METHODOLOGY TO CONDUCT THE NATIONAL LOBSTER AND CONCH UNDERWATER VISUAL SURVEY 2005

BELIZE FISHERIES DEPARTMENT
MINISTRY OF AGRICULTURE AND FISHERIES
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1.0 LOBSTER SURVEY:

The short-term objectives of the annual lobster survey are:

- To determine mean size of locally harvested lobster.
- To estimate total abundance and density of lobster population.
- To estimate the distribution of populations by **habitat type** and **water depth**.
- To estimate population structure by **size category** and collection of morphological parameters.
- To estimate sex ratio and observe gender (M/F).

SITES:

The sites chosen for the surveys will be selected from among the six major fishing zones as identified. The survey stations will include the Bacalar Chico Marine Reserve, Hol Chan Marine Reserve (HCMR), Caye Caulker Marine Reserve (Zone 4), Buttonwood Caye (Zone 5), Turneffe Islands (Zone 3), South Water Caye Marine Reserve (Zone 5), Sapodilla Cayes Marine Reserve (Zone 6) and Glover's Reef Marine Reserve (Zone 3) Gladden Spit & Silk Cayes Marine Reserve (Zone 5 & 6) and other lobster fishing areas along the Belize Barrier Reef.

UNDERWATER VISUAL SURVEYS:

Back Reef:

The line transects will be carried out at the Back Reef parallel along the Belize barrier reef system and will cover the area between the Rocky Point (Bacalar Chico Marine

Reserve) in the North and Lime or Low Caye (Sapodilla Cayes)in the South. Each transect will be place up to a maximum of 30 m westward from the Reef Crest and depending on the habitat strata the divers will use their discretion where exactly to place the transect within the 30 m zone. Due to the cryptic nature of the spiny lobster the surveys will be conducted during the early morning (7:00 am) of the day and later in the evening (3:00 pm). Each team will begin their survey at their designated stations and will conduct each transect at 4 miles apart until they have covered the assigned area. In the **atolls** the transect line will be placed at 2 miles apart along the reef system.

Each transect position will be recorded using the hand held GPS, the coordinates at the beginning and at the end of each transects will be recorded. Each line transects will be surveyed by two divers. A 200-meters nylon rope will be used as the line transect which will be marked at every 20 meters and a one 2-lb lead weight will be attached to each end of the line and others at intervals to avoid flotation. The first diver will uncoil the nylon line while swimming at a uniform depth and searching for lobsters. Then two divers will swim along the length of the line transect searching for lobsters on a 2 meters band on either side of the nylon rope under ledges and other crevices searching for lobsters. The line transects will be either horizontal (reef/rock flat).

The field data collected will allow an estimation of lobster mean density per hectare and overall abundance of lobster over the study area by water depth and habitat type. Water depth will be classified in the following categories: < 10 meters, 10-15 meters and > 20 meters and habitat types will be recorded as Spur and grove (SG), Gorgonian plain (GP) reef (RC) and rock (RK) (Smith & Van Nierop, 1986) (Figure 5).

Lobsters size will be visually categorized by carapace length (CL) as small (S, < 60 mm), medium (M, 60-80 mm) and large (L, < 80 mm). Divers will count the amount of lobsters found along the transect line and record it on their slates also divers will collect lobsters (using tail snares) found at every **20 meter point** in the line transect. The divers will record lobster information such as sex, presence of eggs or tar spot, habitat type and water depth and morphometric data such as carapace length and tail length/weight. This

will allow an estimate of mean sizes that will be established for various morphological measures (C.L., T.L., Telson, TWT) in the lobster species as a whole as well as for various components of the population, including sex ratio and the mature portions within sexes (e.g. berried females).

The sex of lobsters will be determined by the presence or absence of chelae (pincers) on the fifth walking legs (females-chalae present, males- no chelae) and or ploepods (females – biramous pleopods, males – uniramous). Pleopods are leaf like appendages under the tail of lobsters (Figure 3 and 4).

Fore Reef:

Transect will also be conducted at the **fore reef** from Rocky Point (Bacalar Chico Marine Reserve) in the North and Lime or Low Caye (Sapodilla Cayes) in the South. Each transect will be place up to a maximum of 20 m eastward from the Reef Crest and depending on the habitat strata the divers will use their discretion where to place the transect within the 20 m zone.

A 60-meters nylon rope will be used as the line transect which will be marked at every 10 meters and a one 2-lb lead weight will be attached to each end of the line and others at intervals to avoid flotation. The first diver will uncoil the nylon line while swimming at a uniform depth and searching for lobsters. Then two divers will swim along the length of the line transect searching for lobsters on a 2 meters band on either side of the nylon rope under ledges and other crevices searching for lobsters. The line transects will be either horizontal (reef/rock flat).

Water depth will be classified in the following categories: >15 meters, 15- 20 meters and > 30 meters and habitat types will be recorded as Spur and grove (SG), Gorgonian plain (GP) reef (RC) and rock (RK) (Smith & Van Nierop, 1986).

Lobsters size will be visually categorized by carapace length (CL) as small (S, < 60 mm), medium (M, 60-80 mm) and large (L, < 80 mm). Divers will count the amount of

lobsters found along the transect and record it on their slates also divers will collect lobsters (using tail snares) found at every 1**0 meter point** in the line transect. The divers will record lobster information such as **sex, presence of eggs or tar spot, habitat type and water depth and morphometric data such as carapace length and tail length/weight.** This will allow an estimate of mean sizes that will be established for various morphological measures (C.L., T.L., Telson, TWT) in the lobster species as a whole as well as for various components of the population, including sex ratio and the mature portions within sexes (e.g. berried females). Each team will begin their survey at their designated stations and will conduct each transect at 6 miles apart until they have covered the assigned area.

SURVEY STATIONS:

STATION		**NORTHEN TEAM**	**CENTRAL TEAM**	**ATOLL TEAM**	**SOUTHERN TEAM**
From	**To**				
Rocky Pt	St. George's Caye	✓			
Drowned Cayes	Gladden Caye		✓		
Turneffe, Lighthouse Reef	And Glover's reef Atoll			✓	
Silk Cayes	Lime Caye				✓

Spiny Lobster Measurement

Spiny Lobster must have a minimum carapace length of greater than 3-inches and the measurement must take place in the water. The carapace is measured beginning at the forward edge between the rostral horns, excluding and soft tissue, and proceeding along the middle to the rear edge of the carapace (Figure 1 and 2).

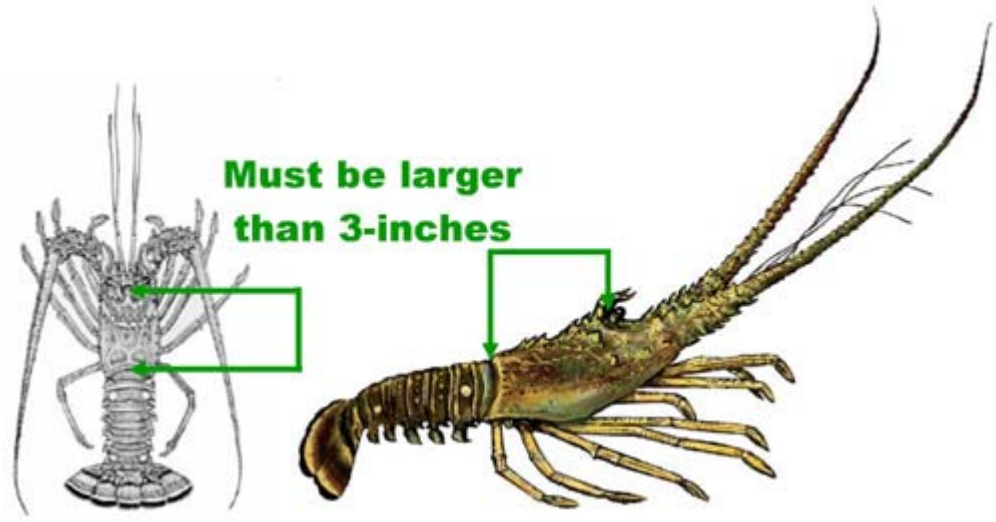


Fig. 1

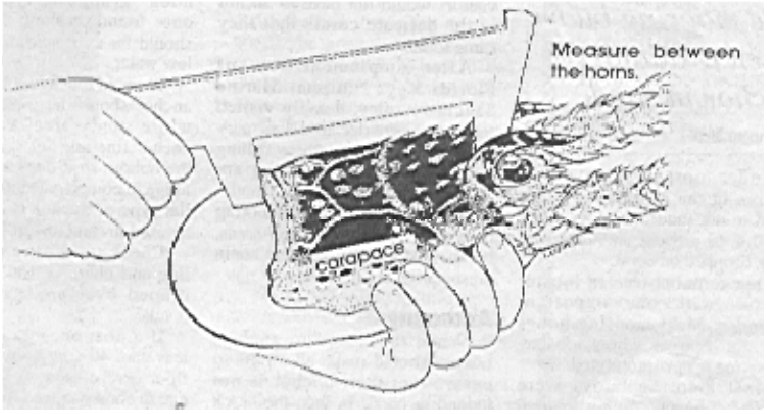


Fig. 2

Fig. 3

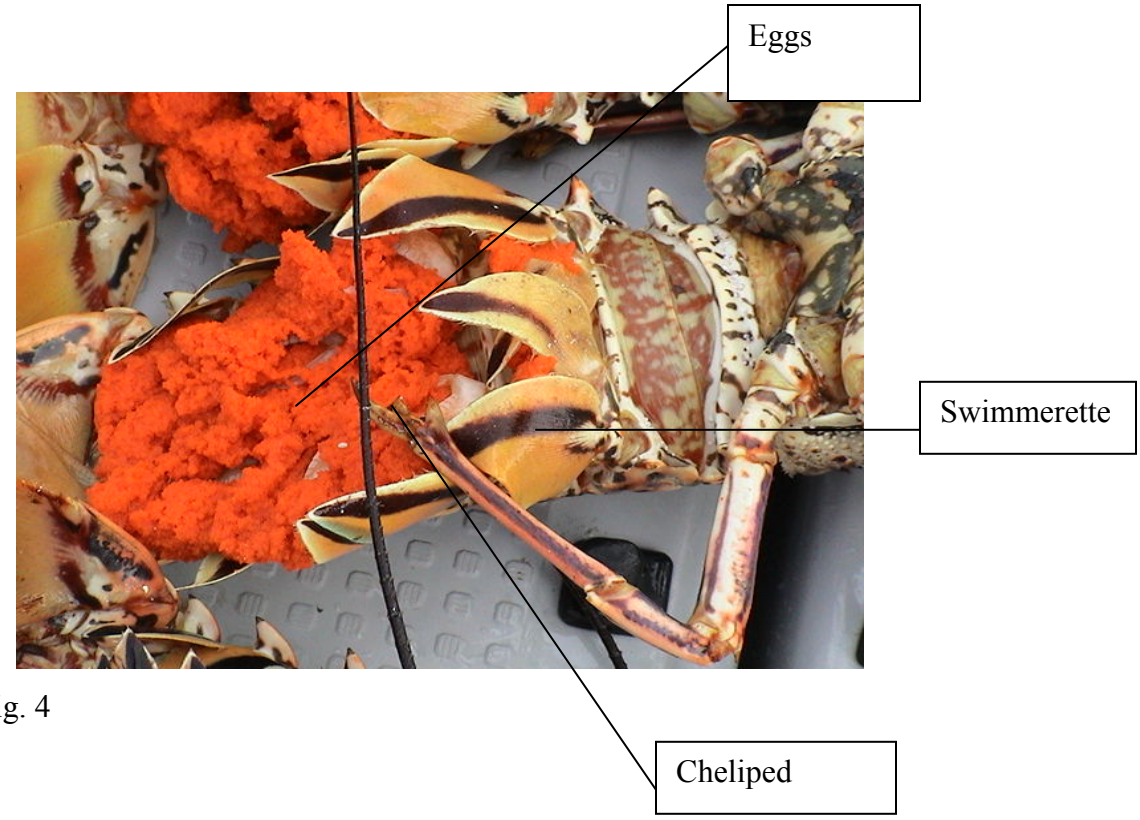


Fig. 4

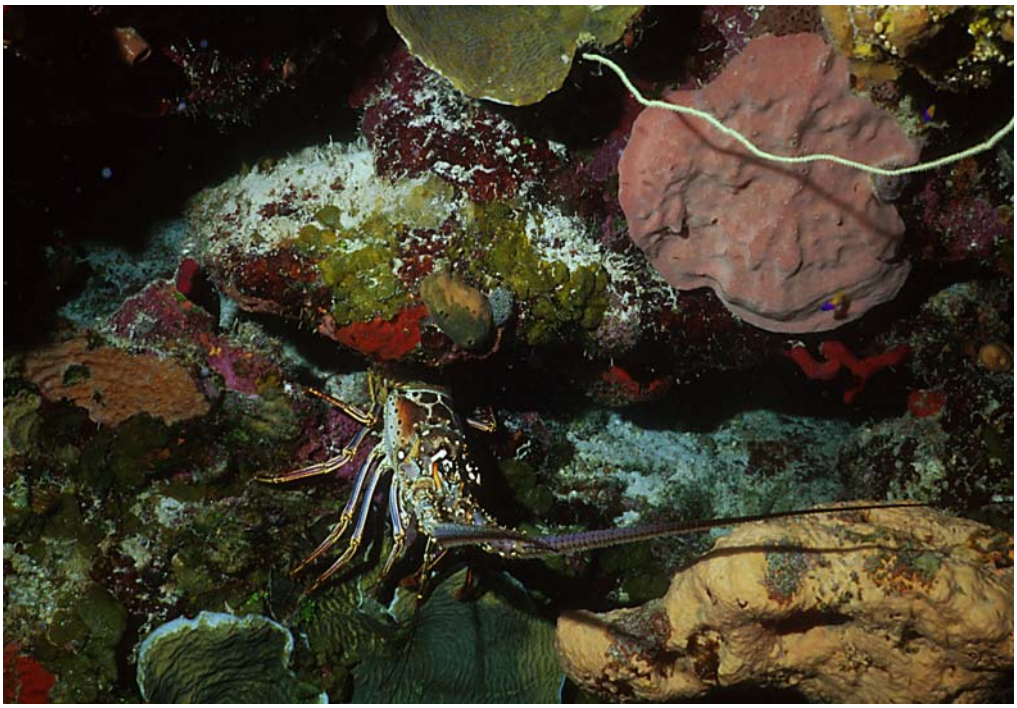


Fig. 5

LOBSTER TIPS:

- Water magnifies things so they look bigger underwater. The lobsters look about 1/3 bigger than they really are. Make sure you measure them.
- Don't take lobster from traps - even if they look lost or abandoned.
- An underwater light is useful even in the daytime for looking into holes and cracks. Sometimes the blinding light in their eyes will even momentarily freeze them.
- When you grab the bug with your gloved hand, make the motion of your grab from the back to front of the lobster. If you grab while moving your hand forward, all the sharp spines on the shell will get you. Grabbing the other way keeps you from getting stuck. Remember that Florida lobsters don't have any claws to pinch, just the sharp shells to passively defend themselves.
- Put them in your bag tail first for two reasons. The first is that they escape by flicking their tail and going backwards. This puts them right in your bag. The second is that the sharp spines all face forward so it's harder to put them head first in a mesh bag. Once it's in the bag make sure it's tightly closed.
- Check your bag frequently for big holes where they can escape
- When you see a nest of lobster, catch the little one first. If it meets the size requirements then you know the rest of them will.
- Bigger lobsters are generally out in the 40-60 foot depths.

LOBSTER SURVEY DATA SHEET- 1

(LOBSTER ABUNDANCE)

DATA COLLECTOR:		**DATE :**	**FISHING ZONE: (circle)** **1- 2 - 3 – 4 – 5 - 6**
SITE (G.P.S):			
Start	End	**TRANSECT No.**	**NUMBER OF LOBSTER**

LOBSTER SURVEY DATA SHEET- 2

(MORPHOMETRIC DATA SHEET) **Data Collector**: _____

Date:	**Transect No:**	**Site: G.P.S**		**Depth (ft)**	**Habitat Type**	**No.**	**M/F**	**Carapace Length (mm)**	**Tail Length (mm)**	**Maturity TS, FE**
		Start	**End**							

* **Habitat Type**: Spur and grove (SG), Gorgonian plain (GP) reef (RC) and rock (RK)
* **Maturity**: TS- Tar spot, FE- Female with eggs

2.0 CONCH UNDERWATER SURVEY:

The short-term objectives of the annual conch survey are:

1. Assess the distribution and abundance of Conch in selected conch areas in Belize.
2. Collect morphometric data on conch from each area (e.g. Length, total weight, animal weight, meat weight, lip thickness, sex, and relative maturity e.t.c.).

The complementary Queen Conch surveys and assessment will be conducted in two parts, which are the abundance survey and the collection of morphometric data.

STATION/SITES:

The conch survey will be conducted at strategic stations from the six fishing zones in Belize. Surveys will be conducted at Rocky Point, Hol-chan marine reserve, Caye Caulker channel, Gallows's Point, South English Caye, South Long Caye, Cross Caye, South Water Caye (Grand Channel), Sapodilla Caye. Also the three atolls will be survey at strategic points of interest.

Abundance and Distribution Survey:

The methodology consists of line transects of 500 meters by 4 meters oriented perpendicular to the reef crest. These transects will begin behind the reef crest and run to the 15m depth contour towards the main land. In the atolls, when the water depth becomes 15m or more then divers will use their own discretion as to whether to discontinue the transect and/or continue along the same line when the depth again shallows to 15 meters.

In addition, surveys will be conducted at the fore-reef of each marine reserve. These sites will be surveyed using the line transect method. These transects will be 30 meters long by 4 meters wide and 30 meters apart.

Morphometric Data collection:

A quantity of conch observed during transect swims, with the exception of copulating and spawning adults, will be collected from the sea so that morphometric measurements could be taken. Shell length (LTH) (tip of the spire to the siphonal canal) will be measured to the nearest millimeter using a measuring board. The shell lip thickness (LIP) (mid-lateral region on the lip side of the shell approximately 40 mm in from the edge of the shell) will be measured to the nearest 0.1 mm also using sliding vernier calipers.

Upon completion of the measurements all animals will be returned to the sea and in most cases to the area of capture. Upon completion of the measurements all animals will be returned to the sea and in most cases to the area of capture.

The variables that will be measured include:

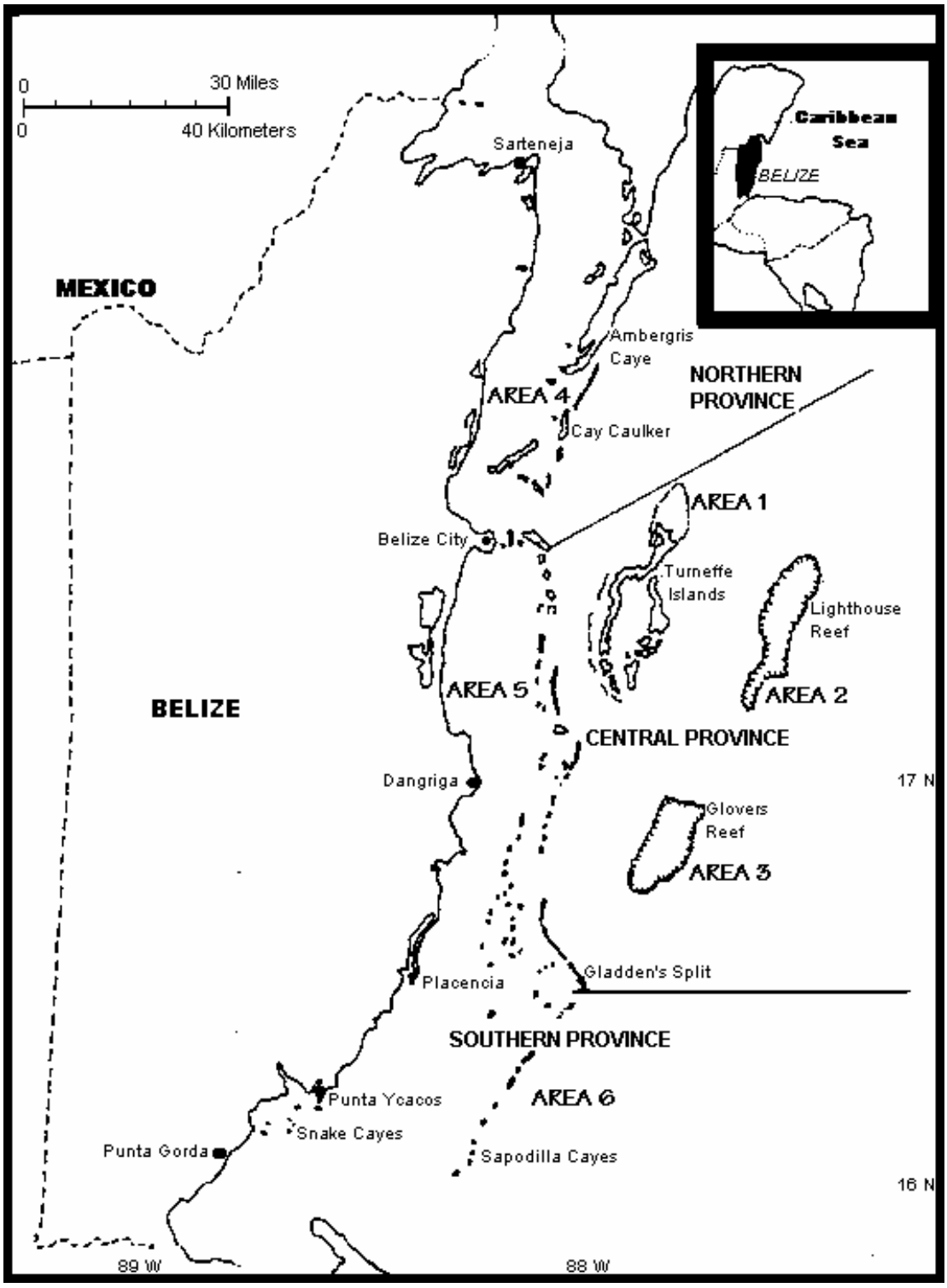
- Length of the shell from the tip of the spire to the end of the siphonal canal (cm).
- Lip thickness (adults only) (mm).

CONCH SURVEY DATA SHEET-1

Date:	Transect No:	Site: G.P.S		Depth (ft)	Habitat Type	No.	Shell Length (cm)	Lip thickness (mm)	Comments
		Start	End						

ADULT QUEEN CONCH

JUVENILE QUEEN CONCH


0
30 Miles
0
40 Kilometers
Caribbean Sea
BELIZE
MEXICO
Sarteneja
Ambergris Caye
NORTHERN PROVINCE
AREA 4
Cay Caulker
AREA 1
Belize City
Turneffe Islands
Lighthouse Reef
AREA 5
AREA 2
BELIZE
CENTRAL PROVINCE
Dangriga
17 N
Glovers Reef
AREA 3
Placencia
Gladden's Split
SOUTHERN PROVINCE
AREA 6
Punta Ycacos
Snake Cayes
Punta Gorda
Sapodilla Cayes
16 N
89 W
88 W