

ETHICAL REVIEW COMMITTEE, ICDDR,B.

Zarin Greenough

Principal Investigator Dr. Bilqis A. Hoque

Trainee Investigator (if any)

Naureen Shahid

Application No. 95-016

Supporting Agency (if Non-ICDDR,B)

NIH

Title of Study Survey of *Platanista gangetica*

Project status:

(dolphin) as an Environmental Sentinel

- New Study → This is an animal study that requires ^{surveying of} fishermen and villagers.
- Continuation with change
- No change (do not fill out rest of form)

Species for the Ganges River delta

Provide the appropriate answer to each of the following (If Not Applicable write NA).

Source of Population:

- (a) Ill subjects Yes No
- (b) Non-ill subjects Yes No
- (c) Minors or persons under guardianship Yes No

5. Will signed consent form be required:

- (a) From subjects Yes No
- (b) From parent or guardian (if subjects are minors) Yes No

Does the study involve:

- (a) Physical risks to the subjects Yes No
- (b) Social Risks Yes No
- (c) Psychological risks to subjects Yes No
- (d) Discomfort to subjects Yes No
- (e) Invasion of privacy Yes No
- (f) Disclosure of information damaging to subject or others Yes No

6. Will precautions be taken to protect anonymity of subjects

Yes No

7. Check documents being submitted herewith to Committee:

- Umbrella proposal - Initially submit an overview (all other requirements will be submitted with individual studies).
- Protocol (Required)
- Abstract Summary (Required)
- Statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (Required)
- Informed consent form for subjects
- Informed consent form for parent or guardian
- Procedure for maintaining confidentiality

Does the study involve:

- (a) Use of records, (hospital, medical, death, birth or other) Yes No
- (b) Use of fetal tissue or abortion. Yes No
- (c) Use of organs or body fluids Yes No

Are subjects clearly informed about:

- (a) Nature and purposes of study Yes No
- (b) Procedures to be followed including alternatives used Yes No NA
- (c) Physical risks Yes No NA
- (d) Sensitive questions Yes No NA
- (e) Benefits to be derived Yes No
- (f) Right to refuse to participate or to withdraw from study Yes No
- (g) Confidential handling of data Yes No
- (h) Compensation &/or treatment where there are risks or privacy is involved in any particular procedure Yes No NA

* If the final instrument is not completed prior to review, the following information should be included in the abstract summary

1. A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.
2. Examples of the type of specific questions to be asked in the sensitive areas.
3. An indication as to when the questionnaire will be presented to the Cttee. for review.

Consent to obtain approval of the Ethical Review Committee for any changes affecting the rights and welfare of subjects before making such changes.

Zarin Greenough
Principal Investigator

Naureen Shahid
Trainee

APPLICATION FOR PROJECT GRANT

1. Principal investigator(s) :

Zarin Greenough
Dr. Bilqis A. Hoque

2. Other investigators :

Dr. Chip Stem
Naureen Shahid

3. Title of project :

Survey of Platanista gangetica (river dolphins) as an
Environmental Sentinal Species for the Ganges River Delta

4. Starting date :

As soon as Committee clearances are obtained

5. Date of completion :

2 months from starting dates

6. Total budget requested :

N/A

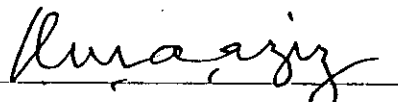
7. Funding source :

NIH Research training grant

8. Head of programme :

This Protocol has been approved by:

Dr. K.M.A. Aziz
Division Head
Community Health Division


Date 1.7.95

9. Aims of project :

General aim

To study reproducible methods for monitoring population fluctuations of Platanista gangetica (river dolphins) in selected sites in the Gangetic watershed of Bangladesh.

Specific aims

1. To do a literature search in Dhaka and contact individuals and organizations interested in evaluating the current status of the Platanista gangetica population in the Ganges river delta.
2. To use information gathered from the above parties to select sites along the delta which would be helpful to conduct a survey.
3. To develop an oral survey of fishermen and villagers living close to the river to begin to establish the frequency of sightings and the relationship between the human and P. gangetica populations.
4. To use the analysis of the survey data to locate 2-3 possible sites for setting up P. gangetica enumeration sites using both human counts and a video recorder. To devise a reproducible method that could be repeated seasonally, annually or every other year.

Summary

Platanista gangetica are a species of freshwater river dolphins with highly degenerate eyesight that inhabit the Gangetic watershed. They range from Nepal, through India and into the Ganges, Brahmaputra and Meghna rivers in Bangladesh, where the delta empties into the Bay of Bengal. This vast flow of water carries the silt responsible for the extremely fertile farmlands that support one of the most densely populated countries on the planet. Fishermen and dolphin populations sit at the top of this riverine food chain, each deriving their resources from the abundance of fish and mollusks indigenous to the watershed. Turbid waters favored the selection of characteristics unique to Platanista gangetica, such as a sophisticated echolocation system enabling survival in this river habitat. Recent studies in Nepal and India have shown a marked decrease in Platanista gangetica numbers over the last several decades, indicated in the 1986 Workshop on the Biology and Conservation of the River Dolphins. It is suspected that Bangladesh has suffered the same decline, however there is no data available to support this concern.

This is a multiphasic project. The first phase will be conducted this summer. This primary phase will include conducting a local literature search and making contact with individuals familiar with the P. gangetica population. Survey sites will be selected according to this information. An oral survey of fishermen and villagers will be conducted at these sites. The data collected will be used to set up stationary counting sites which could be repeated seasonally. The results from the first phase and the availability of funding will be the basis for continuing into the second phase. The second phase would include developing safe and humane capture and release methods for the purpose of obtaining tissue samples and fecal swabs. The tissue samples would be tested for the presence of industrial and agricultural chemicals and the fecal swab for the presence of water borne human pathogens as a baseline for future comparison.

10. Ethical implications :

N/A

11. Background

Platanistoid dolphins inhabit several large watersheds around the world. The Bangladeshi watershed is turbid with the rich silt that it deposits in the delta. The fertility of this land enables a country the size of the state of Georgia to support a population of 118 million (Pocket Version of Bangladesh Statistics, 1992). Living for millions of years in a water environment of intense turbidity, has meant that the pressures of natural selection of Platanista gangetica have not placed an emphasis on eyesight (Pilleri, 1970a; Reeves, 1979). Over time these animals have lost their visual acuity, and now live with degenerate eyes that lack a crystalline lens. The same evolutionary pressures have resulted in Platanista gangetica becoming among one of the most specialized and unique cetaceans in the world, with a highly advanced echolocation system and an unusual side swimming behavior that maximizes the sensory information which they receive from the environment, permitting them to exploit this unusual habitat (Pilleri, 1970a; Reeves, 1979).

Extensive research has been done on several related species to evaluate their behavior and populations in the wild (Inia geoffrensis in the Amazon river, Lipotes vexillifer in the Yantzee river and Platanista minor in the Indus river) (Pilleri 1970a). The Platanista gangetica found in Bangladesh are the least studied and evaluated of all the populations (Perrin et al, 1986). In comparative literature a common concern is the uncertainty of the status of the dolphin population in Bangladesh (Lal Mohan, 1989).

The studies on the Platanista gangetica in Nepal and India are broad based in their evaluation of behavior, description and population distribution within each country (Pilleri, 1970a; Bhatti and Pilleri, 1982). In each case a sharp decline was noted in the populations. This instigated conservation efforts and legislation to begin monitoring and protecting the remainder of the dolphin populations (Lal Mohan, 1989). In one such study the author identified the need to investigate the population changes in the river dolphin along the Karnafuli river in relation to the Kaptai dam in Bangladesh (Reeves, 1979). Dams and barrages built along the Indus river were shown to have a profound effect on the water flow, thus altering the riverine ecosystem. In this case the dolphin population had become divided into

small isolated groups (Perrin et al, 1986). Subsequently, conservation programs were set into motion which have facilitated the gradual recovery of the Indus dolphin population (Reeves, 1979).

In 1972 the first and only survey of the dolphin population in Bangladesh was undertaken, along the Ganges and Brahmaputra river systems. This survey was conducted as a visual count from a series of launches and ferries in the month of January (the rivers are very low in the dry season) (Kasuya and Haque, 1972). The survey ranged from the estuary near the Sunderbands to Tistamukh Ghat, resulting in a count of 283 individuals (Kasuya and Haque, 1972). Another count was done in April and May in the upper stream of the Meghna river near Bhairab Bazaar and found 540 individuals (Kasuya and Haque, 1972). There have since been no published surveys or research in this area. There have been references to the lack of data available. The concern seems to be in light of dolphin population declines in other areas and a shrinkage of the dolphins' habitat. Anecdotal references have alluded to their disappearance from many tributaries in the Ganges watershed (Lal Mohan, 1989).

During the 1986 Workshop on the Biology and Conservation of the River Dolphins the Bangladeshi delegate's comments were presented. His concerns touched on the increasing use of chemicals that were then being washed into the rivers, alteration of water flow as a result of dams and siltation of the riverbed. It was also recommended that the ecological status of the Ganges river dolphin be evaluated (Perrin et al, 1986).

Bangladesh depends on a steady supply of nonpolluted water. The river dolphin sits at the top of the riverine food chain and does not appear to be fished by the human population (Reeves, 1979). This position in the riverine ecosystem exposes Platanista gangetica to a whole range of toxins and heavy metals which could become concentrated in its tissues. It would appear that Platanista gangetica would indeed be a very valuable sentinel species (Reeves, 1979; Perrin et al, 1986; Lal Mohan, 1989).

The purpose of this study is therefore to establish baseline data specifically of important pollutants and toxins found in the Gangetic waterways. Further, to establish a cost effective and simple technique for prospective censuring which would provide important

demographic information on the species (Perrin et al, 1986). The collaboration with a well respected local institution, the International Center for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) could lead to the institutionalization of Platanista gangetica as an environmental sentinel, used to help preserve the riverine ecosystem for future generations.

The extensive nature of the project requires that it be separated into several phases. This summer the first phase of the study will be undertaken. The results from the first phase will be the basis for pursuing the second phase of the project. The methods described below will only cover the first phase of the project.

Methods

The primary phase of this project will be done in collaboration with the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). An additional literature search will be conducted here in Dhaka to supplement literature previously gathered on Platanista gangetica. This will lead to compilation of groups and individuals with an interest in further investigation of the status of P. gangetica in the Ganges river delta. Contacting and the gathering of information from these sources will help focus on areas along the rivers where it would be most productive to conduct the surveys, according to the population density of P. gangetica in various areas.

The second step will be to select a site at which to pretest a survey of fishermen and villagers that live along the river. The interview will then be revised and will be done at several sites. Its purpose will be manifold. It will help establish appropriate areas to do a series repeatable counts of P. gangetica. We hope to look at 2 to 3 sites and compare them over several years. We also hope to gain an understanding as to local attitudes and interactions of the local human population with the P. gangetica population. We will also begin to look at the frequency and results of purposeful or accidental capture of P. gangetica by local fishermen with the hope that these findings could be applied to the development of future safe and humane capture and handling techniques.

Analysis of the data of the surveys may facilitate answering of these questions and help guide us as to how the second phase of the project should be approached. If possible, we would hope to establish at least two enumeration sites either from a bridge or from an elevated portion of the shore. The method should involve a count by an individual with a video of the river as a backup to check the count. The protocol developed should be one that could be repeated at any given interval. If a change in the P. gangetica population can be established in a given area, then the question of why there is a change can be approached.

References

A Pocket Version of Bangladesh Statistics 1992 Bangladesh Bureau of Statistics

Bhatti, M. and G. Pilleri. 1982. Status of the Indus Dolphin Population (*Platanista indi* Blythe, 1959) between Sukkur and Guddu Barrages in 1979-1980. Invest Cetacea 13,245-261

Kasuya, T. and A.K.M. Aminul Haque. 1972. Some Informations on Distribution and Seasonal Movement of the Ganges Dolphin. Sci. Rep. Whale Res. Institute 24,109-115

Kasuya, K. and N. Nishiwaki. 1975. Recent Status of the Population of the Indus Dolphin. Sci. Rep. Whale Res. Institute 27,81-94

Lal Mohan, R.S. 1989. The Threatened Ganges River Dolphin. Whale Watcher 126,6-8

Perrin, W.F., R.L. Brownwell, Jr., Zhou Kaiye and Lui Jainkang. 1986. Biology and Conservation of the River Dolphins. Occasional Papers of the IUCN Species Survival Commission: Proceedings of the Workshop on Biology and Conservation of Platanistiod Dolphins. Held at Wuhan, Peoples' Republic of China.

Pilleri, G. 1970a. Observations on the Behavior of *Platanista gangetica* in the Indus and Brahmaputra rivers. Investigations on Cetacea 2,27-60 = 14 plates

Reeves, R. 1979. Echoes in the Dark. Oceans 12(5),32-36

Report of the Workshop on Individual Recognition and Estimation of Cetacean Population Parameters. 1988. Rep. Int. Whal. Commn (special issue). SC/A88/1d13, 3-52.

12. Publications of principal investigator(s) (last 5 years) :

N/A

13. Flow chart (sequence of tasks within time frame)

Week 1

- Revision approval
- Make contacts - set up meetings if necessary & write letters
- Make new schedule
- Try literature search at ICDDR,B

Week 2

- Pick day for Agriculture/Fisheries Meeting & Library
- Pick sites for survey
- Make final draft of survey
- Select students to help with survey
- Schedule site visits

Week 3

- Go to Matlab this week to do survey pretest
- Train survey assistants during the pretest (do 5-10 interviews)
- Analysis & rewrite survey questions
- Schedule actual site visits (3)

Week 4

- Do surveys at first site (20-30 interviews)
- Input of collected data back at ICDDR,B

Week 5

- Do surveys at second site
- Input of collected data back at ICDDR,B

Week 6

- Do surveys at third site
- Input of collected data back at ICDDR,B

Week 7

- Data analysis
- Select 2 possible sites for enumeration
- Select individuals to run those counts

Week 8

- Try to do a test run of counting procedure at at least one if not both sites
- Train counters
- Decide count intervals

Week 9

- Write-up
- Tie up loose ends

* if time permits begin doing literature search on industrial & agricultural pollutants found in Ganges River Delta.

14. Itemized specific tasks for each listed investigator :

1. Zarin Greenough

- a. Literature search
- b. Contacting individuals and institutions familiar with the general status of the Platanista gangetica population in Bangladesh.
- c. Select survey sites
- d. Developing an oral survey to be carried out on fishermen and villagers living along the river.
- e. Conducting survey pretest
- f. Conducting revised survey
- g. Survey analysis
- h. Select sites for stationary P. gangetica counts

2. Dr. Bilqis A. Hoque (ICDDR,B) and Dr. Chip Stem (Tufts University) will provide technical assistance to the project.

3. Naureen Shahid - Research Assistant
Third year undergraduate student majoring in environmental chemistry.

- a. Help conduct survey pretest
- b. Help conduct revised survey
- c. Assist in survey analysis

15. Budget :

A lump grant of US \$ 2,500.00 is obtained from NIH to cover all the activities of the project. There is no monetary involvement of ICDDR,B.

16. Justification of budget :

N/A

Dolphin Survey

Name / ID :

Date :

Age :

Survey # :

Occupation, Recently :

Survey type:
 Fisherman (F)
 Villager (V)

Occupation before the
 embankment was built:

Religion :

Sex :

1. Can you describe to me what a "shishuk" is? Y / N
 (record descriptions for later comparisons)

2. Have you ever seen a "Shishuk"? Y / N

3. When did you most recently see a "Shishuk"?

A) Today

B) This week

C) This month

D) Other _____

4. "Shishuk" sightings:

Season	Where? (name river) ask size of river at that point. (S,M,L)	Location in river: (S,M,I,O)	# sightings per day	# sightings per week	# of "shishuk" seen per sighting
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5. Have you noticed any change in the number of "Shishuk" you see over the years? Y/N

6. If Yes:

- | | |
|---------------------------------------|-----------------|
| A) Since India/Pakistan partition | Inc./Dec. _____ |
| B) Since Bangladesh independence | Inc./Dec. _____ |
| C) Since Sk. Mujib was assassinated | Inc./Dec. _____ |
| D) Since Pres. Zia was assassinated | Inc./Dec. _____ |
| E) Since the embankment was completed | Inc./Dec. _____ |
| F) Since the last monsoon | Inc./Dec. _____ |
| G) Since the last dry season | Inc./Dec. _____ |

7. Why do you think there has been a change?

8. Fishing Habits :

Season	Where (name river) ask size of river at that point (S,M,L)	Location in river (S,M,J,O)	Type(s) of fish caught	Amount of fish caught (by weight)	Fishing Method
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* need local names of fish to establish a code
 need names of fishing methods & description to establish a code

9. Do your fishing pattern change? Y/N

10. If yes, how?

- (A) seasonally
- (B) with movement of fish
- (C) with change in water level
- (D) other _____

11. Has your catch changed over the years?

Y/N

12. If yes, how?

- (A) Since the India/Pakistan partition
- (B) Since Bangladesh independence
- (C) Since Sk. Mujib was assassinated
- (D) Since Pres. Zia was assassinated
- (E) Since the embankment was built
- (F) Since the last monsoon season
- (E) Since the last dry season

Inc./Dec. _____
Inc./Dec. _____
Inc./Dec. _____
Inc./Dec. _____
Inc./Dec. _____
Inc./Dec. _____
Inc./Dec. _____

13. Why do you think there has been a change?

14. Have you ever caught a "Shishuk" in your net?

Y/N

15. If yes, how often?

- (A) every time you fish
- (B) once in a week of fishing
- (C) once in a month of fishing
- (D) other: _____

16. If you caught one, what did you do with the "shishuk" in the last 3 cases?

- (A) uninjured - released it
- (B) injured - released
- (C) killed it
- (D) dead - left it
- (E) dead - used it
- (F) other _____

- (1) _____
- (2) _____
- (3) _____

17. What do you use the "Shishuk" for?
- (A) Food
 - (B) Oil
 - (C) Medicinal
 - (D) Other _____
18. Do "Shishuk" mean anything to your livelihood? Y/N
19. If so, what?
20. What would happen if the "shishuk" all died?
- (A) nothing
 - (B) help fishing
 - (C) harm fishing
 - (D) other _____
21. How often do you come to the river?
- (A) every day
 - (B) once a week
 - (C) other: _____
22. Do you see "Shishuk" when you come to the river? Y / N
23. How often do you see them?
- (A) every trip
 - (B) once a week
 - (C) once a month
 - (D) other: _____

24. When you see "shishuk" what time of day is it?
- (A) morning
 - (B) midday
 - (C) dusk
 - (D) other/combo: _____
25. When you see "shishuk" what are you doing?
- (A) washing cattle
 - (B) collecting water
 - (C) washing
 - (D) bathing
 - (E) walking to and from the river
 - (F) other _____
26. Do "shishuk" come close to the bank? Y / N
27. Do "shishuk" have a characteristic smell? Y / N
28. Do you ever see them washed up on the shore? Y / N
29. If yes, what do you do?
- (A) avoid it
 - (B) use it
 - (C) examine it
 - (D) other _____
30. Folklore? (recorded)

INTERNATIONAL CENTRE FOR DIARRHOEAL DISEASE RESEARCH, BANGLADESH
P.O. BOX 128, MOHAKHALI, DHAKA-1212, BANGLADESH

CONSENT FORM (FOR THE DOLPHIN STUDY)

River dolphins are fresh water mammals that at one time were found in abundance in the waters of Bengal. There is reason to believe that their numbers are decreasing. This decrease is attributed to several factors, such as increased pollution of the river water by industrial waste, increased motorized river transport and a decreased food supply in the river system. Poisons created by pollution may be deposited in the tissues of the dolphins and in heavy concentrations could be injurious. The presence of a healthy river dolphin population along with fish and other wild life is an important indicator of a balanced ecosystem.

We would greatly appreciate your participation in this study in which we will ask you question on your observations of the river dolphin. We have selected you to be respondents because you live close to the river banks and also derive your livelihood from the river. Your opinions will be confidential.

If you decide to participate in this study please put your signature/thumb impression in the following space.

Signature of subject _____

Signature of Investigator _____

Date _____



TUFTS UNIVERSITY

School of Veterinary Medicine

Department of Medicine

MEMORANDUM

TO: Zarin Greenough V'98

FROM: M. S. Anwer *MSA*
Program Director, NIH Short-Term Training Grant

DATE: March 6, 1995

SUBJ.: 1995 Summer Research Training Award

It is my pleasure to inform you that the Summer Research Training Awards Selection Committee has recommended that your proposal entitled "Platanista Gangetica as an Environmental Sentinel Species for the Riverine Ecosystem of the Ganges River Delta" be funded for the summer of 1995.

The award consists of a stipend for three months (approximately \$833 per month) of training. We need to take care of a few formalities so that you will get paid on time. In addition, I would like to make you aware of certain special aspects of this program. I have thus arranged a meeting of all awardees on April 13 from 12 noon to 1:00 PM in the Dean's Conference Room, Grafton Campus. **It is important that you attend this meeting, because you have to sign some forms. We will not be able to pay you without these forms signed by you.** Please feel free to bring your lunch. If for any reason you are unable to attend this meeting, please contact me (X4777, Grafton). If you are unable to pursue the 1995 summer research training award, please let us know as soon as possible so that we may replace you with another student.

If animals are to be used in your study, make sure that you have approval of our institutional Animal Research Committee. Your advisor may already have approval for the project. If not, contact the Animal Welfare Committee, Grafton Campus to initiate the approval process, which may take a month. Please be advised that no animal studies are permitted without this approval. If any problem, get in touch with me.

On behalf of the Selection committee, I congratulate you on your award and wish you and your mentor a very rewarding experience during this summer.