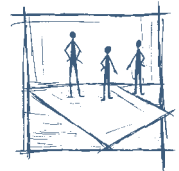
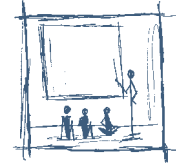


THE PROJECT SEQUENCE

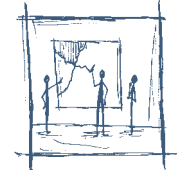
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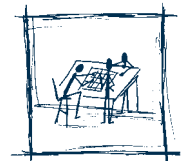
ORIENTATION AND TRAINING



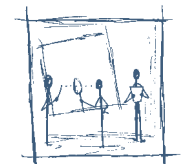
**GATHERING DATA
AND SKETCH MAPPING**



**TRANSCRIPTION OF DATA
ONTO NEW MAPS**



VERIFICATION OF DATA



**CORRECTING AND
COMPLETING THE FINAL MAPS**



7

STEP FOUR: SECOND WORKSHOP

The primary task of the second workshop was to transcribe the cartographic information brought in from the field onto newly constructed maps fashioned from government base maps, aerial photographs, and other materials. This work was split into two broad task areas that were done separately: (1) correcting, filling in, and naming the physical features of the maps (river systems, swamps, lakes, lagoons) and locating indigenous communities; and (2) plotting land use patterns (hunting, fishing, agriculture, etc.). Prior to this, the technical team equipped the mapping room and assembled cartographic materials in preparation for the arrival of the community team. The second workshop in both Honduras and Panama lasted roughly one week.

PREWORKSHOP PREPARATION

Before the Surveyors returned from the field in both Honduras and Panama, the technical staff (cartographers, draftsmen, photo interpreters) focused on assembling their equipment and materials at the site of the second workshop. They set up drafting tables and brought in a variety of maps of the region, pencils and pens, paper, aerial photographs, stereoscopes, light tables, lettering devices, and other tools of the trade. The specific, general, and topographical maps that they assembled were laid out on the tables or hung on the walls. Lastly, using sheets of vellum, the cartographic staff traced the major river systems for each of the zones, setting the stage for the Surveyors to work with the lead cartographer to fill in the details.

As soon as the Surveyors arrived from their communities but before the workshop formally began, the technical staff had them place their materials — hand-drawn maps, questionnaires, notebooks — in individual folders. The lead cartographer then made a careful inventory of these folders and labeled each with the name of the Surveyor and the zone. He went through the folders carefully, without the Surveyors present, and noted down which ones were complete and which had holes. He then added to the folders base maps and air photos of each zone and categorized each bundle according to degree of difficulty: some zones were replete with information and could be dispensed with



Figure 13. Aerial Photograph Interpreter Hugo Solis, of Panama's National Geographic Institute, studies photographs of the Darién using a pocket stereoscope.

easily, while others were a bit thin and would be more problematic. In the workshop that followed, he worked with the most difficult areas first, focusing on two tasks: plotting and labeling physiographic features, and delineating land use zones.

PREPARING DRAFT MAPS

Both projects began with the goal of producing 1:500,000 regional maps of the Mosquitia and Darién, respectively. In Panama, however, the decision was made at the outset to seize an opportunity that had not been fully taken advantage of in Honduras. A complete finished set of 1:50,000 community maps — 20 in all — would also be made. As later chapters will show, these maps were extremely important. At the same time, however, producing them also intensified the pressure in the second workshop — the crucial pivot on which the fate of the whole project turns — because neither the operational methodology

nor the time frame were adjusted to cope with the additional workload.

Physiographic features and indigenous place names: In both Honduras and Panama, the Surveyors and the cartography staff came together in the drafting room. They laid out the questionnaires and the community sketch maps alongside the aerial photos and base maps on the drafting tables. The lead cartographer then took the transparent sheets on which technicians had earlier traced the major physiographic features and began filling in details provided by the Surveyor of each zone. Together they filled in small rivers, creeks, communities, and isolated household clusters, checking and cross-checking the various types of information. For example, there were times when the government base map might have eight streams, while the Surveyor had marked six on his community map. In such cases, the Surveyor might consult his notebook for any relevant information, while the

cartography team would take a close look at aerial photos of the region in search of clues (in some cases, this was judged to be the final authority). In Panama, several specialists in photo interpretation were with the team for a while. At times the Surveyors came in with names on the questionnaire that they could not locate on the map. Whatever the uncertainty, if the matter remained suspicious or unresolved, the cartographer would place a question mark on the map and jot down a notation in the notebook so the Surveyor could check it during the second fieldwork period. He could then clear up with villagers how many streams there were between this and that river, verify the curve of a river, determine whether a swamp connects with a river, and so forth.

While interviewing the Surveyors, the cartographer put in the names, most of which were indigenous, of the rivers and other features. Place names on the questionnaire and on the map were matched with comments in the notebooks such as: "X river is 30 minutes by motor from Y bend in the river," or "to reach X area of hunting, travel to the left inland from point Y for 15 minutes," or "there are six streams on the right side heading upriver between X and Y."

The key to such work is meticulousness and persistence. The lead cartographer would quiz each Surveyor in detail about every aspect of the data: Is the name of this river spelled correctly? Are you certain that there are only four streams here? Is the curve in the river a wide or a tight loop? Is the

hill behind or in front of this river? Is it nearer to this stream or that one? And so forth. After working with a Surveyor to produce a draft map, it could then be handed over to a draftsman to produce a clean copy.

Herlihy's diligence to detail, an admirable quality when time and resources are abundant, proved cumbersome in the end, as he took it upon himself to personally debrief each Surveyor rather than delegate responsibility to other members of the technical team. In Honduras the process was somewhat expedited through Leake's assistance in conducting the initial Surveyor interviews. In Panama, tensions grew as the process ground slowly forward and the time for returning to the field hurried closer. In this context, Herlihy let González, the Kuna cartographer, work with some of the Surveyors that Herlihy found troublesome, including the two who were Kuna and some of the Emberá and Wounaan. The work got squeezed into the time frame, but bad feelings lingered, to a large extent



Figure 14. Front to back, Coordinator Andrew Leake, Surveyor Gilberto Maibeth, and Cartographer José Ramiro Andino look over draft maps of the Mosquitia.



Figure 15. Cartographer Nicanor González (seated) and several members of the community team work with aerial photographs to compile a map.

because the number of serious unresolved questions was higher than expected.

In Honduras the government base maps were judged to be relatively accurate, and few revisions were deemed necessary on the new maps. In Panama, however, this was not the case. The regional Darién map was becoming a thorny task for the cartographer and his team. Aerial photos frequently showed a landscape blanketed with clouds; and where there were no clouds, dense tree canopy covered everything. One way or another, waterways and other key features were often hidden from view. Over the years, government cartographers had made maps relying only on these unrevealing photos, with no opportunity to verify accuracy in the field. They had often resorted to guesswork, and their maps, unsurprisingly, were riddled with errors. Beyond this, in the years since the maps had been made, a number of the rivers had changed

course, new streams had appeared, meanders had formed, and settlements had moved or divided up and split off into new settlements.

As these confusions became more and more apparent, the impulse to correct the maps grew. Yet with the cut-off date for Herlihy to leave and take up his academic commitments at the University of Kansas fixed at the end of August, time was tight. With the project's schedule so rigidly circumscribed, some errors were set straight, while others were left untouched, but no decision was made about doing major reconstructive work. Nonetheless, the unvoiced anxiety of having to do so was working at the back of Herlihy's mind.

Land use patterns: The second task was to fill in the areas of indigenous subsistence. Inevitably, this process overlapped with the work to specify physiographic features and name them. Herlihy and Leake (1997,

721–2) describe how this process unfolded in Honduras during the week-long workshop:

With questionnaires, sketch maps, and base maps spread out on the drafting table, each surveyor worked with the researchers [Herlihy and Leake] locating their recorded data onto the cartographic sheets. The positioning of each toponym or location of sites of particular land use was determined through dialogue between the researchers and surveyors, based on their respective empirical knowledge of a given place. Reference was made to sketch maps, which was cross-referenced with the data gathered by surveyors in adjacent zones. In some cases, several hours work were required for the location of one site, although most were relatively easier to position. As the field data was plotted meticu-

lously, point by point, onto the cartographic sheets, the surveyors became aware of the fact that their geographical knowledge of their respective zones was often far more detailed than [sic] contained on the official government maps....

Each point was assigned an alphanumeric code, with a letter to designate the survey zone and a number to identify each community (e.g., B-7). Adjacent to these, the use of the area was noted, for example 'agriculture' or 'hunting.' A line was drawn around all of the land use points of each community, indicating the overall area used by each settlement for subsistence purposes. Another line was then drawn around the overall area, or 'subsistence zone,' used by the various communities within each given zone.

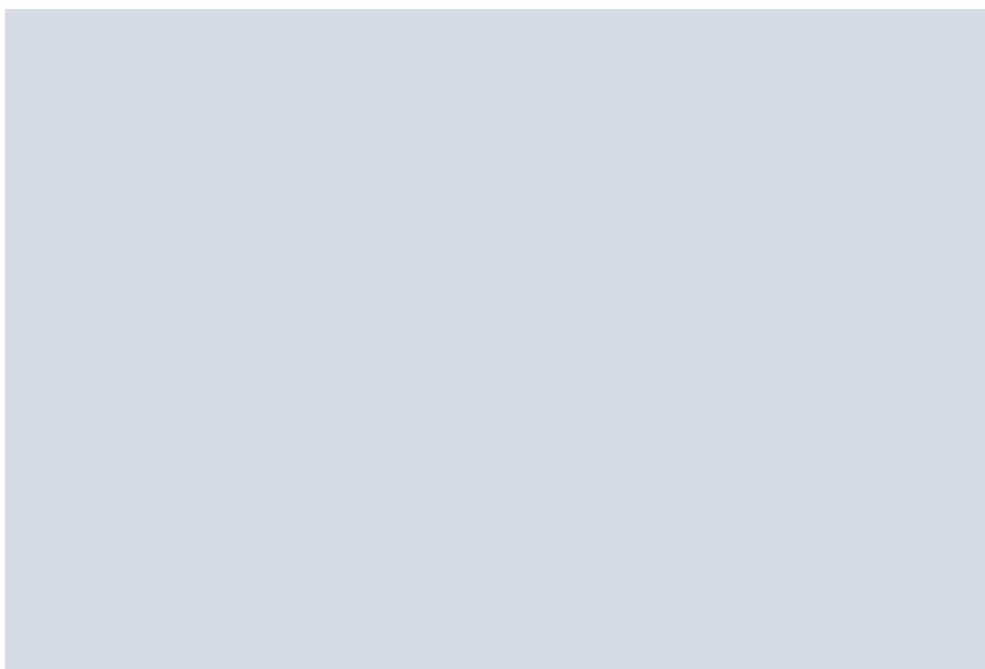


Figure 16: A portion of the Marea Zone Map from Panama showing the communities of Aldea Emberá and Burá along several streams feeding north into the Tuira River (at Isla Mangle), and the subsistence land use codes according to the legend.

In Panama, the same process was followed, plotting subsistence areas as points and labeling them according to the following legend:

- A: Agriculture (Agricultura)
- P: Fishing (Pesca)
- C: Hunting (Cacería)
- M: Gathering of Materials (Recolección de Materiales)
- M/F: Gathering of Medicines & Fruits (Recolección de Medicinas y Frutas)
- Ar: Cutting of Trees for Subsistence (Corte de Arboles para Subsistencia)
- Arc: Cutting of Trees for Commerce (Corte de Arboles para Fines Comerciales)

Each point, in addition to being identified with a land use code, was assigned a number to identify it with a particular community within the zone. For example, if zone X had four communities, they would be labeled 1, 2, 3, and 4. In plotting land use, the cartographers would put “C2” to locate a hunting area for Community 2; “M/F3” was an area where Community 3 gathered medicine and fruit.

In the questionnaires, the Surveyors put down the names of the places that mark the limits of the lands utilized by the communities, the farthest distances they travel to carry out subsistence activities. In soliciting this information, the Surveyors sought four points: north, south, east, and

west. Two questions were framed from slightly different angles, with differently phrased reference points, to make certain the determinations coincided. This was a useful form of cross-checking. For example, the completed questionnaire for the community Aldea Emberá in the zone of Marea, reads as follows:

What are the limits of the lands and forests utilized by the community?

*In front of (the community): Marinasia
Behind: Narazati
To the right: Bocanupa
To the left: Junkara*

What are the limits on the points of the compass of the lands and forests utilized by the community?

*North: Bocanupa
South: Junkara
East: Narazati
West: Marinasia*

This helped define the most distant areas to which villagers traveled to carry out subsistence activities.²⁸

Just as in locating physiographic features, every effort was made to pinpoint resource sites by an exhaustive series of questions: This mountain where you hunt, how long do you walk inland from the river? Which side of the mountain do you hunt on? Is it past this creek? How far? How large is the area where you gather medicines? Does it go all the way to this stream? In this way, the activity

²⁸ All of this has to be within reason, of course. On occasion, Kuna from the zone of Wargandi travel all the way into San Blas to the north to hunt, a distance of roughly 40 kilometers on foot. This is clearly outside the subsistence range of the group's core area and therefore was not plotted on the map.

symbols (representing resource areas) were fixed on the maps.

Using stereoscopes, the Surveyors were able to take “cartographic journeys” with the cartographers. A stereoscope allows aerial photos to be seen in three dimensions — the mountains and hills jump out from the flat surface — and the Surveyors could check the information in their notebooks by traveling along rivers and seeing the actual contours of the land. When the work reached an impasse the cartographers often said, “forget the map for a minute,” pulled out a blank sheet of paper, and began tracing a journey up a river. This often broke loose mental logjams and restored the flow of information. When all else failed, the Coordinators took the Surveyors outside the building for walks to clear their minds.

Sometimes when a Surveyor was uncertain or confused, a Surveyor from an adjacent overlapping zone was called in. The cartographer or interviewer would then run through the questions again to see if the two men, working together, could shake loose intractable information. In this way, thousands of points were plotted and labeled with information relating to subsistence activities and community. Then a line was drawn encompassing the outermost dots, cre-

ating a border around the land use area for each zone.

When all available details were put on the maps, everything was passed over to the draftsman to produce a final draft. In Panama this was José Aizpurúa. At this point, the pressure was off the Surveyors; Aizpurúa only worked with them to verify details. In particular, he wanted to make sure that the indigenous names were correct. Unfortunately, the calm at Aizpurúa’s table was one of the few quiet corners of the map room; in the days and weeks ahead, a storm that was growing stronger would soon engulf the project.

While the technical end of the mapping somehow managed to keep moving forward and would eventually produce the coveted maps, which were loaded with cultural information, damage was being inflicted on everyone. Four interrelated factors had combined to create an atmosphere of unhealthy volatility: (1) the failure to adequately orient the technical and community teams for the task at hand; (2) the tightly controlled, centralized manner in which the technical team was managed; (3) the need to compress a large amount of work into a short time frame; and (4) the lack of a coherent institutional framework to hold things together.

DISCUSSION

The second workshop is the point at which the fruits of the project, in their inchoate form, are glimpsed for the first time. It is when the Surveyors bring their field data in from the communities and the technical team initiates the process of laboriously transcribing, detail by detail, the physical features and land use patterns onto newly constructed “geo-referenced” maps.²⁹ If the Surveyors have been well prepared for the fieldwork, and if they have had sufficient time to consult with specialists in the communities, the data they return with should be excellent. By the same token, if the cartographers have gathered together, prior to the workshop, a thorough record of maps and aerial photographs of the region and analyzed them carefully, they will be in good shape to assimilate the field data.

In neither Honduras nor Panama were these conditions altogether satisfied. In Honduras, the Surveyors received a relatively adequate orientation to the fieldwork, but they had to cover too many communities in too short a time. The second workshop lasted only a

week, which forced Herlihy and Leake to work from dawn far into the early hours of the following morning. The level of stress was high but contained. The pace of work was very fast and left everyone exhausted, but the project went forward without any serious hitches.³⁰ In retrospect it would be evident that the quality of the data had been compromised by the limited time frame, but at least participants had a generally favorable impression of the way things were going.

In Panama, there had been an almost total lack of orientation, resulting in larger gaps in the quality of information gathered. This created tension that the lack of reliable backup aerial photography only intensified. Thus the atmosphere of the second workshop began heating up from the start, like a pressure cooker with no release valve. With no institutional structure like MOPAWI in Honduras to keep things in check, the temperature continued rising until the project would threaten to rupture in the next phase of activity. As confusion and bad feeling mounted in Panama, Native

²⁹ A map that has been geographically referenced, in which points are located on a coordinate system of latitude and longitude.

³⁰ One Surveyor, recollecting the atmosphere of the second workshop in a group meeting, said that Herlihy “...didn’t sleep. He worked from 8 A.M. to 3 A.M., straight through, every day. And Andrew Leake worked right along with him.” Other Surveyors present smiled broadly and shook their heads. All of them agreed that the process was far too rushed — not only at the second workshop but throughout the entire project.

Lands was spending most of its time in the United States trying to raise funds to keep the project afloat. Although it was clear that things were amiss, there was no money to spend on travel. Denunciations and accusations from all sides were pouring in by phone, but we could do little more than talk with the different factions and try to calm everyone down. Nothing we said relieved the pressure for long.

Much of that pressure focused on the lead cartographer, who tightly controlled the transfer of all community information onto the new maps. In his striving for exactitude, he sometimes spent as long as seven or eight hours with a single Surveyor. While Herlihy did delegate some work to González, even that had to be closely reviewed for validation. Meanwhile the rest of the technical staff was shunted aside to a variety of menial chores — drafting clean versions of marked-up zone maps or lining up and interpreting aerial photos — or they were left to stew, sitting around idly with nothing to do. This system was inefficient on two counts.

First, the centralized management of the technical team, combined with the fast pace set from the start, both distorted and accelerated the rhythm of the second workshop, creating misunderstandings that only worsened with time. Given the tight schedule, the only thing that could expand was the workday. The usual 9-to-5 schedule, which had been bent in Honduras, was ignored altogether in Panama as the

technical team and the Surveyors labored from dawn until far after dusk, and occasionally until the following daybreak. Herlihy began working as many as 25 to 30 hours at a stretch, sleeping for an hour or two before doggedly resuming the work. He expected the Surveyors and his technical staff to keep pace, or at least be on call when needed. Everyone in the project was subject to this regimen, and as people failed to get their quota of sleep, tempers flared ever more frequently. Relations deteriorated precipitously among Herlihy, the indigenous participants, and CEASPA. Several members of the technical team quit outright; one simply failed to return after a break.

The second failure was harder to see, and represented a lost opportunity. The Surveyors, too, were left on their own for long stretches while waiting to be summoned by the lead cartographer. Herlihy, with the experience of Honduras under his belt, was in an excellent position to give the technical and community teams an overview of the mapping process. Unfortunately he did not. There was no discussion of the general objectives of participatory mapping projects or the specific objectives for the present project; the context in which the work was taking place was not presented, nor was any effort made to instill team spirit among the participants. The lead cartographer did not train, formally or informally, any of the technical team in how his work was done so that mapping skills would be embedded locally after he

had departed.³¹ The grind was far too intense for him to hold training sessions or educational meetings. This same reasoning also led him to resist CEASPA's efforts to bring in visitors from conservation organizations and government agencies to observe activities in the workshop.

Yet given the lead cartographer's narrow focus, the vacuum was perhaps not altogether bad. The Coordinators and tribal authorities were given a free hand with Surveyor's down-time, and much of it was structured with an eye to the eventual forum at which final maps would be presented. Surveyors were assigned topics and went over their materials: social organization, flora and fauna of the region, hunting practices, agriculture, and so forth. They gave verbal presentations to the group and were critiqued. When they felt more confident, their talks were taped, transcribed, and edited. In Honduras, Leake and Herlihy had helped script and rewrite the speeches, and worked closely with the speakers to polish their presentations. But they had also wanted to make sure that the speeches were not substantively political. In Panama, Herlihy's attention was soon diverted by his mounting workload during the second workshop, and the Indian Coordinators took over the process.

Thus the Surveyors and Coordinators had considerable time together as a group. This not only gave them an opportunity to polish their presentations for a forum, it also gave them a chance to discuss a variety of other issues that were not programmed into the project. These discussions dealt mainly with land and natural resource issues, with a focus on colonist incursions, logging concessions and, in particular, the construction of the Pan-American Highway through the Darién.

Several lessons can be gleaned from what happened. Because of the critical nature of the second workshop, sufficient time must be set aside so that it can run its course smoothly and free of tension. In subsequent projects in Bolivia, Cameroon, and Suriname, we have allowed a full three weeks for this workshop, and regular hours have been kept. We have opened up space for social interaction between Surveyors and cartographers; group meetings to discuss various aspects of the specific project and more general aspects of cartography and the utility of maps have been held on a regular basis. This workshop should be treated as more than an exercise in data transcription. It is an excellent opportunity to develop a social process in which both Surveyors and cartographers interact and learn about unfamiliar areas: in the case of the

31 Those working with him learned what they did about the process largely through osmosis by observing what was going on. González, who was somewhat privileged because of his association with Native Lands, was given greater responsibility and was able to learn a good deal. The payoff from this would become evident when he went on to manage the cartographic component in the Bolivia project.

Surveyors, they can learn about maps; in the case of the cartographers, they can become acquainted with indigenous peoples and their way of life. It is a chance to develop respect while working on a common task.

Another crucial aspect of this workshop should be instruction in basic cartography. In the Bolivia project, and more systematically in Cameroon and Suriname, we have encouraged

the technical team to teach the Surveyors the rudiments of cartography so that they learn how to read, interpret, and use maps. These are extremely valuable skills, for they enable the indigenous participants to work with maps in their negotiations with outsiders; it creates a common language in which discussions can be held. The second workshop provides an excellent atmosphere for instruction of this sort to take place.