to acquire over 26,000 acres of land and his son, William Cabell II, would go on to own over 30,000 acres at one time. By the end of the revolution, William Cabell II was one of the top 100 wealthiest men in Virginia (Hughes, 1979, p. 89, 159, 161).

4.3. Surveyors sold their land

If surveyors were allowed to accumulate large holdings of land because of their abilities to lower transaction costs in the market for land, then they must sell their lands to individuals seeking to settle. Otherwise it is unlikely that the colonial government would have allowed them to claim as much land. Most surveyors who acquired large holdings of land ended up disposing of their parcels (Hughes, 1979, p. 159). How wealthy a surveyor would become was determined by how ambitious they were in their

land speculation ventures (Hughes, 1979, p. 64). Of the wealthy surveyors who have been recorded, many of them were continually engaged in land speculation. Some mentioned wealthy surveyors who acquired wealth by selling their lands were George Carrington, John Henry (father of Patrick Henry), William Cabell II (Hughes, 1979, p. 159–160), William Preston (Glanville, 2013, p. 45; Hughes, 1979, p. 160), George Washington (Gallo, 2012, pp. 117–118), and James Wood (Hughes, 1979, p. 135).

Frontier surveyors acted as "junior partners" in land speculating groups helping the enterprise formalize their claims through surveys (Hughes, 1979, p. 85). Other surveyors simply pursued their business of turning their land into profit themselves. They rented out their farmable land to tenants, who were often immigrants, making large cash payments on leases that were often for three years (Hughes, 1979, p. 160).[28] Sometimes surveyors sold their land to others who were accumulating land for speculative purposes, such as Drury Stith (Hall, 1945/1749, p. 314) and Benjamin Watkins (Hillman, 1966/1750, pp. 521–522).

Many surveyors in Virginia were able to climb to the top status of the wealthiest individuals in the New World because of the lands they claimed. Seventeenth century surveyors like Edmund Scarburgh, Robert Beverley, and George Brent came into ownership through patent and purchase of over 20,000 acres each (Hughes, 1979, p. 68). This would continue to the eighteenth century with surveyors like "William Cabell, who used his position as assistant surveyor in Goochland and Albemarle counties so successfully for his own personal ends that when he eventually turned to a second career, medicine, both he and his sons ranked among the wealthiest men of the colony" (Hughes, 1979, p. 89). Cabell was one of many surveyors who amassed great wealth from surveying on the western frontier of the rich lands in the Piedmont region in Virginia.[29] Even up until the revolution surveyors were able to claim vast amounts of land, such as the case of John Donelson, who held 4749 acres that he used to establish an iron works and later sold for £4000 (Hughes, 1979, p. 153). Profits from land speculation and development laid at the fingertips of the surveyor and were theirs for the taking.

If surveyors acquire wealth through land speculation, then surveyors of western counties will be wealthier than surveyors in eastern counties with less unclaimed land. This seems to be the case as the surveyors who gained power and wealth in the eighteenth century were those in western counties (Glanville, 2013, p. 44). Later in the century, as unowned eastern lands dried up, the eastern county surveyorship became occupied by much less prestigious and wealthy individuals:

> While civil surveying was a pressing, nearly overwhelming job on the frontier, as one moved eastward it became a lucrative part-time post, then eventually a casual source of occasional income for a teacher or farmer. As the workload declined, and particularly as control over access to public land vanished, the surveyor's income fell and his social and political status dropped proportionately. After 1750 few surveyors in the tidewater region held any political offices or officer's rank in the militia. Instead of being leaders of their communities, they were among the solid citizenry who owned one to two hundred acres of land and were called regularly to serve on the grand jury Hughes (1979, p. 134).

Many of these surveyors often quit their jobs and left their posts as surveyors (Hughes, 1979, p. 134). The power and wealth associated with the office of surveyors only appeared when large amounts of unclaimed land lied at the hands of surveyors for the taking. When there was no more land to be claimed, the surveyor had few opportunities for acquiring wealth through land speculation and so left their offices to pursue more promising careers.

To provide a detailed example of a surveyor profiting from their lands, we use surveyor William Preston. We examine all land purchased by Preston, whether it was bought when he was an active surveyor, or if it was outside their home county. We consider the price of the land when bought, the price it was sold for, and the profit margin created. While we do not have any clear maps for georeferencing, William Preston's history of land-dealing is well documented and provides us an in-depth case study. Preston, an Irish immigrant, arrived in Virginia in 1738. Already having some education in Ireland and continuing in the states, his family settled in Beverely Manor, also known as the Irish tract.[30] In 1738, John Lewis became Beverly's land agent. Preston would become Thomas Lewis's protégé (John Lewis's son) around the early 1750s (Glanville, 2013, pp. 57–58; Hughes, 1979, pp. 89–90). William Preston was already illegally surveying in the early 1750s (Osborn, 1990), but by the mid-1750s he had gained the skills necessary to earn a living as an independent surveyor.

Preston would go on to be made deputy surveyor in 1752, which was a position he would keep until 1783 and across four counties. He was deputy surveyor of Augusta from 1752–70, Botetourt county 1770–72, Fincastle county from 1772–77, and Montgomery county from 1777–83. He would go on to be considered one of the most powerful surveyors of all before the Revolution (Glanville, 2013, pp. 43, 59; Hughes, 1979, pp. 91). It was surveying that "was Preston's life's work, and his skill and success at it, and the opportunities for dealing in land that it brought, enabled him to become wealthy, powerful, and influential" (Glanville, 2013, p. 45). He owned 20,513 acres of land on his deathbed, from an original 520 he inherited from his father. Preston's records provide us an example of how a surveyor could accrue large sums of land.

Preston's first land speculation deal came at the age of 20 when he bought 799 acres of land and flipped it for a 600% profit (Glanville, 2013, p. 59). After Preston was appointed county surveyor in 1769, he patented 2860 acres of land that year and 1143 the next (Hughes, 1979, p. 159). Osborn (1990) provides a detailed record and appendices of Preston's land dealing before death. Of Preston's 20,513 acres at death, 10,723 of those acres came from treasury rights or grants from the governor. Out of all acreage Preston was personally involved in, 1338 acres were lands Preston surveyed and claimed for himself. Post-Revolution

[28] These leases occasionally acted as a trial period for the land, in which case the tenant purchased the land after their lease was up. For more details on these types of rental contracts and their stipulations, see McCleskey (1990, pp. 454–459).

[29] See Hughes (1979, p. 159) for a detailed list of others.

[30] Beverley Manor was known as the Irish tract due to the large number of Scots-Irish that settled in the area with help from William Beverley.

(1780s), the average farm was only 230 acres (Main, 1954). Preston had managed to claim over five times the average farm from his surveying.

While we can show that Preston had well over the average amount of owned acreage at death, we can also use (Osborn, 1990) to study some specific examples. One specific example of how Preston could use his surveying position to make money is shown in a 96 acre plot Preston surveyed in 1767. William Preston then received a land grant for the acreage for £0.10 in 1769. Preston then sold the land for £20 in 1782. This specific lot resulted in a 200% profit. Earlier in 1762, Preston surveyed 338 acres for himself at £3.12. He then sold for £100 in 1773 at a 32% profit. There are many other examples throughout Preston's history where he receives a high profit margin. Within the appendix it is not specified if Preston surveyed these himself, but some other examples are a 175 acre property sold at a 625% profit and a 50 acre property sold at 500% profit. Preston had 12 children, one of which would become a surveyor, and had over 273 books in his library at the time of his death (Hughes, 1979, p. 161).

5. Conclusion

As more and more land was taken up in the western counties, the profitably and esteem of the surveyor positions followed the similar decline of the eastern counties decades before. Once Kentucky was founded in 1792, Virginia's frontier expansion came to an end and with it the opportunities to claim vast amounts of land by Virginians (Hughes, 1979, pp. 134, 164). Some sons of surveyors followed their father's line of work but found the profession not nearly as profitable. Other sons of surveyors took advantage of their advantageous upbringings and pursued other lucrative and prestigious careers. Patrick Henry, Thomas Jefferson, Robert Brooke III, and James Wood II became Virginia governors (Hughes, 1979, p. 162). The days of the overly wealthy county surveyors had come to an end.

Only by seeing through the eyes of the colony are we able to understand why surveyors became so powerful. One of the primary goals of the colony in the eighteenth century was to expand its boundaries and grow the size of the territory governed. To do so, it needed to settle people on its boundaries and newly claimed lands. They faced many obstacles in achieving this. The new immigrants to the colony who would settle on these lands faced high costs in discovering which lands were unclaimed and agriculturally productive. Surveyors had a comparative advantage in acquiring this knowledge. By assigning the property rights of these lands to surveyors, the colony was able to take advantage of the local knowledge that is often absent in the state's quest to make society legible (Scott, 1998).

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used ChatGPT (OpenAI) in order to assist with copy editing, refining phrasing, and consistency checks. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The author is an Editorial Board Member/Editor-in-Chief/Associate Editor/ Guest Editor for this journal and was not involved in the editorial review or the decision to publish this article.

Appendix A. Land settlement requirements

See Table A.1.

Appendix B. 18Th-Century surveyor acts and regulations

Subsequent acts regulating surveyors following the 1705 Act focused on eliminating fraud and standardizing their practices. The 1736 *Act for better regulation of the Office of Surveyors of Land* (Hening, 1820a/1736, pp. 511–513) targeted the practice of surveyors falsely claiming that land had already been entered in their books to block new claims. The law required surveyors to produce their entry book and provide a certified copy upon request when refusing a new land entry on the grounds that it had already been claimed. Refusal to comply resulted in a £20 fine payable to the aggrieved party.

The act also made surveys conducted outside a surveyor's assigned county illegal. Unauthorized surveys were declared void, could not be patented, and incurred a £5 fine payable to the appropriate county's surveyor. This was immediately enforced. Two years later in 1738, Orange County surveyor James Wood reported to the Council that Robert Brooke had been surveying lands in his jurisdiction. The Council responded that "the Clerk of the Secretarys Offie Receive no Surveys made by the said Brooke or any other person" in Orange County (McIlwaine, 1930/1738, pp. 426–427). Further strengthening frontier surveyors' monopoly, the law stipulated that "counties where there are great quantities of unpatented land"—specifically Brunswick, Amelia, Goochland, Hanover, and Orange—were to have only one surveyor, who was required to reside in the county or pay a £10 fine for every month of absence (Hening, 1820a/1736, p. 513).

Table A.1
Requirements for seating, planting, and improving lands under the 1713 Act.

Land type	Definition (from 1713 Act)	Improvement requirement (Within 3 Years)	Alternate option	§
Plantable	Fertile and immediately cultivable without special preparation	Clear, tend, and work 3 acres per 50 acres of plantable land	Drain 3 acres of swamp, sunken ground, or marsh per 50 acres (if included)	IV
Barren	Land unfit for cultivation without improvement, but usable for pasturage until improved	Maintain 3 cattle or 6 sheep/goats per 50 acres, until 3 acres per 50 are improved	None	IV
Extremely unprofitable	Land entirely unfit for cultivation or pasturage without prior improvement	Build a house (min. 20′ × 16′) and maintain 3 cattle or 6 sheep/goats per 50 acres	None	V
Rocky/Stony	Rocky or stony land unfit for planting or grazing, but potentially valuable for quarrying or mining	Employ 1 able worker per 100 acres digging quarry, coal, or other mines for 3 consecutive years	None	V
All types (General rule)	Applies to all tracts under patent	3 acres improved (cultivated, drained, or mined) secures 50 acres permanently from forfeiture	Patentees may withdraw stock or stop mining after sufficient improvement	VI
All patents (Quit-Rent rule)	Applies regardless of land quality	Must pay quit-rents regularly—failure for 3 years forfeits title, even if land was improved	None	X

Note. Definitions and requirements are derived from the 1713 *Act declaring what shall be accounted a sufficient seating, planting, cultivating, and improving of lands already granted, or hereafter to be taken up and patented* (Hening, 1820a, pp. 37–42). The table was constructed based on the categories and obligations explicitly defined in sections IV, V, VI, and X of the statute.

Another effort to curb surveyor fraud came in 1742 with the *Act to amend the 1705 act regarding issuance of survey copies* (Hening, 1819a/1742, pp. 170–171). It prohibited surveyors from sharing copies, certificates, or plats with anyone other than the client who had commissioned the survey. A 1744 statute further restricted surveying by requiring that counties with "large quantities of unpatented lands still to take up"—specifically Albemarle, Augusta, Frederick, and Louisa—have only one surveyor, who was required to reside in the county to quell the "many controversies and disputes [that] have arisen, and daily arise... about priority of entries" in these frontier regions (Hening, 1819a/1744, pp. 253–254).

The 1748 *Act directing the duty of Surveyors of Land* (Hening, 1819b/1748, pp. 33–38) reiterated many earlier provisions but added notable new requirements. Surveyors were now required to post a £500 bond guaranteeing faithful performance and to record any land entries for themselves publicly before a justice of the peace and the county court. The last significant act before the Revolution, passed in 1772, mandated that surveyors use true meridian rather than magnetic north and record magnetic variation on plats, thereby improving both the technical accuracy and legal clarity of surveys (Hening (1820b)/1772, pp. 526–527hening1819statutesv.7).

Appendix C. Augusta county land grants

See Figs. C.1 and C.2.

Appendix D. Land tract plots

See Figs. D.3–D.6.

Data availability

Data will be made available on request.

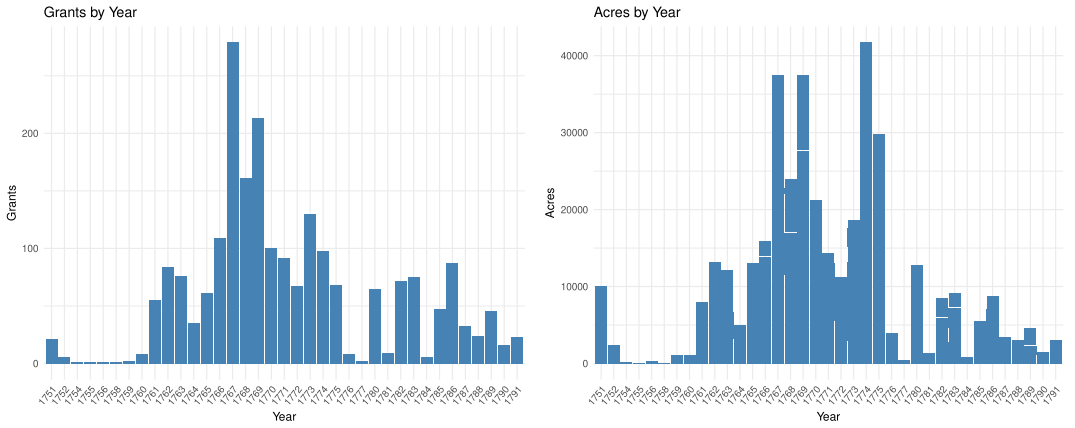


Fig. C.1. Survey grants and acres per year.

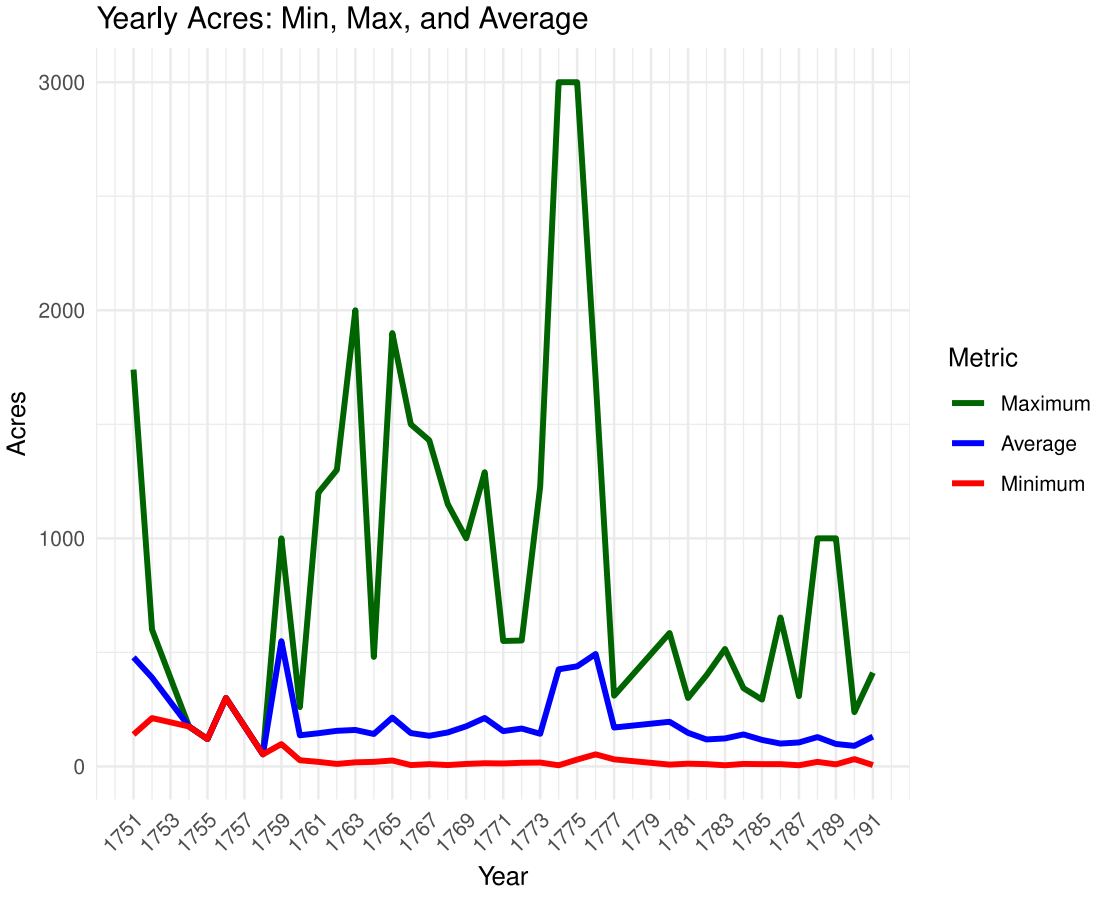
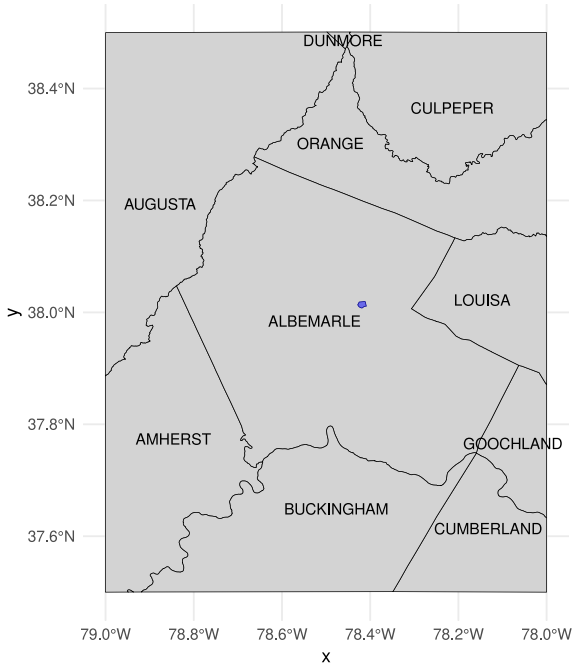


Fig. C.2. Maximum, average, and minimum acres per grant per year.



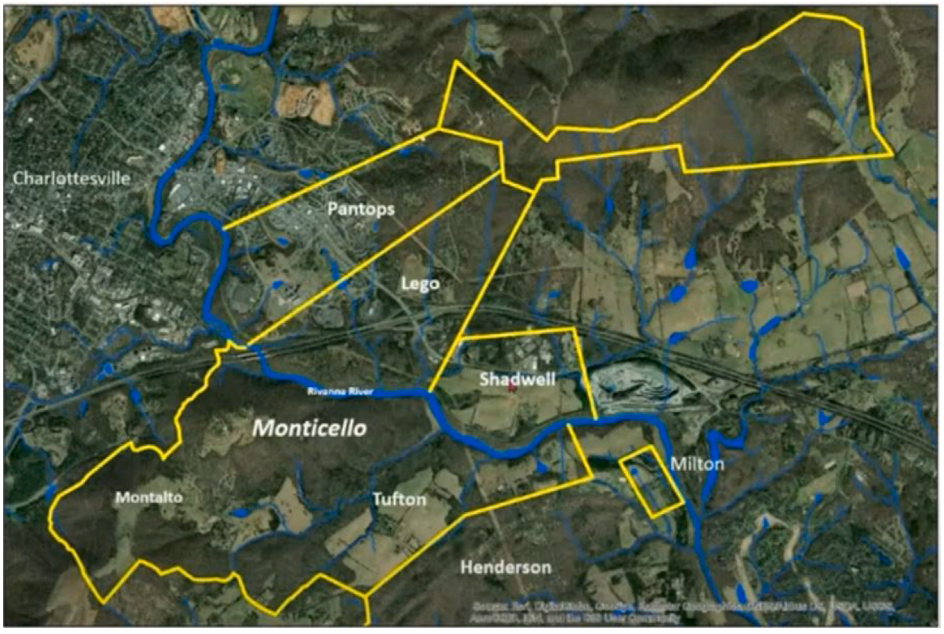
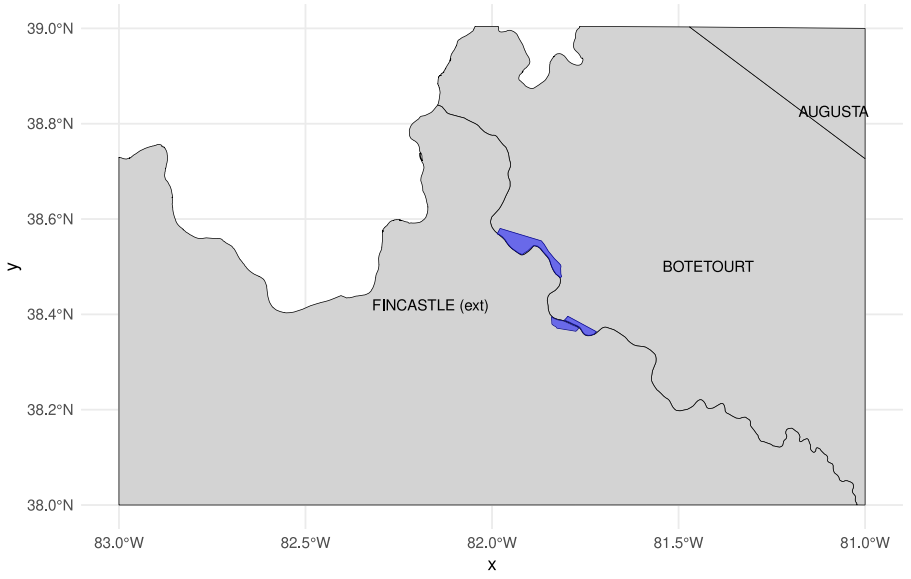


Fig. D.3. Jefferson's Shadwell tract and reference image.



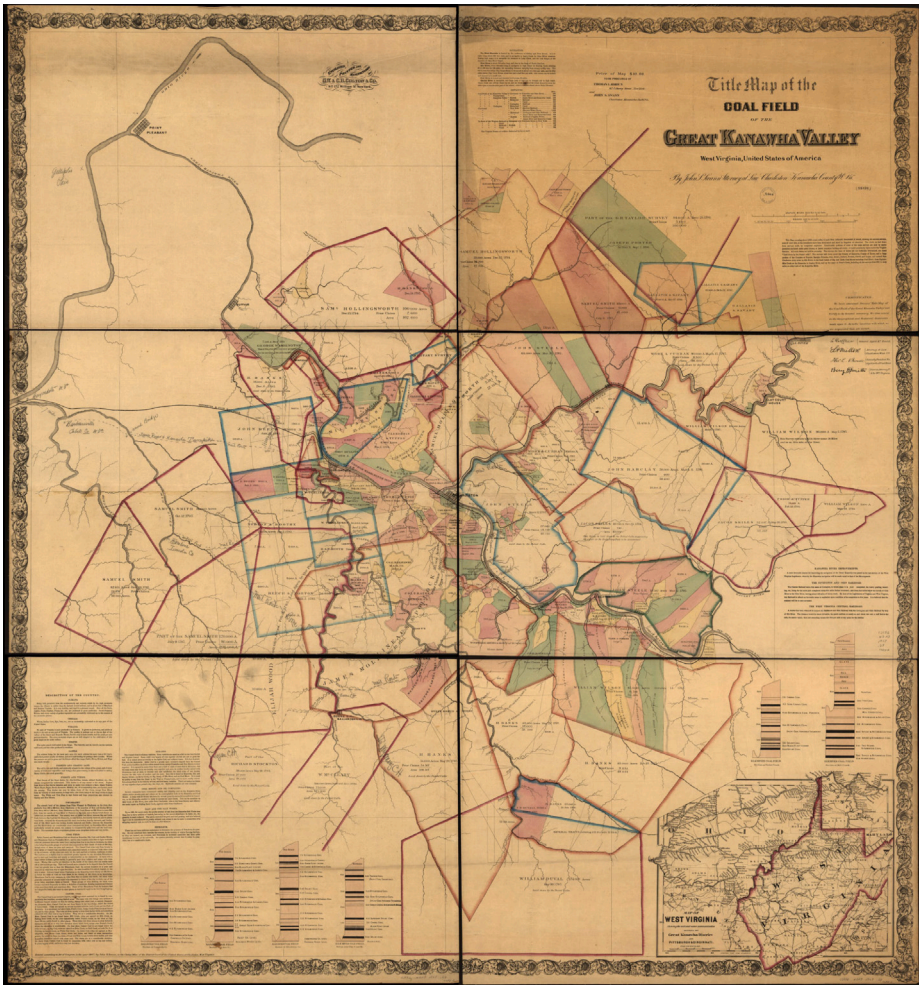


Fig. D.4. Washington's tract and reference image.

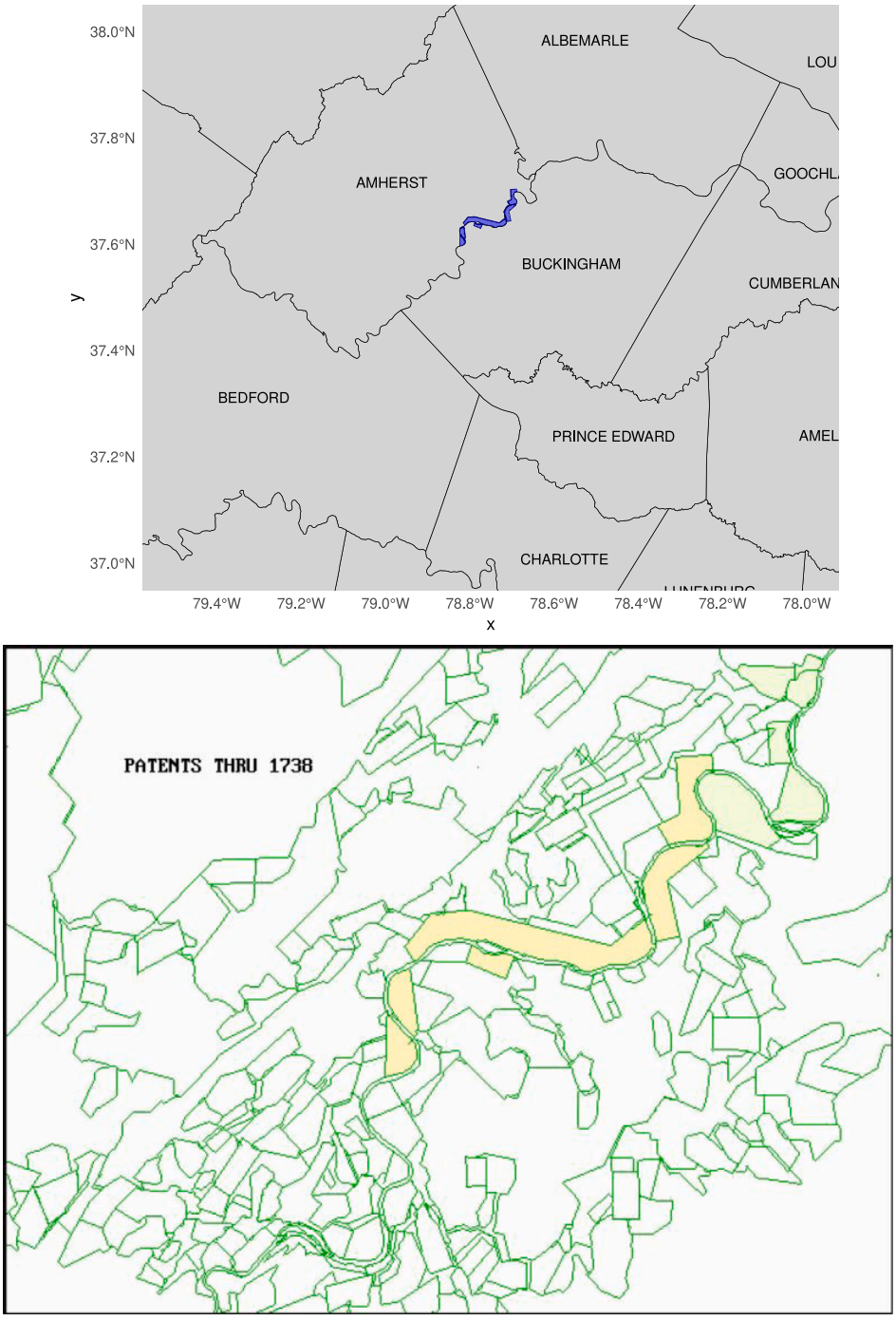


Fig. D.5. Cabell's tract and reference image.

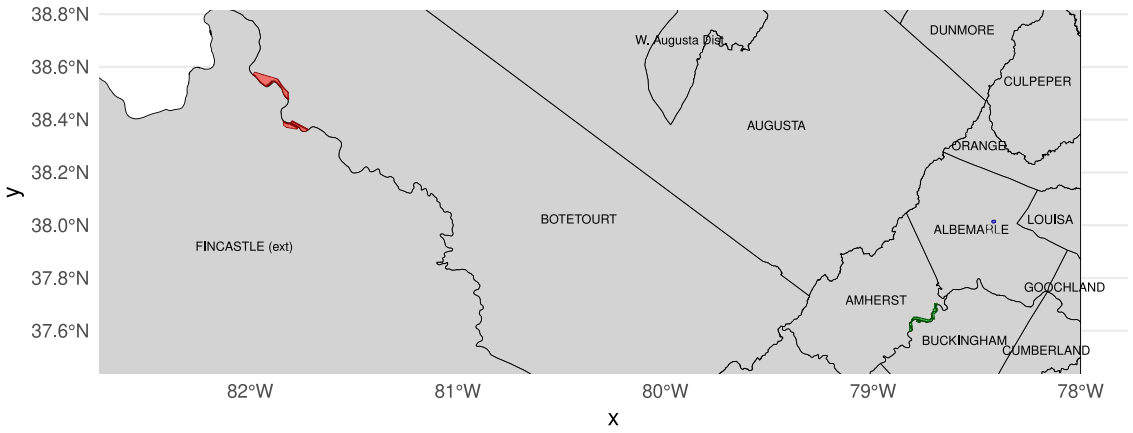


Fig. D.6. All used tracts: Washington (red), Jefferson (blue), and Cabell (green). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

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