

Review of Past Recommendations for Gharial Conservation and Management 1975-2006

**Gharial Multi-Task Force
2006**

The following is a summary of recommendations made by gharial workers over the past three decades, either on their own or as a group through meetings and symposia. It includes suggestions from 3 of the range countries all the Indian range states.

Biswas,S., 1970. Preliminary Survey of Gharial in the Kosi River (Bihar). Indian Forester, 96 (9), pp. 705-710.

Gives reasons for decline as being killing for skins, poaching and netting. River courses shifting, annual flushing of gharial down river to uninhabitable places by monsoon flood waters, artificial embankments all contribute to the gharial's demise.

Recommendations:

1. Total ban on killing of the species
2. Well planned study of the migration, feeding, breeding (ecology/biology) in order to decide steps for protective measures

Whitaker, R, V. Rajamani and D. Basu, 1974. Gharial Survey Report, mimeographed report of the Madras Snake Park/Reptile Research Centre, 16 pp.

Recommendations:

1. Further surveys of all known historical gharial habitats and designation of gharial reserves.
2. Translocation of vagrant gharial to protected areas
3. Establish captive breeding stock, collection of eggs, rearing of young
4. Publicity for gharial and investigative reports to Forest Dept. officials
5. Special effort to publicize protective laws and implement protection
6. Studies on the biology of the gharial

Bustard, H.R.1975. A Future for the Gharial, Cheetal 17 (2), pp.3-8

After large numbers were killed off for their skins, set nets are responsible for the extirpation of gharial from most former habitats. Seven killed in nets in a 4 day fishing operation on the Chambal.

Recommendation:

1. A study on gharial and fish ecology with a view to mitigate this conflict.

Bustard, H.R., 1976. Operation Gharial. Cheetal, 17(3/4) pp 3-6.

Recommendation:

1. Selective culling could produce substantial revenue for local people and assist in conservation of the gharial

Whitaker, R., and E. Mahadev 1976. Gharial Survey Report to the N.Y. Zoological Society, mimeographed report of the Madras Snake Park/Reptile Research Centre, 19pp.

Recommendations:

1. Assam: Ban set net fishing across river widths in favour of other, gharial-friendly methods. Strict enforcement of laws prohibiting dynamiting of fish. Identify areas for gharial re-introduction such as the Manas river and Subansiri Gorge.
2. Madhya Pradesh: Enforce law against dynamiting. Establish gharial conservation project at the Mandla Sanctuary on the Ken river.
3. Nepal: Karnali river: Dam feasibility studies should include extensive studies on the ecology of the site and the likely effects (EIA). In the case of the Karnali Dam study only 2% of the study budget was allotted.

Bustard, H.R., 1980. Status of the gharial in Bhutan. JBNHS Vol.77, pp150**Recommendation:**

1. Efforts should be made to re-establish the gharial in the Manas river, protected in the Manas Sanctuary in Bhutan and India.

Whitaker, R., 1987. Management of Crocodilians in India. Wildlife Management, Eds. G. Webb, C. Manolis and P. Whitehead. Surrey Beatty and sons, Australia, pp. 63-72.**Recommendations:**

1. Public education to gain acceptance of crocodilians in riverine habitats close to human settlements
2. Development of a means of using crocodilians as a sustainable economic resource

de Vos, Antoon, 1982. India Crocodile Project Assessment. FAO/UNDP Report**Recommendations:**

1. Adequate management plans to be prepared for all crocodile sanctuaries and well trained personnel appointed to implement such plans.
2. The monitoring of released crocodiles (gharial) be stepped up to determine how effective release programmes are.
3. Education programme to be launched on why and how to protect crocodilians.
4. Study on crocodilians' relationship with commercially valuable fish to determine whether they are beneficial or detrimental to fisheries.

Rao, R.J., 1988. Nesting Ecology of Gharial in National Chambal Sanctuary. Study report, WII, Dehra Dun.**Recommendations:**

1. Greater protection by improved management practices
2. National Chambal Sanctuary to be up-graded to National Park status
3. Creation of a central coordinating body for the Chambal by the Govt. of India
4. Core area to be given high priority with control on all illegal fishing and other activities
5. Releases of head-started young gharial to be continued as per the recommendations of the Technical Committee of Project Crocodile (GOI)
6. Careful monitoring of the gharial population for periodic assessment of the success of rehabilitation

Shrestha, T.K., 1990. Status, Ecology, Conservation and Management of Genetic Resources of Crocodiles of the Himalayan rivers in Nepal. HMG Dept. of Hydrology, Kathmandu.

Recommendations:

1. Fish ladder to permit fish and crocodilians to bypass dam barriers
2. River shorelines to be managed to allow for fish spawning areas and crocodilian breeding sites
3. Stop poaching of adults, young and eggs by educational propaganda
4. Wetland/river management to make sure river levels don't fall too low for gharial survival and that every river/irrigation/watershed development project includes a plan for crocodile and fish conservation
5. Establish a full-fledged Integrated Fish and Crocodile Farm at the Royal Bardia N.P.
6. Replenish the depleted stock of fish and crocodilians by release of hatchery raised young
7. Studies on homing, migration, territory, population dynamics and survival of young

Choudhury, B.C. 1990. Indian Crocodile Conservation Situation Report—Action Plan for the 1990s. Wildlife Institute of India. Report for the CSG Meeting Proceedings, Volume 2, pp. 337-345.

Recommendations:

1. Brahmaputra survey for habitat suitability a top priority.
2. Assistance to gharial Protected Areas authorities to draft management plans for the species and habitat.
3. Plan ahead for the gharial rearing and breeding centers.
4. Help develop alternative livelihoods for people who lose rights to use riverine habitat to gharial conservation.

Rath, R.L., L.A.K. Singh and S.Kar, 1990. Report for CSG, pp 166-176.

Recommendations:

1. Improve management of Satkosha Gorge Sanctuary and promote it as an Elephant Reserve
2. Commence research to highlight significance as a wetland ecosystem
3. Release and monitor gharial in Hirakud Reservoir with necessary habitat improvement
4. Survey Brahmani river for possible release sites
5. Take up captive breeding as a research project to look at hormonal levels and improve husbandry

Singh, L.A.K., 1991. Non-survival of Gharial in River Mahanadi, Orissa. Technical Report of the Wildlife Wing, Forest and Environment Dept., Govt. of Orissa, 38 pp.

Recommendations:

1. Declaration of Mahanadi Sanctuary (to increase the Protected Area from the present 30kms to several hundred kms)
2. Population monitoring by gharial guards

3. Further releases of head-started young gharial to be done with strict guidelines (detailed by the author)
4. Surveys of other suitable release sites followed by releases
5. Development of compatible and sustainable use of fish resources
6. Regulation of navigation in the Mahanadi Sanctuary (10 year ban)

Rahman, M.M., 1992. The Systematic Status of Crocodiles in Bangladesh: A Country Report. Tiger Paper, Vol XIX:1, pp.10-14.

Recommendations:

1. Promote scientific studies on crocodiles for their conservation and management.
2. Promote strong protection measures through implementation of the Bangladesh Wildlife Preservation Law.

Rao, R.J. and B.C. Choudhury, 1992. Sympatric Distribution of Gharial and Mugger in India. JBNHS Vol. 89:3, pp.312-315.

Recommendations:

1. To minimize competition between gharial and mugger, more conservation/management inputs should be give to gharial in the Ganges and Brahmaputra rivers systems and more similar inputs for the mugger in southern Indian and in the rest of its range.

Crocodile Conservation and Management in India. Report of a CSG Workshop held at Madras Crocodile Bank, India, March 1993. 27pp.

The workshop concluded that the India crocodile programme requires restructuring and new inputs need to consolidate its achievements and ensure future success.

Recommendations:

1. Revival of GOI's Technical Committee for Crocodiles.
2. Initiation of countrywide surveys to determine released croc status and locate additional release habitats.
3. Establishment of commercial captive breeding wherein a portion of the revenue is for croc conservation.
4. Initiation of international cooperation with Nepal and Bangladesh for crocodile management.
5. Maintenance of select groups of captive genetic stock of all three species as conservation insurance.
6. Encouragement of additional expertise and a second line of crocodile researchers.

Cox, Jack, 1993. An Assessment of Crocodile Resource Potential in Bangladesh. A consultancy report for Oceanix Resources Pty. Ltd., Australia XX pp.

The fate of Bangladesh crocodilians appears inextricably linked to the conservation/management spinoffs of successful ranching and farming operations and private enterprise should be encouraged to play a leading role in the rehabilitation of the croc resource.

Recommendations:

1. Develop a croc management plan with strong recovery strategy
2. Obtain eggs and juveniles from India and Nepal

3. Undertake captive breeding for reintroductions
4. Systematic surveys of possible relict wild populations and assessment of wild habitat
5. Protection of wild gharial and primary (nesting/basking/feeding) habitat
6. Develop local economic incentives to elicit support for croc conservation

Dorji, Kuenga, 1993. Note from Bhutan for the Crocodile Specialist Group. 2pp

Recommendations:

1. Rivers in Bhutan to be surveyed for habitat suitability include: Bado, Manas, Sunkosh, Toroa, Raidak Puna and Tsongchu.

Andrews, H.V. and P. McEachern, 1994. Crocodile Conservation in Nepal. NGO Environment Management Programme, IUCN, Kathmandu, Nepal, 29 pp.

Recommendations:

1. Need to encourage a continued supply of croc researchers to learn captive husbandry, survey and monitoring techniques, through education with government funds, university grants and external sources.
2. In Nepal, a commitment to sustainable use of crocs is essential to their conservation
3. Develop experimental gharial ranching to benefit local people under eco-development programmes
4. Survey and identify suitable additional gharial habitats and bring them under the protection network
5. Form a Crocodile Technical Committee under Nepal's Biodiversity Action Plan, incorporated into the Wetlands Group under IUCN auspices.
6. The Kali Ghandaki and West Rapti rivers to be designated 'Conservation Areas' for gharial (and mugger).
7. Captive breeding should be actively pursued and an intensive 5 year restocking program carried out for rebuilding wild populations in protected areas. Continuous post-release monitoring essential.
8. All major river developments must be 'fauna friendly' and facilitate faunal migrations along river channels.
9. Cooperation with India essential for gharial conservation as most habitats are contiguous.
10. Present system of Army guarding National Parks needs to place wildlife officials in the chain of command.
11. The crocodile database created by IUCN Nepal needs to be developed, maintained and regionalized.

Rao, R.J. and L.A.K. Singh, 1995. Status and Conservation of the Gharial in India. Zoos' Print, Vol. X: 2, pp 1-5.

Recommendations:

1. PAs such as Chambal National Sanctuary and Katerniaghat Sanctuary to be considered core areas of gharial protection with the other gharial sanctuaries acting as buffers.

2. To increase post-monsoon survival of hatchlings, eggs should be collected and hatched and hatchlings released after the monsoon.
3. Emphasis should be on protection of key breeding sites in the most productive gharial habitats.
4. The human-crocodile interface needs to be sensitively managed; local support for croc conservation will only come about if the basic needs of the people are met.
5. In future, if laws are relaxed, gharial ranching can be initiated for sustainable use of the resource under a carefully planned and rigorously controlled management programme.
6. Eco-tourism in crocodile sanctuaries is identified as a tool for public support of crocodile conservation and can generate local revenue.

PHVA for Gharial Report, 1995. Jiwaji University and Zoo Outreach Organisation. 106pp.(edited)

Recommendations:

General:

1. A National Action Plan, incorporating comprehensive management plans for each major river system and Protected Area.
2. A second PHVA for gharial should be held within 3 years
3. The research base to be strengthened with Jiwaji University, Gwalior to be the National Centre for Gharial Research and the Gharial Rehabilitation Centre at Deori (Morena) revived as a field research station.
4. Population Biology:
5. Systematic monitoring of wild and captive gharial to record longevity, reproductive age, sex ratio etc.
6. DNA fingerprinting recommended to better understand genetic makeup and effects of population bottleneck
7. Effects of threats to be studied to deal with the causes and reduce the impact of these threats
8. Populations to be studied for migrations to understand the dynamics of the population
9. Continuous supplementation for some populations to ensure viability
10. Gharial juveniles of minimum 4 years and above to be released to reduce mortality
11. Monitoring of juveniles to be carried out on a regular basis
12. Annual census to be conducted in all habitats with gharial. Compile habitat field maps and record any changes to basking and nesting sites. A permanent central coordinating unit should be created.
13. Comprehensive census maps showing historical and current ranges and updated annually
14. A clear and concise brochure on census techniques and value should be prepared for census takers
15. NGOs and interested individuals to be motivated, briefed and participate in the census work

Habitat:

16. Availability/status of habitat to be assessed by trained surveyors. Suitable habitats to be recommended for PA status
17. International cooperation for habitats extending across country borders, especially India and Nepal

Threats:

18. Identify communal nesting sites and provide protection
19. Study threats such as fishing, sand-mining, riverbed cultivation and pollution and develop education and awareness activities
20. Opening of trade in crocodilian products in India, at least at present, is not justified
21. In the case of surplus crocodiles accumulated “in good faith”, the GOI may consider undertaking support of the animals for the rest of their natural lives.

Reintroduction:

22. Standard optimum sizes to be released, followed by frequent and consistent monitoring
23. Releases to strictly adhere to accepted norms of release
24. Long term survival of gharial at Katerniaghat cannot be assured without supplementation

Captive Population/Disease:

25. Individual ID marking of all gharial and preparation of a studbook
26. Veterinary help with disease diagnosis in the lab to find out causes and cures for sometimes high mortality
27. Improved management and rearing practices to be investigated, disseminated and implemented

Education:

28. Major initiative toward specific target groups such as fishermen and others directly affected by the gharial conservation programme with emphasis on the utility of the gharial for maintaining the health of the river system and the perilous consequences of its disappearance.

**Biodiversity Conservation in Wetland Habitats – Action Plan – Crocodilians.
Report of the first Western Asian Conference of the IUCN/SSC Crocodile Specialist
Group. Jiwaji Univ., Gwalior, June 1997. 19pp.**

Recommendations:

1. Liaison with the Ministry of Environment and Forests in order to reconstitute the Technical Committee on Crocodile Conservation.
2. Research: including wild and captive croc database, feasibility studies on management and use and the main priority being surveys of wild populations and potential restocking sites.
3. Publicity and Awareness: targeting people living in and around croc habitats, improving the image of the croc and its usefulness in nature is an ongoing priority.

4. Skill Development and Training: providing opportunities for Wildlife staff to learn survey, captive and wild management, nuisance croc capture and control techniques.
5. Regional Interaction and Coordination: cooperation among West Asian countries with croc conservation.
6. Funding: fund-raising, using wetlands biodiversity as the emphasis is an urgent priority.
7. The responsibility of the Western Asian chapter of the Crocodile Specialist Group is to ensure that action is taken on the above recommendations.

Choudhury, A., 1998. Status of the Gharial in the Main Brahmaputra River. JBNHS Vol. 95, pp118-120.

Gharial nearing extinction in Northeast India (<20) due to heavy year-round fishing with gillnets, encroachment of basking and breeding banks, chasing and killing of any gharial sighted, siltation of rivers due to deforestation.

Recommendations:

1. Start a gharial conservation project along the lines of those in Uttar Pradesh, Madhya Pradesh and Orissa.
2. Survey Protected Areas with suitable gharial habitat, such as Kaziranga, Dibru-Saikhowa, Orang and Burhachapori in Assam and D'Ering in Arunachal Pradesh as possible reintroduction sites.

Hussain, S.A., 1999. Reproductive success, hatchling survival and rate of increase of gharial in National Chambal Sanctuary, India. Biological Conservation 87, pp 261-268.

Recommendations:

1. Impose a moratorium on reintroduction to allow the Chambal gharial population to stabilize on its own
2. Strictly enforce the Wildlife Protection Act to prevent the use of nylon gill nets in the Sanctuary

Bustard, H.R., 1999. Indian Crocodile Conservation Project. Envis, Bi-annual Bulletin of W.I.I., Vol.2:1, pp.5-9.

Recommendations:

1. GOI support to well-conceived state plans for enhanced croc conservation.
2. Continued monitoring to make assessments of current status and hence future requirements, is vital.
3. Revitalizing the active involvement of wildlife managers in croc conservation.

Singh, L.A.K., 1999. Significance and Achievements of the Indian Crocodile Conservation Project. Ibid

Recommendations:

1. Immediately conduct surveys in all crocodile habitats.
2. Keep alive some good rearing stations.
3. Locate alternative habitat for gharial.
4. Attend to 'problem crocodile' calls more effectively.

5. Build up base to gear villagers toward a possible village farming operation for saltwater crocodiles.
6. Project crocodile sanctuaries as wetland areas of multiple species management.

Singh, L.A.K. 1999. Status of Gharial and Mugger in Orissa. Ibid

Recommendations:

1. Declaration of Mahanadi Sanctuary, including Satkoshia Gorge.
2. Future release of gharial in the Mahanadi to be monitored using radio telemetry.
3. Survey of Brahmani river for possible release of gharial.
4. Develop compatible and sustainable utilization of the fish resource.
5. Regulation of navigation in the Mahanadi Sanctuary (ten year ban).

Hussain, S.A. and Ruchi Badola. 2001. Integrated Conservation Planning for the Chambal River Basin. A paper for the National Workshop on Regional Planning for Wildlife Protected Areas, New Delhi. 20pp.

There are 21 PAs in the Chambal Basin including the National Chambal Sanctuary and 6 more on the periphery, totaling 6600 km² (about 5.5% of the area). Conservation problems include poverty driven dependency on biomass resources, development activity including 428 small, medium and large irrigation projects on the anvil, irregular water releases from dams, grazing by feral cattle in the PAs, mining, riverine agriculture, ravine formation (erosion) and increasing pollution from industry, sewage, pesticides and fertilizers.

Recommendations:

1. States and government agencies to work collaboratively, using the abundant statutes already in place, taking a holistic approach rather than following their own, limited, departmental agendas.
2. Develop and strengthen the policy and legislation for Integrated River Basin Management.
3. Establish the Chambal River Basin Management Authority to address issues of management of water resources, sustainable economic development, minimize impacts of land use and water projects, reduce dependency of local communities on biomass resources from PAs, control soil erosion and ravine formation.
4. Establish village eco-development and joint forestry management committees and build public awareness.

Singh, V.P. 2003. Evaluation of Gharial Rehabilitation. Uttar Pradesh Forestry Project Report for Biodiversity Research. PpXX

There has been no effort to modify release strategy in response to results of monitoring. No recapture even though all are marked before release. Recent sociological studies show pathetic conditions of fishermen who have no sympathy for conservation of river biodiversity. Resources could have been better deployed to do awareness enhancement among riparian people who view the gharial programme with skepticism since there are minimal direct economic benefits accruing to the local community.

Recommendations:

1. Formulate a Critical Areas Network in each state's river systems for conservation of river biodiversity.

2. Identify communities dependent on river resources and their socio-economic needs.
3. Formulate a conservation/management plan which involves the communities.
4. Initiate an eco-development programme for the Critical Areas Network with NGO help.
5. Concentrate on Protected Areas as gharial are most unlikely to survive outside PAs.

Whitaker, R. 2003. Report on Gharial for the IUCN/SSC Asia Regional Meeting, Colombo, Sri Lanka. 2pp.

Recommendations:

1. Propose relisting of the gharial as Critically Endangered
2. Find funding to hire a person for three years to coordinate gharial conservation measures including:
3. Surveys in collaboration with the State Forest Departments and other agencies
4. Network with river dolphin, bird (wetlands), turtle and fish research groups for interdisciplinary surveys
5. Identify river habitats for further study and restocking of captive reared gharial
6. Identify main problems facing the gharial and possible solutions
7. Draft a practical Gharial Survival Plan for implementation by the State Forest Depts. and other agencies
8. Approach the State and Central Governments to act on recommendations made by the CSG for the protection and rehabilitation of the gharial.

Messel, H., 2003. Letter from the CSG Chairman to the Minister for Environment, Government of India, Mr. T.R. Baalu. 1 pp.

Recommendations:

1. Gharial need to be reintroduced into appropriate, protected parts of the Brahmaputra river system.
2. The Mahanadi River and its tributaries need to be re-assessed for gharial rehabilitation.
3. With hopefully increasing numbers of crocodiles there is a need for a quick response Nuisance Crocodile Management Team that can also undertake Crocodile Public Relations.
4. Croc-based tourism and public education can bring support to croc conservation in key croc areas like the Chambal River, Bhitarkanika Sanctuary, Sunderbans Tiger Reserve, Gir National Park and Katarniaghat Sanctuary.
5. Nepal has a long pending request for Indian gharial for release in the Royal Chitwan National Park.
6. These and a number of other relevant issues need to be acted upon and followed up. At this juncture it is imperative that the Indian Board for Wildlife appoint a Task Force or reactivate its Technical Committee on Crocodile Conservation.

Wakid, Abdul, Dibrugarh University, Assam, 2003. Correspondence with R.W./CSG Vice-Chairman.

Recommendation:

1. Combined river dolphin and gharial survey of 700km stretch of the Brahmaputra including 47 major tributaries

Draft Resolution by the 3rd World Conservation Congress in Bangkok, Thailand, November 2004:

(submitted too late to be issued)

1. ENCOURAGES Government of India to continue its efforts to save the Gharial in the Chambal River and elsewhere
2. URGES all IUCN members to support the Government of India in their efforts to:
 - (a) maintain a strong research presence dedicated to the species
 - (b) manage biodiversity within the tri-state Chambal sanctuary, of which the Gharial is a component
 - (c) take such actions that are necessary to ameliorate current threats to the existing Chambal Gharial, with the primary aim of improving the status of this population
 - (d) undertake measures to reverse population declines of Gharial in the Chambal
3. REQUESTS the Species Survival Commission, within available resources, to offer assistance to India, through the IUCN/SSC Crocodile Specialist Group, in convening a technical workshop to implement the foregoing actions.

Basu, D., H.V. Andrews and R. Whitaker, 2004. Gharial Conservation – Urgent Action Needed. Summary situation assessment submitted to the BNHS for submission to the National Wildlife Board by member Dilnavaz Variava. 2pp.

Recommendations:

1. Continual and indefinite monitoring of all surviving gharial populations.
2. Extension of gharial population restoration through head-starting programs in all existing PAs with the suitable potential.
3. Sustained research on dispersal and migration of gharial and refinements of supplementation techniques.
4. Research on river water management and impact of dams, barrages and excessive water extraction.
5. Research on environmental impact of different anthropogenic pressures on the Chambal River and other gharial habitats and conservation areas.
6. Innovative eco-development to raise standards of living of important target groups of local river residents and elimination of their dependence on natural resources required for gharial survival.
7. Sustained and adequate awareness campaigns for different target groups and stake-holders in river resources also essential for gharial survival.
8. The Chambal as a World Heritage Site and stoppage of all exploitation of natural resources in the core gharial habitat.

Sharma, R.K. and D. Basu, 2004. Recent Reversals in the Population Trends in Gharial in the National Chambal Sanctuary. Proceedings of the 17th Working Meeting of the CSG, Darwin, pp 180-186.

Recommendations:

1. Implementation of the Chambal Management Plan by the Madhya Pradesh government.
2. Urge the participation of the Rajasthan government in the National Chambal Sanctuary Project.
3. Conservation remains detached from the socio-economic aspirations of the local people which must change.
4. The rate of recruitment/retention of released (or wild bred) gharial to the population is very low necessitating protracted and sustained supplementation.
5. Unprotected areas with conflict and disturbance from humans are unsuitable for gharial releases.
6. Continual monitoring of all surviving gharial populations is necessary.
7. Extend the gharial restocking programme to all PAs with suitable gharial habitat.
8. Carry out sustained research on dispersal and migration of gharial to refine supplementation.
9. Carry out research on river water management and impacts of water abstraction.
10. Carry out research on environmental impact of biotic pressures on the Chambal and other gharial habitats.
11. Initiate innovative eco-development to raise living standards of river dwellers in PAs and eliminate their dependence on natural resources required for gharial conservation.
12. Mobilize indigenous and foreign funds to achieve these gharial conservation goals.

Dacey, Tom, Executive Officer, CSG. Email correspondence, March, 2006.**Recommendations:**

1. Select someone to be (gharial) project coordinator
2. Develop a staged project, outlining the priorities
3. Estimate costs for each stage, identify possible funding sources for each and seek that funding.

Rao, R.J. (pers. comm. by email, August, 2006)

In a recent meeting with the Conservator of Forests, Gwalior, the Forest Department agreed with the wisdom of stopping all sand mining (for, among other things, a huge MP government project to build houses for the urban poor) in the Chambal National Sanctuary. However, it has now become a major source of income for river dwellers who have little other livelihood opportunities. The fear is, that deprived of this livelihood because of gharial conservation, they will retaliate and kill gharial. Also, it was acknowledged that fishing with gill nets is presently the biggest local threat to the survival of the gharial.

Recommendations:

1. Examine the issue of sand-mining and see a) if it can be done sustainably without damage to the river's geology (ground water, erosion, siltation) and ecology

- (gharial, fish, turtles, otters, river dolphins and b) where in the Sanctuary (if anywhere), or elsewhere it can be carried out without negatively impacting the gharial and other taxa.
2. Take strict measures to enforce the ban on fishing within the National Chambal Sanctuary (noting that the fishing mafia is not as big nor as offensive as the sand-mining mafia which recently attacked Police and Forest officials). Gharial-friendly fishing methods could be adopted but only for local communities, not out-of-state fishing gangs.
 3. Regular policing of the Sanctuary (boats, arms and funding needed)
 4. Dedicated gharial and other researchers needed to maintain a scientific presence in the Sanctuary

Choudhury, B.C., 2006. Agenda Item for the Steering Committee Meeting at the 18th CSG Meeting, Montelimar, France.

Recommendations:

1. Upgrading the current endangered listing of the gharial to Critically Endangered status in the IUCN Red Data List
2. Propose an immediate action including status surveys and urgent development of a species recovery action plan for all the range countries i.e. India, Nepal, Bangladesh, Bhutan, Pakistan and Myanmar.

Basu, D. (pers. comm. by email, August, 2006)

Dear All

The recent resurgence of concern for the gharial's survival, since the France CSG meeting, was unusually delayed as the reversal was reported in 2004. The synergy of a forum such as this and that of field authorities who carry out the day to day gharial conservation activities has been non-existent so far; a situation which clearly has to change if the gharial is to receive a 50:50 chance of survival.

The gharial still faces a high probability of extinction. Apart from a period in the early phases of the Chambal Project, when population increases created the false impression in some quarters that its survival had been secured, the status of gharial will perhaps forever swing between critically endangered and 'conservation dependent', a point that is not being elaborated here but any assertion that conservation action can ensure the species survival in the wild except as relict populations, in the face of the growing human pressures, is debatable. These arguments should not detract from the need to go on doing everything possible to conserve gharial along with the other biodiversity of Indian rivers.

The gharial, in spite of high fecundity and massive egg collection/head-starting/release programme (12,000 eggs collected, 5,000 young gharial released) is faring much worse than the tiger. Compared to the many reserves that have been set aside for the tiger, breeding populations of the gharial survive in only four reserves of this country, namely Corbett (?), Katarniaghat, Chambal and the Son. It may be noted that recovery of populations in all these areas occurred by enhancing a remnant population of adults and nowhere was a population successfully established through reintroductions. The failure of attempts to do so in the Mahanadi at Satkosia gorge, further confirms the difficulty of this

proposition. So the likelihood of locating new conservation reserves for the gharial can only be a long term strategy with equal chances of success or failure. Having recently visited the Son river for the first time, it seems only an apology for a gharial conservation area with just a few, small viable areas of habitat separated by long stretches of tracts totally uninhabitable by gharial. The Chambal therefore still represents the most viable reserve for the gharial.

I feel that little can be done until the Government of India recognizes the gharial problem as well as the need to solve it effectively. Those spearheading the attempt, would do better by spending much more time in the corridors of power in New Delhi and elsewhere to educate the people at the helm of affairs. But today's political scenario is quite different from what it was in Mrs. Gandhi's heyday and recently even the tiger disappeared completely from a well known reserve. In this highly deteriorated conservation scenario instilling political will is likely to be much, much harder. I think the bottle necks need to be prioritized and today the best bet would be to:

1. Support and help facilitate the implementation of the MP Government's Management Plan for the National Chambal Sanctuary in collaboration with Uttar Pradesh and Rajasthan
2. Seek international assistance for technical expertise on river/wetlands PA management and funding of some components of the Management Plan for the the National Chambal Sanctuary
3. Liaise with the Government of India to initiate a Project Gharial on the lines of Project Tiger
4. Pursue the same line of action with governments of other Indian states as well as other countries to promote gharial conservation in each and every potential situation.

The situation is worsening with each passing day and the sooner one gets started the better it will be.

Basu