5.1. Survey methods (Michael Cherkiss and Alvaro Velasco)

With few exceptions, crocodilians must be located and counted for studies of their ecology or in the development of a management plan (Bayliss 1987). Various techniques are used for finding and counting crocodilians and depend on a variety of factors such as habitat type, cost, field logistics, goal of the study, etc. Cherkiss et al. (2009) provide a good overview of transportation needs and crocodilian survey methods and drawbacks, which include:

Transportation

• Automobile: work well when surveying a canal or water body adjacent to a road or raised levee.
• All-terrain amphibious: used to traverse large expenses of dry areas between wet ones, when seasonal wetlands dry out periodically leaving crocodilians concentrated in isolated ponds and pools.
• Walking: Sometimes crocodilians can be found on foot.
• Horseback: is a method used in the Venezuelan Llanos to visit caiman ponds.
• Water-craft: usually have a shallow draft and open interior and include Kayaks, jon boats, canoes, pirogues, marsh skiffs, fishing skiffs of various design, and airboats.
• Fixed-wing aircraft and helicopters: Can be used to find crocodilians in areas not accessible by boat, and to cover large areas quickly.

Survey Methods

• Informants: can be helpful upon the initial visit to a site as a method to obtain background information or in determining current needs (Thorbjarnarson 1988; Thorbjarnarson and Hernandez 1988).
• Artifacts: Searching a site for the sign (crawls, nesting sites, etc.) of a crocodilian can be helpful in determining the presence (but not absence) of animals.
• Daylight Ground Counts: Daylight ground counts require the least equipment and are the most easily arranged. However, many zero-counts have been associated with daylight ground counts, given that crocodilians refrain from basking with cloudy weather or when the optimal body temperature is reached (O’Brien 1990). These counts can be done on foot, from a ground vehicle, or from the air, sometimes reducing transportation and logistical costs (Magnusson 1982).
• Daytime Aerial Surveys: are widely accepted as a cost-effective method to survey crocodilian habitat given the immense ground coverage in a limited time (Magnusson 1982; O’Brien 1990). Aerial surveys are most effective in open marsh and lake habitats to detect distribution and abundance of crocodilians or nests, and least effective in areas where canopy closure blocks visibility (Magnusson 1982; O’Brien 1990).
• Night Spotlight Survey: are the preferred method of crocodilian survey (Magnusson 1982) due to their versatility in habitat and the nocturnal nature of the animals. Spotlighting is usually performed from a watercraft but can be done on land from a vehicle or on foot. Eyeshines allow the researcher to see the animal from great distances and in situations where the animal might not have been otherwise seen (O’Brien 1990). Night surveys may be the most costly ground effort but produce the most reliable population data. This technique also allows for gathering environmental data and specific details on the animal and its condition.
• Lighting: Good lights make a big difference. Brighter is not always better; very bright lights will wash out the eyeshine from smaller crocodilians and those that are nearby. Lights in the 50,000 to 200,000 candlepower range are most effective (Cherkiss et al. 2009).

Limitations

Factors other than population density affect the number of crocodilians counted during a survey, and not all of the crocodilians in an area will be counted (Graham and Bell 1969; Magnusson et al. 1978; Bayliss 1987). Environmental conditions (wind, air and water temperature, and wave action) impact survey results and ability to observe animals (Woodward and Marion 1979). Two observers shining lights independently can estimate potentially visible crocodilians missed (when one observer sees one that the other does not) during surveys (Magnusson et al. 1978; Bayliss 1987). Wariness of crocodilians is
another factor affecting results and can be estimated by the distance an observer can approach before submergence (Webb and Messel 1979; Pacheco 1996), and visibility in different habitats can be tested by thoroughly searching a sample area in daylight after a typical survey, or by having one crew set out dummy crocodilians to be counted by a survey crew (Cherkiss et al. 2006, 2009).

References


