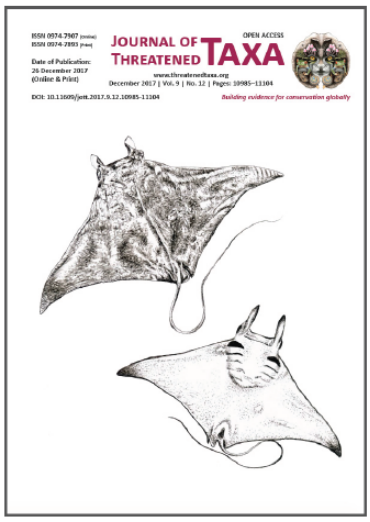

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COMMUNICATION

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Raju Vyas & Colin Stevenson

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Review and analysis of human and Mugger Crocodile conflict in Gujarat, India from 1960 to 2013

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Abstract: Human-Crocodile conflict (HCC) occurs to varying degrees around the World, and with a number of crocodilian species (CrocBITE 2013). The Mugger or Marsh Crocodile *Crocodylus palustris* found in Gujarat State is the crocodilian species responsible for conflict with local people. This paper is a compilation of HCC occurring in various parts of Gujarat from 1960 to 2013. A total of 64 crocodile attacks were recorded: 44 (24 fatal & 20 non-fatal) on males, and 20 (9 fatal & 11 non-fatal) on females. By region 52 HCC were recorded in central Gujarat; five in Saurashtra, four in the northern region and three in Kutch; no crocodile attacks were recorded in southern Gujarat. Of the two major river systems in central Gujarat, 41 attacks occurred within the Vishwamitri-Dhadhar River System and 11 in the Narmada system. Most crocodile attacks happened between the months of April and September, peaking in May with 14 attacks. These months are the peak breeding season for the species in Gujarat. The most obvious contributors to HCC are lack of basic facilities in rural areas, poverty, illiteracy and the presence of adult animals close to human settlements and activities. Other contributing factors are lack of preventive measures by the forest department, absence of protocols for mugger crocodile rescue, and haphazard release of problematic animals.

Keywords: Analysis, *Crocodylus palustris,* Gujarat, Human-Crocodile conflict, India, Mugger, review.

Gujarati Abstract: માનવી અને મગર જોડેની અથડામણ દૂનિયામાં જુદા ભાગમાં જુદા કારણોસર નોંધાયેલા છે તેમાં મહતમ મગરની પ્રજાતિઓમાં જોવા મળેલ છે (ક્રોકબાઇટ ૨૦૧૩). મગર અથવા માર્સ ક્રોકોડાઈલ તરીકે ઓળખાતી મગરની પ્રજાતિ ગુજરાત રાજયમાં જોવા મળે છે, અને માનવીઓ સાથેની અથડામણ માટે આ પ્રજાતિ જવાબદાર છે. ગુજરાત રાજયમાં વર્ષ ૧૯૬૦ થી ૨૦૧૩ દરમ્યાન થયેલ મગર વચ્ચેની અથડામણ બાબતનો આ દસ્તાવેજ છે. આ સમય ગાળા દરમ્યાન કૂલ ૬૪ મગરનાં હૂમલા નોંધાયેલા, તેમાથી ૪૪ હૂમલા (૨૪ જીવલેણ અને ૨૦ ગંભીર હૂમલા) પૂરૂષ ઉપર અને ૨૦ હૂમલા (૯ જીવલેણ અને ૧૧ ગંભીર હૂમલા) મહિલા ઉપર નોંધાયેલા, તેમાથી મગરનાં બાવન હૂમલા મધ્ય ગુજરાત, પાંચ હૂમલા સૌરાષ્ટ્રમાં, ચાર હૂમલા ઉત્તર ગુજરાત અને ત્રણ હૂમલા કચ્છ પ્રદેશમાં જયારે દક્ષીણ ગુજરાતમાં એક પણ મગરનો હૂમલો નોંધાયેલો, જયારે મધ્ય ગુજરાતની બે મુખ્ય નદીઓ; વિશ્વામિત્રીનદીમાં ૪૧ હૂમલા અને નર્મદા નદીમાં ૧૧ મગરના હૂમલા થયેલ. મગરનાં માનવીઓ ઉપરના હૂમલા મોટાભાગે એપ્રિલ અને સપ્ટેમ્બર મહિના દરમ્યાન અને ૧૪ જેટલા હૂમલાઓ મે મહિનાઓ નોંધાયેલા, જે મગર ક્રોકોડાઈલની પ્રજનનની ઋતુ ગુજરાતમાં છે. ગ્રામીણ વિસ્તારમાં જોવા મળેલ/થયેલ મગરના માનવીનઓ જોડેની અથડામણ માટે તે વિસ્તારની ગરીબાઈ, સગવડતાઓનો અભાવ, ભણતરની ઉણપ, નદી કાંઠામાં માનવીઓના રેહઠાણ અને તે વિસ્તારમાં રહેતા મહકાઈ મગર મુખ્યેત્વે જવાબદાર લાગે છે. તેમજ વનવિભાગ તરફથી જરૂરી પગલાઓ જેવાકે, આ બાબતની માર્ગદર્શિકાનો અભાવ, મગર બચાવ જુંબેશ અને નામચીન પકડાયેલા મગરને આડેધડ છોડી દેવા જેવી બાબતો પણ જવાબદાર જણાય છે.

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Author Details: Dr. Raju Vyas is now retired after 30+ years of service as a Zoo Inspector, at the Sayaji Baug Zoo, Vadodara, India. Based in Vadodara City, his long-term research has focused on monitoring crocodiles and their habitat as well as issues of human-crocodile conflicts for more than 25 years. Presently he is the Regional Vice Chair of the IUCN/SSC Crocodile Specialist Group (South Asia and Iran), and member of various IUCN/SSC's Specialist Group. Mr. Colin Stevenson is presently Head of Education for the UKs, where his is working on a number of research project. He is currently editing the revised Action Plan for crocodiles for the IUCN/SSC Crocodile Specialist Group, and compiling the species account for *Gavialis gangeticus*.

Author Contribution: RV visit the attack site, collects relevant information from victims & victim's family members and preparation of pictographs and images. CS analyzed and concludes the data.

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INTRODUCTION

Conflicts between humans and wildlife have occurred throughout man's history (Dickman & Hazzah 2016). On all continents, in developed as well as developing countries, conflict is a growing issue, although the specific problems vary according to the particular environment and people's way of life (Lamarque et al. 2009). Human-wildlife conflict occurs when a species threatens human lives, livelihoods or even lifestyle (Woodroffe et al. 2005). When the species of wildlife involved is endangered, there is a clear need for management plans to ensure the co-existence of the wildlife species and the local people (WPC Recommendations 20, 2003).

Human-wildlife conflict is one of the major problems facing wildlife conservation around the world (Rai et al. 2013; Agrawal et al. 2016; IUCN/SSC Human-Wildlife Task Force 2017). As human populations grow at an alarming rate, a proliferating demand for natural resources is accompanied by rapid depletion of natural habitats, and increasing encroachment into previously wild or uninhabited areas. Expanding human populations and the associated increase in demand for natural resources accelerates the depletion of natural habitats, and brings humans and wildlife into closer proximity. And given time, this proximity turns into conflict. Consequences of human-wildlife conflict can be both direct, including injury and death from encounters with dangerous animals, and indirect, including loss of crops, livestock and damaged infrastructure. We should also mention that conflict is a two-way street: just as people and property are injured or lost to wildlife, wildlife species and their habitats are of course impacted as well (normally much worse than people and property). The resultant loss of biodiversity has a negative impact on local human populations as well, particularly over the long term.

Human-crocodile conflict (HCC) has been reported in over 33 countries spanning the tropics and subtropics, and the problem probably exists in many more (Lamarque et al. 2009). There were eight species of crocodilians implicated in attacks on humans, including *Alligator mississippiensis*, *Melanosuchus niger*, *Crocodylus niloticus*, *C. porosus*, *C. moreletii*, *C. acutus*, *C. mindorensis* and *C. palustris* (Caldicott et al. 2005; CrocBITE 2013).

Gujarat State is situated in the western extent of India and is home to one of the largest populations of Mugger or Marsh crocodile (*C. palustris*) - the species responsible for attacks on humans within the state. The literature reveals that Vyas (1993, 2005, 2010a,b, 2012, 2013), Vijakumar (1997), Whitaker (2008) and Sideleau & Britton (2013) have studied HCC in the state. This, however, needs to be reviewed to estimate the magnitude of the crisis and identify sites and cases of conflict, to derive workable solutions for the mitigation of HCC.

First HCC in History

The most authentic note on HCC found in Indian history chronicles is from the 8th century (796 CE) on the banks of the Purna River (now Periyar) near Kaladi Village, Eranakulam District, Kerala, where an eight year old boy was attacked and was later known to be Sankara Vijayan (Mahadevan 2014).

STUDY AREA

Gujarat State

Gujarat State is situated on the western coast of India between 22.309425 N & 72.136230 E. It is bounded by the Arabian Sea in the west, by the state of Rajasthan in the north and northeast, by Madhya Pradesh in the east and by Maharashtra in the south and southeast. The state has an international boundary and a common border with Pakistan on the northwestern fringe.

Gujarat State has an area of 196,000km^2 that makes for 5.98% of the land area of the country. The state is administratively divided into 33 districts. The physical features of the state show five distinct topographic zones based upon the relief, slope and landforms, soil, drainage pattern, climatic variation and agricultural development: (1) northern Gujarat, (2) central Gujarat, (3) southern Gujarat, (4) Saurashtra and (5) Kutch (Fig. 1).

The rain is erratic in the state, therefore every decade the state faces both severe drought and flooding conditions. The rain density decreases as one travels from south to north, therefore most of the rivers in the state are seasonal, except a few larger perennial rivers like the Tapi, Narmada, Mahi and Sabarmati. People of the state depend on the village ponds, tanks and large water reservoirs for their daily requirement for water. Farms usually yield well only when there is ample rainfall.

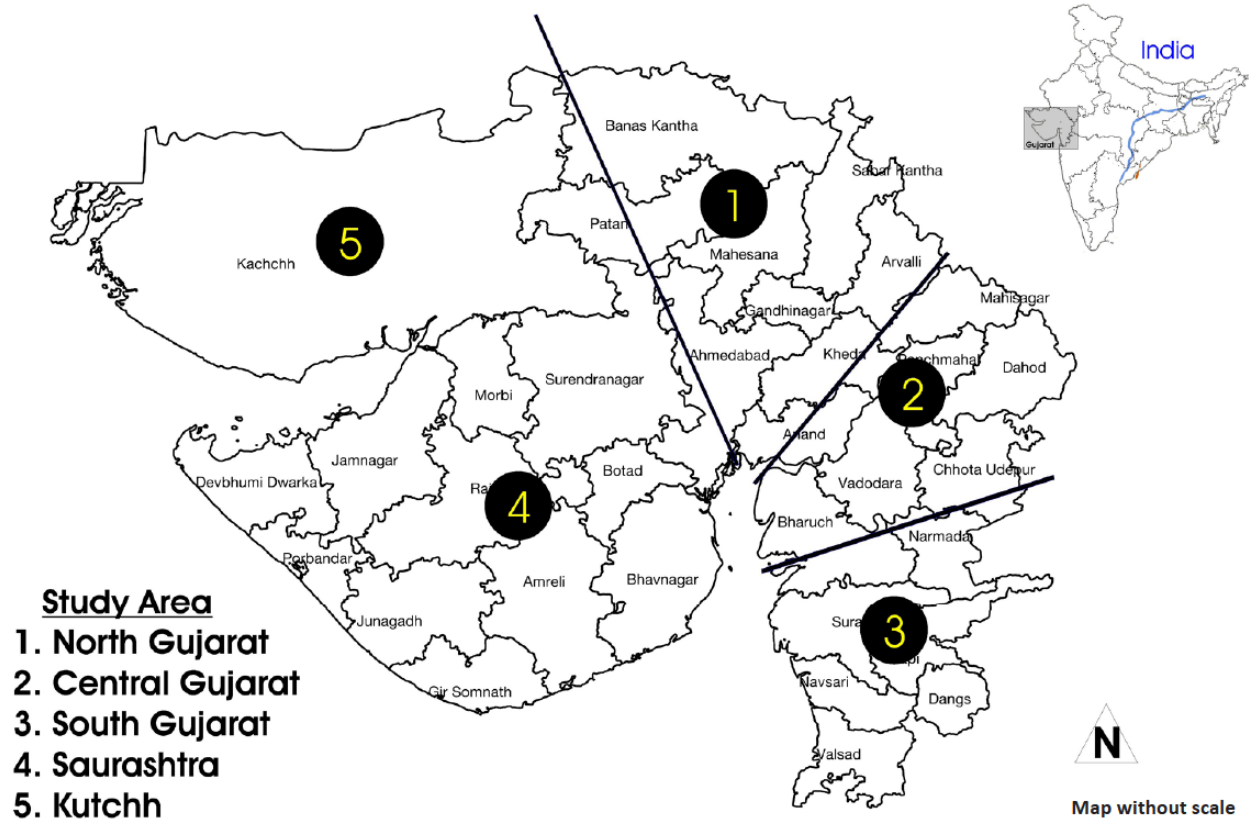

Figure 1. The study area of Gujarat: biogeography and climatic division of the state.

METHODS

The HCC Data was collected from various sources, including Press, TV and Electronic media, NGOs and various government agencies; forest department, hospital and public health centres, and police. All the HCC incidents were checked with locals, and the incident sites were visited, victims/victim's relatives were interviewed along with relevant forest officials. Attempts were made to understand and interpret the situation surrounding these incidents. Croc survey and habitat analysis was carried out in and around the location sites of HCC.

All the HCC information collected, including date, location, geo-coordinates, type of water body, victim's age, caste, gender and accident time and activities was analyzed using MS Excel. The data were plotted on a map in order to correlate the location of incidents along with the mugger population. The present updated information on HCC along with prior published information from literature on HCC was gathered and reviewed.

Analysis of attacks

Year and month of attacks: From 1960 to 2013, a total of 64 Mugger attacks were registered in the state (Appendix 1), with an average of 1.18 crocodile attacks each year. The early HCC records were found in 1960 and 1970 in Ahmedabad District, after which there were no further incidences in the state until 1991. Over the next 23 years—from 1991 to 2013—almost every year attacks have been recorded in the state. Only the years 1992, 2000, 2001 and 2002 had no HCC incidents recorded (Fig. 2). The highest incidents of HCC were observed in the year 2011 with 12 attacks, including eight fatal and four non-fatal. The attacks of Muggers were noted in all months, except the month of January. Numerous attacks were noticed in the months of April to September, and highest number of attacks was noted in the month of May with 14 incidences of attacks, especially in the pre-monsoon.

Fatal and non-fatal: Within a 54-year span, a total of 64 crocodile attacks occurred in the state, of which 33 were fatal and 31 were non-fatal but 12.90% of victims are suffering from permanent disability. A total of 44 attacks (24 fatal and 20 non-fatal) were recorded on males and 20 attacks on females (9 fatal and 11 non-

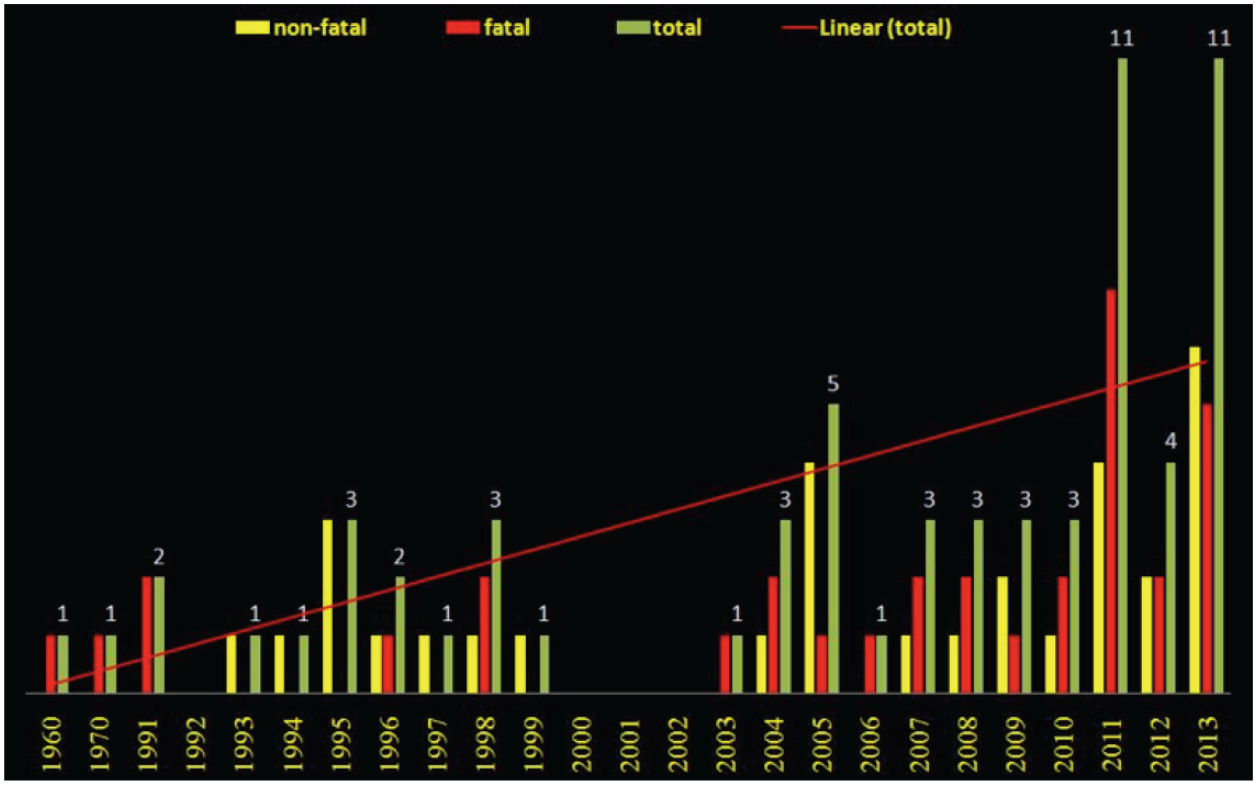

Figure 2. Year-wise Mugger attacks in Gujarat State.

Table 1. Region-wise Mugger *Crocodylus palustris* attacks noted in Gujarat, India (1960–2013)

	Region	North	Central	South	Saurashtra	Kutch	Total
A	Male Non-fatal	1	14	0	4	2	21
B	Male Fatal	2	20	0	0	1	23
C	Total Attack on Male (A+B)	3	34	0	4	3	44
D	Female Non-fatal	0	10	0	1	0	11
F	Female Fatal	1	8	0	0	0	9
G	Total Attack on Female (D+F)	1	18	0	1	0	20
	Total of Attacks (C+D)	4	52	0	5	3	64

fatal), showing these attacks to be biased towards males.

Regions: The highest numbers of HCC incidents were recorded in central Gujarat with 52 attacks including 28 fatal and 24 non-fatal. The second highest was recorded in Saurashtra region with five attacks, and lowest number of crocodile attacks was recorded in the Kutch area with three attacks. No crocodile attacks were recorded in southern Gujarat (Table 1).

Habitat and HCC: A total of 68.75% (44) of attacks occurred in flowing water (noted as riverine habitat) and 31.25% (20) attacks in stagnant-waters-various ponds, village tanks and lakes in the state. Of a total of 41 attacks, 33 occurred in Vishwamitri-Dhadhar River basin area, of which 27 attack victims were male and the remaining 14 were females. This was followed by 11 attacks in the River basin areas of Narmada, including seven male victims and four females victims. Both the river basin areas are a part of central Gujarat.

Activity and HCC: Mugger attacks occurred on humans while they were engaged in various activities, either directly in water bodies or on the edge of the water bodies (Table 2). Washing is the activity most at risk of attack, with 15 attacks recorded. This is followed by crossing water bodies with 13 attacks, and bathing with 11 attacks. Herding livestock and fishing both recorded eight attacks, and there were four attacks

Table 2. Mugger *Crocodylus palustris* attacks and activities of victims, Gujarat, India (1960–2013)

	Activity	tMale			Female			Totals attacks	
		A	B	C	D	E	F		
		Fatal	Non-fatal	Totals (A+B)	Fatal	Non-fatal	Totals (D+E)	In both sexes (C+F)	%
1	Washing	1	0	1	4	7	11	15	23.43
2	Bathing	4	6	10	0	0	0	11	17.18
3	Crossing	4	2	6	1	1	2	13	20.31
4	Fishing	4	3	7	0	0	0	8	12.5
5	Grazing	5	2	7	0	0	0	8	12.5
6	Playing	2	2	4	0	0	0	4	6.25
7	Sand Coll.	1	0	1	0	0	0	1	1.56
8	Water Coll.	0	0	0	1	0	1	1	1.56
9	Pumping	0	1	1	0	0	0	1	1.56
10	Sleeping	1	0	1	0	0	0	1	1.56
11	Watching	0	1	1	0	0	0	1	1.56
	Totals	**22**	**17**	**39**	**6**	**8**	**14**	**64**	

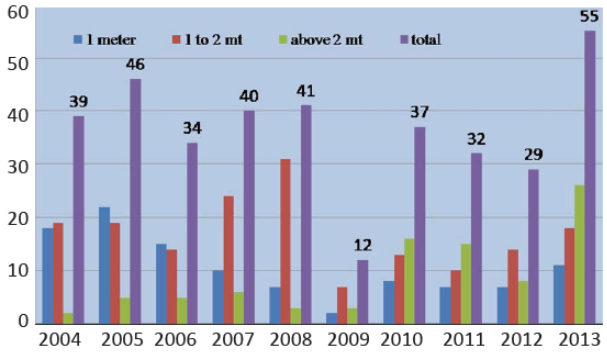

Figure 3. During last decade various sized Muggers rescued from Vadodara City, Gujarat, India

Table 3. The data of Mugger attacks and age group relation, Gujarat State

Age group of victim	Male	Female	Totals of both sexes	%
Age up to 10	4	1	5	7.81
Age 11 to 20	8	3	11	17.18
Age 21–30	18	5	23	35.93
Age 31–40	8	4	12	18.75
Age 41–50	4	3	7	10.93
Age above 50	2	4	6	9.77
Totals	**44**	**20**	**64**	

recorded on children and boys whilst playing at the edge of the water. Singular incidents were recorded while the victims were involved in sand and water collection, loitering, sleeping on the banks and water pumping.

Age groups: The data shows that all age groups are at risk of mugger attacks, from 9-year-olds to 64-year-olds (Table 3). The gender-wise category and croc attacks indicate that male victim ages ranged from nine years to 52 years, while female victim ages ranged from nine years to 64 years. The highest percentage of victims (at 35.93 %) belonged to the 21–30 year age group.

Nuisance animal trapping: There were six cases where the culprit Muggers/probable culprit Muggers were trapped from six different location sites. After serious attacks on humans, the locals demanded the removal of these animals. Therefore the state forest department trapped these animals with the help of zoo staff and volunteers from local NGOs (Table 4). In three cases these large, trapped muggers were kept in the zoo and not released back into the wild. But in the later three cases from the location sites of Tranj (Matar, Kheda District), Kodarvaya (Waghodia, Vadodara Districts) and Jambuva (Vadodara City), the trapped animals were released back into the wild at Pariaj, Kheda (1) and Narmada Dam (2), respectively.

CONCLUSIONS

A total of 64 HCC incidents were recorded within a 54-year span, an average of 1.18 crocodile attacks per year in the state. This seems quite negligible in magnitude and certainly less serious than other wildlife-

Table 4. List and details of culprits' Mugger trapping from various HCC sites in Gujarat, India.

	Name of water body / Date	Trapping agency	Trapping method	Size of Mugger	Sex	Remarks
1	Kankariya, Ahemdabad 8 May 1960	Ahemdabad Zoo	Hook-baited		M	Animal kept in Ahemdabad Zoo, few days after died
2	Chaloda, Ahemdabad 28 April 1970	Ahemdabad Zoo	Hook-baited		?	Animal Kept in Ahemdabad Zoo
3	Dunelav, Vadodara May 1991	Vadodara Zoo	Fishing net	336.5cm	M	Animal transfer & kept at Junagadh Zoo
4	Tranj, Kheda August 2009	NGO & Sojitra, Forest Department	Trapping cage		?	Animal released in Pariaj Reserve, Matar, Kheda, Probably wrong Mugger trapped.
5	Kodarvaya, Vadodara 29 September 2012	NGO & Waghodia, Forest Department	Bait trapping cage	390cm	F	Animal released in Narmada Dam, Narmada District
6	Jambuva, Vadodara City 19 August 2013	NGO	Trapping	365cm	M	Suspected animal released in Narmada Dam, Narmada District

human conflicts, especially snakebite records in the state (See: Mohapatra et al. 2011). The trends of HCC data show a gradual increase in the number of incidences over the last few years within the state (see: Fig. 2) and particularly the areas of central Gujarat, from the two river basin areas, namely the Vishwamitri-Dhadhar and Narmada Rivers.

The highest number of HCC i.e., 41(64%) was recorded from the River Basin areas of Vishwamitri-Dhadhar. Most of the incidents occurred when the people were engaged in some domestic activities in/near the water bodies, such as washing (15), crossing the river/water body (13) and bathing (10). The victims were socio-economically disadvantaged and poor, and depended on water bodies for hygiene and health due to the lack of basic facilities, especially in remote rural areas of the state.

Most of the attacks observed were between the months of April to August, which coincides with the breeding season of the species. Usually, in the state, female muggers nest during the months of April and May and hatchlings emerge in the month of August. April and May is the nesting and nest guarding period followed by two months' incubation in June–July. It is reasonable to suggest that this is a key factor in aggressive mugger croc encounters, especially females. Female Muggers defend their nests against intruders, including humans, and guard the territory vigilantly.

Overall habitat survey and assessment analysis from the earlier and recent studies shows an increasing population of muggers in the state, especially in the region of central Gujarat. A total of 430 Muggers were counted during the 1995–96 survey from the entire state (Vijaykumar 1997) and during last crocodile surveys 2012 there were 334 crocodiles counted from only three districts (Kheda, Anand and Vadodara) (Vyas 2013). A recent estimate shows there are about 1,500 muggers

Table 5. Mugger *Crocodylus palustris* population comparison census data 1996 and 2012* (Crocodile count)

Region	Vijaykumar (1997)		Vyas (2013) + estimations = total
	Survey	Reported	
Northern Gujarat	0	10	82* (Kheda & Anand) + 78 = 160
Central Gujarat	0	?	252* (Vadodara) + 218 = 470
Southern Gujarat	24	89	50
Suarashtra	311	1271	720
Kutch	94	176	100
Total	429	1546	1500

inhabiting the various water bodies and rivers of the state (Table 5). The increasing numbers of crocodiles, including larger-sized crocodiles, is resulting in more frequent interactions with humans. Earlier, Andau et al. (2004) concluded similarly with the Saltwater Crocodile (*C. porosus*) that the increasing attacks in Sabah, Malaysia, were a result of increasing numbers of crocodiles. Glasgow (1991) emphasizes the relationship of increasing numbers of American Alligators and an expanding human population in Louisiana in the 1970s, resulting in increased interactions with alligators.

Increased HCC in the state is not merely a result of one reason or factor but it is an outcome of multiple factors arising in the state during the last decade. These include: (i) increasing Mugger Crocodile population, (ii) socio-economic issues, (iii) lack of management plan for the crocodile population. The most notable causes behind the conflicts in Gujarat are the Mugger population increasing within particular areas, along with larger individuals found in human-dominated areas. Other factors include poverty, illiteracy and also the social setup of the society (irreverent attitude towards nature), contributing to the gravity of this issue.

During the last decade, there were several instances

Image 1. A sub-adult Mugger released at main Narmada Canal at Hansapur, Halola, District Panchmahal

Image 2. A large adult Mugger basking in main Narmada Canal at Bodeli, District Vadodara

where Muggers were found in human habitations (Vyas & Bhatt 2004; Vyas & Bhavsar 2009) and agricultural fields after the monsoons. These stray animals were rescued by staff of the local fire-brigade department, volunteers of NGOs and some individuals. In a few cases, these animals were rescued by staff from the State Forest Department. These rescued muggers were then released into convenient nearby locations by the local forest staff, with little experience or understanding of accepted procedures for trans locating crocodiles, or the need to monitor these released animals (see IUCN/SSC 2013). The best example is observed in Vadodara City, where over the last 10 years about 365 variously-sized crocodiles from 25–390 cm TL (total body length) were rescued from the city itself (Fig. 3). These rescued crocodiles were released at a number of locations, including Ajwa Sarovar, Narmada Dam, or the main canal of Narmada (Image 1), and within River Vishwamitri itself (either in upper or in lower riverside) without tracking their original location or determining which release site would be most suitable for the individual, so as to avoid negative consequences. These problem animals might return or create problems at the release site. The main issue is that we have no way of knowing the movements, survival, or conflict consequences of these animals.

The increase in HCC in the last few years; especially in Central Gujarat is also caused by the scarcity foods faced by the species, especially in the lower stream areas of River Vishwamitri-Dhadhar and the developmental region of Narmada Canal Network (also there is a government policy that all water bodies be connected to this canal network). This large canal network provides for easy movement of muggers for migration from one water body to another. There are several examples where the sub-adult muggers were absent from the water body in the recent past due to migration through the canal network (Image 2) (Vyas 2008; Vyas & Basu 2008; Vyas et al. 2012).

Another indirect factor responsible for the HCC in the state is the "mugger rescue and release practice" deployed by the authority. Lack of experts in the Forest Department and absence of protocols for the rescue, release and translocation of problem animals have totally failed the mitigation of HCC. It is suggested that the authority should comply with scientific guidelines in order to tackle this task. Present estimation of Mugger population and rising numbers of HCC since the last decade is a clear signal and a warning call, demanding a new management plan and strategies to manage the muggers of the state. There is a vital need to develop species-specific management and education awareness programs in Gujarat State to protect both people and crocodiles from this escalating conflict. In such critical situations of wildlife and human conflicts, poor management results in the loss of wildlife forever.

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Appendix 1. Details of Mugger attack in Gujarat State, India from 1960–2013

	Date	Fatal or Non-fatal	Sex	Age	Activity	Location	Source /Victim details
1	08 May 1960	Fatal	M	15	Bathing	Kankariya	-
2	28 Apr 1970	Fatal	M	12	Sleeping	Chaloda, Dholaka	-
3	May 1991	Fatal	M	32	Herding grazing	Rudramata	Latif Sidaki Sumra
4	12 May 1991	Fatal	M	10	Bathing	Dundelav	Santilal Solanki
5	May 1993	Non-Fatal	M	30	Herding grazing	Rudramata	Vijykunar, 1997
6	May 1994	Non-Fatal	M	25	Bathing	Fodala	Vijaykumar,1997
7	Mar 1995	Non-Fatal	M	31	Bathing	Rudramata	Vijaykumar,1997
8	12 Jul 1995	Non-Fatal	M	42	Fishing	Varkhad-Narmada	Nandlal V. Sadariya
9	05 Dec 1995	Non-Fatal	M	9	Plying	P-Bhaththa-Vishvamitri	Firoj Ibrahim
10	Mar 1996	Non-Fatal	M	28	Bathing	Fodala	Vijaykumar, 1997
11	May 1996	Fatal	M	12	Plying	Fodala	Rabari Natharam Son
12	31 Jul 1997	Non-Fatal	M	25	Plying	Mandvas, Sinor	Santilal Vasava
13	01 May 1998	Non-Fatal	F	30	Washing	Thikariya-mubark	-
14	05 Jul 1998	Fatal	M	35	Fishing	Karjan dam	-
15	01 Aug 1998	Fatal	M	10	Herding grazing	Surwada, dhadhar	-
16	Apr 1999	Non-Fatal	M	40	Herding grazing	Gothatad, Barada	Rabari Bhuvo Giban
17	Apr 2003	Fatal	M	22	Fishing	Sama, Vadodara	-
18	May 2004	Non-Fatal	M	40	Crossing	Thikariya-mubark	-
19	07 Nov 2004	Fatal	M	28	Bathing	Dayek, Narmada dam	Tadavi Champak B.
20	15 Nov 2004	Fatal	F	60	Washing	Dayek, Narmada dam	Tadavi Ukardi B.
21	Feb 2005	Non-Fatal	M	40	Fishing	Vemali, vishwamitri	Rathod Jasubhai
22	Apr 2005	Non-Fatal	F	45	Washing	Vemali, vishwamitri	-
23	Apr 2005	Non-Fatal	M	45	Fishing	Harni vadodara	Bariya Chanchalben
24	May 2005	Non-Fatal	F	40	Washing	Thikariya-mubark	-
25	Aug 2005	Fatal	M	15	Herding grazing	Shehra, Vishwamitri	Taliviya Govinbhai R.
26	Sep 2006	Fatal	M	16	Herding grazing	Khalipur, Vishwamitri	-
27	Jun 2007	Fatal	M	21	Fishing	Sama, Vadodara	Rathod Brijesh
28	Aug 2007	Non-Fatal	F	50	Washing	Talsat, Vadodara	Thakor Joyatsnaben
29	Sep 2007	Fatal	M	25	Fishing	Talsat, Vadodara	Rathodiya Dayabhai G.
30	17 Jun 2008	Non-Fatal	M	23	Crossing	Jalaram T., Vadodara	-
31	21 Aug 2008	Fatal	M	30	Crossing	Virjoy, vishwamitri	Govindbhai
32	28 Aug 2008	Fatal	M	25	Crossing	Talsat, Vadodara	Rathodiya Ramesh L.
33	14 Apr 2009	Non-Fatal	F	40	Crossing	Sambhoy, Dhadhar	Panchal Sarda T.
34	08 Jun 2009	Non-Fatal	M	40	Pumping	Juna vadiya, Amod	Solnki Natavrshi P.
35	Aug 2009	Fatal	F	9	Water collection	Tranj, Kheda	Ode Hetal
36	04 Apr 2010	Non-Fatal	F	28	Washing	Shurwada, Dhadhar	Solanki Lata P.
37	06 Jul 2010	Fatal	F	32	Crossing	Shurwada, Dhadhar	Parmar Mdhu Syamal
38	01 Sep 2010	Fatal	M	14	Plying	Kothawada	-
39	Feb 2011	Non-Fatal	M	22	Bathing	Malsar, Narmada	Monters Club
40	13 Apr 2011	Fatal	M	28	Grazing	Vadsar, vadodara	Bhaliya Amrut
41	17 Apr 2011	Fatal	F	22	Washing	Kothawada	Divan Amina Yakub
42	22 May 2011	Fatal	M	15	Crossing	Kothawada	--
43	28 May 2011	Non-Fatal	F	21	Washing	Goraj, waghodiya	Rana Krishnaben
44	06 Jun 2011	Fatal	M	45	Sand collection	Virjay	--
45	08 Jul 2011	Non-Fatal	F	48	Washing	Malsar, Narmada	Vasava Savitaben
46	14 Aug 2011	Fatal	M	30	Washing	Oaz, Nareshwar	Vasava Bhudha K.
47	21 Aug 2011	Fatal	M	22	Crossing	Khalipur vishwamitri	Rathodiya Navin N.
48	29 Sep 2011	Fatal	M	52	Bathing	Goraj, waghodiya	Joshi Dilip J.
49	08 Oct 2011	Non-Fatal	M	40	Bathing	Sama Vishwamitri	Mali Ravaji J,

	Date	Fatal or Non-fatal	Sex	Age	Activity	Location	Source /Victim details
50	03 Mar 2012	Non-Fatal	M	10	Loitering	Tranj, Kheda	Parmar Jaimin J.
51	23 Aug 2012	Non-Fatal	M	42	Bathing	Mota Vasana, Zagadiya	Vasava Suresh Manu
52	29 Sep 2012	Fatal	F	17	Washing	Kodarvaya	Solanki Mita Chiman
53	25 Oct 2012	Fatal	F	11	Washing	Goraj, waghodiya	Vasava Kausheliya K.
54	22 Mar 2013	Non-Fatal	F	18	Washing	Jambudi, Vishavadar, Junagadh	Sonal Thakar
55	16 May 2013	Fatal	M	11	Crossing	Kotdna, Padara	Ajay R. Rathodiya
56	25 May 2013	Fatal	M	55	Fishing	Harni, Vadodara	Jagadish H. Rathodiya
57	28 May 2013	Fatal	F	55	Herding shepherd	Surwada, Karjan,	Savitaben A. Chouhan
58	06 Jun 2013	Non Fatal	M	Middle aged	Crossing	Sambhoi, Dhadhar	Victim no information
59	06 Jun 2013	Non Fatal	M	28	Bathing	Hirjipura, Nareshwar	Thakor Vasava
60	22 Jun 2013	Non Fatal	F	60	Crossing	Vemali, Vadodara	Shardaben Nai
61	31 Jul 2013	Fatal	F	42	Washing	Goraj Waghodiya	Swarpaa R. Parmar
62	16 Aug 2013	Non Fatal	M	30	Crossing	Jambuva, Dev, Vadodara	Kiran Rathod
63	25 Sep 2013	Non Fatal	F	Middle aged	Crossing	Kandro-Sisodar, Nanond	Sukaliben Vasava
64	06 Oct 2013	Fatal	F	64	Washing	Goraj, Waghodiya	Dhahiben Parmar

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