Using Business Names as an Indicator of Oysters' Cultural Value

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Abstract

Business names, as recorded by state tax departments, offer a possible indicator of cultural ecosystem services provided by nearby natural resources. Using oysters in the Chesapeake Bay as an example, we process spatial and quantitative analyses that can potentially identify cultural value for integration into monitoring efforts that aim to incorporate a variety of ecosystem services. Businesses named directly after oysters provide a useful lens to capture the many reasons people value oysters culturally, but also provide an easy aggregate indicator that could potentially be added to regular regional monitoring programs in order to factor in cultural value to adaptive management policies.

Introduction

Along the Chesapeake, the roads of many communities are literally paved with oyster shells. Legends of oyster wars persist, and many still gather for annual skipjack races to watch traditional sail-powered fishing boats show off their skills (Wennersten 2007). At the same time, there is a move toward ecosystem-based management of the bay, which integrates long-standing concerns about upstream activities with fishery rules. This is especially true for the oyster, as a keystone species that creates both a lucrative fishery and habitat for many other iconic Chesapeake fisheries (Chesapeake Bay Fisheries Ecosystem Advisory Panel 2006) and a cultural connection for those living within and visiting the Chesapeake Bay watershed. This, in order to manage the species in a true ecosystem-based context, management measures must address the strong cultural connection Chesapeake citizens feel for the tasty bivalve. Yet we have few ways of keeping track of that connection over time.

To implement ecosystem-based management in a system as complex as oyster reefs, a seemingly endless number of factors must be distilled into a subset that can be regularly monitored. Indicators and their related reference points comprise this subset and serve as an ecosystem status snapshot on which to base management decisions (Rice & Rochet 2005). One of the main challenges in monitoring complex systems is the temptation to measure all things all the time (Fogarty & McCarthy 2014), which is not financially feasible or possible with current monitoring staff (Biber 2013). Instead, an appropriate approach may be to develop a small set of indicators in partnership with local stakeholders that will provide managers the snapshot they desire while also providing scientific insight on the dynamics of the system (Reed et al. 2005).

Focusing on Chesapeake Bay oysters, the challenge of creating indicators is shaped by both a long history of watershed-scale management and a strong cultural significance dating back to the colonial era. The region's management demand for oysters is best summarized by the Fisheries Ecosystem Plan (Chesapeake Bay Fisheries Ecosystem Advisory Panel 2006), in which oysters are one of the five keystone species providing the bedrock for an ecosystem-based management approach. In the FEP, the cultural significance of oysters is recognized as something that needs to be included in decision-making tools, but no specific measures are suggested. Overall, the development of relevant indicators to capture the complex ecosystem dynamics of the region and the science behind those indicators is still considered in its early stages (Boesch 2006).

One of the best ways to channel the complexity of the Chesapeake ecosystem into more easily comprehensible segments—like indicators—is through the use of ecosystem services (Tallis et al. 2012), especially in the delivery of downstream services as a desirable outcome for management (Tuvendal & Elmqvist 2011). Oyster reefs are an excellent example of this, as the restoration community demands ecosystem-based metrics that would demonstrate the full suite of benefits of restoration investments (Baggett et al. 2015). In this case, one of the important ecosystem services is to support the cultural value of oysters (Keiner 2009). Therefore, the best means of meeting the need to track cultural connections to oysters over time is to develop an easy-to-use indicator for the cultural value of oysters. The question is how best to do this.

Often, when people talk about the human dimensions of an ecosystem, they refer to the need for 'socioeconomics'. It is easier to create indicators for the economics side of the hybrid socioeconomic term, as the metrics of the field tend to be quantitative, and therefore easier to integrate with biophysical indicators. Quantitative metrics are important in management contexts in order to be able to evaluate tradeoffs and establish thresholds for action, as expressed in FAO and UNESCO forums (Cury & Christensen 2005). For example in a fisheries community, landings, profitability, and employment trends are commonly collected metrics of community well-being (Clay et al. 2014).

However, the social side of socioeconomics is more difficult, both because there are fewer established protocols for monitoring indicators and because even fewer are quantitative, spatial or both. NOAA Coastal Resources Center captures a few possibilities: gentrification, demographic trends, and dependence on fishing (Jepson & Colburn 2013). Though these resonate with concerns in many coastal communities, they fail to capture residents' sense of place or cultural value of its resources, so something new is needed (Jenkins et al. 2016).

There are a few examples of potential indicators of sense of place or cultural value, i.e. linking ecosystem services to cultural values and outcomes. Often these are specific to a context or particular community. For example, big data approaches to mine social media for how people tweet, Facebook, and Instagram about their town and associated resources can yield immense amounts of data (Jenkins et al. 2016). However, social media users are generally younger and more urban than the general population, so they may only capture a portion of the overall sense of place. Conversely, surveys or, more commonly interviews, can directly assess people's sense of place and values of natural resources (Raymond et al. 2009; Paolisso 2002). But these methods are labor intensive and generally only deployed in a single community context.

Responding to this need for easily collected and used indicators of sense of place and cultural value, we used three criteria to determine what would make a useable, easily gathered, and feasible indicator:

- Quantitative, spatial, or both, in order to be easily integrated with more traditional indicators of ecosystem health (Babcock et al. 2005).
- Data coverage is available at the appropriate scale and timing for management decisions (Greenstreet & Rogers 2006). For the Chesapeake, this is at the state level with annual monitoring.
- The data is open source or otherwise publicly available for free or cheap, so that it can be added to regional databases with open data requirements (Whyte & Pryor 2011)

One possibility meeting this set of criteria is to use business names in the region as a reflection of appreciation for nearby natural resources. Business data are collected regularly for tax purposes and are generally available to the public. Businesses occurring throughout the watershed are registered at the state level, and can be quantified on a per-capita basis or analyzed spatially alongside locations of relevant natural resources. The rest of this discussion will show an example of this indicator utilized for Chesapeake Oysters in an ecosystem-based management context, then turn to how such an analysis might be useful more broadly.

Methods and Data Analysis

We geographically bounded our study to oyster-producing states in the Chesapeake watershed: Virginia, Maryland, and the District of Columbia. For tax purposes, each state collects business data and maintains a business registry. For oyster-containing regions of the Chesapeake, these registries are maintained by the Virginia State Corporation Commission, Maryland Department of Assessments and Taxation, and the DC Department of Consumer and Regulatory Affairs, and all are available and searchable on the department websites. The registries include much more information than necessary for our purposes, so we focused on the business names, addresses, year incorporated, business status, and business type.

For the list of businesses with 'oyster' or 'oysters' in their name (232 in total), many were restaurants or seafood dealers, still others were named after the town of Oyster Point (22), while some (27) were a wide variety of non-food related businesses such as antique shops, wineries, and car mechanics. Food-related businesses were assumed to be named after one of the primary products sold or processed, and their cultural value connected to the availability of commercially-available oysters. In order to see why the non-food related businesses decided to include oysters in their name, we called each of the businesses' main numbers and asked whomever answered the phone, *What is the origin of your business' name?*. Some had to check with the business owner, while others had an answer easily on hand. These will be discussed in the results.

When employing this or a similar indicator elsewhere, one may not need to call business owners to confirm their intentions, but this case exemplifies that oysters are not just for eating, but hold a larger place in the culture of business owners attempting to capture the values of their towns. The best way to display the information is through a map, showing clusters of oyster-named businesses, color coded by whether they are food-related or not (figure 1). This allows geospatial analysis such as exploring the distance from a business to the nearest oysters and what type of oysters those are. We performed this analysis in ArcGIS (ESRI) utilizing oyster-related databases from Maryland Department of Natural Resources and Virginia Marine Resources Commission.

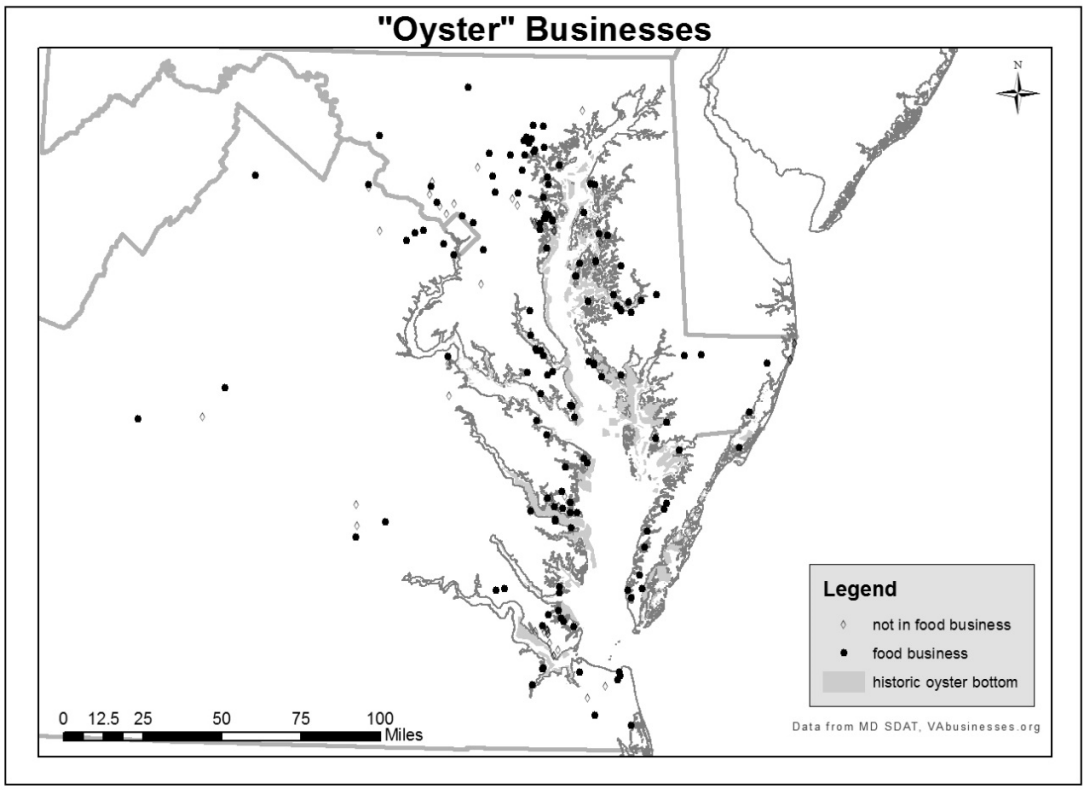

Figure 1 Location of businesses named after oysters overlaid on historic oyster extent.

Results and Discussion

Of the 232 oyster-named businesses in the Chesapeake region, most were food-related (79%). These indicate cultural value, but in a very specific way that is tied to monetary value, food systems, and commercial fishing reliance and identity (Jepson and Colburn 2013). A total of 9% were named after the neighborhood of Oyster Point in Newport News, which also indicates a certain kind of cultural value tied to history, heritage, and constructing a modern identity from those (Alderman 2008). The remaining 12% of businesses were non-food related and not named after a broader community identity, and according to the 67% of business employees from the non-food related businesses that answered our phone query, all of these were named at least in part to pay homage to the cultural value of oysters. These minority non-food businesses suggest a more direct way of indicating cultural value attached to oysters at the level of the individual business owner (rather than also following market forces or pressure for a community identity) than using all businesses.

In the case of Chesapeake oysters, the business name indicator is perhaps best integrated with existing spatial-based platforms such as the geodatabases for planning oyster restoration or the annual report card (UMCES 2015). In these cases, it adds a human dimension to a biology-dominated monitoring scheme. We propose several types of analyses that provide insight on the cultural dimensions of oyster bars. The first depicts how the business locations correlate with the locations of historic (figure 1) or

current oyster bars and their health status (more oysters per bushel of dredge material is considered healthier) (figure 2). We included all businesses in the analysis, and chose to focus our example (figure 2) on an area without neighborhoods named after historic oyster bars. A similar map for Maryland (for comparison) can be found within the Department of Natural Resources Aquaculture Siting Tool (http://gisapps.dnr.state.md.us/Aquaculture/index.html). For privacy concerns, they prefer people reference their tool only for spatial information on aquaculture operations; therefore, we did not include a map of Maryland as part of this paper. The type of oyster that the vast majority of businesses are closest to in Virginia is a private oyster lease (for aquaculture), whereas in Maryland 68% are closest to a sanctuary (no harvest allowed), largely due to the fact that the aquaculture industry is far more established in Virginia, especially around populated areas where most businesses are located. Conversely, Maryland has set aside far more area in sanctuary than Virginia, which declares sanctuaries only as part of a rotational harvest management scheme.

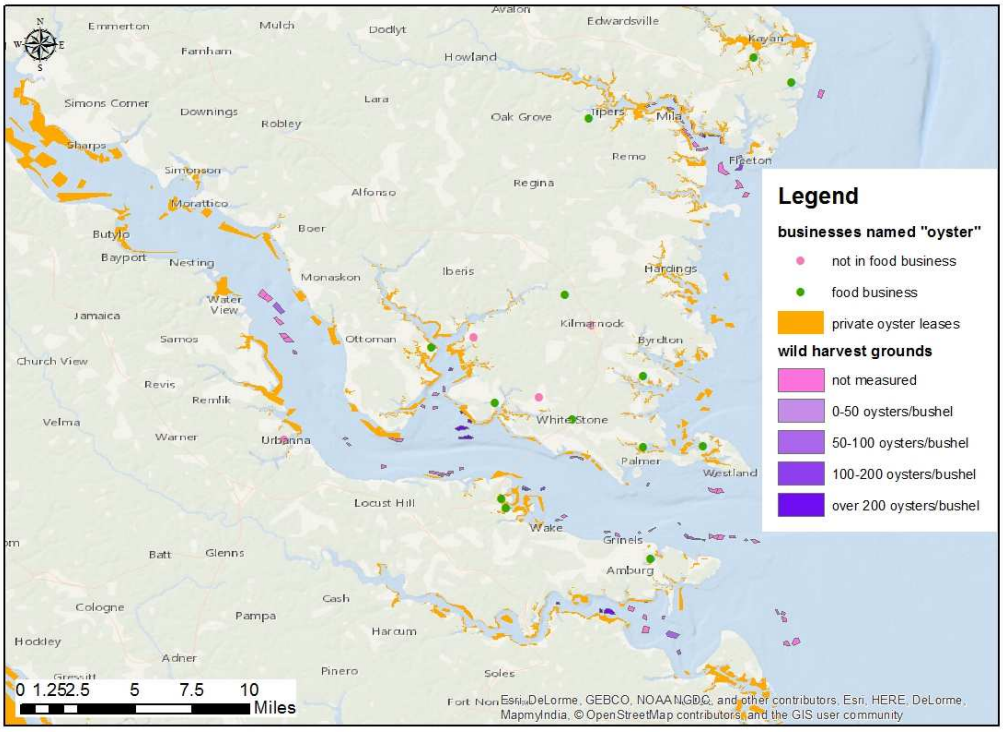

Figure 2 Small-scale example of businesses named after oysters in a region with abundant oysters currently

While some employees did not know the origin of their business name and a handful of others were named for their neighborhood, which in turn, was named for historic oyster-producing water, others promoted the oyster origin in their marketing. For example, one car mechanic and restoration business advertised on their website “oyster has the appeal as being one of the most luxurious and flavorful delicacies from the sea for many around the world. Every kind has its own unique characteristic and flavor...the oyster part symbolizes the unique high quality product I will turn around for you." A real estate company wanted to name their business after a river resource and jumped at the opportunity to use the byline “finding the hidden pearls in investment real estate.” Others, particularly around Urbanna, VA—the home of the well-known Urbanna Oyster Festival—named their businesses “due to oysters being such an integral piece of our area.”

Breaking down the business name data by proportion of businesses with certain attributes yields useful insight into the weight of cultural connection that people have with oysters. For example, looking at the businesses on a per capita basis can help identify hotspots for cultural value. Urbanna and Kilmarnock both have clusters of oyster businesses but a very small, rural population. One can then further investigate the area, looking at the types of oysters nearby, and how healthy the reefs are (figure 2). 'Nearby' in this case simply means in the same stretch of river (on the order of tens of miles); in areas with more topography, one might include topography in the analysis to include only oysters that can be seen from the business, in its 'viewshed' (Wheatley 1995).

Around the Urbanna and Kilmarnock area, the businesses tend to be clustered around wild reefs more frequently than they are around aquaculture leases. On the other hand, the clusters around DC and Baltimore are in line with their dense urban population. Looking at the larger cities also demonstrates another potential way of interpreting and using this data—the ratio of food-related to non-food related businesses. The vast majority of oyster business in Baltimore, for instance, are raw bars that have opened in the last several years to take advantage of a hipster foodie population moving to the city.

The business name indicator works in the Chesapeake context according to the criteria outlined in the introduction. For other US contexts, each US state tax database looks fairly similar and the geocoding from registered addresses can be done through an add-on within ArcGIS automatically, so creating a similarly effective map layer for other contexts is a small time investment. International contexts may be more challenging, but every region that taxes businesses has a registry, it just may not be public. Account for the population and history within the study region to contextualize why businesses may be named after oysters (i.e. Are raw bars popular? High commercial fishing dependence?). Finally, consider removing or otherwise accounting for both family and neighborhood names that contain the keyword. For example we removed "Royster" businesses named after the Royster family but left clusters of businesses named after their neighborhood Oyster Point, since the neighborhood was named after a historic oyster reef. These decisions will be context dependent.

Checking in on these data annually will yield a temporal analysis as well – while historic registries are not typically publicly available, states have collected this data for decades. Current records show when the current active businesses were founded – and suggest that the urban areas like Baltimore tend to have businesses that are just a few years old, while smaller towns like Urbanna has businesses dating back to times with more abundant oyster (the early 1900's). Some of these changes are due to normal market forces, as many small businesses fail in their early years while maintaining a business for a century is quite difficult and requires generational transfer. But these small businesses also capture the zeitgeist of the time.

A word of warning here, as the length of the registries and the large number of businesses in the region mean that it can be difficult to get the most desired business name. One business owner in our survey mentioned that oyster was the only version of his bay-related business name that wasn't taken. Local planners also note that the registry represents just a name for tax reporting, but the actual sign on the business may say something else, and this might change over time. Several of the businesses we spoke to had also moved in the years since founding, and the original paperwork was still filed under either their old address or their home address. Therefore, groundtruthing either by a drive-by or through technology like Google Earth streetview is necessary.

Returning to the needs of the Chesapeake science and management context, one might ask how well this indicator fits the need and criteria for a good indicator. The spatial approach works well since so many of the other indicators utilized in regional management are spatial and have been for many years (Holland et al. 1987; Brandt et al. 1993; Moore et al. 2000). It could be made more quantitative in combination with and relation to other datasets like the US Census for demography, state oyster surveys for oyster health (figure 2), NMFS commercial landings and value, etc.

Finally, the data are collected annually as part of regular business registry updates and is therefore open to the public to use on spatial scale and timeframe matching management needs. In addition, it is an endpoint ecosystem service (cultural value) that depends on the production of healthy natural oyster reefs as well as aquaculture to fully develop. The recent rise in use of valuation of ecosystem services tools for decision-making demonstrates their utility, yet they struggle to include cultural services. Quantified versions of this business indicator may fill that niche. Policymakers tasked with both natural resource management and preserving cultural heritage of the Chesapeake can use this indicator to integrate their missions.

While the focus of this exploratory study is primarily to demonstrate that relatively easy indicators of cultural value are possible to include in an ecosystem monitoring scheme for management, it also leads to a larger set of conclusions about incorporating culture into any coupled human and natural system research. First is that while people may appreciate an entire watershed and the natural resources it provides, they tend to call out specific resources in a cultural context. In this case, oyster names extended beyond businesses based on eating oysters to demonstrate appreciation of their contribution to cultural heritage. This particular arrangement may not be the case everywhere, but the dynamic of some resources being more important than others probably is. There are likely keystone species elsewhere—e.g. lobster, salmon, moose, bear, buffalo—that may be worth testing.

Overall, how people value oysters culturally is as complex as oysters' role in the ecosystem. While many people may simply value the availability of tasty local aphrodisiacs (and this shouldn't be undercounted), other people value their contribution to the rich history of the region (resulting in town names and community identity), or personal connection to oysters and the Bay system they represent. The businesses named after oysters capture this variety and serve as a relatively easy snapshot of a complex concept that could be monitored over time and contribute to an adaptive management strategy for the oyster that leaves space (figuratively and literally) for sanctuary reefs, harvested reefs, aquaculture, and restored areas to help deliver the full suite of cultural values.

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References

Alderman, D. H. (2008). Place, naming, and the interpretation of cultural landscapes. *The Ashgate research companion to heritage and identity*, 195-213.

Babcock, E. et al., 2005. A perspective on the use of spatialized indicators for ecosystem-based fishery management through spatial zoning. *ICES Journal of Marine Science*, 62(3), pp.469–476.

Baggett, L.P. et al., 2015. Guidelines for evaluating performance of oyster habitat restoration. *Restoration Ecology*, 23(6), pp.737 – 745.

Biber, E., 2013. The Challenge of Collecting and Using Environmental Monitoring Data. *Ecology and Society*, 18(4).

Boesch, D.F., 2006. Scientific requirements for ecosystem-based management in the restoration of Chesapeake Bay and Coastal Louisiana. *Ecological Engineering*, 26(1), pp.6–26.

Brandt, S.B. et al., 1993. Spatially Explicit Models of Striped Bass Growth Potential in Chesapeake Bay Spatially Explicit Models of Striped Bass Growth Potential. *Transactions of the American Fisheries Society*, 8487(June).

Christine Keiner, 2009. *The Oyster Question*, Athens, GA: University of Georgia Press.

Clay, P.M., Kitts, A. & Pinto da Silva, P., 2014. Measuring the social and economic performance of catch share programs: Definition of metrics and application to the U.S. Northeast Region groundfish fishery. *Marine Policy*, 44, pp.27–36.

Cury, P. & Christensen, V., 2005. Quantitative ecosystem indicators for fisheries management. *ICES Journal of Marine Science*, 62(3), pp.307–310.

Fogarty, M. & McCarthy, J., 2014. *The SEA: Marine Ecosystem-Based Management* volume 16., Cambridge, MA: Harvard University Press.

Greenstreet, S. & Rogers, S., 2006. Indicators of the health of the North Sea fish community: identifying reference levels for an ecosystem approach to management. *ICES Journal of Marine Science*, 63(4), pp.573–593.

Holland, A.F., Shaughnessy, A.T. & Hiegel, M.H., 1987. Long-Term Variation in Mesohaline Chesapeake Bay Macrobenthos: Spatial and Temporal Patterns. *Estuaries*, 10(3), p.227.

Jenkins, A. et al., 2016. Crowdsourcing a collective sense of place. *PLoS ONE*, 11(4), pp.1–20.

Jepson, M. & Colburn, L.L., 2013. Development of Social Indicators of Fishing Community Vulnerability and Resilience in the U . S . Southeast and Northeast Regions. *NOAA Technical Memorandum NMFS-F/SPO-129*, (April), p.64.

John Wennersten, 2007. *Oyster Wars of the Chesapeake* 2nd ed., Washington DC: Tidewater Publishers.

Moore, K.A., Wilcox, D.J. & Orth, R.J., 2000. Analysis of the abundance of submersed aquatic vegetation communities in the Chesapeake Bay. *Estuaries*, 23(1), pp.115–127.

Panel, C.B.F.E.A., 2006. *Fisheries Ecosystem Planning for Chesapeake Bay*, Bethesda, MD: American Fisheries Society, Trends in Fisheries Science and Management 3.

Paolisso, M., 2002. Blue crabs and controversy on the Chesapeake Bay : A cultural model for under ... *Human Organization*.

Raymond, C.M. et al., 2009. Mapping community values for natural capital and ecosystem services. *Ecological Economics*, 68(5), pp.1301–1315.

Reed, M. et al., 2005. Integrating Methods for Developing Sustainability Indicators to Facilitate Learning and Action. *Ecology And Society*, 10(1), pp.1–6.

Rice, J. & Rochet, M., 2005. A framework for selecting a suite of indicators for fisheries management. *ICES Journal of Marine Science*, 62(3), pp.516–527.

Tallis, H. et al., 2012. New metrics for managing and sustaining the ocean's bounty. *Marine Policy*, 36(1), pp.303–306. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0308597X11000728 [Accessed December 21, 2014].

Tuvendal, M. & Elmqvist, T., 2011. Ecosystem Services Linking Social and Ecological Systems : River Brownification and the Response of Downstream Stakeholders. *Ecology And Society*, 16(4).

UMCES, 2015. *Chesapeake Bay Report Card 2015*, Available at: chesapeakebay.ecoreportcard.org.

Wheatley, D. (1995). Cumulative viewshed analysis: a GIS-based method for investigating intervisibility, and its archaeological application. Archaeology and geographical information systems: a European perspective, 171-185.

Whyte, A. & Pryor, G., 2011. Open Science in Practice : Researcher Perspectives and Participation. *International Journal of Digital Curation*, 6(1), pp.199–213.

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