

Research design and data collection for land use and occupancy mapping

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Introduction

Aboriginal peoples in Canada have been mapping aspects of their cultures for two generations. The resultant maps have been given various names, including “land use and occupancy”, “land occupancy and use”, “traditional use”, “traditional land use and occupancy”, “current use”, and “cultural sensitive areas”. I use “use and occupancy mapping” generically to include all the above. The term refers to the collection of interview data about traditional use of resources and occupancy of lands by Aboriginal peoples, and the presentation of those data cartographically. It is an exercise in the geography of oral tradition, and equally in the mapping of culture and resources.

Such mapping can support a range projects, including documenting elders’ oral history before more knowledge is lost, determining shared use areas and reconciling boundary conflicts between neighbouring communities, providing evidence for legal cases, settling claims, negotiating agreements, determining the probable impacts of development, providing baseline data for community planning and resource management, and developing curricula for education. At a routine level, a local government must acquire, update and control an inventory of its people’s cultural resources.

I offer some ideas and recommendations for producing good maps based on some three decades of experience designing use and occupancy mapping projects, and working with Canadian and Australian indigenous peoples at the community level. I discuss some key factors that lead to successful community mapping. However, I do not offer a simple formula, or off-the-shelf methodology, that can be applied universally because that would be impossible given many different reasons for doing research, a huge range of cultural and linguistic diversity among the Pacific Islands’ indigenous communities, and enormous contrasts in various nations’ relationships to resources.

Following a brief introduction to land use and occupancy mapping, the tasks involved are sketched. The concepts of “map biography” and thematic map are introduced, emphasising the importance of quality data and of avoiding the museum approach to mapping. Obtaining and training good personnel, taking control of research design, and

respecting workers’ limitations are examined, and special attention is paid to “response burden”, the factor that most commonly undermines research. Five defining characteristics of any project are discussed, along with the principles guiding research design and implementation, the measures of quality, and the culture of research.

Despite their tremendous diversity, Pacific Island communities have in common the harvesting of fish, wildlife, and plant materials, the historical basis of economic life throughout the region. In the pursuit of resources that constitute the foundation of their cultures, people leave traces over the landscape; evidence that they have been there. Yet many activities leave no visible evidence. Rather, they etch themselves in the minds of those who travel their home region in search of physical and spiritual sustenance. For most Pacific Islanders, these mental images are embroidered with intricate detail and knowledge, based on the community’s oral history and an individual’s direct relationship to the traditional territory and its resources.

Use and occupancy mapping is about documenting those aspects of the individual’s experience that can be shown on a map. It is about telling the story of a person’s life on the land and sea. Over time, individual experience becomes part of the collective oral tradition, a much greater story. In this respect, use and occupancy mapping helps record a nation’s oral history.

Further, mapping is not just about making maps because other benefits arise from the process. When properly done, use and occupancy interviews increase participants’ awareness of their connection to territory. People are usually surprised to see how much they have used their land and sea. They obtain a new understanding that their individual activities are part of a larger community concern and undertaking. The exercise of mapping provides opportunities for different generations to share their experience, information and knowledge. Elders from different villages are often brought together, renewing bonds between communities. Overall, land–sea use and occupancy mapping helps to invigorate peoples’ pride in their cultural heritage. In addition, the administrative and technical capacity acquired through successful mapping projects increases the ability to administer and manage a territory.

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Map biographies and thematic maps

Typically, land use and occupancy mapping projects collect data using “map biographies”; in other words, face-to-face interviews during which individuals are asked about their use of the community territory. During an interview the locations of use and occupancy sites are indicated either on a paper base map, or onto a clear overlay taped over it. Usually the interviewer asks for information about the participant’s experience of the land base or seascape over their entire lifetime. Therefore, it is called a “biography”.

Most researchers focus on obtaining data about only an interviewee’s direct personal activities and experiences. Others, however, have found it useful also to seek information about knowledge of sites obtained from parents and elders. If the interviewer covered enough topics and the participant has an excellent memory and is willing to sit at the mapping table long enough, the resulting biography would represent everything that could be marked on a map. Of course, this never happens; what does emerge from the map biography is a useful but simple and incomplete representation of the interviewee’s life story on the land and waters of a territory.

Some practitioners restrict their map biography method to questions about harvesting activities such as hunting, fishing and gathering, and travelling to engage in them. Others extend the method to include questions about the participant’s experience and knowledge of ecology and critical habitats, traditional habitation sites, spiritual and sacred areas, legends and stories associated with sites, and place names. After many map biographies have been completed, the information from them is used to make a series of thematic maps. These break out subsets of information from map biographies and combine them either for all community members or for specific groups, such as teenagers for example, within a community. Such maps include those of fish harvest sites, plant harvest sites, sacred areas, travel routes, habitation sites, and place names.

The categories for each thematic map change, depending on the reason(s) for making the maps, which community is doing it, and the intended uses

of the maps. Whereas the map biography is used for collecting an individual’s use and occupancy information, the thematic map is used for displaying or presenting an entire community’s data. The biography is a data collection tool whereas thematic maps are used for presentation, education and negotiation, among other things.

It is important to understand that doing research well is not the same as making research results look professional. “Quality” pertains to the manner in which data are collected, whereas “appearance” is about the way data are presented. Using computer enhancement techniques, geographic information system (GIS) technicians can make almost any dataset look impressive, but they cannot improve its quality. Technology should never be allowed to lead or define a research agenda, something that should always be kept in mind because many communities possess GIS hardware and software, but not the capacity to operate it well.

Appreciating the challenges of oral history as social science

A common problem is the underestimation of the difficult task faced by a community’s own data collectors. After having been passing knowledge from generation-to-generation for thousands of years, it might be quite natural to underestimate the difficulties of land use and occupancy mapping. A basic difficulty arises because land use and occupancy mapping employs the rules of Western social science, which studies society and social relationships. Its practice is social in nature because one person is asking another for information; it is science because the questions are being asked systematically, according to established Western scientific rules of gathering and verifying knowledge. All manner of psychological and social considerations are involved when someone is asked to provide information, especially when the questions asked are personal, as they are in the case of use and occupancy mapping. The problem is amplified because the research crosses cultures, with the community adopting rules of research developed by the larger society.

The “museum approach” to mapping

It is risky to view a use and occupancy project in isolation from a larger research strategy. No matter how thoroughly the data are collected, typically budgets are always insufficient to map all aspects of a community’s entire cultural geography. Even if funds were available to do four major mapping projects — harvesting sites, travel routes and habitation, spiritual sites, and place names — and all the mappable information that all elders and harvesters was documented, the final product would not represent the totality of a culture and oral tradition. The

final set of maps would still have gaps, with many cultural features isolated by blank spaces. The critical issue is that blank spaces can be essential to the survival of the culture. For instance, the final maps might display the places a community harvests fish whereas fish spawning areas on the community's territory remain as unmapped blanks.

The danger of showing cultural features as disconnected fragments on a map is that corporations and government agencies carry on with business as usual on the portions for which no data are mapped. Governments may take the position that aboriginal title and rights are site specific, and do not apply on the rest of the territory. They tend to regard the mapped areas as "museum pieces" that are isolated remnants of heritage, instead of parts of living cultural systems.

The unfortunate reality is that even though all remnants can be saved, ultimately little or nothing is saved. The developments occurring in the blank spaces, much of which could be productive habitat for the fish, animals and plants necessary to sustain a culture, can lead to the mapped features eventually becoming museum curiosities that do little more than commemorate extinct tradition. Perhaps the fish harvesting sites receive some protection in planning processes, but the watersheds continue to be clear-cut, resulting in the siltation of the spawning sites within the reef. Saving some of the pieces — some of the sites — is not the same as keeping the system healthy.

In other words, mapping specific sites is risky, but it is necessary to the production of credible maps that serve a community well. The issue is not so much whether to map detailed and specific sites when appropriate, but rather how to control the release of data, how much data to release, to whom, when, and at what level of detail, both in terms of geographical space and historical significance. Collecting data that are best represented as small areas or points and mapping them as large polygons defeats many of the purposes for which communities do the mapping in the first place. That is why it is important to link each piece of use and occupancy mapping research to previous efforts, and to have following projects build on the strengths of what is being done now.

Ideally, that would result in "comprehensive research", which requires an overall plan that links a number of key components together. Taken as a whole, it demonstrates that the "museum approach" is not valid. Comprehensive research also describes the complex system of use that is the foundation of all the mapped use and occupancy data. That system of use cannot be portrayed in map form, but it can be put into words. Traditional ecological knowledge, social customs, organizational structures, and

social institutions are part of the system, and when the maps are considered in light of these, there are no blank spaces. Everything can be shown to be interconnected. What appear as blank spaces on the map can be shown to have meaning and significance to the culture.

The groundwork for good research

The most important consideration regarding community research is whether or not members are willing to participate. A community administration can have a well thought out and desirable project, but will surely fail if it does not secure community support, ideally before the first map session takes place. If community consensus has not been obtained before interviewing commences, workers will struggle throughout the entire data collection phase. They will find themselves spending far too much time explaining the project to people, and listening to individuals' concerns about the research itself and related issues such as the funding agency. For many data collectors, getting individuals to sit down with them has been quite frustrating in itself, and the experience of having prearranged map sessions turn into no-shows is all too familiar.

In addition to building consensus for the endeavour, a community government must provide hands-on political and material support to its data collectors for the entire period of interviewing. Administrative personnel are usually stretched thin because of limited resources. Often, everybody ends up being asked to take on more than they can handle. Unfortunately, the success of the research can be jeopardized if interviewers are asked to take on too many responsibilities.

Research personnel and training

Leaders sometimes make the mistake of always hiring local research directors, regardless of the candidates' previous experience or training. This can be a recipe for disappointment.

Community politicians must be clear about whether their primary goal is to reap the short-term rewards of hiring local research directors (such as local political support and income for the community) or to seize the opportunity to produce maps that can help win long-term benefits. This is not always an either-or situation. Many communities lack highly trained or skilled administrators among their members. So most communities will, for the time being, remain dependent on the services of skilled outsiders to help them design and direct land use and occupancy research. Most communities have now had experience with outside consultants and researchers, hence most are aware of the importance of keeping consultants accountable, and of maintaining control of cultural data.

Still, administrations sometimes make poor judgments about the abilities of consultants to help them do good mapping. Often it is assumed that if a candidate for research director is a university graduate, she or he will be suitable. University experience is a valuable asset, but it does not in itself lead to successful research. The candidate's academic background is likely to be in a field such as forestry or archaeology, which accepts the world view of society at large. If his or her assumptions about the connection between a people's culture and well-being are at odds with a local people's way of looking at the world, then problems will arise. The risk is that the research will be undertaken largely in keeping with outside values, despite the person's best intentions. The research would then likely end up serving outside interests.

In addition to the research director, the selection of community people to collect data is critical. These individuals have to be motivated by the belief that the project will make a difference to their people. They need to be self-starters and firmly committed to staying on for the duration of the data collection phase. This is especially important, because in most communities the team of interviewers is made up of just a few people, and the loss of even one makes a difference in the amount of map sessions that can be completed. Most projects lack the budget or flexibility to allow for the training of replacement personnel. The level of commitment and motivation is as important as any other qualification. The tone in this regard will often be set by the community leadership. If the project is perceived to be a make-work program, the likelihood increases that workers will be hired who regard the position as just a job.

There are numerous other considerations in selecting workers. They should have good interpersonal skills, the respect of community members, especially elders, a heartfelt interest in their culture, a familiarity with their traditional culture, systems of harvesting, and traditional territory, a lifestyle that allows them to show up on the job consistently, the ability to read and understand maps, the ability to speak and write in their indigenous language, the ability to use a flexible interview guide by being able to think quickly and probe with follow-up questions, a willingness to pay close attention to detail, and the ability to read and write well and keep good research records.

Few people meet all those criteria. It is important to select a team so that individual strengths complement each other. For instance, successful interview teams sometimes have only one member who speaks the indigenous language and who has an intimate knowledge of the territory, and another member who writes well enough to keep good records and take responsibility for the detail required by social science.

Most government-funded research projects encourage workers to start data collection without sufficient training. Agencies either set low standards, or do not provide the means by which higher ones can be achieved. It is up to the community to insist on high standards that respect the rules of social science, and to collect data in a manner that meets them.

Taking control of research design and data

In addition to building up community-wide support for the research and the careful hiring and training of staff, the community administration must take control of the research design. The design is a combined blueprint and work plan that specifies how the data are to be collected and then worked into a final set of maps. A community's maintenance of control over its map data is essential.

A number of projects have been successful in meeting obligations to supply information, by providing data that are presented in a way that safeguards sensitive sites from violation. For instance, there might be a category of sites that is especially vulnerable to vandalism, such as ancestral burial grounds. The map could show each site as an area covering ten square kilometres, making them impossible to find on the ground without the community's assistance.

Information-sharing agreements can be negotiated to include a variety of mechanisms that allow local groups to retain sole possession of the kinds of data most likely to be abused. Under some arrangements, the community releases data on a case-by-case basis as the need arises, and only after careful evaluation by a committee of elders and other leaders. Under other arrangements the government receives only maps showing cultural sites, whereas the local community retains control of the database, which contains the detailed information about the history and significance of each site.

Taking control of a mapping project involves more obvious things such as negotiating a strong information-sharing agreement and keeping consultants accountable. It also means giving careful thought to the technical design of the research. Funding arrangements often include pre-packaged research designs, in the form of policy guidelines or "how-to" manuals, and these usually have major problems. Fortunately, funding guidelines always leave room to manoeuvre. But if a community does not take advantage of this flexibility and design its research, then, by default, others will already be in control.

Avoiding "response burden"

A community taking control of its research involves avoiding the unintended invitations to fail that are hidden in the instructional material provided by

government or industry. The most common invitation is simply that the community is asked to take on an overly-ambitious project, one for which the expectations set by the research design are too high. This appears innocent enough, and so makes it difficult to recognize as a potential problem. Attempting to accomplish too much is probably the principal reason for research shortcomings, and why map projects fail to produce the results wanted by aboriginal administrations.

Research designs have to be realistic about what can be done within a set budget and time frame. Expectations must take into account the skill levels of project personnel and the level of cooperation to be expected from potential participants. For example, the design of a project to map the content of oral tradition could include collecting some of the following kinds of information: harvesting sites, ecological and critical fish habitats, site-specific features of special cultural significance, travel and trade routes, and place names. All of these kinds of information, or themes, are mappable. However, it is impossible to collect the data needed to map them all in a single project, which is exactly what some guidelines encourage communities to do. A really good job can be done only when the focus is on one or two of the themes. It is necessary to be selective because otherwise an interview guide would be complex and long, which means running the risk of major “response burden”.

“Response burden” occurs when a participant experiences the interview as too much of an effort. People have a range of experiences at map sessions. Some will find them enjoyable and even fun; others will find them positive, but somewhat inconvenient. Still others will experience their interview as frustrating. The interview must be structured so that most participants will be satisfied afterwards, especially the elders. Those are the people who likely know the most about many kinds of cultural features. They also tend to experience the most fatigue and frustration when the “response burden” is high. Elders also tend to be listened to by community members at large, and their opinions about the interview have considerable impact on final participation rates. What is required is that the mapping exercise generate project support by having participants go back into the community and tell others what a worthwhile endeavor it is. People should not leave the session feeling annoyed or discontented.

Two things happen when “response burden” is high: 1) The interview gets a reputation for being complex and difficult. When this happens, data collectors spend much more of their time trying to coax people to participate, and the final number of completed sessions is low. 2) People who agree to do a map are more likely not to provide good

quality data for each of the questions. Both of these outcomes translate into a weak set of community maps.

One way to look at “response burden” is as an issue of respect. Workers should respect the basic limitations common to all people. Participants do not have unlimited energy, time or willingness to concentrate on the task at hand. On average it seems that most people are comfortable staying focused up to about an hour and a half at one sitting, although this varies by culture and certainly also by individual.

Respecting the limitations of community workers

Encouraging people to design research that results in excessive “response burden” is only one way in which instructional material invites failure. Another is to set up wildly unrealistic expectations of workers. Consider this scenario. A community receives funding for a mapping project. The administrator can hire four workers and a research director for 15 months. The government supplies guidelines laying out the project’s phases and how each is to be conducted, as well as what the community is expected to provide at the end of each phase. So far so good, but the problem is the job description of the workers.

A typical mapping project involves a number of large tasks. Some research guidelines also require the project, as part of the same 15-month package, to do additional tasks such as archival work, ground-truthing of sites, and the completion of a data form for each mapped feature. On some projects community members are asked to do a whole range of tasks, any one of which alone is a substantial undertaking. Most individuals selected as workers for these kinds of projects do not have professional experience or much training in related fields.

This would be fine if both the community and funding agency had set out with the intention of providing workers with a broad opportunity to sample a whole series of research skills over a period of a few months, but that is never the case. Funds are provided to produce a concrete product, which is the primary objective. Capacity building is secondary. The administration typically does this kind of research because it needs data for specific purposes, often urgently. Workers who are asked to learn, master, and apply a variety of skills within a short time, and produce something of quality might feel stressed. One of the saddest consequences of research guidelines that invite people to take on too much too quickly is that the project ends up leaving the workers overwhelmed, even demoralized.

The likely results of such a situation are that community leaders, negotiators, educators, lawyers, and resource managers do not receive the quality

data needed to serve their people. The community acquires a reputation for failure and finds itself out of luck the next time it applies for funding to do cultural research. Community members become cynical about research because their efforts did not translate into concrete benefits. The workers are left doubting their ability to acquire and apply research skills, and perhaps thinking the project's outcome was their fault. These are serious consequences, especially if a people's vision is to govern itself and develop the capacity to do its own research, planning and resource management. Every research project is an opportunity to build the skills and confidence that are one of the cornerstones of self-government.

Designing the project

There are hundreds of detailed decisions that relate to the design of a use and occupancy mapping project. So, where to start? Fortunately, there are a small number of key decisions that help clarify everything that follows. These have to do with the project's five main defining characteristics, or parameters: the Why?, Who?, When?, Where?, and What? of the research. They look simple at first glance. Many map projects do not think these through carefully enough, leading to problems and unnecessary damage control efforts later on. More than that, not giving due consideration to the defining characteristics can seriously undermine the quality of the resulting maps.

1) Why: *Why are you doing this project?*

All five questions are important, but the most critical one is "Why?" A community administration should query why it is doing this project, what it seeks to accomplish with it, what its objectives are, and whether the land use and occupancy maps are for curriculum development, co-management negotiations, impact mitigation, negotiation or litigation of rights and title, compensation, or some other purpose. The list could go on and on. For instance, an oral history mapping project could be designed to focus entirely on the management of a particular fish species, or on the rehabilitation of medicine sites, or on traditional travel routes with an eye to developing ecotourism.

The temptation is to list many purposes and then to design a process to achieve them all. This cannot be done, at least not well, because it would result in a mass of poor quality data that will not meet the requirements of any of the listed purposes. It is fine to have multiple objectives in mind as long as one is clearly identified as primary. That single objective then becomes the focus of the entire project, the reference point around which all other design considerations revolve, including the other four parameters.

2) Who: *Who are you going to interview?*

Depending on the primary objective and the time and budget available, decisions must be made about how many and which people are to be interviewed; in other words the study population must be defined. It is often useful to start by dividing the community membership list into smaller lists of males and females, by 10-year age groups. Rank each of the smaller lists, so that the most experienced and knowledgeable people in each group are identified, and indicate which elders are at risk because of health reasons. Mark people no longer living in the community, and note where they reside currently. Perhaps knowledgeable individuals who are not on the membership list but who have married into the community should be added. Maybe there are official members who have not set foot on the territory for many years, and who should be taken off the lists. Each community is unique, but these are the kinds of considerations that lead to a set of criteria, or rules, that determine the study population. The point is to think it through and have the population defined before starting data collection. It is impossible to know exactly how many interviews are needed, but it is important to have some idea about the minimum number of sessions required to meet the main objective. Although a large sample is always desirable, it is not always necessary.

3) When: *What is the period of time for which you want to collect data?*

Like all the parameters, this depends on the purpose of the research. Generally, there are two relevant time frames. One is recent or "current" use and occupancy. The accepted definition for this is "within living memory", which is any time within the person's life. Some researchers regard this as the period from the person's teenage years until the date of interview. Others prefer to include childhood recollections. A set of current use maps represents the sum of the direct personal experiences of all participants. It can display some information for up to 75 or 80 years prior to the time of survey, but most is more recent, because most participants are younger. The second time frame pertains to historical use and occupancy research, which involves a greater time depth. It results in data that extend farther back than those obtained strictly from within-living-memory sources.

Historical use research uses a combination of oral history and written sources, and documents a community's occupancy of a territory going back hundreds of years. Historical use and occupancy studies use sources that go deeper than the direct life experiences of current generations to help determine the limits of the traditional territory, often for land claims purposes. Current research is usually undertaken to determine the extent and limits of a

community's use of territory within recent years. This is important for claims research and, when data are obtained for the whole territory and not just the outer edges of it, current use. Occupancy mapping is especially useful for resource management.

In some situations both the historical and within-living-memory time frames might be inappropriate. Take, for example, a community doing research to assess the impacts of industrial development. It would likely have a different definition for its "when" parameter than those used in either historical or current use and occupancy studies. Because of budgetary constraints, the impact assessment research might focus only on the families most likely to feel the greatest impacts of development. Those would be the families that had been active in the zone of impact in the years immediately preceding the research. It is conceivable that few elders would be interviewed for such a study.

4) Where: *Where is your study area?*

If the main objective is to obtain data to be used as evidence for proving aboriginal title, the area of relevance would cover the territory defined as traditional by elders, and for which obtainable use and occupancy data could be anticipated. What about sites much farther afield, on one of the more distant village's territory? These kinds of questions need to be considered and answered prior to the first interview. Sometimes information that emerges from data collection warrants a rethinking of how the study area was initially defined, and occasionally this results in a slight modification.

5) What: *What questions are you going to ask participants?*

Any of the five parameters can be difficult to define. Almost always the one that is most time-consuming has to do with "What?" What kinds of data are wanted for the maps? There is a huge range of different kinds of mappable oral history data, or themes, which can be relevant to meeting a primary objective, such as harvesting areas, habitation sites, travel and trade routes, place names, and so on. It is important to choose a small number of themes, usually no more than two.

There are two advantages to being so selective: 1) a thorough job can be done so that the research product is complete enough that subsequent projects can build on it from a position of strength, and 2) excessive "response burden" can be avoided.

If harvesting sites is decided on as a theme, it is necessary to think about who are the consumers of the harvests. Are mapped data needed that represent where people obtained resources that were used to feed themselves and their community, or that were used for sale on commercial markets, or for trade

with distant kin? Is a site to be mapped where a resource is harvested and a portion feeds the local community and a portion is sold on international markets? These kinds of considerations need to be resolved carefully. Questions must be framed in a way that allows participants to know exactly what the interviewer is after.

The interview guide, the actual list of questions to be asked, is the concrete end product of all the decisions made concerning the "what" parameter. Even a quick look at it can say a lot about a project's chances of success, because its length and complexity are related to the way people will likely experience the mapping sessions. The interview guide is where the overly ambitious project gets into major trouble by generating too much "response burden". It is also where the more carefully designed project succeeds. The effective interview guide is carefully constructed and then tested on a few individuals to see if its wording is clear, and to make sure the interviews will not be too long and difficult. Some changes might be necessary, after which the guide is finally administered to participants.

Principles of research design and implementation

There are a number of principles that are very helpful when designing and implementing the work. Some of these are discussed below.

1) Respect: *Respect participants in a heartfelt manner, at all times.*

Respect is at the top of the list. The need for honoring the limitations of participants and workers has already been mentioned. Most individuals can sense whether the community researcher genuinely honors the experience that is being shared during an interview, even if that experience comes from a belief system different from the interviewer's. Some of the questions asked during an interview are private and intimate. Elders are often asked to talk about things for which many local people have been judged and ridiculed, making some participants reluctant to share what they know about cultural sites, especially related to spirituality. Many communities have had experiences with outside researchers and consultants, and even with some of their own people, that have not helped the situation. Every person associated with the project must be willing to respect participants in a heartfelt manner, at all times.

2) Confidentiality: *Adopt official mechanisms that define confidentiality in concrete terms, and follow through by honoring them.*

Confidentiality is closely related to respect because it is fundamentally about trust. Even a single breach of it can undermine a mapping project. Individuals

can have all kinds of reasons for not wanting others to have access to their personal information. Most are concerned that the government might use it against them in some way. Some are even afraid about individuals from their own community seeing it. In every research project confidentiality is an issue, and most projects underestimate the amount of concern that emerges once data collection starts. It is smart planning to anticipate the concerns of people and to think of things that can be done to address them.

People generally want to know how the data or information will be kept confidential. The important thing is to be able to follow through on what you tell people.

3) Informed consent: *Make sure that potential participants have the information needed for them to offer informed consent, and that they can withdraw from the process at any time.*

Informed consent also is related to respect. People have a right to know about the nature of the project, its objectives, why the data are needed, what the anticipated uses of them are, and so on. This principle is not only about the rights of community members; the success of the project may depend on it. Widespread participation and quality data will not be forthcoming unless individuals have come to their own understandings about the need for their cooperation. Such understanding can only be based on information. People must also have the right to consent, without pressure or coercion. Similarly, successful research recognizes a participant's right to withdraw his or her consent, and to cease participation at any time.

4) Focus: *Maintain a workable focus by being realistic about the number of themes to be mapped in a single project, and by being selective in constructing the interview guide so that the average session is not too long.*

Focus, a fourth principle of good research, was touched on above in the section on "response burden". It is important to be careful about the number of different themes to be mapped in a single project, and it is critical to be selective in constructing the interview guide so that the average session is not too long. Focussing on the primary objective of the project keeps everything else on track.

5) Flexibility: *Be flexible in the administration of the interview guide while also maintaining sufficient focus that ensures the primary objective is finally met.*

Flexibility allows staff to deal with situations as they arise. For example, people have their own preferences about when and where they want to do their interviews. They have their own ideas about where the research should head and how it might

be modified. The research team learns in the doing. There will be changes in methodology, usually minor ones, as data collection proceeds. The trick is to be flexible while at the same time maintaining sufficient focus, "sufficient" being that which ensures the primary objective is finally met.

Striking this balance is not always easy. For example, the data collector has an interview guide to work with, which has been designed with a clear objective and focus in mind. Now she is sitting down with an elder who has his own ideas about what kinds of cultural information the community needs to put on maps. He may also think that this much younger person ought to just put the tape recorder on, respectfully keep her mouth closed, and listen. Situations like this are not uncommon. After all, the social scientific model of inquiry has been parachuted in on top of the traditional indigenous way of passing knowledge from one person to another. So, how to respect the elder and still find a workable balance between focus and flexibility? When elders are well informed about why questions are being asked in a strange or seemingly intrusive manner, they are almost always willing to meet the interviewer more than half way.

6) Consistency: *Have all interviewers follow the same methodology in a highly consistent manner.*

Consistency means doing things the same way each time. It applies to each of the hundreds of little conventions that are determined by the research design. A convention is simply an agreed on way of doing something. There might be several dozen conventions that govern, for instance, how data and symbols are to be indicated.

Marking data is only one of a number of areas of research design. The following are some of the others, each one of which is made up of its own bunch of conventions: assignment of participant numbers, interview procedure, how to use the questionnaire, how to code symbols, labelling audio-recordings, keeping records, and taking care of the materials containing data.

The hundreds of conventions involved, taken as a whole, make up the research methodology. The methodology informs the worker how to deal with any conceivable situation relating to any aspect of data collection. It is important for all data collectors to follow the same methodology, and for each one of them to follow it consistently. One reason is that the monetary costs of not doing so can be very high. Data collection is only one in a sequence of tasks, each of which can be a major undertaking in terms of labor and expense. Keeping each component within budget largely depends on how consistent the technicians involved in the preceding steps have been in their work. A data collector with a casual attitude or inclination to be sloppy can

create enormous amounts of unnecessary work for the transcribers, digitizers, and others. More importantly, consistency is one of the foundations of social science because it is closely tied to something called “reliability”, which is a cornerstone of the scientific method and a basic measure of data quality.

7) Organization: *Stay organized so that interviews can be set up quickly, raw data tracked easily, and the needed project notebook material at hand to write a quality methodology report.*

Organization requires people to take detail seriously. First-time researchers are usually surprised at how quickly raw data, overlays and audio-recordings accumulate, and how much research equipment and materials they have to handle on a daily basis. Imagine a research office, typically quite small, with a number of large map tables, many hundreds of overlays with data on them, four or five hundred base maps, hundreds of recordings with data, and all the recording equipment and supplies needed by a team of three or four workers. Good organization allows one to stay on top of it all.

It is almost impossible to stay organized if there is not a secure, well-lit interviewing room that has space for a number of mapping tables and whatever is needed for elders to feel comfortable during interviews. Conducting the map sessions in one centralized, well-equipped room is more productive than trying to interview participants in their homes. In addition to a good working space, obtaining custom-built storage boxes for overlays and recordings helps with organization.

8) Caution: *When recording data, err on the side of caution.*

Caution is generally wise when it comes to the design of oral history mapping and data collection. For instance, if a participant says, “I think I took a ‘such and such’ a fish from there,” the interviewer should ask for clarification before marking the site. If the hunter’s response still indicates uncertainty, the worker might say “OK, we’ve got that information on tape, and we’re not going to mark the site on the map.” The datum is not lost because it is captured on an audio recording and appears in the transcript record. This principle of erring on the side of caution lets you, if needed, make the argument that your maps are conservative, that they understate the community’s dependency on cultural resources.

9) Self-reporting: *Design current use and occupancy research to obtain as much self-reported data as possible, and in a way that permits the sorting of data that were reported secondhand.*

Self-reported data refer to the notion that, generally speaking, when doing current use and occupancy research, as much of the information as possible should be reported by individuals who have had

direct experiences of the mapped features they indicate. The principle emphasises two things. First, it is best to have individuals tell their own stories. Second, if necessary the researcher should be able to revisit a dataset and sort out which data were self-reported, and which were reported by individuals secondhand. This is not to say that secondhand or hearsay information is not important. On the contrary, it is very valuable and forms a foundation of the community’s living oral tradition.

10) Integrity: *Audio-record the interviews and design other aspects of data collection and record-keeping in a way that enables the source of any particular datum to be tracked.*

Integrity of data refers to traceability. If data have good integrity, the researcher can trace back any of the thousands of individual features appearing on a final set of maps to its source. The ability to do this is important for a variety of reasons. If the maps are being used administratively for land use permitting for instance, the users want the data to be easily sourced to the people who have knowledge about the sites in question. If maps are being used in court to support aboriginal title, claimants need the data to be linked to source transcripts. Entire land use and occupancy data sets have been dismissed by judges because integrity was not demonstrable.

Excellent data integrity requires that each mapping session be recorded electronically. Occasionally, a community researcher is concerned that certain individuals will not participate if there is a recorder involved. Having conducted many hundreds of map interviews, I have never found an individual who, having initially objected to being recorded persisted to the point of not participating. When given enough information about the project and opportunity to ask questions about things such as confidentiality, and time to think it over, people always agree to have their sessions taped. If somebody refuses to do a map biography the issue is almost certainly not about recording. The researcher’s job is to discover what the real problem is and address it.

In addition to good data integrity, having all map sessions recorded is a necessity for any project that is serious about obtaining detailed information about the mapped features. It is impossible to make a good written record of all relevant data during a map session, especially if the interviewer has her sights on data diamonds.

11) Data diamond: *Train interviewers to think in terms of data diamonds, which will ensure that maps have the appropriate level of historical depth.*

Data diamond is an idea or mental picture that is useful to keep in mind both when designing research and while interviewing people. It reminds data collectors of the kinds of information that the use and occupancy project is after. Once interviewers get

into the habit of thinking in terms of collecting diamonds, they are much more likely to be thorough in their questioning and, therefore, successful in obtaining the most useful data possible. The diamond shape, with its four points, refers to the linking of four kinds of information: a person's name (who), an activity (what), a location (where), and some indication of time period (when). Each time a feature is marked on a map, whether it is a point to indicate a fish harvest site or a polygon for a burial ground or a line to represent a travel route, the participant has automatically provided one diamond.

Use and occupancy map projects are about collecting these diamonds. A single project will produce thousands of them, whether the interviewers are aware of it or not. Data collectors who do not think in terms of diamonds will still obtain them. The advantage of being conscious about diamonds is that by actively seeking them out, many hundreds or thousands more are obtained, without interviewing additional participants. In addition, the descriptive information that can be linked to each feature on the final set of thematic maps has much more detail and historical depth. It is these kinds of descriptive data that are the most powerful evidence a group has been active on a territory.

It is especially important to collect diamonds when interviewing elders, because they are capable of providing evidence of use and occupancy farther back in time. There are many of these kinds of data contained in the oral traditions of most communities. Research should be designed so that as many as possible of the elders' diamonds are recorded, because these bear testimony to the long-time historical use and significance of each mapped site. They give thematic maps the added dimension of historical depth, and convert the notion that "we've used our territory for a long time" into something concrete. With diamonds, the argument becomes alive with the names and stories of real flesh-and-blood ancestors. This kind of detailed information is invaluable for educational purposes, and not easily ignored by agencies or courts.

Measuring quality

In addition to the parameters and principles of research, close attention must be paid to the indicators of data quality. These are characteristics of data that can be evaluated and measured. They are the things to which potential users would give consideration when deciding whether the maps are useful. Critics would look at them closely when trying to demonstrate that maps are not up to scratch.

The measures of quality described below are equally a part of the research principles. Similarly, some of

the principles — such as integrity, self-reported data, and data diamonds — could legitimately be regarded as indicators of quality, because their presence and relative amounts can be observed and measured.

1) Reliability: *Could someone else replicate the map survey using the same methodology, and come up with the same maps?*

Reliability is a cornerstone of social science because it has to do with reproducibility. Can the research results be duplicated? If a fire destroyed all the "map biographies" and all the thematic maps, could the project be done a second time, and produce the same results?

Good reliability is based on two things. First, there has to be a carefully designed methodology, administered in a consistent manner from one interview to the next. Second, there has to be a thorough written account of that methodology, which consists of definitions of the parameters and detailed descriptions of the conventions adopted. Theoretically, a different set of data collectors should be able to re-interview the same people and end up with a similar set of maps. In other words, reliability has to do with predictability of outcome.

The methodology is the project's set of instructions. It is important not only to help prove that the data are reliable, but also to demonstrate they are valid. Reliability, validity and accuracy are words used interchangeably by most people, but social science uses each in different ways. There are complex interrelationships among the three concepts that need not concern us.

2) Validity: *Do maps say what you claim they say?*

Validity refers to the meaning of maps. Do they mean what they are supposed to? Do they say what a researcher claims they say? This might sound confusing, so here is an example. Imagine you are looking at one of a community's finished thematic maps, the one depicting animal kill sites. The title reads: "Jackson Community Fishing Sites of Game Fish Used for Community Consumption." The Jackson community is known to eat a lot of game fish, but you are still surprised to see 2,000 sites on their map. It is also known that their men do a lot of guiding for Western sport fishermen. You decide to check the methodology report, and discover that the interview guide's question does not instruct participants to mark only those caching sites for which fish were used to feed community members. You then listen to segments from a small number of recordings to hear how interviewers handled the game fish question. Not surprisingly, they did not specify what the interview guide had not instructed

them to. How many of the 2,000 game fish sites provided meat for village residents, and how many are sites where Jackson guiding parties met with success but the fish ended up filling tourists' freezers? Does this particular fishing site (the one on Tiny Borrocks Island), really belong on this thematic map, given the title of the map? If a question like this cannot be easily answered, the data have poor validity. The meaning and significance of the map is open to too much interpretation.

3) Accuracy: *Are real-life features on the land or sea truly located where your maps indicate they're located?*

Accuracy is related to precision. How true is the location on the map where Charlie saw the remains of old Monabu's hut? Does the spot marked on the map truly represent the location of that hut on the earth's surface? Assume that Charlie got it exactly right when he showed the interviewer where to make the point. If the base map used for data collection is 1:250,000 scale, the ink dot representing the datum point can easily cover a 0.25 km on the ground. If the base map used is 1:50,000, the ink point covers about 50 m, and the datum is thus more accurate. Accuracy is also related to things such as the participant's ability to read or interpret maps, his ability to see well, and his willingness to be careful when indicating sites. To verify accuracy, one could compare where Charlie indicated Monabu's hut to where other participants independently located it. Such triangulation provides a basis to make the best possible judgment about where the likely location of the feature is, without additional expenditure of research budget. You could also do what is called ground-truthing, and take the base map and a global positioning system (GPS), and go with Charlie to the actual site.

Accuracy is related to scale of mapping, which is determined by the main objective for doing the research in the first place. Even if the community wants data for operational planning, in most cases it is nonsensical to think that an inventory of cultural sites can be mapped at 1:20,000 scale. Many communities' territories easily cover 40 x 1:50,000 map sheets, which is the equivalent of 250 x 1:20,000 sheets. The sheer awkwardness of working with a set of 250 maps for data collection purposes, and its effect on "response burden", are reasons to abandon the notion. In addition, there is so much detail and often so few recognizable reference points on a 1:20,000 sheet that participants sometimes have difficulty locating themselves.

It is important to be realistic about the strengths and limitations of the various map scales for data collection purposes. The community should decide which scale best suits its needs. Often the best scale

is 1:50,000 because the resultant maps are detailed enough to use as a reference tool for many planning and management purposes, while still providing the information needed for claims processes. One can refer to the thematic maps whenever the need arises to obtain more complete data for any area or feature, or to improve the accuracy of existing data. A mapped inventory of cultural sites, collected at 1:50,000 scale, can be effective for operational planning when used in consultation with elders during on-site visits and in conjunction with GPS corrections.

Having a process in which the mapped data are ground-truthed a few at a time, on an ongoing basis, is advantageous for another reason. Ground truthing large numbers of sites is very expensive and can cripple research budgets. The community should carefully define its priorities, and use as much as possible of the available funds to interview key elders before deaths result in more permanent loss of local knowledge. Sometimes immediate ground-truthing of a site is warranted because the participant may, in extreme cases, be the only person alive who knows about the site, and there is uncertainty as to its location. It is important for the community, and not the funding agency, to define how much verification of accuracy is needed, and when.

4) Representativeness: *Are the mapped data that participants provided characteristic of the community the participants belong to?*

Representativeness refers to whether the data speak for the population the maps claim to represent. To what extent are the data provided by participants characteristic of the population to which participants belong?

A number of things have to be looked at when answering this question. How were individuals selected when compiling the list of people to be interviewed? What were the criteria for defining that study population? Are those criteria consistent with the primary objective of the project?

How many members of the study population were interviewed, and what percentage does that number represent? Did participants provide complete, high quality data? If the participant selection criteria are valid in terms of the project's objective, then two simple statistics, the number of participants and the coverage rate, provide a good sense of representativeness. For instance, if 160 individuals complete "map biographies", then participation is 160. If the study population is 200 people, then the coverage rate is 160 over 200, or 80%, which suggests good representativeness. Coverage of 10% would suggest it is poor. Whether the objective of

the use and occupancy study warrants widespread participation of all adults or a sizeable subset of adults, the idea is generally the same: 70% or 80% coverage suggests good representativeness. However, if the study depends on a small number of participants, or “key informants”, then it is important to have complete coverage of that group because the absence of even one informant’s data can result in weak representativeness.

To give a simplified example, pretend the Gob Stopper Community designed a mapping project to document the extent of its lobster harvesting. Its final thematic map shows 575 places where community members have harvested lobsters and one wants to know whether the map represents the pattern and extent of community members’ lobster harvesting sites. To determine this one would look at the methodology report’s description of how people were selected to be interviewed. First, one would determine what the population group is. If lobster is a basic food and all adults are known to be active harvesters, the study population might consist of all adults, men and women, in which case the study is like a survey. If, on the other hand, there are only a few women who specialize in lobster harvesting, and are known to harvest huge amounts for distribution to other community members, the study population might consist of only this handful of key informants.

In either case, one would then look at the report’s account of coverage rate. If it were only 10% you would suspect that representativeness is poor. This is because if more study population members were to be interviewed, and their data added to the thematic map, changes in pattern would emerge. Some of the gaps would fill in and some of the edges of data distribution would expand outward. However, in the survey of all adults, if coverage was 75%, chances are that you could keep doing interviews, adding data, and not see resultant changes in overall pattern. At that point you have good representativeness. On the other hand, if the study population was only a small number of women, you might need 90% or 100% coverage before the interviewing of an additional person would have no major effect on the distribution of mapped sites.

5) Consensus: Do the users of the maps agree that they are useful for the intended purposes?

Consensus is not really an inherent characteristic of data. But it can be measured, and it does reflect the degree to which maps are reliable, valid, accurate, and representative. Suppose the maps are tabled at a co-management meeting where a number of different agencies and user groups are negotiating. If

those people take a close look at the maps and at the companion methodology report and find them to be good quality, the thematic maps themselves are likely to achieve consensus.

Excellent research is supposed to provoke controversy in some fields of inquiry, but not in this one. Land use and occupancy mapping has been around in Canada for a long time. The basic methodology is well developed and the research product has been used in many different contexts, including co-management negotiations and courts. If maps do not achieve consensus regarding their usefulness, it is probably because they are of questionable quality.

Conclusion: Creating a positive culture of research

The most obvious result of giving insufficient thought to the measures of quality, principles, and parameters is that the research product is likely to fall short of the project’s immediate objectives. There is a larger picture to consider though. A community’s experience, positive or negative, of its own use and occupancy initiatives contributes to its culture of research.

This is the group’s collective understanding of research and its benefits, and people’s willingness to contribute to an ongoing research programme. How receptive are community members to the announcement of yet another study or survey? Does it make people unhappy and elicit comments such as “We’ve been studied to death,” or “It’ll never change anything,” or “They’ve already asked me those kinds of questions before?” Do people respond with a sense of optimism and enthusiasm? Is there resistance to the idea, or openness?

It is critical to ask these kinds of questions while designing any particular piece of research because the answers are suggestive of the “response burden” likely to be encountered, and the participation that can be expected. It is also important that local government does what it can to encourage a culture of research that is favorable to future initiatives. The long-term research needs must be kept in mind, with the goal being that community members, when called on, will be willing to support their community government’s call for information and knowledge.

The collective attitude towards a particular project is largely determined by people’s experiences of previous research endeavors. There are things that can be done so that the overall experience of any particular land use and occupancy study will enhance the community’s culture of research.

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