Pohnpei State
Geographic Information Science (GIS) Capacity Survey Results

Sara Krosch

COELD Outreach Coordinator/Program Developer

August 12, 2005

College of Micronesia—FSM

**Center for Organizational Effectiveness
and Leadership Development (COELD)**

Sara Krosch
Outreach Coordinator
P: 320-3795
F: 320-3799
E: sara@comfsm.fm

Survey Background

In June of 2005, it was brought to the attention of COM-FSM's COELD Outreach Coordinator that there existed training needs and strong local interests related to the use of Geographic Information Science (GIS) software and Global Positioning Systems (GPS). Several offices and individuals in Pohnpei State participated in GIS training workshops over the past years and to maintain and expand the skills they gained the formation of a GIS User's Group was discussed. Unfortunately, the Pohnpei GIS Users Group lacked clear goals and organization and only met a few times, and many offices that had received GIS training lacked the software to put their new skills to use.

To revive GIS practices in Pohnpei State the COM-FSM Pohnpei Campus Information Technology (IT) Staff secured ESRI ArcView GIS 9.1 software licenses for one campus computer lab in July of 2005. To assist these efforts COELD worked with GIS professionals/trainers and COM-FSM Pohnpei IT Staff to create a GIS Capacity Survey to assess the related training and resources needs of organizations, government offices and businesses in Pohnpei State. The results of the survey will be used to plan training opportunities and organize groups and events. The baseline data generated by the survey will be made available to all offices that participated in the survey and other interested parties in The FSM.

Survey Participation

August 1, 2005, GIS Capacity Surveys were distributed to nineteen (19) offices in Pohnpei State. Surveys were addressed to employees who were known to have had received GIS training in the past and/or to those currently using GIS in their workplaces. Offices were also encouraged to make additional copies of the survey for individual employees and other offices interested in receiving GIS training. Forty-six (46) completed surveys were collected by August 12, 2005.

Office	Number of Surveys Completed
1. Pohnpei State Environmental Protection Agency (EPA)	3
2. Pohnpei State Office of Transportation and Infrastructure (T&I)	3
3. Pohnpei State Department of Agriculture and Forestry (Forestry)	1
4. Pohnpei State/FSM Telecommunications (Telecom)	2
5. Pohnpei Utilities Corporation (PUC)	2
6. USDA– Natural Resources Conservation Services (NRCS)	2
7. Conservation Society of Pohnpei (CSP)	4
8. Pohnpei State Hospital (Hospital)	1
9. Pohnpei State Department of Public Health (Health)	1
10. Pohnpei State Office of Historic Preservation (H. Preservation)	4
11. Pohnpei State Court of Land Tenure (Land Court)	4
12. Pohnpei State Office of Public Lands (P. Lands)	2
13. College of Micronesia-FSM National Campus Facilities (COM-FSM)	1
14. College of Micronesia– FSM Pohnpei Campus IT Department (COM-PNI IT)	2
15. College of Micronesia—FSM Pohnpei Campus Vocational Division (COM-PNI Voc)	1
16. FSM Land Grant Community Extension Services (Land Grant)	5
17. FSM National Oceanic and Resource management Authority (NORMA)	4
18. Pohnpei State Port Authority (Port Authority)	4
19. Pohnpei State Department of Public Safety (Pub. Safety)	0

Survey Questions and Answers

<u>**Section A. Current Skills and Experience**</u>

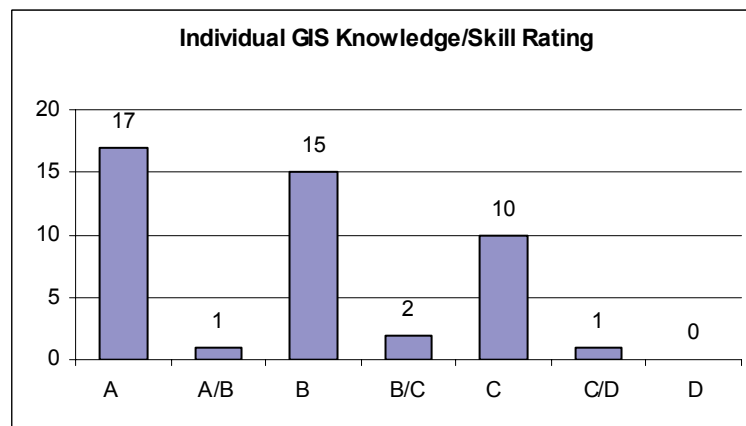**1) Please mark the appropriate response to the following questions (A,B,C, or D):**

A.   I have no understanding of this topic.

B.   I know some about this topic but I do not fully understand it nor have I been able to practice it.

C.   I have some experience with this topic, but I need additional instruction.

D.   I am comfortable with this topic and I need no further instruction.

	Displaying map data			Creating graphs
	Navigating a map			Clipping layers
	Looking at feature (point, line, polygon) attribute tables			Buffering layers
				Exporting data
	Using ArcCatalog			Buffering features
	Symbolizing features and rasters			Overlaying data
	Changing symbology			Calculating attribute values
	Symbolizing features by categorical attributes			Projecting data in ArcMap
				Building geo databases
	Using styles and creating layer files			Creating new features
				Editing features
	Symbolizing rasters			Making maps for presentation
	Classifying features and rasters			Spatial analysis
	Labeling features			3-D analysis
	Querying data			
	Joining and relating tables			
	Selecting features by location			
	Dissolving features			

This question asked participants to rate their level of knowledge and experience in 29 specific GIS skill areas. The answers will enable trainers/facilitators to tailor training content and the pace of instruction to meet the needs of clients with skill levels ranging from beginner to intermediate levels.

From the results of this survey, no individual or office could be considered to have advanced GIS skills in Pohnpei State at this time.   For the purposes of this report each survey participant was assigned a letter—A, B, C, or D—which corresponds to the individual's general knowledge/skill rating. This letter label reflects the letter that appeared most in answers to question 1 categories.

Individual GIS Knowledge/Skill Rating

Rating	Count
A	17
A/B	1
B	15
B/C	2
C	10
C/D	1
D	0

Survey Questions and Answers

<u>**Section A. Current Skills and Experience**</u>

2) Of the above topics, choose 5 that you feel would be the most beneficial for your office to learn:

Question 2 will enable trainers/facilitators to focus their instruction on the skill areas deemed most in need of strengthening. However, given that 16 of the 43 survey participants have little to no understanding of the 29 GIS skill areas outlined in question 1, GIS trainers will need to include the basics of GIS in most training events.

The top responses are as follows:

Response	Number of Responses
Displaying map data	22
Making maps for presentation	19
3-D analysis	15
Building geo-databases	13
Querying data	11
Creating graphs	11
Projecting data in ArcMap	10
Navigating a map	10
Joining and relating tables	10
Exporting data	9
Spatial analysis	8
Using Arc Catalog	8

3) Briefly describe any projects your office has done or is currently doing that utilize GIS:

Several offices have done some type of work related to GIS. However, many offices lack the resources (software) and/or skills to convert their own data and have turned to other offices (***Pohnpei State Department of Land and Natural Resources) to process and display their data with GIS applications. Of the eighteen (18) offices that participated in the survey seven (7) have not utilized GIS in any projects to date. Eleven (11) offices have used GIS in the following project areas:

Office	Past/Current GIS Project Areas
EPA***	water quality and earth moving
T & I***	road paving, dumpsite relocation, water and utilities, air strips and ferry dock
Forestry***	mangrove and forest clearing, establishing community-based agro forestry projects
PUC	water, sewer and electrical systems
USDA-NRCS	25+ projects per year, farm planning
CSP***	marine protected areas, watersheds and reef zones
H. Preservation	archeological surveys of historical sites
COM-FSM	College buildings and infrastructure
Land Grant	soil mapping
NORMA	delimiting maritime zones, tracking fishing vessels, determining Continental Shelf
Port Authority	airport runway extension, reef markers

Survey Questions and Answers
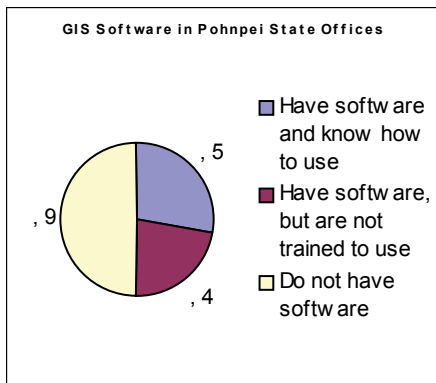
SECTION B. GIS Resources and Training Needs

4) What would you like to see your office do with GIS?

The following is a summary of the responses survey participants gave revealing the variety of sectors and project areas GIS can be utilized in. Several offices mentioned that GIS tools could help in the planning, implementation, monitoring, evaluation and 'enforcement' of their projects. Many surveys also expressed the need to become more acquainted with different GIS software packages and GPS units and the need to be trained to effectively use these tools.

Office	Possible Future GIS applications
EPA	Monitor drinking and recreational water quality, map project locations for sand mines, landfills and quarries
T & I	Data management, analysis and visualization
Forestry	Zoning of watershed and mangrove areas
Telecom	Planning and records
PUC	Expand decision-making possibilities and tools, present accurate data, use GIS as a design tool
CSP	Centralize and consolidate monitoring data from marine and terrestrial projects, produce maps for presentation and reporting, gather and present bathymetry data on Pohnpei Lagoon and marine protected areas
Hospital	Analyze diseases by municipality
Health	Map hepatitis and TB cases to plan activities
H. Preservation	Map all historic sites in Pohnpei State
Land Court	Land parcel maps to use in disputed cases, linking extensive database with Mapping Office activities
COM-PNI Voc	Have a certified trainer/instructor to teach GIS courses
NORMA	Track movements of fishing vessels, delimit FSM EEZ, integrate GPS data, present fish catch data
Port Authority	Accurate geographical positioning of all port and airport facilities, plot reef markers, report to FAA and ICAO

5) What software package does your office use?

Of the eighteen (18) offices that participated in the survey nine (11) currently own some GIS software package although not all offices are trained to use their packages effectively.

GIS Software in Pohnpei State Offices

- Have software and know how to use , 5
- Have software, but are not trained to use , 4
- Do not have software , 9

Office	Current GIS Software in Use
NRCS	ArcInfo 8.3
NORMA	MapInfo 5.5
PUC	ArcGIS 8.X
Telecom	AutoCAD
Port Authority	AutoCAD

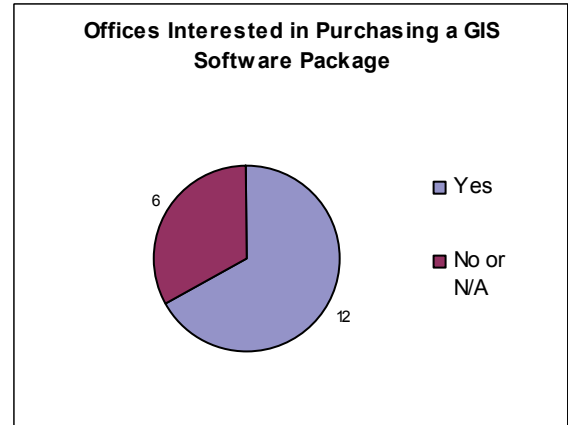| Office	Software Available for Use
Forestry	unknown
COM-PNI IT	ArcGIS 9.1
H. Preservation	ArcView ?
Hospital	ArcView ?

Survey Questions and Answers

SECTION B. GIS Resources and Training Needs

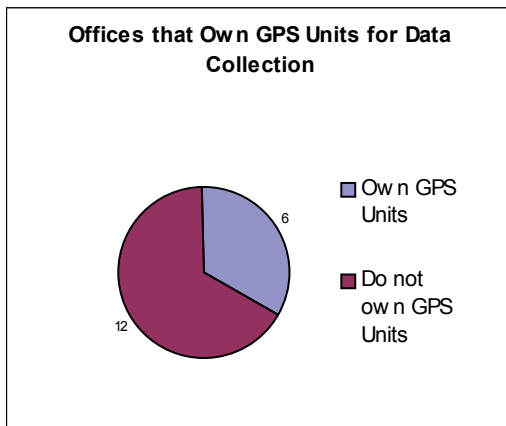**Continued 5) Is your office interested in purchasing GIS software?**

Twelve (12) of the eighteen (18) offices that participated in the survey are interested in purchasing a GIS software package for the first time or upgrade to a different package. Public Health, CSP and COM-FSM are currently drafting proposals to purchase GIS software pack-ages. Several offices said that they would like to either learn the software before they buy it or would like to purchase software pack-ages they have been trained to use. Most offices would like recom-mendations as to which software packages would best serve their needs.

The following offices would like to purchase GIS packages:

EPA	T &I	Forestry	CSP
Health	H. Preservation	Land Court	COM-FSM
Com-PNI (Voc)	Land Grant	NORMA	Port Authority

Offices Interested in Purchasing a GIS Software Package

- Yes
- No or N/A

6)   What GPS equipment does your office use?

Offices that Own GPS Units for Data Collection

- Own GPS Units
- Do not own GPS Units

The survey also assessed the number of offices that gather field data with GPS units and what particular models they are using. Although using GPS is not the only way to gather data for GIS input, this technology is currently under-used in Pohnpei State given the relative low cost of the units and the ease of their use, given basic training. And, not all offices surveyed may have the need to gather first hand data with GPS such as Land Court which already has an extensive database.
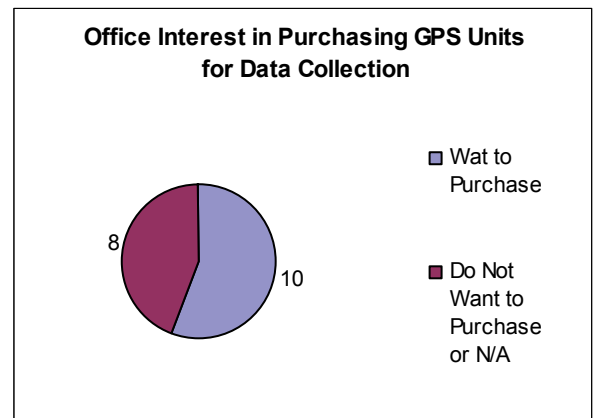
Six (6) of the eighteen (18) offices surveyed currently own GPS units. Four (4) of these six (6) offices use Garmin Brand GPS units although Port Au-thority says their GPS is not compatible with their computers.

Is your office interested in purchasing GPS equipment to gather data?

Ten (10) offices surveyed are interested in purchasing GPS units for the first time or in upgrading the units they currently have. Several offices expressed the need for product recommendations and proper training to use GPS in their work.

The following offices would like to purchase GPS units:

Forestry	T&I	EPA	PUC
CSP	H. Preservation	Com-PNI (Voc)	Land Grant
NORMA	Port Authority		

Office Interest in Purchasing GPS Units for Data Collection

- Wat to Purchase
- Do Not Want to Purchase or N/A

Survey Questions and Answers

<u>**SECTION B. GIS Resources and Training Needs**</u>

7) By completing this survey, COM-FSM's COELD understands that your office is interested in obtaining more GIS capacity building support.
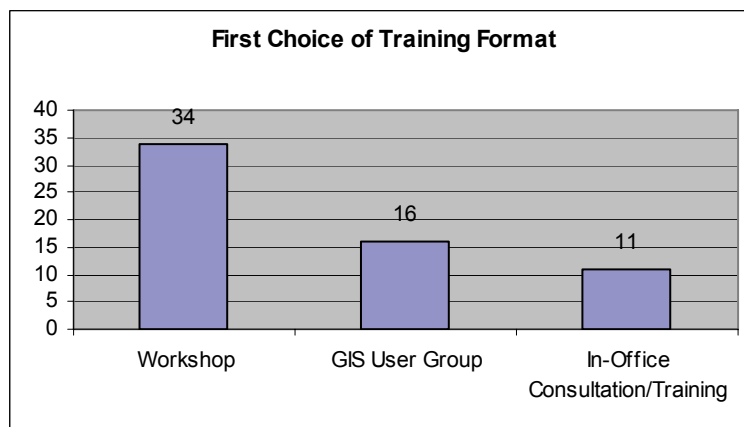
In order to best serve your capacity building needs in a format that is feasible for you to participate in, please circle a 1st Choice, 2nd Choice and 3rd Choice from the options below:

• **I am interested in attending a formal workshop at a COM-FSM campus for**	**1st Choice 2nd Choice 3rd Choice**
1-2 weeks focusing on ArcView GIS software applications and GPS use.	

• **I am interested in attending GIS-User's group once or twice a**	**1st Choice 2nd Choice 3rd Choice**
month focusing on ArcView GIS software applications, GPS use and	
project troubleshooting.	

• **I am interested in hosting an in-office GIS consultation to**	**1st Choice 2nd Choice 3rd Choice**
identify our specific capacity building needs and a training for 1-3 days?	

This question was created to give participants a choice in expressing which capacity building format they would be most likely to take part in. One-two week (or longer) workshops are the traditional form of training that all offices are familiar with in Pohnpei State, so it was no surprise that this was a popular choice. There has been talk of forming a GIS User's Group but no entity has stepped forward to organize such a group. And offices seemed least familiar with the idea of training happening in their offices even though this may be a very effective option to ensure better skills transfer to the workplace.

First Choice of Training Format

The aim of COELD is to creatively serve the capacity building needs of our clients. Although GIS workshops have been offered in the past, this may not be the most effective mode of training for GIS skills. Many participants that attended past GIS workshops have commented on their loss of knowledge since the training event due to lack of resources (GIS/GPS) and/or lack of practice with the tools.

Ten (10) survey participants listed more than one format as their first choice showing an openness to explore new avenues of instruction. If a Workshop, a GIS Users Group and In-Office Consultations/Trainings are organized and implemented by COELD than all three methods can be evaluated and compared in terms of overall effectiveness. And, ultimately, all three formats of support and instruction will complement each other.
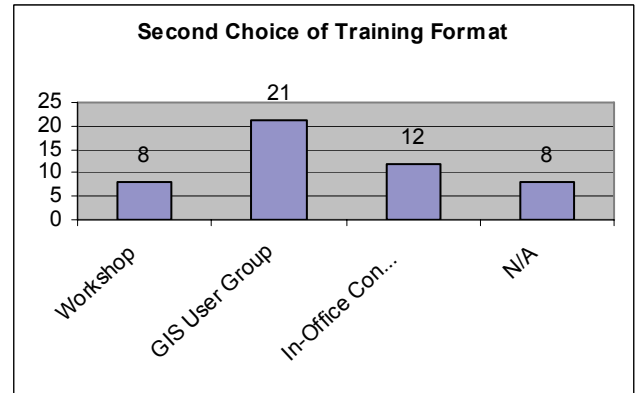
Survey Questions and Answers

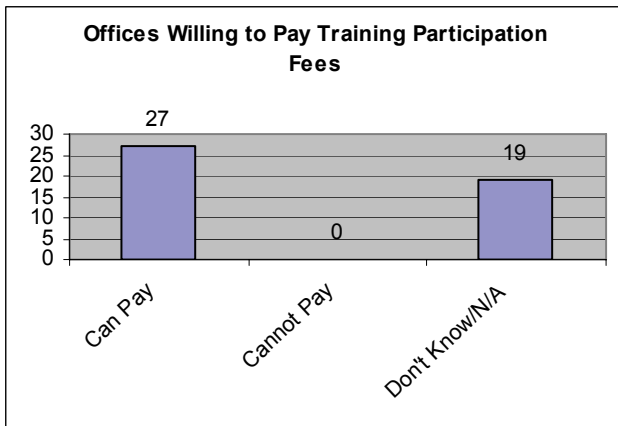**SECTION B. GIS Resources and Training Needs**

Question 7 Continued

A GIS User Group was a popular second choice for a training format.

American Samoa and Palau have successful GIS User Groups. COELD has been in touch with the American Samoa group and its members have been helpful in suggesting resources and programming tips.

It seems that any past attempts at forming a Pohnpei State GIS User Group have failed due to lack of organization, communication and management—duties COELD would be glad to assume if this format proves useful to offices using GIS and GPS technology .

Second Choice of Training Format

Workshop	GIS User Group	In-Office Con...	N/A
8	21	12	8

8) COM-FSM COELD strives to make training opportunities as affordable as possible for participants. Would your office be willing to pay participation fees for attending GIS capacity building training events?

Offices Willing to Pay Training Participation Fees

Can Pay	Cannot Pay	Don't Know/N/A
27	0	19

COELD organized training events and programs require participants to pay participation fees. The budget for COELD events is kept to a minimum in order to enable maximum participation and to lessen dependence on expensive, short-term, foreign consultants.

Survey participants overwhelmingly expressed confidence in their offices' interest and ability to pay training participation fees. Some survey participants could not definitely say training fees could be paid, often stating that they were "not the boss" and did not have the authority to decide.

It is positive to see that no office surveyed is completely unwilling or unable to fund participants for GIS/GPS training and support.

CONCLUSIONS

- Given the overwhelmingly positive participation—18 offices and 46 individuals—GIS and GPS training and support are clearly areas of interest and need in Pohnpei State.

- Thirty-three (33) out of forty-six (46) or 72% of survey participants have either no understanding/experience of GIS or have some GIS knowledge and skills but have not been able to maintain and strengthen this capacity due to lack of resources (computers, software packages, GPS units etc.) and/or lack of practice with the technology.

- The offices surveyed have identified many possible project areas in which GIS and GPS technologies can be applied, but 50% of these offices do not have any GIS software packages and 22% have software but are not trained to use it effectively.

- Although eleven (11) of the eighteen (18) offices surveyed state that they have been involved in some sort of project that utilized GIS in the past only 5 offices (28%) have the capacity to analyze and present their own project data. Because so few offices and individuals in Pohnpei State possess adequate GIS knowledge and skills offices continue to remain dependent upon outside, short-term consultants or the Department of Land and Natural Resources Office which is already overwhelmed with is own projects. As GIS skills lag behind the databases of several offices grow larger and larger and this information remains largely inaccessible and not fully understood by employees and the public. The more people who are trained to effectively process data with GIS applications the stronger Pohnpei State's infrastructure and conservation programs will become.

CONCLUSIONS Continued

- The participating offices conduct projects that fall under two general categories: infrastructure or environment/ conservation. The GIS trainers COELD has already identified can offer their experiences and expert advice on which are the most economical, user-friendly, work-appropriate software packages and data gathering tools offices may like to purchase and then train employees to effectively use this technology.

- Several offices currently use ESRI software and most training events have also used these products. Therefore, the ArcView GIS 9.1 software package currently available at the COM– FSM Pohnpei Campus would be a logical choice for use in future training events.

- Two-thirds (2/3) of offices surveyed are interested in purchasing software. ESRI software is not the only GIS package products currently found in Pohnpei State. Offices should be made aware of other product options that on-island trainers are skilled in using, may cost less and perform the appropriate functions their work activities demand.

- Two-thirds (2/3) of offices surveyed do not currently own GPS units for data collection but over half (56%) of these offices would like to purchase this technology.

- All three GIS/GSP capacity building options—a one-two week workshop, a GIS Users Group and in-office consultations and trainings— should be explored. Based on past experience and the technical, practice-based proficiency of GIS/GPS, a GIS workshop can only be effective if the knowledge and skills it offers can be immediately and regularly used in the workplace.

- In-office consultations and training will allow expert trainers the opportunity to assess individual offices' resource needs and become familiar with the nature of their work in order to make appropriate product recommendations. Subsequently, employees can be trained in the very environment they will be using the technology in, increasing the likelihood of knowledge and skill transfer that is often low after only workshop attendance.

- On-going training, support, information and data sharing and possible project collaboration through a COELD organized and managed Pohnpei GIS User's Group will strengthen the use of the technology and the overall effectiveness, efficiency, and success of infrastructure and environment/conservation projects in the State.

- A GIS user's group was the first choice of training options for thirty-five percent (35%) of survey participants and the most popular second choice (43%). This capacity building format encourages cooperation, sustainability and enhancement of skills and knowledge, and it may be the best option for busy offices that cannot allow their GIS specialists one-two weeks away from work for a formal workshop. The GIS User Groups in American Samoa and Palau can be models and possible partners for Pohnpei's group. World GIS Day, an event the American Samoa GIS User Group has participated in for the past two years, could serve as a launching event for the Pohnpei State GIS User's Group.

- Fifty-nine percent (59%) of survey participants answered a definite "yes" to their office's ability to provide participant's fees for training events. Because the surveys were primarily addressed to GIS practitioners, many of whom are not the Directors or Office Managers, it was not surprising to see that forty-one percent (41%) of participants did not know if participant fees could be paid or did not answer the question. No one said "no", participation fees could not be paid for GIS/GPS training and support.

PLAN OF ACTION

⇒ Distribute survey results to participating offices and other interested parties.

⇒ Plan GIS Capacity Building Workshop(s), possibly one for "Infrastructure" clients and another for "Environment/ Conservation" clients

⇒ Plan to host a GIS Day event on November 16, 2005 to showcase GIS work being done in Pohnpei State, raise public knowledge and awareness of the tool and recruit offices to join a Pohnpei State GIS Users Group. Possibly hold this event at a COM campus to encourage student interest and the development of GIS courses.

⇒ Contact individual offices that participated in the survey to arrange for in-office resource/project needs consultations and individual office training events.

⇒ Follow up on survey results after workshops, user group meetings and in-office consultations have been conducted. Evaluate the effectiveness and feasibility of these different formats of GIS/GPS capacity building support and measure changes in GIS/GPS capacity in Pohnpei State due to COELD interventions.