ADMINISTRATIVE CODE
BOARD OF COUNTY COMMISSIONERS

CATEGORY:	CODE NUMBER:
Development/Planning/Zoning	AC-13-10
TITLE: Supplemental Information for Chapter 10 of the Land Development Code (Protected Species)	ADOPTED: 8/30/89
	AMENDED: 4/20/94 1/4/95
	ORIGINATING DEPARTMENT: Community Development

PURPOSE/SCOPE:

To provide a Lee County listed species survey method as required in Chapter 10 of the Land Development Code.

POLICY/PROCEDURE:

The Protected Species Section of the Land Development Code requires a survey to accompany all planned development rezoning applications and all development order applications where FLUCCS codes for the property indicate a possible presence of a Lee County listed species. The Lee County Listed Species survey method is outlined and illustrated below:

LEE COUNTY LISTED SPECIES SURVEY METHOD*

Method of Diminishing Quarters

The survey method of diminishing quarters utilizes components of belt transect sampling in an order sequence of survey which increases coverage of site areas and minimizes the errors inherent in unordered transects, roadside transects or other path-of-least-resistance methods. The method is less exhaustively intensive than spot-mapping census which requires at least eight census visits to the site.

The diminishing quarters method has two levels of application, one for species presence and one for species abundance.

For Species Presence

This method is applied when the basic survey in question is: Does the Lee listed species occur in the specific Florida Land Use, Forms and Cover Classification (FLUCCS) area being surveyed?

Step 1

On an aerial map delinate the appropriate FLUCCS registers (Figure 1).

Areas of multiple occurrence of the same FLUCCS should be labeled by compass quadrant or cross labeled to a reference map with alphabetical subscript following the FLUCCS code in order from NW to SE (Figure 2).

Step 2

Tabulate on the data sheet each FLUCCS register with the potential Lee listed species which could occur in that register. Each species would then be tabulated on a second data sheet by species with each appropriate FLUCCS site listed with a check box for presence or absence as follows:

SPECIES	SITES	% AREA SURVEYED	PRESENT	ABSENT	DENSITY
Indigo snake	411A				
	411B				
	428A				
Gopher tortoise	411A				
	411B				
Gopher frog	411A				
	411B				
etc.					

* This survey method was written for use with the Lee County Protected Species Ordinance by James W. Beever, III, Resource Management and Research Coordinator, Southwest Florida Aquatic Preserves, Bureau of State Lands, Florida Department of Natural Resources.

Step

At each FLUCCS area the first belt transect will begin at the southernmost point of the register at the ecotonal boundary. This point of beginning is marked by brightly visble surveyors tape on a tree or stake *set* at visible level to the observer.

Example will be illustrated for symmetric and non-symmetric habitat boundaries (Figure 3).

Step 4

A belt transect proceeds north across the FLUCCS register. The observer records the limits of visible observation for that particular FLUCCS register habitat as it exists on that site for the Lee listed species in Figure 2. The limits of visible observation may vary for both left (W) and right (E) sides of this first transect and will certainly vary with habitat type. Close shrubby forested wetlands will have shorter visibility than open low herbaceous marshes.

On the belt transect all observations of Lee listed species are recorded for that particular FLUCCS register site (Figure 4). Note that no east and no west may be non-systemmetric.

The resulting transect will bisect symmetric habitats Figure (5A) cross FLUCCS and unlisted areas (5B) of irregular sites or only cross a small portion of linear sides (5C). Note the end of the belt transect 1 is also marked with tape.

Step

A second belt transect is defined which crosses the FLUCCS habitat from east to west at a right angle too and crossing the midpoint of the first transect for habitat shapes A and B. For a long linear habitat such as C the second transect would begin at the north end of transect 1 and proceed east (Figure 6). The ends of the second and the following transects are flagged.

Step 6

For most habitat shapes, the transects will have defined a cross with four quarters. Each of these quarters is now treated as a subcell of the FLUCCS habitat and are transected North to South. The third set of transect lines *may* (7A) or *may not* (7B) correspond symmetrically with the first transect set.

For habitat shapes like C the staggered transect walk continues. Note that while the area covered per transect step in C is less than for A or B the shorter transects require less time to perform.

Step

As in step 5 an east to west belt transect is performed in each quarter in areas that have not yet been surveyed. Figure A has been completed on the previous step and therefore requires no further transects. Note again transects are located to maximize coverage of the remaining unsurveyed quarters of Figure 8B

The areas covered at the completion of this step are shaded. At this point unless the site possesses some unusually arrayed microhabitats both habitats 8A and 8B have been well surveyed. In contrast 8C remains largely unreviewed. Therefore, 8C requires several more transects to be complete. A minimum of 80% coverage is required.

The following table is illustrations:

FIGURE	# OF TRANSECTS	% COVERAGE
A	4	100
B	10	80-90
C	4	30-40

Clearly long linear sites present a special survey problem for the method of diminishing quarters.

For long linear sites with a meandering path (natural streams) the stepwise stagger is recommended (Figure 9) while in truly linear systems (canal ditches) a transect following linearly along the long axis of the habitat is recommended.

If banks are sufficiently varient, two transects will be needed.

Step 8 For Species Abundance and Density

If a Lee listed species is present the density would be calculated as follows:

density = number observed/transect length
x east visibility
x west visibility

or $D = n/L(ev)(wv)$

When 90%+ of each FLUCCS habitat subarea is submerged then the abundance and density of observed species can be calculated as follows:

$$\text{Abundance} = \Sigma\, n_i * 1/A$$
$$\text{Density} = \Sigma\, (n_i/(w_1 * w_2 * L)_i * 1/A$$

Where D is density for that FLUCCS habitat subset, n_i is the species observed in transect i, w_1 is visible widths left, w_2 is visible width right, L is transect length and A is the fraction of the FLUCCS habitat surveyed.

Step

All surveyors tape should be removed from the transect ends.

Step 10

The complete survey would include:

1) the completed cover sheet and aerial (Step 1);

2) the completed presence sheet with calculated species densities and abundance (Step 2); and

3) an aerial map indicating which FLUCCS trigger areas possess which species.

Alternative Methods

Since the Method of Diminishing Quarters is one of several reasonable methods for the identification of species, equivalent methods may be utilized provided:

- ö the method is approved by the County Administrator or their designee prior to survey completion; and
- ö the method allows for the same coverage and relative sampling as the method described above; and
- ö the alternative method is documented with similar detail as the method described above; and
- ö the documented, approved method is placed on file with the County.

References

Coopervider, A., R. Boyd, and H. Stuart. 1986. Inventory and Monitoring of Wildlife Habitat. Washington, D.C.: Bureau of Land Management, U.S. Department of Interior

David, D., and R. Winstead. 1980. "Estimating the Numbers of Wildlife Populations, "Wildlife Management Techniques Manual." Washington, D.C.: The Wildlife Society.

FIGURE 1
Project Site Example

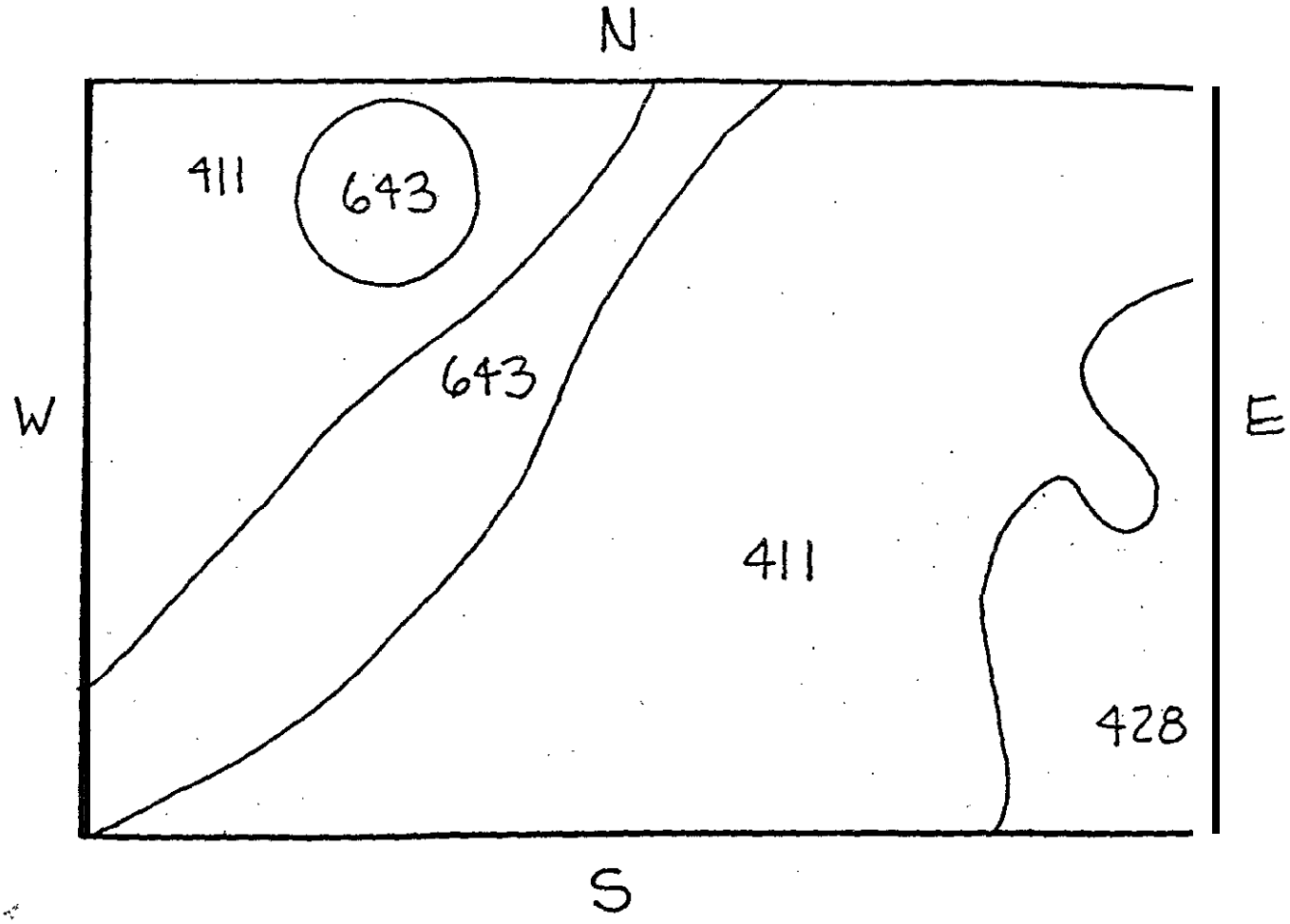

FIGURE 2
Data Sheet Cover

ALPHABETICAL	FLUCCS GEOGRAPHICAL LISTING	POTENTIAL SPECIES
411A	600 NW	indigo snake, gopher tortoise, gopherfrog, southeastern american kestrel,woodpecker, mangrove fox squirrel, burmannia, satin leaf, beautiful pawpaw.
411B	600 SE	indigo snake, gopher tortoise, gopher frog, southeastern american kestrel, woodpecker, mangrove fox squirrel, burmannia, satin leaf, beautiful pawpaw.
428A	428 Central	indigo snake, Simpson stopper, twisted air plant.
643A	643 Central	limpkin, reddish egret, sandhill crane, wood stork, snail kite, everglades mink.

FIGURE 3

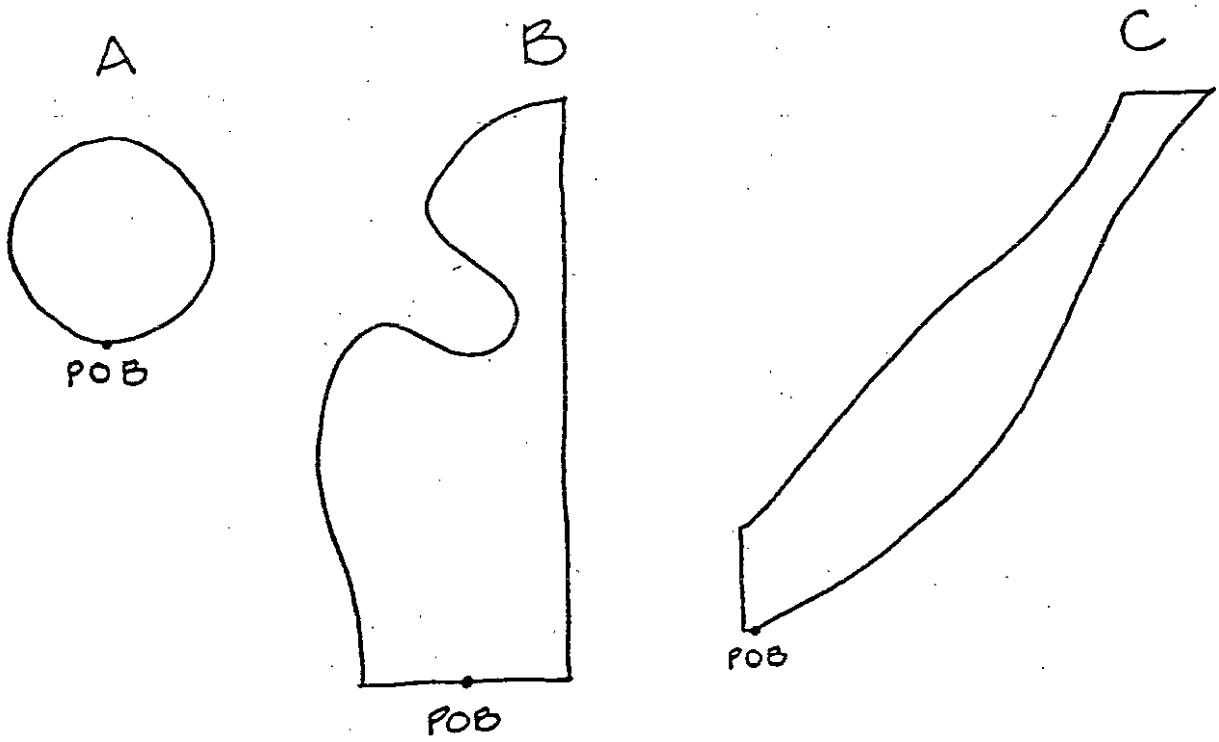

FIGURE 4

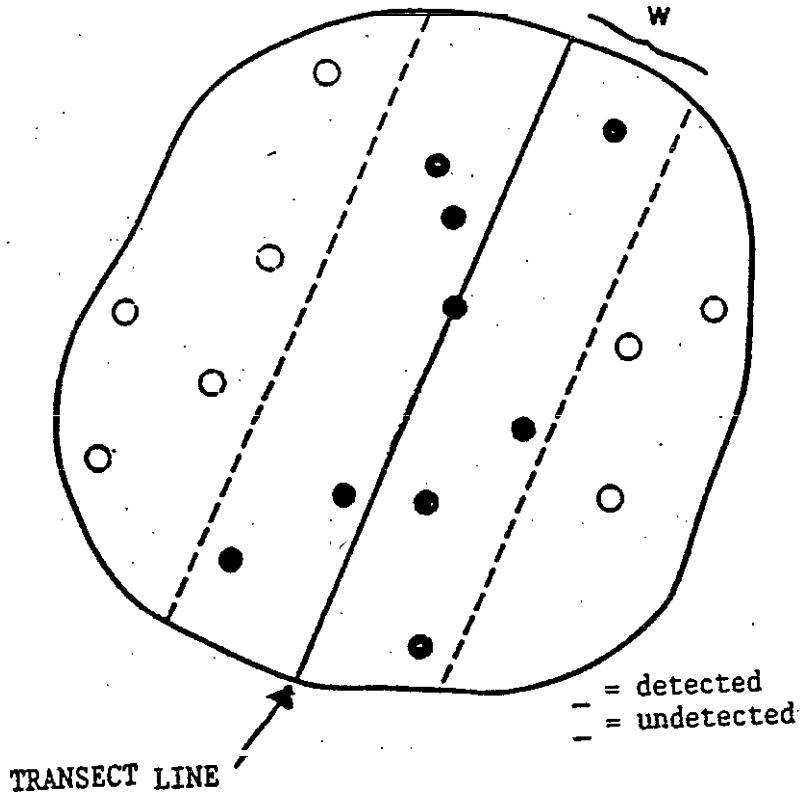

FIGURE 5

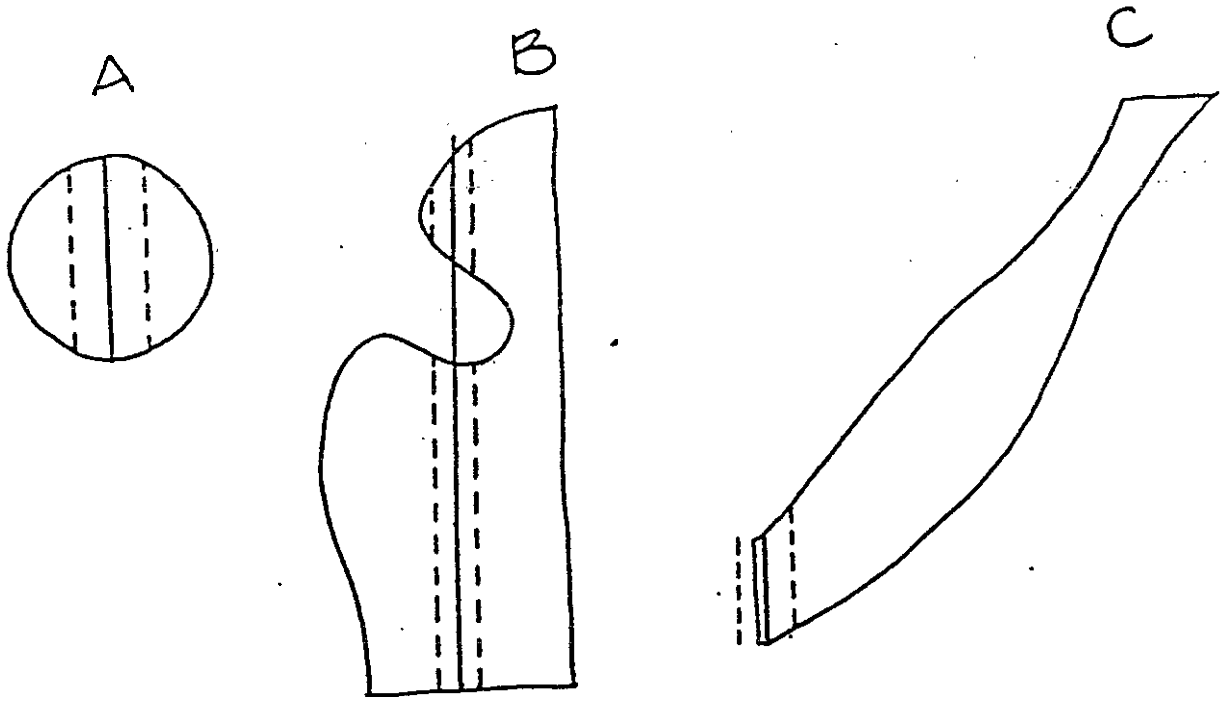

FIGURE 6

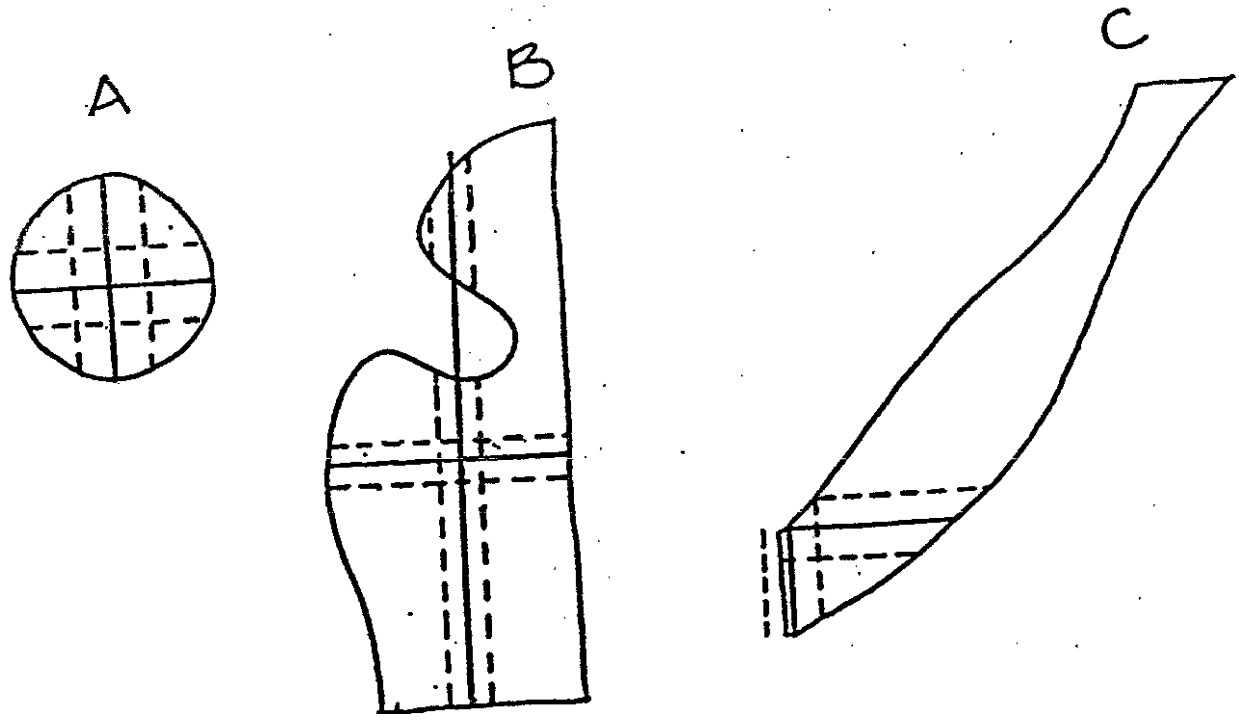

FIGURE 7

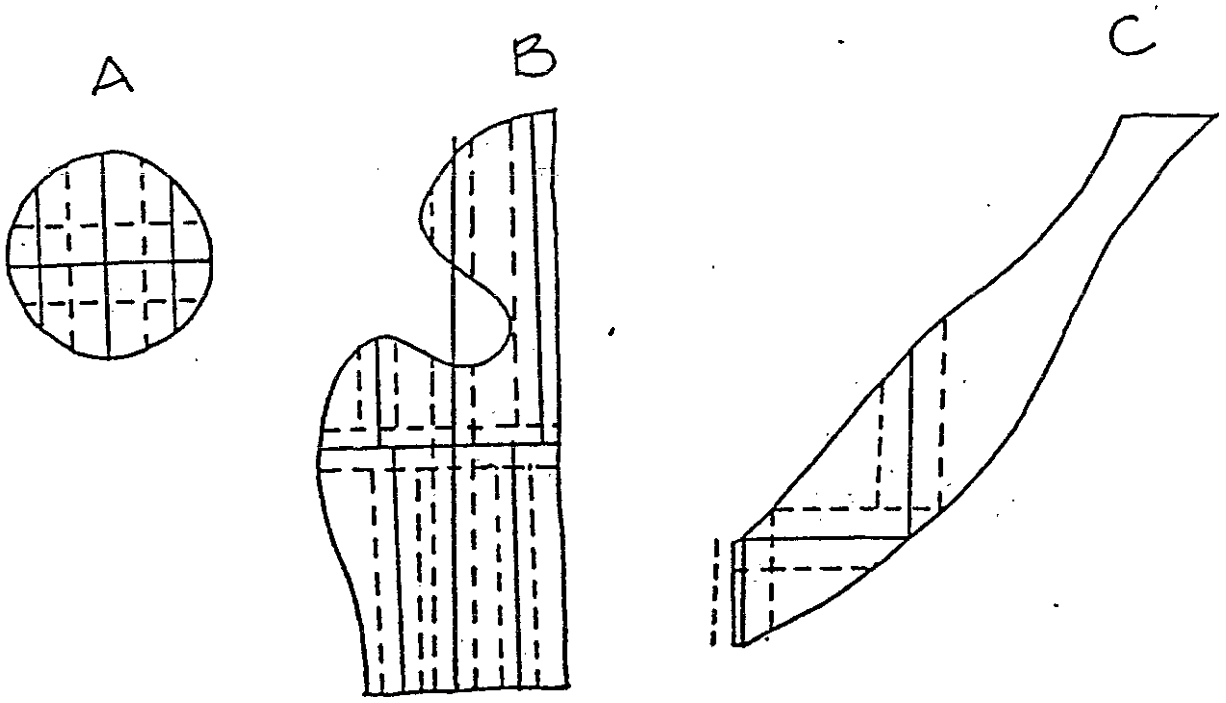

FIGURE 8

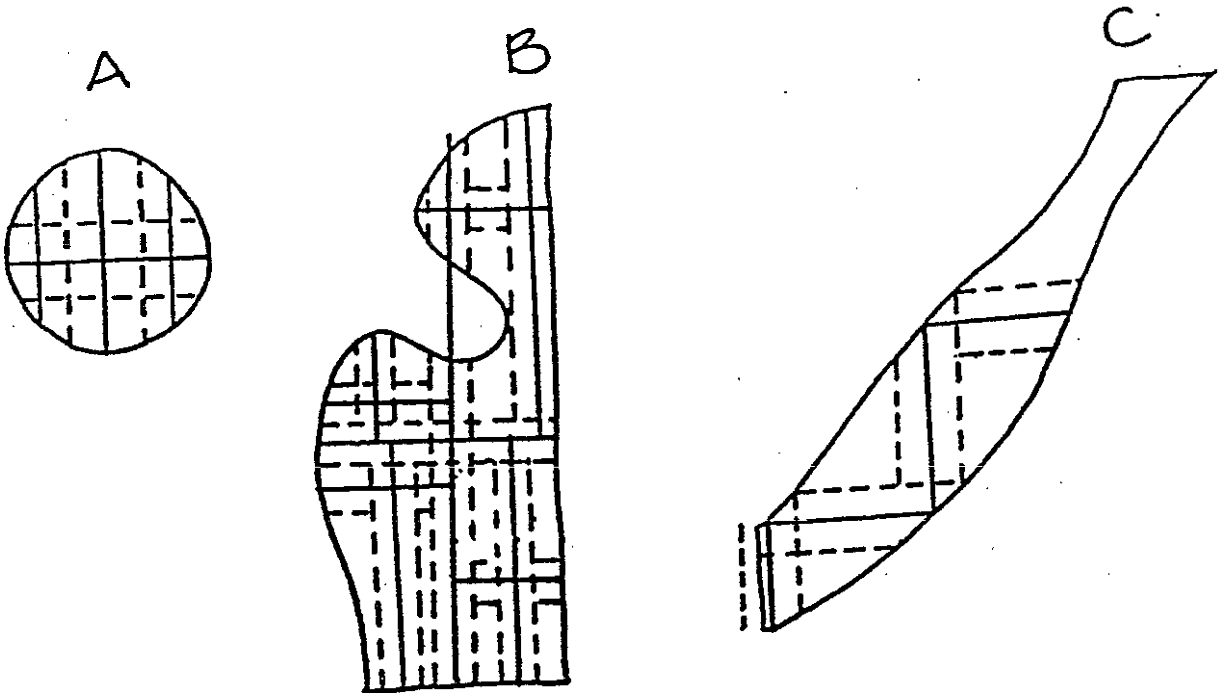

FIGURE 9

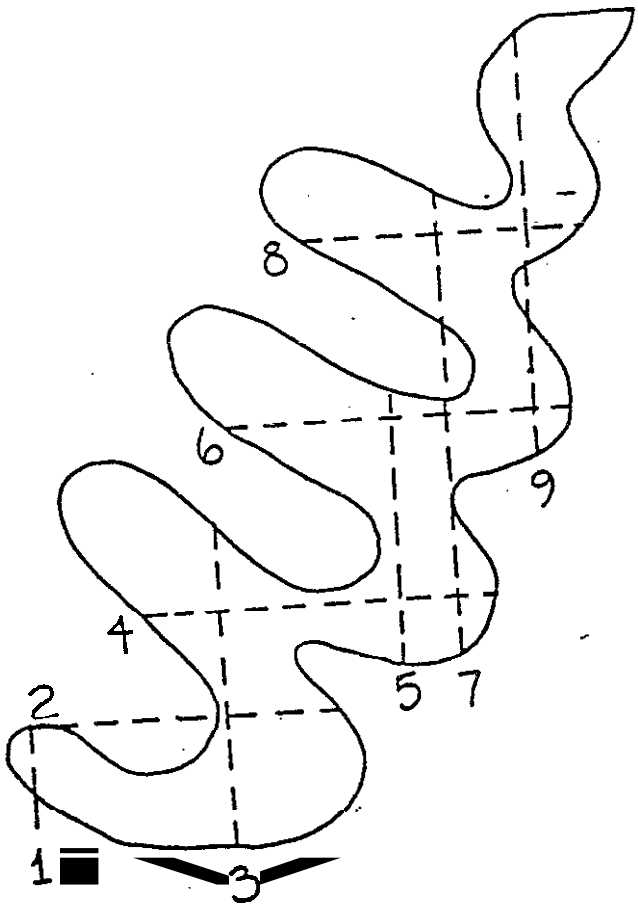
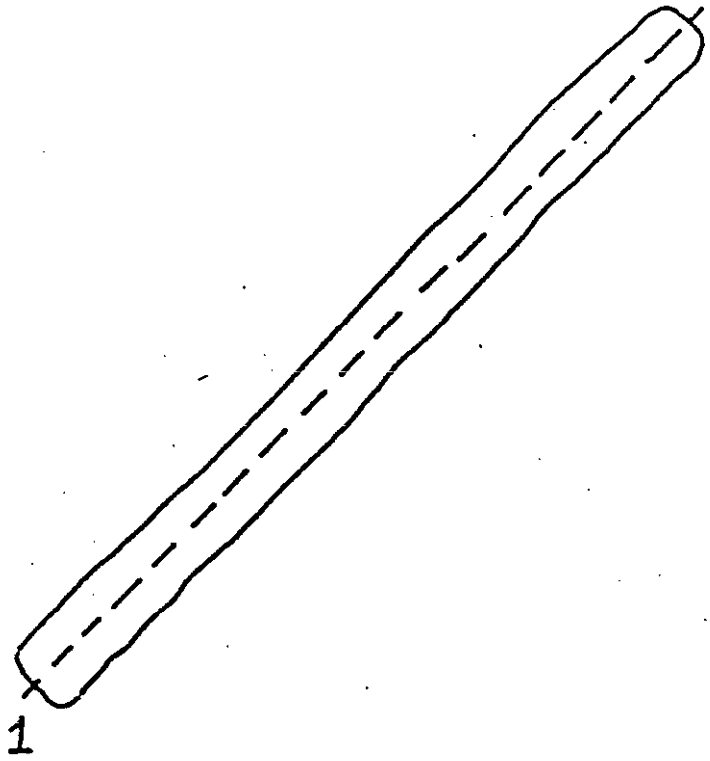
FIGURE 10