3/9/2021 **Action History**

REQUEST

FORWARDED TO CPIO

REQUEST DISPOSED

OF

ACTION HISTORY OF RTI REQUEST No.WLIOI/R/E/21/00015

Applicant Name		Devangi Jhalani			
Text of Application		With regards to the 2013 Supreme Court appointed expert committee in matter of Asiatic Lion reintroduction from Gir to Kuno Palpur please provide the following: 1. All details of the expert committees action plan for reintroduction of Asiatic lion to Kuno Palpur. 2. Copy of the most recent draft of this plan. 3. All documentation related to all correspondence of the committee by minutes. 4. Progress of all of committees work from 8 March 2018 to 12 February 2021.			
Reply of Application			en sent to you in your	e provide you under RTI Act, registered email ID:	
SN. Action Taken		Date of Action	Action Remarks Taken By		
1	RTI REQUEST RECEIVED	12/02/2021	Nodal Officer		

Print

Nodal Officer

P.K.Aggarwal-

(CPIO)

Forwarded to CPIO(s): (1) P.K.Aggarwal

15/02/2021

09/03/2021

Letter :: Request Disposed Off

3/9/2021

Print

Government of India Wildlife Institute of India, Dehradun Wildlife Institute of India P.O.Box-18, Chandrabani, Dehradun, Uttarakhand,

Dated: 09/03/2021

To

Ms. Devangi Jhalani Jhalani Residence, Sailana Road, Opp. Hotel Heera Ratlam 457001

Registration Number: WLIOI/R/E/21/00015

Dear Sir/Madam

I am to refer to your Request for Information under RTI Act 2005, received vide letter dated 12/02/2021 and to say that *due to large size of documents to be provide you under RTI Act, 2005 have been sent to you in your registered email ID: jhalanidevangi@gmail.com.*

In case, you want to go for an appeal in connection with the information provided, you may appeal to the Appellate Authority indicated below within *thirty days* from the date of receipt of this letter.

Director, WII

FAA & Director

Address: Wildlife Institute of IndiaChandrabaniDehradun

Phone No.: 01352646101

Yours faithfully

(P.K.Aggarwal) CPIO & Deputy Registrar Phone No.: 01352646110 Email: pka@wii.gov.in

https://rtionline.gov.in/RTIMIS/CPIO/ui.finalReplyLetter.php





ONLINE PORTAL

Date: 09 March, 2021

No. WII/RTI/CPIO/2020-21 (Qtr-IV)/100

To,

Devangi Jhalani Jhalani Residence, Sailana Road, Opp. Hotel Heera, Ratlam, Pin:457001, Madhya Pradesh Email: jhalanidevangi@gmail.com

Sub.: Information under RTI Act, 2005-reg.

Ref.: Your Online RTI No. WLIOI/R/E/21/00015 dated 12/02/2021

Dear Sir,

Please refer to your application cited above under RTI Act, 2005. In this context, point-wise response to your queries is given below:

Information Sought under RTI	Reply		
With regards to the 2013 Supreme Court appointed expert committee in matter of Asiatic Lion reintroduction from Gir to Kuno Palpur please provide the following:			
1. All details of the expert committees action plan for reintroduction of Asiatic lion to Kuno Palpur.	Please see attached documents as given below: 1.Minutes_5_Expert_Committee_Meeting_Asiatic_Lions		
Copy of the most recent draft of this plan. All documentation related to all correspondence of the committee by minutes.			
4. Progress of all of committees work from 8 March 2018 to 12 February 2021.	No information available. May send your query to Wildlife Division, Ministry of Environment, Forest and Climate Change, Indira Paryavaran Bhawan, Jor Bagh, New Delhi		

If you are not satisfied with the aforesaid reply, you may appeal to the **Appellate Authority** i.e. "Director, Wildlife Institute of India, Post Box 18, Chandrabani, Dehradun – 248 001, Ph. 0135-2640910".

Thanking you,

NO & CPIO (RTI)



Government of India Ministry of Environment, Forest and Climate Change (Wildlife Division)

5th Floor, Vayu Wing Indira Paryavaran Bhavan Ali Ganj, Jor Bagh Road New Delhi- 110003

F. No. 1-63/2007 WL- I (pt) Dated: 25^{1/1} May 2016

5th Meeting of the Expert Committee on translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh-reg.

With reference to the subject mentioned above, the undersigned has been directed to forward the approved summary record of discussions held during the meeting of the Expert Committee held on 13th May 2016 under the chairmanship of Additional Director General of Forests (WL) at Ministry of Environment, Forest and Climate Change.

(S. P. Vashishth) **Deputy Inspector General of Forests (Wildlife)**

Telephone: +91-11-24695355

Encl.: As above

Distribution:

1. Additional Director General of Forests (WL), MoEFCC, New Delhi

2. Additional Director General of Forests & Member Secretary, NTCA, New Delhi

3. Director, Wildlife Institute of India, Dehradun

4. Chief Wildlife Warden, Madhya Pradesh

5. Chief Wildlife Warden, Gujarat

6. Dr. Ravi Chellam, Wildlife Biologist and Conservation Scientist, Flat No. T-2, Dollar Heights, 45, 12th Cross, 12th Main, Bandappa Gardens, Muthyalnagar, Bengaluru- 560054, Karnataka

7. The Secretary General and Chief Executive Officer, WWF India

8. Dr. A. J. T. Jonhsingh, A-15, Almond Tree, Survey No. 33/2, Kenchanahalli,

9. Off Doddaballapur Road, Yelahanka, Bengaluru - 560 064

10. Dr. P. R. Sinha, Country Director, IUCN India Country Office, C4/25 Safdarjung Development Area, New Delhi

11. 110 016 New DelhiShri M. B. Lal, Ex-Additional Director General of Forests

12. Dr. M. K. Ranjitsinh, 'Krishnasaar', No. 5 Tiger Lane, W6 C Lane, Sainik Farms, New Delhi-11062.

13. Dr. Y. V. Jhala, Scientist, Wildlife Institute of India, Dehradun

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Summary record of discussions held during 5th Meeting of Expert Committee on 'Translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sancutary, Madhya Pradesh' held on 13th May 2016.

The 5th Meeting of 'Expert committee on translocation of Asiatic lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh' was held on 13th May 2016 at Indira Paryavaran Bhavan, Ministry of Environment, Forest and Climate Change, New Delhi under the chairmanship of Additional Director General of Forests (WL), Shri Vinod Ranjan. List of participants of this meeting is placed at **Annexure**.

The Chair welcomed the participants of the meeting and thanked them for their continued support. Zero Draft Action Plan as well as the Revised action plan which have emerged out the committee's work, were briefly highlighted and the Chair hoped that in this meeting, the committee would make a sincere attempt to finalize the revised action plan after due deliberations.

Joint Director (WL) Shri Roy P. Thomas briefed that some members of the committee have given their comments on the revised action plan. The Ministry had circulated these comments with the committee members and further discussions were expected to take place in this meeting.

Agenda item: Discussion on the Revised Draft Action Plan for translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh

A chronology of key events leading to the formulation of this committee and that of the important decisions taken so far were briefly highlighted. Discussions took place on the revised draft action plan regarding the said translocation and members made point-wise suggestions/ inputs on the same. Various issues related to the transportation, translocation, soft release, balancing of prey-predator population were discussed in detail. The committee decided that the Wildlife Institute of India would share the finalized revised action plan after making necessary changes in light of the discussions happened in this meeting within 15 days.

Agenda item: Discussion on the comments received from PCCF, Gujarat on Revised Action Plan

The PCCF (WL), Gujarat, vide letter dated 18th September 2015 had shared his inputs on the revised draft action plan for the translocation. Along with the comments/ inputs received from other members of the committee, his comments too were shared with the committee members by MoEFCC. Chief Wildlife Warden, Government of Gujarat made a detailed presentation highlighting various issues involved in the translocation. Issues raised by the Government of Gujarat were deliberated upon in order to further fine-tune the revised action plan. These points related to the issues of choice of methodology for translocation, demographic profile of Asiatic Lions, prey-predator population balance at Gir and Kuno, Man- animal conflict issues involving lions, risk analysis, and other aspects related to adaptive management strategies for this translocation were discussed. The studies proposed by PCCF (WL), Gujarat were considered by WII and a presentation of their compliance/ necessity as well as non-requirement of certain studies were deliberated and WII was asked to incorporate the studies in the Action Plan. WII representatives agreed to make necessary changes in the action plan in light of the discussions held.

Agenda item: Discussion on way forward regarding the translocation

The committee agreed that airlifting of lions would be the feasible option and after the translocation, Madhya Pradesh shall take necessary scientific measures for maintaining genetic stability of this lion population in view of the IUCN guidelines on translocation. It was also decided that before the action plan is implemented, Kuno sanctuary should be declared as a National Park for effective implementation of relevant activities. MoEFCC will share the minutes of previous four meetings with WII representatives who will prepare a summary of actions taken so far. Implementation of ecological studies would be undertaken simultaneously with the translocation. Out of these studies some studies would be initiated before undertaking the translocation while some studies would be undertaken along with the translocation. CWLW, Gujarat mentioned that if Gujarat Government's issues are addressed and a scientific method on translocation is followed, Gujarat shall go ahead with the decision of the committee.

An action plan to give effect to this translocation, along with a note on way forward (with detailed roles, responsibilities and points of action) will be submitted by WII by 30th May 2016. A draft tripartite Memorandum of Agreement clearly indicating roles, rights, risks and privileges of each of the three parties (Government of Gujarat, Government of Madhya Pradesh, and Ministry of Environment, Forest and Climate Change) would be drafted and finalized in the next meeting.

Agenda item: Discussion on the research project submitted by Wildlife Institute of India

Committee members were apprised of the research proposal 'Ecology assessment and monitoring of Kuno landscape as a potential reintroduction for the Asiatic Lions' by WII representatives. It was explained that the studies to be undertaken under this project are as per the Supreme Court of India's verdict and in full compliance with IUCN's Guidelines for species reintroduction. Following are the research objectives of this proposal-

- Assessment of status and distribution of prey and other predators in Kuno;
- Assessing habitat characteristics and quantifying impacts of anthropogenic disturbances;
- Understanding the space use, resource selection and mechanisms
 of niche separation by sympatric carnivores (tiger, leopard, hyena,
 jackal, wolf, sloth bear) in Kuno;
- Assess prevalence and virulence of major important pathogens/diseases among wild carnivore communities and associated domestic dogs and cats around the sanctuary;
- Understanding livelihood issues and quantifying social carrying capacity for reintroducing lions in the Kuno landscape;

The committee approved the proposal. The study shall be undertaken for the period of three years and tentative budget for the first year is pegged at around ₹ 2.42 Crores and WII was requested to incorporate the same in their budget.

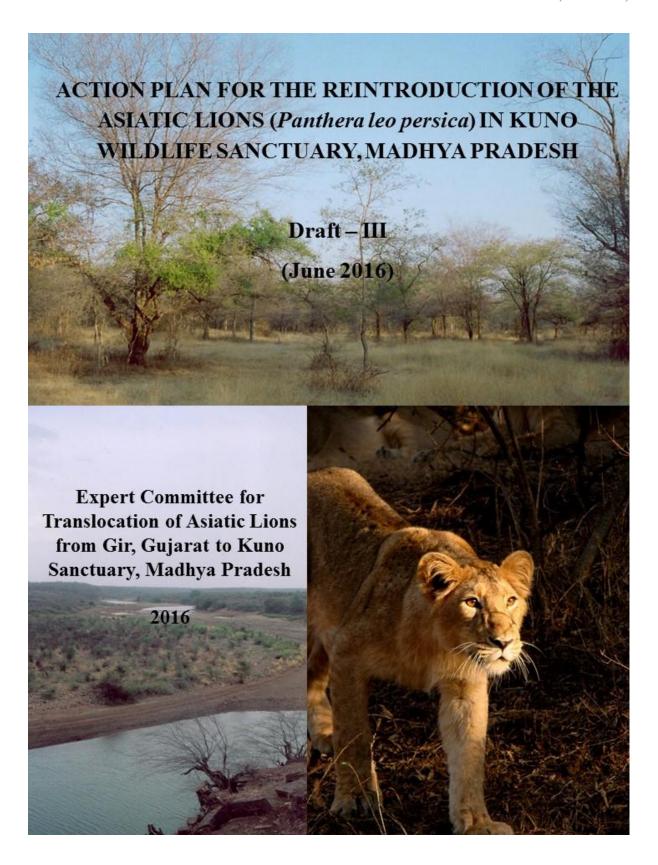
Members agreed to make two state specific empowered/coordination committee for Gujarat and Madhya Pradesh (one each) comprising of CWLW, DFOs, WII authorities and representatives from the other State Forest Department. These committees will look after issues related to translocation in their respective states and scientific issues. There shall be a steering committee to oversee these coordination committees to be presided over by Director, Wildlife Preservation, MoEFCC.

Next meeting of the expert committee be held in the first week of June at Kuno Sanctuary, Madhya Pradesh to finalize the action plan on translocation.

The meeting ended with vote of thanks to the Chair.

List of participants- 5th Meeting of 'Expert committee on translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh' held on 13th May 2016.

No.	Name	Designation
1.	Shri Vinod Ranjan	Additional Director Genera (WL)
2.	Shri B.S.Bonal	Additional Director General (PT)/ Member Secretary, NTCA
3.	Shri R.K. Srivastava	Inspector General of Forests (PE)
4.	Shri Roy P. Thomas	Joint Director (WL) and Member Secretary
5.	Dr. M.K. Ranjitsinh	Member
6.	Shri Ravi Srivastava	Chief Wildlife Warden, Madhya Pradesh
12.	Dr. J.A. Khan	PCCF (WL) and CWW, Government of Gujarat.
7.	Shri Brijendra Srivastava	Divisional Forest Officer, Kuno Palpur, Madhya Pradesh
14.	Shri V.S. Sharma	Chief Conservator of Forests, Lion Project, Gujarat
8.	Dr. A.J.T. Johnsingh	Member
9.	Shri Ravi Singh	World Wide Fund For Nature, India
0.	Shri Y.V. Jhala	Wildlife Institute of India
1.	Kausik Ranerjee	Wildlife Institute of India
3.	Shri P.R. Sinha	Member
5-	Shri S.P. Vashishth	Deputy Inspector General of Forests (WL)



	Asiatic Lion T	ranslocation Action	n Plan DRAFT III	(June 2016)
Prepared by: Wildlife Ins	titute of India, Deh	radun in consulta	tion with MoEFC	CC
		2		

ACTION PLAN FOR THE REINTRODUCTION OF THE ASIATIC LIONS (*Panthera leo persica*) IN KUNO WILDLIFE SANCTUARY, MADHYA PRADESH

EXECUTIVE SUMMARY

Last free-ranging population of approximately 523 Asiatic lions *Panthera leo persica* are found in the 22,000 km² of the Gir landscape in Gujarat, western India. Carnivore populations restricted to single sites face a variety of extinction threats from genetic and stochastic environmental factors. Catastrophes such as an epidemic, an unexpected decline in prey, natural calamities or retaliatory killings could result in their extinction when they are restricted to single populations. Reintroduction of Asiatic lions to an alternative site to ensure their long-term viability therefore became a major conservation agenda in post-independent India since late-1950s. Failure of the first attempt of the Asiatic lion reintroduction in India (Chandraprabha Wildlife Sanctuary of Uttar Pradesh) in 1960s has been unanimously ascribed to the lack of an a priori scientific study on lion prey base, habitat requirements, local people's attitude and a post-release monitoring program. In early 1990's after ecological assessment of some protected areas within the historical range of lions, the Wildlife Institute of India (WII) identified Kuno Wildlife Sanctuary (Kuno WLS) in the central Indian state of Madhya Pradesh as the most potential reintroduction site. Subsequently between 1996 and 2001 twenty three villages were resettled from inside Kuno sanctuary by the Madhya Pradesh Forest Department (MPFD) and an area of about 1,280 km² was demarcated as Kuno wildlife division. The Standing Committee of the National Board for Wildlife (NBWL) also endorsed the lion reintroduction program in Kuno. However, the lion introduction proposal had met with a deadlock with the Gujarat Forest Departmentos (GFD) reluctance to provide founder lions from Gir for reintroduction purpose and even an affidavit was filed before the Supreme Court of India objecting the lion reintroduction. After legal tangles spanning for almost two decades, the apex court finally gave its verdict in April, 2013 and explicitly directed the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India (GoI) to expedite the lion reintroduction in Kuno in compliance with the IUCN Guidelines of carnivore reintroduction. Accordingly, the current Action Plan is developed under the directives of the Additional Director General (Wildlife) to guide a successful lion reintroduction in Kuno. The Plan enlists various ecological, biological, management and social facets in accordance with the IUCN/SSC Guidelines to develop a time bound protocol (Fig. E1) essential for implementing the reintroduction program. Some management actions recommended in the Action Plan are concomitant and should continue for long-term.

Synthesis of the strategies for lion reintroduction in Kuno:

PHASE I (WITHIN SIX MONTHS OF FINALIZING THE ACTION PLAN)

- 1) Organizational Commitments First, a long-term (at least 25 years) Asiatic Lion Reintroduction Program involving financial, technical and administrative commitments needs to be guaranteed by signing a Memorandum of Agreement (MoA) by MoEFCC, MPFD and GFD adhering to the Action Plan. The goals, responsibilities and commitments should be explicit and transparent in the MoA. Financial commitments should be flexible to accommodate rational changes to a translocation plan during implementation and subsequent monitoring.
- 2) Habitat management and enhancing carrying capacity of Kuno for lions Current habitat management initiatives by MPFD inside Kuno WLS (such as weed eradication, fire management, grassland management, waterhole management etc.) should continue so as to enhance nutritional carrying capacity for wild ungulates. Although the current carrying capacity (k) for 345 km² Kuno WLS is a maximum of 40 lions, Population Habitat Viability Analysis (PHVA) models for Kuno lions show that the lion population will be viable for longterm only at a minimum figure of around 80 individuals. Thus it emphasizes the need of further enhancing the current carrying capacity and prey base of Kuno for long term viability of the reintroduced lion population. MPFD should achieve this by urgently declaring the inviolate areas within the sanctuary as a National Park and gradually including the potential habitats of the Kuno Wildlife Division (1,280 km²) as the part of the current Kuno Protected Area (PA). The sanctuary boundaries need to be extended to cover the areas of the relocated villages and this will enlarge the inviolate core and available habitats to more than double the size of the current sanctuary. MPFD should also gradually manage parts of the larger Kuno-Sheopur-Shivpuri landscape (3,300 km²) contiguous with Kuno WLS as a potential buffer zone as per National Tiger Conservation Authority (NTCA) landscape management plan guidelines. Conservation legislations (Eco-sensitive zones, Conservation Reserves) without compromising with local livelihood needs, compensation for livestock kills, mitigation of human-wildlife conflicts and curtailment of high impact linear developments should be some of the actions to be taken up by MPFD. Habitat management with restorative inputs and protection against poaching will assist in developing the natural prey base (especially chital) in this landscape in tandem with the recovery of Kuno WLS gradually over time (30 years) to accommodate a self-sustaining population of about 80-100 lions in the larger landscape.

Expecting approximately a realized growth of r=0.18 ó 0.2 like that observed for recovering tiger populations, along with supplementation every 4 years from Gir; the lion population in Kuno WLS should reach current carrying capacity of 40 within 15 years. To reach the required self-sustaining population size of 80 lions, the time required would be close

to 30 years. Therefore, the landscape level conservation approaches should be initiated urgently concomitant with the other lion reintroduction activities inside Kuno WLS and require long-term commitments, extensive investments, policy change and management interventions from MPFD and MoEFCC. By the time lion numbers exceed carrying capacity of the sanctuary (about 40 lions) and gradually lions start dispersing out in the peripheral areas (about 15-20 years), the larger landscape should be ready for sustaining additional lions in terms of availability of habitat *refugia* and prey and social support systems. Such landscape level efforts are not quick fix since their enactments demand time and they must not impede the immediate goal of reintroduction lions inside the sanctuary.

3) Village resettlements & financial commitments by MoEFCC - MPFD should attempt to resettle three more villages (Bagcha, Jaangarh and Maratha) as proposed earlier from Kuno to integrate about additional 700 km² area to the current inviolate zone. The resettlement should be planned and executed in the same manner as it was done earlier. MoEFCC should also ensure financial aid to MPFD for this purpose as it did previously.

PHASE II (6 MONTHS – 1 YEAR AFTER FINALIZING THE ACTION PLAN)

- 4) Ecological monitoring of Kuno and quantifying social carrying capacity for lion reintroduction WII should be mandated by MoEFCC and MPFD to undertake a telemetry based research assessing prey, predators, habitat parameters, land use patterns, disease prevalence among carnivore communities, livelihood issues and local communitiesø perceptions on lion reintroduction in Kuno. Funds and logistics for this should be made available much in advance of reintroducing lions in Kuno. The lion reintroduction in Kuno should not, however, wait for the completion of WII research since the PHVA models demonstrated the current potential of Kuno to support about 40 lions. The information generated from the research is required for allowing lions to be accepted better in the society by appropriately mitigating conflicts. The research project is in compliance with IUCN guidelines, can assist management in planning different phases of lion reintroduction in a better way and must continue as post-reintroduction monitoring of ecosystem dynamics of Kuno.
- 5) Construction of lion enclosure in Kuno The existing lion enclosure near Palpur Kuno is old, in bad shape and needs to be constructed anew. Forest officers from Kuno can also visit Barda sanctuary in Gujarat where GFD has already built an enclosure for soft release of lions in Barda. International and national standards (WAZA, CZA) laid out for constructing a lion enclosure should be consulted and expertise of WII biologists could be sought to implement this. MPFD should immediately start working on this so as to show their commitment towards adhering to time bound protocol developed for lion reintroduction.

- 6) Training, infrastructure development and capacity building in Kuno MPFD should continue with training and capacity building initiatives for forest officials and frontline staff deputed in Kuno. Some of the key measures delineated in the current Action Plan which demand long-term commitment by MPFD include filling up of vacant posts, strong protection regime against poaching by intelligence gathering and well equipped patrolling teams, implementing technology aided patrolling (MSTrIPES), setting up of veterinary units, ensuring staff amenities, training of forest personnel in issues related to large carnivore management and conflict mitigation measures, abating the prevalent gun culture in the peripheral Chambal region and enhanced inter-sectorial collaborations.
- 7) Eliciting better public support for lion reintroduction This is an extremely vital component likely to determine the success of lion reintroduction in Kuno in future and should be a continuous commitment from MPFD over the years. The need to involve people whose livelihoods may be affected is a sine qua non, but when ignored may have disastrous consequences. Chances of people getting mauled or even killed and depredation of domestic livestock by carnivores during the initial years of lion reintroduction may be high since communities lack experience of living with lions. An ex-gratia compensation scheme in accordance with the NTCA norms and payment of livestock predation compensation and their regular (2-3 years) revisions in reflectance with market price should be adopted. Crop damage mitigation measures (compensation, installing pulsating fences in the farmlands etc.) should be introduced so as to dissuade local people from using guns and foster their greater tolerance to conservation. Central and state sponsored beneficiary schemes such as JFM, Ecodevelopment, rural development programs, incentivize communities, recruitment of local tribal in various forest departmental jobs etc. should be prioritized so as to enhance livelihood securities and standard of living for the local communities and curtailing their dependence on forest resources. No wildlife tourism should be allowed inside the sanctuary for the initial 3 years after the first batch of lions are introduced to permit the founder and first supplemented lion populations to establish their territories without any external intervention. MPFD should prepare a ten year tourism policy in compliance with NTCA@ guidelines ensuring no adverse impacts on traditional land-uses of the region and safeguarding local livelihood issues.
- 8) Identification of founder lions in Gir The primary aim of selecting the founder animals would be to maintain harmony between social dynamics and behavior of lions both in Kuno and Gir while securing a wide gene pool for the reintroduced population. It is proposed that 8 to 10 adult lions (5-7 females and 2-3 males) and their dependent young be captured from two to three lion social groups spaced apart within the Gir Protected Area and translocated. Translocation of a whole lion pride (all the lionesses belonging to a same group) may disrupt the social dynamics in Gir and is not desirable. Therefore, 2-3 breeding lionesses of varied

age groups from each group (depending upon the group size) and their dependent young from Gir should suffice for the reintroduction. Male lions for the reintroduction should be selected in such a way that they have sired at least one cohort of cubs in Gir. Considering the first reproductive age of male lions in Gir about 4 years and a land tenure of about 3 years, this is possible by selecting prime adult males of approximately over 7-8 years. Youngest cubs of these males in Gir must be about 2 years in age so as to avoid infanticides by new lions that would take over their pride in Gir once these lions are taken to Kuno. These recommendations are in absolute compliance with the IUCN Guideline in ensuring that removal of individuals for reintroduction shall not be detrimental to the parent population.

9) Disease & health management of founder lions - Major threat of founder lions in Kuno can be transmission of infectious diseases from domestic carnivores (dogs and cats). Vaccination and providing medical support to all wild lions are not always feasible and also it should not be done after the first few years of the reintroduction. However, careful identification of disease sources and interface (from domestic animals) could help arrest their spread into wild populations. As mentioned earlier, as a part of ecological assessment of Kuno, WII should be mandated by MoEFCC to undertake scientific studies using modern immune-molecular techniques to assess prevalence of potential carnivore pathogens/diseases both in Gir and Kuno. Active cooperation and logistic support is needed from both GFD and MPFD in implementing this study. Diseases prevalent in Kuno but not in Gir need to be addressed through vaccination of founder population. It would be prudent to screen the founder population of lions for antibodies through an ELISA (dot assay) and for antigens through a PCR with fluorescently labeled universal primers available for pathogens and epizoic that are prevalent in the region, before they are released in Kuno.

PHASE III (1 – 2 YEARS AFTER FINALIZING THE ACTION PLAN)

10) Capture, translocation and soft release of lions in Kuno – GFD has an expertise in capture and handling lions. Founder lions should be captured, immobilized and fitted with radio-collars (GPS/satellite) according to the standard protocols. This needs to be a joint exercise between GFD, MoEFCC expert committee members and WII. Individual lion profiles should be maintained by officials of GFD, MPFD, MoEFCC and WII. All the individual lions should be shipped to Kuno within a few days by the best transport options (preferably air). Transport crates should be in accordance with the International standards laid out by Associations of Zoos and Aquariums (AZA). Lions should be allowed to acclimatize for 10 days to two months within the newly built lion enclosure in Kuno to enable them recover from the stresses resulting from capture and transportation. Males should be released first so that they can explore and investigate the available habitats first. But they will not wander much since

females are confined within the enclosure. Females shall be released 1-4 weeks after the release of the males depending upon the states of malesøcomfort in the new environment. The entire exercise needs to be performed in close association between officials from GFD, MPFD, veterinary teams of Sakkarbaug Zoo and Gir and WII biologists and would be monitored by MoEFCC expert committee members. Expertise of international agencies involved in reintroduction exercises could be sought as and when required.

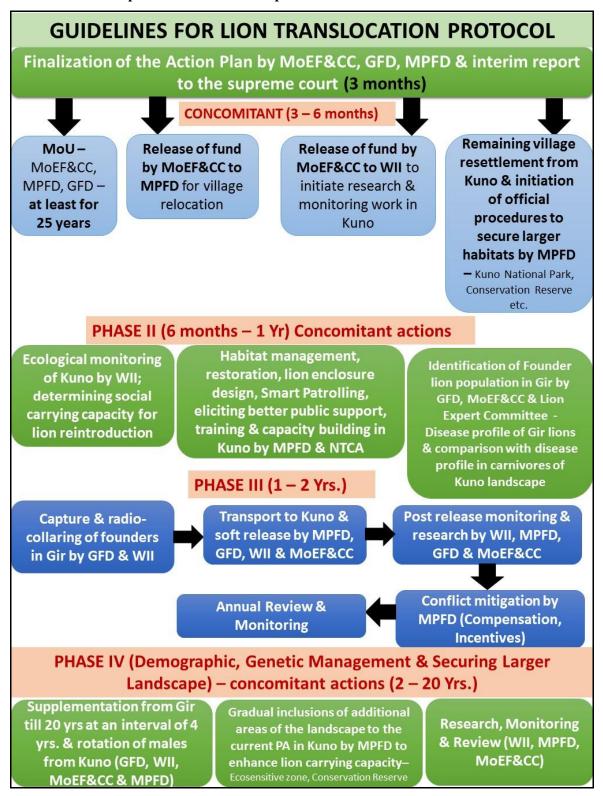
- 11) Post-reintroduction monitoring & research A thorough monitoring system needs to be in place so as to provide feed-back in an adaptive management framework. The reintroduced lion population in Kuno needs to be intensively monitored and managed at least for 20 years with all the adult lions fitted with GPS/satellite collars for 10 years. Movements of lions immediately after release shall be radio-monitored several times in a day by the local staff assisted by WII research team. Once all the lions establish home ranges (3-4 months), the monitoring frequency can be reduced to 2-3 locations/day and one visual observation semiweekly. MoEFCC and MPFD should continue supporting WIIøs research on ecological monitoring of Kuno for at least 10-15 years so as to understand ecological and social impacts of lion reintroduction (prey predator dynamics, change in habitat parameters, change in local communitiesø perceptions etc.). This is crucial for planning an exit strategy if and when needed and in compliance with IUCN guidelines. Other carnivore populations in the landscape (eg. tigers) may need to be managed during initial years of lion reintroduction (4-5 years) so as to avoid/minimize interspecific strife and allow the reintroduced lion population to stabilize. WIIøs research should address this by radio-collaring other carnivores in Kuno in the same temporal scale so as to monitor their movements and understand the underlying resource separation mechanisms. Based on this, management strategies to permit and promote coexistence or to manage the carnivore community in Kuno could be decided in future.
- 12) Conflict mitigation As already discussed, MPFD should have a long term commitments in mitigating conflicts to foster greater tolerance of local communities for lion conservation. This should be addressed by paying adequate and timely compensations for human death/injury, crop damage and livestock depredations. Compensations for livestock depredation should incorporate lost opportunity cost by the pastorals and be revised regularly in reflectance with changing market prices. Half of the payment should be onsite while the remaining amount should be paid only after ensuring that carcasses are not poisoned and fed upon by the carnivores. WIIøs research should explicitly aim to study conflict and changing dimensions of human perceptions (negative or positive) over the years. Policy level amelioration should be planned based on these findings.
- 13) Annual review For the initial two years, the research and monitoring team comprising of WII and MPFD frontline staff should report lion movement and field updates weekly to the

DFO, monthly to the CCF (Wildlife) Gwalior and quarterly to the Chief Wildlife Warden, MP state. Progress of the project shall be reviewed every year by the lion reintroduction committee appointed by MoEFCC along with International experts (if required), decision makers of both the states and wildlife biologists of the country. Such monitoring should be a long-term (20-25 years) process and be coordinated by MoEFCC in association with MPFD. It is recommended that the results of reintroductions be published and peer-reviewed at frequent intervals to allow other reintroduction attempts to benefit from the experiences. This should be part of a continuous feedback loop with the results of the documented evaluation leading to alterations to the existing reintroduction program via an adaptive management strategy. Although the guidelines promulgated in the current Action Plan are likely to be relevant for long term (15-20 years); they could, however, be revised by the expert committee of MoEFCC as per emerging situations during various implementation phases of lion reintroduction.

PHASE IV (2 - 20 YEARS AFTER FINALIZING THE ACTION PLAN)

14) Genetic management & supplementation - Six lions (two males and four females) should be supplemented in the Kuno population from Gir until 16 ó 20 years from the first reintroduction at an interval of 4 years. To minimize inbreeding and maximize genetic diversity in the reintroduced population of lions, the founder males need to be removed after they sire one cohort (after 3-4 years of their reintroduction) of cubs in Kuno and be replaced by an unrelated coalition of male lions (7 ó 8 years old) from Gir PA. The new males and females should be younger than the founder stock and should be captured from different areas (other than the founder stock) of the Gir PA. This would enable the overall representation of the lion genetic structure of the Gir PA amongst Kuno lions. Males after siring one cohort of cubs in Kuno will still be capable of reproduction (about 10 years) and could be relocated to a suitable site (such as back to either Greater Gir landscape or gene pools at Rampara, Barda in Gujarat, zoo exchange programs or in the conservation breeding program for zoos) where they can contribute to the *ex situ* conservation of the species.

FIGURE E1. Proposed reintroduction protocol for the Asiatic Lions from Gir to Kuno



15) Landscape level conservation approach by MPFD - Gradual increase in the habitat carrying capacity would allow lions to populate new areas of Kuno-Shivpuri-Sheopur landscape and is likely to encourage their dispersal in the larger landscape of Madhya Pradesh

as is happening in Gujarat. If and when this happens in future, this action plan propose to manage the different sites together as a ometapopulation, thereby enhancing the survival chances as well as maintaining the genetic diversity of the founding population (Kuno). However, by the time lion population in Kuno reach that stage it may be too late for them to colonize newer areas owing to the loss of potential habitat corridors, breeding and refuge patches under the increasing impacts of agricultural intensifications and linear infrastructural development. Therefore, foreseeing the larger picture of lion conservation in Madhya Pradesh, it is important that the state Government should start adopting a conservation friendly land-use policy in the region and implement strong legislation at the earliest so as to curtail possible ill-impacts of urban sprawl and unplanned developments in the region.

16) Exit strategy - Success of lion reintroduction in Kuno within a span of 10 years form first batch of reintroduction should be judged by the following indicators: 1) establishment of a population of at least 20 lions (50% carrying capacity of Kuno WLS) that are breeding naturally with a good recruitment rate, 2) timely supplementation of lions adhering to the recommendations prescribed in the current Action Plan, 3) inclusion of more areas to the existing sanctuary by resettling villages and declaration of a larger Protected Area, 4) landscape scale conservation approaches through restoration and legislation (declaring community reserves, conservation reserves and eco-sensitive areas) and 5) stringent protection regime against poaching and gradual abatement of the prevailing gun culture in the region. All these mostly demand long-term tripartite financial, technical and administrative commitments from MoEFCC, GFD and MPFD. On the other hand, the project could be considered as a failure if 1) failure of securing lion habitats in the larger landscape by declaring them as PA (sanctuaries, conservation reserves and/or eco-sensitive zones), 2) lions with less than 10-12 breeding individuals after 10 years of the first batch of lion released with no natural births and 3) high premature mortality (>60%) of reintroduced lions due to humaninduced causes (poaching, electrocution, poisoning, road accidents, retaliatory killings etc.). If these occur then the project needs to be rolled back and reconsidered in terms of legal, policy and alternative strategies.

Carnivore reintroduction is an appropriate conservation strategy to restore the integrity of ecosystems. It is a rapidly growing science which, if carried out accurately, has the potential to be a valuable component of the conservationistos toolkit. However, many pitfalls exist that can result in the total or partial failure of a reintroduction program and can potentially waste valuable and limited resources. This Action Plan aims to guide the reintroduction program of the Asiatic lions in Kuno in the most realistic manner based on science and pro-active management.

ACTION PLAN FOR THE REINTRODUCTION OF THE ASIATIC LIONS (Panthera leo persica) IN KUNO WILDLIFE SANCTUARY, MADHYA PRADESH

Introduction & Background

Currently the only free ranging population of about 523 Asiatic lions (*Panthera leo persica*) exists in the Gir landscape (approximately 22,000 km²) comprising of the Gir PA, Girnar Sanctuary, coastal scrublands and human dominated landscapes of Saurashtra peninsula, Gujarat (Singh & Gibson 2011; Banerjee & Jhala 2012; Gujarat Forest Department 2015). However, carnivore populations restricted to single sites face a variety of extinction threats from genetic and environmental stochastic factors (Gilpin & Soulé 1986). Catastrophes such as an epidemic, an unexpected decline in prey, natural calamities or retaliatory killings could result in the extinction of a threatened species when it is restricted to a single site. It is worth recording that an epidemic caused by a mor billivirus closely related to Canine Distemper Virus emerged abruptly in the lion population of the Serengeti National Park, Tanzania in early 1994 resulting in fatal neurological disease characterized by grand mal seizures and myoclonus; the lions that died had encephalitis and pneumonia (Roelke-Parker et al. 1996). In 1957 an attempt was therefore made to translocate lions in the 96 km² Chandraprabha Sanctuary in Uttar Pradesh but the program failed due to lack of understanding on adequacy of prey base, crucial habitat requirements and the insufficiency of protection, habitat management and monitoring (Negi 1969). Thereafter in 1990s the Wildlife Institute of India (WII) took up the matter of finding an alternative home for the species and identified Kuno Wildlife Sanctuary (345 km²) in Madhya Pradesh as the most suitable site (Chellam et al. 1995; Johnsingh et al. 2007). A population habitat viability workshop for the Asiatic lions held at Baroda in October 1993 also reiterated the need of a second home for the species in Kuno (Ashraf et al. 1993).

Between 1996 and 2001 the Madhya Pradesh Government had relocated twenty three villages containing 1,547 families from Kuno sanctuary under a õbeneficiary oriented scheme for tribal developmentö and an area of about 1,280 km² was demarcated as Kuno wildlife division (Figure 1; Johnsingh et al. 2007). The Standing Committee of the National Board for Wildlife (NBWL) in its meeting dated 18.02.2008 also recommended a lion reintroduction program in Kuno. However, the Asiatic lion introduction proposal has met with a deadlock with the Gujarat Government w unwillingness to provide lions for reintroduction purpose and Government of Gujarat even filed an affidavit before the Supreme Court of India in April 2009 objecting the lion reintroduction. The issue was sub judice with the Court for almost four years and finally on 15.04.2013 the Court directed the Ministry of Environment, Forests and Climate Change (MoEFCC) to expedite the lion reintroduction in Kuno in compliances with the IUCN guidelines of species translocation (IUCN/SSC 2013). An expert committee under the chairmanship of ADG (Wildlife) comprising of the officials from MoEFCC, Forest Departments of Gujarat and Madhya Pradesh, experts like Dr. A.J.T. Johnsingh, Dr. Ravi Chellam and Dr. Y.V. Jhala and officers from WWF-India was constituted to oversee the technical affairs related to the lion reintroduction in Kuno. The first meeting of the committee was held at Delhi on July 29, 2013 and development of an action plan for lion reintroduction in Kuno was recommended. With this context the current action plan discusses various ecological, biological management and social considerations in accordance with the IUCN/SSC Guidelines for lion reintroduction in Kuno.

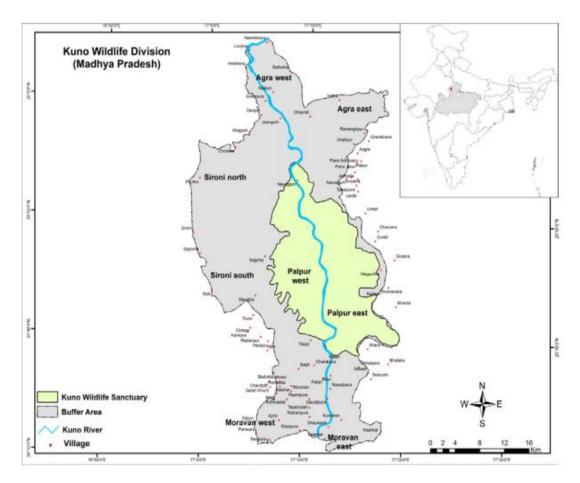


Figure 1: Kuno Wildlife Division (1,280 km²), Madhya Pradesh

The Kuno Wildlife Sanctuary (345 km² between 25°30 E to 25°53 E and 77°07 N to 77°26 N) located in North Madhya Pradesh was one of the hunting grounds of Gwalior Scindias and was notified as a sanctuary in 1981 (Notification number 15-8-79-10-2 dated January 16, 1981 of MP Forest Department). The Sanctuary is classified under the Semi-arid 6 Gujarat Rajputana (zone 4B) biogeographic zone (Rodgers & Panwar 1988). Climate is slightly arid with the average maximum summer temperature being 42.3° C in May, while the lowest winter temperatures are between 6 and 7° C during December and January (Chaudhary 2001). The average annual rainfall in the area is about 760 mm most of which precipitates between the end of June till September (Sharma 2007). The forests of Kuno Wildlife Sanctuary falls under the Northern Tropical Dry Deciduous Forest (Champion & Seth 1968) consisting mainly of *Anogeissus pendula*, *Acacia catechu* and *Boswellia serrata* communities and their associated flora (Rawat 2003). The terrain and topography of the sanctuary area is undulating with the elevation of the sanctuary ranging from 238 m asl to 498 m asl (Chaudhary 2001). The sanctuary is almost free from human habitation, as 23 of

the 24 villages that existed here have already been relocated outside, as a part of the lion reintroduction program. The sites of the relocated villages have developed into large grasslands, extending in size to as much as 1,500 ha in some cases (Pabla et al. 2011). The sanctuary is inhabited by carnivores such as leopard (*Panthera pardus*), wolf (*Canis lupus*), jackal (*Canis aureus*), Indian fox (*Vulpes bengalensis*) and striped hyena (*Hyaena hyaena*). Chital (*Axis axis*), sambar (*Rusa unicolor*), nilgai (*Boselaphus tragocamelus*), chinkara (*Gazella bennetti*), wild pig (*Sus scrofa*), chowsingha (*Tetracerus quadricornis*) and blackbuck (*Antelope cervicapra*) are the herbivores commonly found in the area.

The perennial Kuno River flows through the middle of the Protected Area (PA), providing water supply to the PA throughout the year. The PA had a small tiger (*Panthera tigris*) population until late 1990s, but now it reports only occasional presence of tigers dispersing from the Ranthambhore Tiger Reserve of Rajasthan, which is only about 60 km away (Panwar 2007; Jhala et al. 2008). One tiger, identified as T-38 of Ranthambhore, has been resident in the Sanctuary over two years now (Pabla et al. 2011). Occasional presence of wild dog (*Canis alpinus*) is also reported from the Sanctuary. The endangered Gharial (*Gavialis ganjeticus*) has also now moved up the Kuno River and is now found in the Sanctuary.

There is a lower village density in this area, due to a long history of dacoits in the area (Ranjitsinh & Jhala 2010). Majority of the people in this area belong to the Sahariya tribe; a sub-caste of the Gonds (Chaudhary 2001). The Bhil community, original residents of Jabhua and Ratlam districts in Madhya Pradesh, has settled on the north-west, west and south-western side of the park. The Moghiya tribe, notorious for their hunting abilities, though low in numbers, dwells all around the park; especially on the northern and eastern fringes of the WLS (Johnsingh et al. 2007). Pastoralist communities in the area are Gurjar and Yadav who also practise agriculture. The other economic well-off communities are Dhakad, Jatav and Thakur, who own some of the largest agricultural holdings in the area (Pabla et al. 2011). People from the Kachchh in Gujarat have also settled in the area nearly 30-35 years back, and have been given the right to cultivate (-pattaø land) by the forest department. Almost every village has -baniyaø families who own provision shops and operate small-scale moneylending business within the village. Majority of people in the landscape own guns for protecting their houses from dacoits of Chambal and crops from wild ungulates.

Aims of lion translocation in Kuno Wildlife Sanctuary

It is imperative to establish clear goals and objectives prior to the lion reintroduction, and follow sound management principles in an effort to alleviate problems after their release. The primary aim of the lion translocation in Kuno Wildlife Sanctuary is to establish a self-sustaining free ranging population of the species initially and subsequently to promote the colonization of lions in the larger forested landscape (3,330 km²) outside the Kuno Sanctuary. Within this larger goal, the project will strive to achieve the following objectives:

a. To return an apex predator and a spectacular mega mammal to its former habitat and thereby give a fillip to conservation efforts to reverse the trend of local extinctions, as well as

to instill pride in the local population and indeed in the people of MP, of once again possessing an iconic animal.

- b. Provide adequate security to local flora and fauna and thereby conserve this unique habitat of immense potential.
- c. Better protection and conservation of the habitats within the sanctuary. This in turn will enable conservation of other endangered species in the landscape such as caracal, rusty spotted cat, chowsingha, chinkara, Great Indian Bustard and lesser florican. This would fulfill the mandates of conserving the endangered species emphasized in the National Wildlife Action Plan (2002 ó 2016).
- d. Build the capacity of the forest department of MP in the field of habitat (especially of grassland-forest mosaics), prey, large carnivore and conflict management in view of the emerging needs.
- e. Develop the capacities of the local communities to adapt to the changing scenario after lion re-introduction and coexist with large carnivores.

Action Plan

Considerations for formulating objectives & actions to achieve the lion reintroduction goals in Kuno Wildlife Sanctuary. The Action Plan has been developed in compliance with IUCN guidelines (explained at each section & vide page 39) and a roadmap to lion reintroduction (time bound protocol) is provided at the end (vide page 38).

IUCN (2013) designed guidelines for reintroduction programs wherein it has been mentioned that any conservation translocation should have clearly defined goals and should follow a logical process from initial concept to design, feasibility and risk assessment, decision-making, implementation, monitoring, adjustment and evaluation. Hayward & Somers (2009) have documented various biological and social considerations behind designing conservation reintroductions of top-order predators. The points those need to be considered for formulating objectives and actions to achieve the lion reintroduction goals in Kuno Wildlife Sanctuary include:

- 1) <u>Site assessment, Kuno prey densities:</u> Chital is the most abundant wild prey in Kuno WLS (**Appendix 1**). Chital population grew at a realized growth rate of r = 0.36 and finite rate of population change, = 1.43, where $= e^r$ (Bipin et al. 2013, 2015). The observed $\pm r \phi$ is exceptionally high suggesting a growth rate close to $\pm r m \phi$ (intrinsic growth rate) and is likely due to good management practices and protection offered in Kuno WLS during the past 10-15 years (Bipin et al. 2013).
- 2) <u>Current lion carrying capacity of Kuno:</u> Prey biomass models based on preferred prey species and preferred preysø weight ranges (Hayward et al. 2007) suggest the carrying capacity of Kuno for lions to be ranging from 8 to 13 lions/100 km² (**Appendix 2**). This translates into Kuno sustaining a minimum of 24 to a maximum population of about 40 lions at the current prey density. Keithøs model (Fuller 1989) predicts that Kuno WLS with the current prey density can support about 19 ó 23 lions without causing any

declining trend in the prey population (Appendix 2). However, availability of about 2,500 feral cattle in the park (Banerjee 2005; Johnsingh et al. 2007; Khudsar et al. 2008) was not included in the models. These cattle are likely to provide lions with an additional prey base, at least during the initial phase of the reintroduction. This, if incorporated in the models, would further augment the carrying capacity of Kuno WLS for lions.

3) Population Habitat Viability Analysis (PHVA) of Kuno lions:

A PHVA model was parameterized based on demographic data obtained from the Greater Gir lion population (Banerjee & Jhala 2012). Probability of extinction of Kuno lions is most sensitive to number and frequency of supplementation of lions subsequently after the initial reintroduction of 8-12 individuals and carrying capacity (k) of Kuno for lions (**Appendix 3**). Supplementation of 4 lionesses and 2 lions every 4 years for the next 16 years increases population persistence to 95% for 100 years. The selection of animals for supplementation should be from distant and diverse social units within the Gir, so as to ensure a good representation of the Gir gene-pool in the founding population of Kuno. Even with this strategy long-term (> 200 years) lion persistence in Kuno requires a population of over 80 lions. This can be achieved by increasing the size of the Protected Area combined with an increase in prey abundance which will enhance the carrying capacity for the lions to the required level. The PHVA models were extremely sensitive to loss of lions to human causes and therefore strict monitoring and protection are required during the initial years till the population size exceeds 60 lions.

Compliance of Action Plan sections 1 to 3 with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
1 (site assessment and prey density of Kuno WLS)	Section 5.1.1. (basic biological knowledge) & Annexure number 8.1 (survey/monitoring before release)	Annexure 8.1 states that õit is desirable to collect baseline information on any area before releases into it.ö
1-2 (site assessment, prey density & carrying capacity of Kuno WLS)	Section 6 (ecological risk) and sub-heading 13 of Annexure 5.3 (habitat)	Previous studies by WII on prey, copredators and habitat in Kuno generated ecological information that address the concerns raised in these sections: õpossible ecological roles of the focal species in any new environment should be carefully evaluated, with the particular concern that the conservation interests of other species and habitats will not be jeopardised by the translocation.ö
1 ó 3 (site assessment, carrying capacity & PVA models)	Section 5.1.1 (basic biological knowledge), feasibility & design category	The relevant sections and annexures state that õsome type of modelling should be used to predict the outcome of a translocation

	Annexure numbers 5.1 (background biological and ecological knowledge) & 5.2 (models, precedents for same/similar species)	under various scenarios, as a valuable insight for selecting the optimal strategyö and should be based on õdata from previous species management activitiesö. The biomass models developed for carrying capacity estimation were based on information on lionsødiet and preferred prey species in Gir. PVA models were parameterized based on long-term ecological studies by WII on lion demography, resource selection and habitat use by the Gir lions.
3 (PVA models for Kuno lions)	Section 6 (risk assessment) & feasibility and design category Annexure numbers 6.1 (assessing the risk landscape)	These sections/annexures state that õa risk assessment should carefully consider all information on the speciesø biologyö, õknown pathogens or parasites, probability of potential impactsö, õtake into account of all sources of uncertainty and apply them at an appropriate spatial scale.ö

4) Habitat Management:

- i) While the current carrying capacity for Kuno WLS is a maximum of 40 lions, results of PHVA for Kuno lions show that the lion population will be viable for long-term at a minimum figure of around 80 individuals. Thus it emphasizes the need of further enhancing the current carrying capacity and prey base of Kuno for long term viability of the reintroduced lion population. This can be achieved by gradually including the potential habitats of the Kuno Wildlife Division (1,280 km²) and parts of the larger Kuno-Sheopur-Shivpuri landscape (3,300 km²) to a PA status and become part of the current wildlife sanctuary. Habitat management with restorative inputs and protection will assist in developing the natural prey base (especially chital) in this landscape in tandem with the recovery of the Kuno WLS gradually over time (about 50-60 years) to accommodate over 100 lions. Leopards are already there in Kuno in significant numbers with a density of about 10 leopards/100km² (Bipin et al. 2015). Lions and leopards can coexist for longterm in Kuno if adequate prey base and other resources are available. Lions dominate over leopards and therefore the presence of leopards is not a cause of concern for reintroducing lions in Kuno.
- currently Kuno WLS has an excellent water management with all the water holes (natural and artificial) spaced uniformly and not exceeding at a distance of three kilometers from each other. Village relocated areas should be managed as grasslands to promote natural prey base for lions and leopards and other endangered wildlife species of the region. Sustained efforts should be made to eradicate the weed species like *Cassia tora Lantana camara*, *Ageratum*

conyzoides, Ziziphus numularia, and Eupatorium spp. from the grasslands. Another threat is the encroachment of grasslands by woody unpalatable species such as *Vitex negundo* and *Butea monosperma*, which can reduce the productivity of the grasslands (Rawat 2003). Such growth need to be regularly thinned so as to enable the existence of grasslands as an arrested successional stage, to sustain high density of wild ungulates.

- iii) Incidence of fire in Kuno WLS has reduced substantially due to the re-settlement of villages. However, it is common especially on the periphery of the WLS and should have to be further reduced. The forests are rich is khair (*A. catechu*), prized for its :kathaøcontents and dhak (*Butea monosperma*) rich with resin content used in chemical industries. High lopping pressures by the local people therefore affect these species. This and incidence of fire should be stopped through increased surveillance. Department can even think of selling/auctioning various non-timber forest products to lessen illegitimate exploitation of those resources.
- iv) Miscellaneous species like *Ziziphus*, *Acacia*, *Carissa*, *Dichrostachys*, *Aegle*, *Terminalia*, *Diospyros* etc. with high forage value for wild ungulates can be planted at selected sites of Kuno. This will likely increase nutritional carrying capacity for native ungulates which in turn would be beneficial for lions and other carnivores.
- v) MP Forest Department should attempt to resettle three more villages (Bagcha, Jaangarh and Maratha) as proposed earlier from Kuno to integrate about additional 700 km² area to the current inviolate zone. The resettlement should be planned and executed in the same manner as it was done earlier. MoEFCC should also ensure financial aid to MPFD for this purpose as it did previously.
- vi) The size of the Kuno Sanctuary area is only 345 km², but the size of the forested habitat is over 6,830 km² extending from Kailadevi part of Ranthambhore Tiger Reserve, through the forests of Sheopur to Madhav in Shivpuri. Of this landscape 3,200 km² area was demarcated by Ranjitsinh & Jhala (2010) to be managed as the potential buffer zone for Kuno WLS. A buffer zone management strategy for this Shivpuri-Sheopur-Kuno landscape needs to be developed in line with the National Tiger Conservation Authorityøs landscape management plan guidelines (Gopal et al. 2007). These guidelines emphasize incentives and enhancement of livelihood of resident communities, compensation for livestock kills, mitigation of human-wildlife conflicts (discussed in the later sections of the action plan), and curtailment of high impact developmental activities.

Compliance of Action Plan section 4 (habitat management) with IUCN Guidelines

Kuno Action Plan Section Number IUCN Guidelines' Section/Annexure Number		Compliance		
4 (habitat management)	Section 5.1.2 & feasibility and design category Annexure number 5.3 (habitat)	The Annexure emphasized creating suitable habitat through creation of new PAs (habitats), eco-restoration and removal of unwanted species.		

5) Organizational commitments: A long-term (at least 25 years) Asiatic Lion Reintroduction Program involving financial, technical and administrative commitments needs to be guaranteed by signing a Memorandum of Agreement (MoA) by Ministry of Environment and Forests (MoEFCC, GoI) and the state governments of Gujarat and Madhya Pradesh to adhere to the Action Plan. The goals, responsibilities and commitments should be explicit and transparent in the MoA. Financial commitments should be flexible to accommodate rational changes to a translocation plan during implementation and subsequent monitoring.

Compliance of Action Plan section 5 (organizational commitments) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
5 (organizational	Sub-heading numbers 8 and 9 of Section 5.2 of IUCN Guidelinesø (social feasibility)	having mechanisms ensuring inter-organizational
commitments)	Sub section 5.4 (resource availability)	The sub section states that the õfunding agencies should be aware that rational changes to a translocation plan during implementation are normal, and budgets should be flexible enough to accommodate such changes.ö

6) <u>Training of personnel:</u> The forest officials of Gir and Sakkarbaug Zoo (Junagadh) are experienced in capture, handling and transport of lions since they are actively managing lion populations since a long time. Madhya Pradesh forest department can, however, seek the expertise of the forest officials and veterinary officers who worked in close association with CC Africa (now called &Beyond) in a reintroduction program of Gaur from Kanha to Bandhavgarh in 2011. Expertise of organizations like WII can also be sought for this purpose.

Compliance of Action Plan section 6 (training of personnel) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
6 (training of personnel)	Sub section 5.4 of IUCN Guideline (resource availability)	The section explicitly states that õeffective translocation managementö should õemphasis on incorporating social skill sets as well as biological/technical expertise.ö

7) Founder lion population:

- The primary aim of selecting the founder animals would be to maintain harmony between social dynamics and behavior of lions both in Kuno and Gir while securing a wide gene pool for the reintroduced population. Lions for the translocation should have to come from free-ranging stable social units. These lions would have to be identified by the Gujarat Forest department based on their field knowledge, well in advance of their capture. Selection of animals suitable for translocation will be the responsibilities of the forest officials of Gujarat and should be verified by experts of the MoEFCC

 Asiatic lion reintroduction committee.
- ii) Growth and stability of lion populations are largely determined by social and ecological factors such as density, tenure of coalitions of residential male lions, the number of females in a pride, intergroup competition, group territoriality etc. Frequent removal of resident males may influence successful reproduction, either through factors such as infanticide or through reproductive suppression (Whitman et al. 2004). Similarly, removal of adult females, the main breeding units of a pride, can also influence reproduction and population growth as larger groups have higher rates of reproductive success and tend to gain access to the best-quality habitats (Packer et al. 1988; Loveridge et al. 2007). The loss of cubs and sub adults affects population size and future reproductive potential.
- iii) It is, therefore, proposed that 8 to 10 adult lions (5-7 females and 2-3 males) and their dependent young be captured from two to three social groups of the Gir PA and translocated. Two to three lionesses of varied age groups from each pride and (not all the lionesses belonging to a pride from Gir PA) should suffice for the reintroduction. This is likely to prevent social interruptions since the remaining pride lionesses shall be able to maintain breeding units & can reproduce. This is also a primary principle of the IUCN Guideline that ensures that removal for reintroduction shall not be detrimental to the parent population.
- iv) Male lions in Gir attain sexual maturity at about 4 years and have a breeding life continued till late (about 12-13 years of their lifespans; Banerjee 2012). Male

lions for the reintroduction should therefore be selected in such a way that they have sired at least one cohort of cubs in Gir (7-8 years). It should be ensured that their youngest cubs are 1.5 ó 2 years in age so as to avoid infanticides in Gir by the new lions that would take over their pride in Gir once these lions are taken to Kuno.

v) Cub birth peaks in summer for the Gir lions (Banerjee & Jhala 2012). Capture, transport and release of lion pride for reintroduction therefore should be made in cool season (November ó February) so as to minimize stress on breeding lionesses.

Compliance of Action Plan section 7 (founder lion population) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
	Feasibility and design category sub section 5.1.4 (founders)	The sub section explicitly states that ofounders can be either from a captive or wild source.ö
	Feasibility and design category sub section 5.1.5 (animal welfare)	The sub section states that every effort to be made to minimize social disruption and resultant stresses on the source population.
Section 7 (founder lion population)	Annexure number 5.5 (foundersgenetic considerations)	The Annexure states that the removal of individual(s) from a source should not jeopardize the social dynamics or any critical ecological function therein.
	Annexure number 6.2 (risk to source population)	The Annexure states that the removal of individual(s) from a source should not cause a reduction in its viability.
	Sub section 7.2 (release strategy) and Annexure 7 (release and implementation)	Sub-headings 1 (identification of the most appropriate life stage for translocation), 2 (deciding optimum number of founders), 4 (maintaining social dynamics) and 8 (identifying the time of the reintroduction considering the speciesø ecology, biology and behavior).

8) Disease and health management of the founders:

i) Disease threats to wild animals have long been recognized and now become ever more important as we deal with small and isolated wildlife populations. Diseases, both endemic and epidemic, are important considerations which have to be monitored with the necessary management interventions when and if required; in order to ensure the success of lion reintroduction program in Kuno. Epidemic diseases are responsible for discrete epidemic bursts (Anderson & May 1979)

while endemic diseases are known to have a significant effect on the ecology of the host species. With ever increasing human population and their domestic animals, a consequent increase in contact and conflict between domestic animals and wildlife has enhanced the frequency of transmission of common pathogens of domestic animals to wildlife (McCallum & Dobson 1995). Vaccination and providing medical support to all wild lions are not always feasible and also it should not be done after the first few years of the reintroduction. However, careful identification of disease sources and interface (from domestic animals) could help arrest their spread into wild populations.

- Endemic diseases reported for free-ranging lions include Feline herpesvirus (FeHV), Feline immunodeficiency virus (FIV) while the epidemic diseases for which wild lions were found seropositive include Bovine tuberculosis (bTB), Canine distemper (CDV), Feline parvovirus (FPV), Peste des petits ruminants virus (PPRV), Feline calicivirus (FCV), Rabies, Feline coronavirus (FCoV) and Feline Infectious Peritonitis (FIP). Besides, presence of parasites such as diphyllobothrid, taenid, ascarid, strongyle, hookworm and isosporid eggs from the scat of wild lions in Gir PA has been reported (Sabapara 2002; Ramanathan et al. 2007; Shetty 2008).
- vi) Scientific studies assessing prevalence of potential carnivore pathogens/diseases (Rabies, Canine-distemper virus, Canine parvovirus, Feline immunodeficiency virus, Feline leukemia virus and Protozoan diseases like Trypanosomosis, Babesiosis etc.) need to be immediately initiated both in Gir and Kuno. Initially the samples (blood, tissue, swabs and faeces) should be collected from free ranging dogs and cats around both the protected areas and checked/examined for the infection and prevalence of the mentioned diseases. Later upon the results of initial stage, samples will be collected from wild carnivore communities (jungle cats, hyenas, lions and leopards) living inside the PAs to test the level of disease prevalence in the wild species. Samples need to be collected from a minimum of 20 individuals of each species from different locations and social units.
- vii) This exercise needs to be accomplished urgently with active cooperation of the field officers of both the states in association with the scientists from WII. Expert opinions of Indian Veterinary Research Institute (IVRI), Bareilly can be sought if and when required. Diseases prevalent in Kuno but not in Gir need to be addressed through vaccination of founder population. It would be prudent to screen the founder population of lions for antibodies through an ELISA (dot assay) and for antigens through a PCR with fluorescently labeled universal primers available for pathogens and epizoic that are prevalent in the region, before they are released in Kuno.

Compliance of Action Plan section 8 (disease and health management of founders) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance		
	Sub-section 5.1.6 and Annexure number 5.6 (disease and parasite considerations) Section 5.3 (regulatory	The sections clearly state that õthe management of disease and known pathogen transfer is important, both to maximise the health of translocated organisms and to minimise the risk of introducing a new pathogen to the destination areaö which can be achieved through a surveillance.		
8 (disease & health management of	Section 5.3 (regulatory compliance)	The section states that õnational requirements for animal health before release should be met.ö		
founders)	Annexure 6.4 (disease risk)	The Annexure states that õrisk assessment should focus on known pathogens in the translocation stock that are likely to have undesirable impacts on other organisms at the destination. Generalist pathogens with no known history at the destination are a particularly high risk.		
	Sub heading 15 (pre-release treatment of founders) of Annexure 7 (release and implementation)	The section states that õpre-release treatment or medication can help to protect animals from pathogens encountered after release.ö		

9) Monitoring of lions for first three generations by radio-telemetry: All the founder lions should be fitted with satellite/GPS collars enabled with a ground data download facility. The collaring exercise has to be done when lions are captured from the Gir PA and under the supervision of forest officials, veterinary officers of Sakkarbaug Zoo, WII scientists and members of the expert committee. The formal procedure of procuring radio-telemetry equipment (radio-collars, receivers, antenna and data management software) needs to be started well in advance as their shipment may require 4-6 months. WII can also be accorded responsibility of obtaining the radio-telemetry and subsequent monitoring equipment since they have a technical knowhow about the procurement system from the international firms. Lion cubs born in Kuno should be collared at the age of 1.8 ó 2 years prior to their dispersal. Dispersal age males will require satellite/GPS collars while females can be equipped with ordinary VHF/GPS collars.

Compliance of Action Plan section 9 (monitoring of lions for first three generations by radio-telemetry) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number		Compliance
9 (monitoring of lions for first three generations by radio- telemetry)	Section 8 (monitoring ar continuing management) ar Annexure number 8 (monitoring after release)	d 12 11 2 11 2 11 2 11 2 11 2 11 2 11 2	The sections state that õpost-release monitoring is an essential part of a responsible conservation translocation and the intensity and duration of monitoring should be proportional to the scale of the translocation and the levels of uncertainty and of risk around the translocation results.ö

10) Immobilization and capture of lions - drug dosages: Lions should be anesthetized using a combination of Ketamine (2.2 - 2.6 mg/kg body weight) and Medetomidine (0.04 ó 0.06 mg/kg body weight) (Kreeger 1996) injected intramuscularly using a gas-powered projectile (Dan-Inject Aps., Sellerup Skovvej, Børkop - Denmark) dart delivery system. Actual dosage can be decided on the spot, taking into consideration the animaløs health and condition, level of excitement, physiological status, gender, age, time of the day, and ambient temperature. All necessary drug clearances need to be procured *a priori* from the Drug Controller General of India and the Narcotic Commissioner (Ministry of Finance, Central Bureau of Narcotics) if needed. Each sedated lion should be aged, weighed, measured and ectoparasites and blood samples collected using the standardized capture protocol available with WII. Each lion should be implanted with a transponder facilitating their future individual identification. The profiles of all the individual lions should be maintained by MoEFCC expert committee and the forest departments of Madhya Pradesh and Gujarat. Reversal agents (Atipemazole), lifesaving drugs and a well-equipped wildlife rescue vehicle should be kept handy in case of any emergency.

Compliance of Action Plan section 10 (immobilization and capture of lions) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number			Compliance
10 (immobilization and capture of lions)	Sub section welfare)	5.1.5	(animal	The protocol developed for the capture and immobilization of lions aims at minimizing stress on the captured individuals.

11) Transportation of lions from Gir to Kuno:

- i) Lion transportation must be conducted in a manner that adheres to all laws, is safe, and minimizes risk to the animal(s), employees, and general public. Transports should be carefully planned to ensure that the fastest route is taken, with the fewest number of stops and transfers. Lions captured from Gir should be transported to the nearest airport (Keshod/Porbandar/Rajkot/Diu depending upon the parts of Gir from where the lions were captured) by road in a truck. One or two flight(s) should be chartered for transporting lions from Gujarat to Gwalior/Shivpuri from where the animals shall be transported to Kuno by road in truck. Alternatively, Indian Air Force helicopters can also be used for direct airtransport of lions from Gir to Kuno as happened for tiger reintroduction from Ranthambhore to Sariska in 2008 (Sankar et al. 2010). Copies of health certificates, transaction permits and all other relevant documents should be shipped along with the lions and attached to the cage. Apart from the air force staff, a veterinary officer and two to three trained staff in handling lions along with all the necessary supply and equipment should accompany the shipment.
- ii) All the identified lions in the Gir PA may not be captured and collared on a single day. Therefore, the captured lions from Gir may be kept temporarily at the veterinary care center at Sasan under the supervision of a veterinary team. The entire capture operation should not exceed 3 ó 4 days.
- Considering the size and capacity of an airplane, a maximum of two chartered flights need to be arranged to transport all the lions on a single day. Otherwise, captured lions need to be kept at Sasan until they all are shipped to Kuno. Attempt should be made to ship all the individual lions to Kuno within 2-3 days by arranging multiple air shifts in a day.
- Transport crates should be designed in accordance with the norms laid by iv) Associations of Zoos and Aquariums (AZA) and Central Zoo Authority (CZA). Crates designed for tiger reintroduction in Sariska (Sankar et al. 2010) and Panna can offer models for making crates for lion translocation. Care must be taken that transport crates have no spaces that allow lions to reach out with their claws yet sufficiently ventilated for thermoregulation. Padlocks are necessary on every door, and the keys should be included with the shipment paperwork that is attached to the crate. Crates for lions should be light in weights, preferably made up of durable aluminum. The height of the container should allow the animal to stand erect with its head extended; the length of the container should permit the animal to lie in the horizontal position. The frame should be made from metal bolted or screwed together and must include a spacer bar 2.5 cm (1 in.) deep along the side for air circulation. The interior must be metal lined. Ventilation openings should be placed at heights that will provide ventilation at all levels, particularly when the animal is lying down. Care should be taken to keep the container dark from inside so that the animal would remain calm during the transport. Additionally, handles

should be positioned around the crate in case manual unloading is necessary. Spacer bars on the bottom will aid in unloading with machinery. A truck should be used to transport the lion in its container from the site of immobilization to Rajkot airport or veterinary care center at Sasan (Gir).

Compliance of Action Plan section 11 (transportation of lions from Gir to Kuno) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
11 (transportation of lions from Gir to Kuno)	Sub sections 5.1.5 (animal welfare) and 7.2 (release strategy) Annexure 5.6 (disease and parasite considerations)	These section state that õMinimising stress during capture, handling, transport and pre-release management will enhance post release performance.ö The Action Plan section addresses the concern raised in the Annexure: õpoorly designed transport containers and methods of transport, extended time in transport, and lack of adaptation prior to transport can contribute to the occurrence of disease and mortality during the translocation process.ö

12) Soft release of lions in Kuno:

- i) Lions should be isoft released. This would reduce their tendency to disperse long distances from their site of release (homing instinct). Short (2010) reports that a soft release strategy proved more successful in comparison with a hard release (67% versus 27%). The short-soft-release method generally has a significantly lower mortality hazard in comparison with hard-release and captive-born methods & also ameliorates some stresses associated with the sudden release of the individuals into unfamiliar environments as in hard-release methods (Hayward & Somers 2014).
- ii) Soft-releases have been used successfully in reintroductions of northern Rocky Mountain gray wolf (*Canis lupus occidentalis*, Fritts et al. 2001), red wolf (*Canis rufus*, Phillips et al. 2003), Mexican wolves (*Canis lupus baileyi*, Parsons 1998), swift fox (*Vulpes velox*, Sasmal et al. 2015) and African lions (Hunter et al. 2007; Miller et al. 2013; Slotow & Hunter 2009).
- iii) In India, such method has also been successfully used for tiger reintroductions in Sariska and Panna (Sankar et al. 2010, Harsh et al. 2015; Ramesh 2015).
- iv) The lions shall be housed, in the existing fenced lion enclosure near Palpur in Kuno WLS. The enclosures should not have any corners and should be rounded. Four separate zoo-like holding facilities (pen/compartments), each of quarter of ha

should be constructed for different social groups separately. Individual lions belonging to the same social unit can be housed in same compartment. However, if conflict is observed even among the same social unit, lions should be separated in different compartments. Additional retiring cells should be constructed for veterinary treatment and other necessary animal care interventions.

- The height of the fence of the enclosure will have to be raised to about 3 m, from v) the existing height of approximately 1.5 m and a line or two of power fence may have to be fitted at the top. A visual barrier of 2.5 m height may be fixed along the enclosure to minimize any stress to the lions due to movement of people around the enclosure. Adequate water and shade exists in the enclosure but shall be suitably augmented as needed. All enclosures must have smaller shift facilities to permit safe cleaning, cage repair, or other separations. Fresh water should be available at all times and should be checked daily to make sure water is clean and that automatic drinkers, if used, are working properly. The enclosures should contain large rocks, logs, termite mounds and long grasses in particular areas, as enrichment so as to minimize stereotypic behaviors. All enclosures should allow each animal to retreat from conspecifics through the use of visual barriers, such as rock outcroppings and foliage without limiting an animal@s access to food, water, heat, or shade. Round the clock veterinary observation with extra treatment if necessary need to be provisioned.
- Lions should be allowed to acclimatize for 10 days to two months. This will enable them recover from the trauma and the stresses resulting from capture and transportation. The males shall be radio collared and soft released from the main enclosure first. They are expected to establish a coalition territory after exploring and investigating the available habitat, but would tend to return to the enclosure to meet the females. The presence of females in the main enclosure shall ensure that the males do not wander too far away, after their exploration instinct is satiated. Their movements shall be monitored several times in a day by the local staff, assisted by a team of researchers from WII. If any animal tends to get into inappropriate areas/habitats, it will be brought back into the Sanctuary so as to prevent conflicts as is being done by lion tracking teams in Gir (Pathak et al. 2002; Singh 2007; Meena & Kumar 2012). Darting will be done if absolutely essential, by qualified trained personnel.
- vii) The females shall be released, after radio collaring, 1-4 weeks after the males, depending upon the state of the malesø comfort in the new environment. The females shall be monitored and kept under observation through radio telemetry, as in the case of males described above. Once all the lions settle down and establish home ranges/territories (one to three months), the monitoring frequency can be reduced to 2-3 locations/day and one visual observation semi-weekly.
- viii) Gir has an excellent lion tracking team experienced with monitoring lions on a daily basis. The veterinary teams at Sakkarbaug Zoo and Gir are also well versed

with lion behavior, social organization and health issues and have capabilities to capture and handle diseased /injured lions. A team comprising of the 2-3 lion trackers and 1-2 veterinary team members of Sakkarbaug Zoo can be stationed at Kuno for the initial period of three months after reintroduction. They can work in close association with the local veterinary team in Kuno. Veterinary expertise of Van Vihar Zoological Park, Bhopal and adjacent Madhav National Park, Shivpuri should also be sought for regular monitoring of reintroduced lion population until the local veterinary team becomes fully proficient. A permanent veterinary unit and lion tracking team needs to be established and trained at Kuno.

Compliance of Action Plan section 12 (soft release of lions in Kuno) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
	Sub section 5.1.5 (animal welfare)	The Action Plan recommendations address the concern raised in this sub section of the IUCN Guideline: õStress in translocated animals may occur during capture, handling, transport and holding, including through confining unfamiliar individuals in close proximity, both up to and after release.ö
12 (soft release of lions in Kuno)	Sub-heading 8 of Annexure 7 (release and implementation)	The sub-heading states that othe life history, ecology and behaviour of the focal species, together with any seasonality in essential resource availability, should guide scheduling of releases.ö
	Sub-heading 14 of Annexure 7 (release and implementation)	It suggests that õanimals can be behaviourally conditioned before release; this may be particularly valuable for socially complex species.ö
	Sub-heading 15 of Annexure 7 (release and implementation)	The sub-heading states that õpre-release treatment or medication can help to protect animals from pathogens encountered after release.ö
	Sub-heading 16 of Annexure 7 (release and implementation)	The sub-heading clearly states that õanimals may be held for some period at the release site to allow them to accustom to local conditions.ö
	Sub-headings 18 and 19 of Annexure 7 (release and implementation)	The sub-headings suggest that oduring or following release, the provision of artificial caging, shelters or residences, or supplementary food and water can increase survival of animalso and that can

and available nutrients.ö

13) Post-release monitoring and research:

- i) A thorough monitoring system needs to be in place so as to provide feed-back in an adaptive management framework (Williams et al. 2002). The reintroduced lion population in Kuno needs to be intensively monitored and managed at least for 20 years with all the adult lions fitted with GPS/satellite collars for 10 years. Radiocollars on lions should be replaced immediately in case the battery life ends or there is a technical snag.
- ii) Research in all aspects of system recovery and interactions including ecology of the reintroduced lions and their population trends, as well as of their prey species, should be addressed by WII. WII should recruit a senior wildlife biologist and two wildlife biologists to monitor conduct research and supervise the program. The research team should be facilitated by the MP Forest Department with two four-wheel drive vehicles, at least four field assistants and all other necessary logistic supports. The team should work in close association with the local forest officials (Range and Sub-division levels) and report their performance (through telephone/wireless/fax) weekly to the DFO, Kuno; monthly to the CCF (Wildlife) Gwalior and quarterly to the Chief Wildlife Warden in Bhopal. A half-yearly monitoring/research review meeting should be organized at Bhopal/Gwalior/Kuno where experts from WII and forest officials from Gujarat should be invited to assess the scenario of reintroduced lions.

Suggested research/monitoring programs are:

- Radio-telemetry: All adult lions should be equipped with GPS/satellite collars for the first 10 years. After that at least one female (preferably two) from each group should be equipped with radio-collars to monitor the performance of the group. Sub-adult males should be radio-collared before they reach their dispersal ages (about 3 years) to identify new areas in the larger Kuno landscape explored by the lions. Information on survivorship, ranging, movement, dispersal, resource selection, predation and aspects of human-lion conflicts should be recorded from radio-telemetered lions.
- iv) Monitoring lionsødiet: Systematic collection of lion scats should be performed on a regular basis to monitor the lion diet through scat analysis. Such samples could also be used for parasitological assay, which may prove important in assessing the prevalence of parasitic infections. Attempts should be made to locate all predation events (kills) by lions to understand feeding ecology and impact of lion predation on prey demography.

- v) Monitoring prey populations: WII has been studying prey population in Kuno since 2005. Annual abundances of wild ungulates in Kuno should be continued to be estimated based on Distance sampling to measure of food availability for the lions and other carnivores. Efforts should be made to estimate the prey abundance in the larger Kuno landscape (3,300 km²) at least once in a year to monitor the impacts of protection and eco-restoration on prey population. Currently Kuno WLS has sufficient prey base to support about 40 lions and other carnivores in the area. However, sudden increase in the predator population in the area may lead to some unexpected effects on certain prey species and even to habitat (trophic cascade effects, Ripple & Beschta 2012; Ripple et al. 2014). The response of the prey species to the increased predation shall be monitored by WII researchers to understand the new dynamics and supplementation of prey (such as chital and nilgai), if needed will be decided on the basis of annual assessments.
- vi) Monitoring other carnivores: Abundances and population parameters of other carnivores (such as leopards, hyenas, jackals, wolves etc.) should be regularly monitored in a mark-recapture framework (Jhala et al. 2010) based on camera traps. About 50 pairs of camera traps may suffice for this purpose. Scat samples of other carnivores need to be collected to assess their diets. This would enable the management to understand the probable niche partitioning mechanism operating in Kuno. These exercises can, however, be started even before the lions are reintroduced. This will be helpful in evaluating changes in population dynamics and dietary shift (if any) of predators before and after lion reintroduction.
- Monitoring vegetation and anthropogenic disturbances: Sample plots in the major vii) vegetation types should be established and monitored for seed germination, recruitment and succession. This can be achieved by marking adequate sample area and collecting data repeatedly at an interval of three to five years for a period of 25 to 30 years. High resolution habitat mapping of the landscape on a GIS domain at an interval of every five years should be done so as to monitor the changes in the habitat and landscape connectivity. Data on various disturbance parameters (such as cutting, lopping, grazing, human trails etc.) can be collected following the protocol (field guide) developed by Jhala et al. (2013). The vegetation and disturbance data should be collected from localities under varying intensities of anthropogenic pressures and under different management practices. The propensity of Kuno to support a large prey base is related to its grasslands and the presence of õKardhaiö (Anogeissus pendula). These should be particularly studied, including the composition of and changes therein, of perennial grass species that are the preferred food of the herbivores.
- viii) Monitoring and studying human-lion conflicts: The success of the Kuno program will substantially depend on human-lion relationships. Actual conflicts should be quantified through data from radio-telemetered lions (such as frequency of livestock predation versus scavenging, lions coming in close proximity to human habitations etc.) while the perceived data should be collected through interviewing

local people using a questionnaire survey (Ranjitsinh & Jhala 2010; Banerjee 2012). Such information will become crucial in active management of lions in the landscape and for future policy making.

- Monitoring lion population through individual identification: WII has devised a technique to individually identify lions based on vibrissae patterns and other natural body markings (Jhala et al. 1999; 2004). A computer executable database program LION version 1.0 (Badoni et al. 2005) by WII wherein sighting profiles of individually identified lions can be maintained and analyzed to study lion demography and population dynamics (Banerjee & Jhala 2012). Individual profiles of all the lions of Kuno should be maintained in this program by the research team as well as by the park management from so as to monitor lion social organization, survival and other vital rates. This becomes an important tool to monitor lion population in Kuno when the collaring stops (i.e. after the third generation of lion population).
- x) Expecting approximately a realized growth of r = 0.18 like that observed for recovering tiger populations (Jhala & Qureshi unpublished) along with supplementation every 4 years from Gir, the Kuno lion population, should reach current carrying capacity of 40 within 15 years. To reach the required population size of 80 lions the time required would be close to 30 years. During the initial years of lion reintroduction (5 ó 8 years) or population below 20 adult lions (1/2 of carrying capacity, k), no lion should be allowed to stray in the sub-optimal parts of the landscape. If there are such instances, lion(s) should be captured and brought back to Kuno WLS. This should be done as per NTCAØs Standard Operating Procedure available for managing straying tigers in human dominated landscapes

(http://projecttiger.nic.in/WriteReadData/CMS/Final SOP 11 01 2013.pdf). The larger landscape should be allowed to be populated by lions only after the landscape is secured, the prey base adequately enhanced and risks to their survival are minimized. However, such landscape level efforts are not quick fix since their enactments demand time and they must not impede the immediate goal of reintroduction lions inside the sanctuary. Rather they should be concomitant with lion reintroduction exercises inside Kuno WLS.

xi) Boundaries of the potential lion habitats in Kuno WLS, abutting on human habitation shall be secured through proper fencing if needed, in consultation with the affected people, to minimize conflict, poaching and straying of released lions into human habitats and of livestock into the lion habitat, thereby precipitating man-lion conflict.

Compliance of Action Plan section 13 (post-release monitoring and research) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
	Sub section 4.2 (monitoring program design)	The sub section states that omnonitoring the course of a translocation is an essential activity and should be considered as an integral part of translocation design.ö It also provides guidelines on methods and protocols of data collection and agencies/personnel responsible for conducting research and dissemination of finding.
13 (post-release monitoring and research)	Sub-heading 6 of section 6 (risk assessment) and Annexure sub-sections 6.3 (ecological consequences of translocation) and 6.7 (socio-economic risks)	These sections suggest that ofthe ecological consequences of a translocation affecting both the translocated species and other species or ecological processes in the destination communityö and potential direct (livelihood) and indirect negative impacts on human interests should be monitored to develop and revise post-monitoring management strategies.
	Annexure 7 (release and implementation)	Discouraging post-release dispersals.
	Annexure sub section 8.2 (monitoring after release)	Post release monitoring should focus on demographic monitoring, behavioral monitoring, ecological monitoring, genetic monitoring, health monitoring and socioeconomic monitoring.
	Annexure sub section 8.3 (continuing management)	õAdaptive managementö and õactive adaptive managementö based on monitoring.

14) Genetic management: supplementation

- i) PVA models for Kuno suggest that long-term viability of the lion population is possible through regular supplementation of new individuals (Appendix 3). Six lions (two males and four females) should be supplemented in the Kuno population from Gir until 16 ó 20 years from the first reintroduction at an interval of 4 years. To minimize inbreeding and maximize genetic diversity in the reintroduced population of lions, the founder males need to be removed after they sire one cohort (after 3-4 years) of cubs in Kuno and be replaced by an unrelated coalition of male lions (7 ó 8 years old) from Gir PA. The new males and females should be younger than the founder stock and should be captured from different areas (other than the founder stock) of the Gir PA. This would enable the overall representation of the lion genetic structure of the Gir PA amongst Kuno lions. Rotation of male lions should be done in synchrony with the age of their cubs reaching dispersal age both in Kuno and Gir so as to minimize infanticide.
- ii) Capture, handling, transport and release of the lions during the subsequent phases would be as per the norms discussed before (or by any improved facility available in future and deemed technically feasible for translocations) and should aim at minimizing injury/stress and mortality.
- iii) With the release of new male lions in Kuno it is likely that there is a territorial strife with the old males and may result into death/injuries to the older males or/and their dispersal into sub-optimal habitats of the adjoining human-dominated landscape. This, if allowed to happen, may escalate conflicts with humans (mostly through livestock depredations) and may even lead to retaliatory killings of lions like that happened in Chadraprabha (Negi 1969). Such incidents are likely to severely undermine the success of lion reintroduction program in Kuno and may be undesirable.
- iv) Alternatively, the older males after siring one cohort of cubs in Kuno will still be capable of reproduction (about 10 -12 years; Banerjee 2012). MPFD would take all necessary scientific steps for the benefits of these lions as per IUCN Guidelines maintaining genetic diversity of the reintroduced lion population.

Compliance of Action Plan section 14 (genetic management: supplementation) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
14 (genetic management: supplementation)	Sub section 5.1.4 and Annexure 5.5 (founders)	Both the sections suggest enhancement of genetic diversity in the reintroduced populations to ensure long term persistence of the populations.

15) Management of lions and tigers in Kuno: Currently Kuno WLS is occupied by a single resident tiger (T 38) from adjacent Ranthambore Tiger Reserve, Rajasthan (Jhala et al. 2010). Both lions and tigers being top predators will sometime get involved in inter-specific strife resulting into injuries and even deaths. But that would be a natural process and management by appropriate supplementation and recruitment from the introduced population would compensate these. The tiger population in the landscape needs to be managed during initial years of lion reintroduction (4-5 years) so as to avoid/minimize interspecific strife and allow the reintroduced lion population to stabilize. The best strategy would be to radio-collar (GPS/satellite) the tiger (and any other additional immigrant/resident tiger in future) as well, so as to study the interaction between these two top carnivores as part of the research program of Kuno reintroduction. The research should aim at radio-collaring of tigers and other copredators (such as leopards, hyenas and jackals) of Kuno in the same temporal scale. This will generate valuable information on resource separation amongst carnivore communities in Kuno and be of immense help in formulating future management plans. Based on this research, management strategies to permit and promote coexistence or to manage the immigrating tiger individuals need to be decided for the future.

Compliance of Action Plan section 15 (management of lions and tigers in Kuno) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
15 (management of lions and tigers in Kuno)	Annexure 6.3 (ecological consequences of translocation)	The Annexure states that inter-specific competition is a major risk for any reintroduction and that should be studied and managed.

16) Capacity building and training:

- i) A large number of field staff posts are vacant (one Range Officer, five foresters and 42 forest guards) in Kuno. All these vacant field posts should be filled up within six months. In the filling up of vacant posts the guidelines issued by General Administration Department (G.A.D) of the government of MP, by which there would be relaxation of minimum recruitment requirements for Primitive Tribes such as the Sahariyas, should be adopted and as far as possible the recruitment must be from relocated villages.
- ii) Two veterinary teams (each with one officer and minimum three assistants) should be recruited and posted at Palpur and Sesaipura to manage the released lions and other carnivores, in cases of straying, injury and conflict. The teams will have separate jurisdictions overseeing the eastern and western parts of Kuno WLS and should have round the clock responsibilities. Extra incentives and overtimes

should be paid to them and all forest staff of Kuno WLS as per the MP Governmentos rules. Each team should be equipped with a wildlife rescue van (preferably a mini truck), wireless systems, adequate drugs, dart equipment and other necessary paraphernalia. A well-equipped veterinary and rescue care center should be constructed at Sesaipura/Pohari with long-term housing facilities for at least 10 lions and leopards for medical interventions and treatments. This is essential so as to provide treatment for mild ailments, injuries, or to temporarily hold animals that may be unfit for wild release (such as perpetual livestock raiders). A temporary in-field housing facility should be constructed somewhere within Kuno WLS (away from the tourism zone) where injured animals can be housed and treated on a temporary basis. Each Range office should be provided with two transport cages, one each for lions and leopards to expedite rescue operations outside the park. During the initial phase, inputs from the veterinary teams of Sasan Gir and Sakkarbaug Zoo can be sought for training the veterinary staff in Kuno.

- Two separate lion tracking teams should be constituted. Each team would be comprised of two to three young, motivated staff having interest in wildlife and two to three labors recruited on a daily wage basis. The primary duty of this team would be to continuously monitor radio-collared lions with WII researchers. This has been practised in Sariska and Panna where the departmental tiger tracking teams are continuously monitoring the reintroduced tigers in close association with WII research team. The team in Kuno would also learn to track non-collared lions and other carnivores over time. Each team should be equipped with two-three motorcycles and a wireless system so that they can report any case of conflict, injury and/or disease instantly to the veterinary teams. The tracking team should also be trained over the years to capture and handle lions and other carnivores so as to augment the capabilities of the veterinary team.
- Boundaries (legal) of Kuno WLS and the contiguous forest patches (Reserve Forests, Protected Forests) should be demarcated clearly on ground either by constructing rubble walls and/or by erecting posts with appropriate markings written on them in Hindi and English. The boundaries should also be clearly delineated on forest maps and Survey of India@s topo-sheets and be available at every range office. Procurement of satellite imageries and map digitization facility should be developed for management planning. Temporal changes in the high resolution Landsat imageries should be scrutinized regularly to evaluate encroachments in forest lands.
- v) Importance of protection for successful conservation cannot be overemphasized. A protection regime against poaching by snaring, trapping, poisoning and electrocution and accidental deaths due to road accidents and electrocution needs to be initiated urgently around Kuno. This could be achieved by patrolling (both in vehicle and on foot) different areas of Kuno WLS and the larger landscape. A patrolling squad led by an ACF/RFO ranking officer and comprising of 2-3 armed

frontline staff (including one lady guard) and 1-2 police constables (including a lady constable) should be constituted. One additional ACF post may also be created for this purpose. The squad will be provided with a well-equipped vehicle to patrol areas of Kuno and outer landscape anytime of the day. Maintenance, creation and upgradation of road networks within the park and in the buffer areas should be kept in mind. A vigil should be kept on illegal mining, illegal fishing and hazardous electric connections in the villages and farmlands. The squad must also be trained about the technical knowhow of a smart patrolling protocol (developed for the tiger reserves at free of cost by WII) so that they can enter patrolling and monitoring data directly on a computer/laptop that can be accessed directly (online) by the DFO, CCF and Chief Wildlife Warden. It should be kept in mind that the squad is not a replacement of the regular patrolling done by the Rangers and other frontline staff; it is an addition to that.

- vi) Intelligence gathering should be done at bus stands, road side *dhabas* (restaurants), liquor shops, hotels, railway stations through a network of local contacts amongst the communities. Check posts with CCTV surveillance should be erected at strategic points of Pohari-Gwalior, Pohari-Shivpuri and Pohari-Sheopur highways to monitor vehicles passing through there.
- vii) Recruitment for the vacant posts should be as far as possible from the local communities. In this regard experience of Nagarjunasagar-Srisailam Tiger Reserve could be taken into account where efforts are being taken to work with the local Chenchu community protect to http://www.thehindu.com/news/national/andhra-pradesh/chenchus-help-inmanaging-tiger-reserve-better/article3997253.ece. Recruitment of lady staff for various frontline posts should be considered. Emphasis on physical fitness, aptitudes and local candidature is a must in any recruitment. Without a set of dedicated personnel at ace levels, the goals of the project cannot be attained. Madhya Pradesh Forest Department, therefore, should try to ensure that trained and skilled staff once deputed in Kuno must not be transferred quickly and their official leaves are kept minimal during crucial phases of the project implementation. Otherwise, the whole objective behind staff/official training gets undermined thereby delaying and jeopardizing the progress of the project.
- viii) Local people of Mongia and Sahariya tribe will be employed on daily wages, one in every village to develop a landscape level informal informant system. Identity of such informants should be kept secret as far as possible and they should be awarded with cash prizes for useful and timely information. The informant team will directly inform the local Range officers about any movement of suspicious vehicles/people, use of electric fences/snares in the farmlands, incidence of any poaching, rescue/relief needs of wildlife and any livestock predation by predators. This will be important for prevention of poaching and other conflict incidents in and around Kuno.

- A project implementation team consisting of the Chief Conservator of Forests, in charge of the project, Divisional Forest Officer, assistant conservator (s), range officer (s), deputy rangers, foresters and to the extent possible the forest guards shall be selected on the basis of their interest, commitment and capabilities and shall be posted for a minimum period of at least 3 years and if possible up to 5 years. The senior members of the team, including the project biologist and veterinarian, would be sent on a training tour to selected tiger reintroduction sites in India and/or lion reintroduction sites in South Africa as early as possible. The composition of the team would be decided by the CWLW, MP. The training shall be conducted in batches. The senior members, who would be trained abroad, would train the junior staff of the Sanctuary. The entire staff working for the Sanctuary shall be paid a Project Allowanceøat par with the allowance paid to the staff working for Project Tiger.
- x) The Sanctuary boundaries need to be extended to cover the areas of the relocated villages and this will enlarge the inviolate core and available habitats to more than double the size of the current Sanctuary.
- xi) Proper attention should be paid to the staff amenities and welfare. Old forest quarters should be refurbished regularly wherever possible. New quarters should be constructed as per need. Residential accommodation for the children of frontline staff deputed in Kuno WLS in nearby towns or cities (for education purpose) could also be considered. A staff welfare fund should be developed based on revenue generated through tourism. The fund should provide the frontline staff with financial assistance and incentives as and when required. Each staff (permanent and temporary) working under the lion reintroduction project should be provided with a life cum accident insurance and a full medical reimbursement policy during his/her service period. Uninterrupted supply of field kits, medicines, mosquito nets, torches etc. to the frontline staff of Kuno WLS should be ensured. Remote area allowances as per the government rules should be paid to staff deputed in the park.
- Increased mobility of staff, arms and equipment: Kuno WLS should be provided with at least two patrolling vehicles (four-wheel drives for regular patrolling) and two mini truck (with four wheel drives) for carrying cages and other necessary materials during rescue operations. Additional four wheel vehicles should also be provided to the forest rounds which are sensitive to wildlife crimes. Frontline staff should be provided with motorcycles for daily beat patrolling. Running costs of the vehicles/motorcycles (fuel and maintenance) should be borne by the MP forest department. Arms and ammunitions should be purchased in sufficient amount with a minimum of three rifles, three shot guns and two pistols per range and be distributed to the frontline staff. Each forest beat should have a GPS unit, a laser range finder, one sunnto compasses, one binocular and one digital camera for patrolling and monitoring wildlife. Photo documentation of wildlife crimes, rescue/treatment operations and human-wildlife conflict cases

should be made mandatory. Night (on foot or motorcycles) patrolling is helpful for catching offenders and acts as a major deterrent to crime. A photo-copier-fax-printer and a computer should be provided to each Range office for facilitating their office work and managing data on patrolling (MSTrIPES). Distribution of adequate wireless walkie-talkie sets (minimum one hand set per beat) to all frontline staff should be ensured. Staff without any access to electric connections should be provided with extra batteries and solar chargers.

- Training: Regular in-house training of the forest officials, veterinary team, frontline staff and lion tracking team should be organized. Batch wise tour of the officers and staff should be arranged to Gir to learn various issues of lion conservation management. Training on jurisprudence, wildlife forensics, and aspects of illegal trade should be organized for local staff with the help of institutions/organizations like WII, WWF-India, Wildlife Trust of India (WTI) and Wildlife Crime Control Bureau (WCCB). WII would organize regular training programs for the officers and staff on issues like smart patrolling, ecological monitoring of lion, prey, other carnivores and habitat (such as handling of GPS and other equipment, line transects, camera traps, radio-telemetry, lion monitoring software, smart patrolling software, digital photography etc.) in Kuno.
- Additional computers and peripheries should be purchased at Circle, Division and Range levels to cope up with maintenance of increasing amounts of records. Additional clerical posts (data manager, computer operator, hardware engineer, accountant, wireless operators etc.) should be created and recruited as per need in the future.
- xv) Inter-sectorial collaborations: Inter-departmental coordination should be explored. Much of the success of the Kuno lion reintroduction program will depend on this. Collaboration with police and revenue department is essential to design conservation friendly land policy and strengthening protection in and around Kuno. Northern fringes of Kuno landscape form part of Chambal valley, infamous for its notorious dacoits and therefore ensuring protection to every part of Kuno sometime becomes difficult for the forest staff. Assistance of armed police force should be sought in cases of confrontations. Similar alliances with other state governmental departments like agriculture, rural development, tribal development, transport, tourism, power, law etc. should be maintained. Officers from other departments should be oriented towards various aspects of wildlife conservation and legislations on a regular basis. A tehsil level monitoring committee under the chairmanship of DFO, Kuno WLS and a district level coordination committee under the chairmanship of CCF, Gwalior should meet at least once in a month to supervise various facets of management and collaborations. MP forest department should also be prepared to work in close connotation with the Rajasthan forest department especially with the adjoining Ranthambhore Management Unit to monitor interstate movements of tigers and lions.

- xvi) People's support and eco-development: In programs of carnivore reintroduction, one should be aware of the human dimensions of such undertakings. The pre-eminent importance of considering people's reactions to receiving previously absent wild carnivores in their environment shines through in many of the contributions. The need to involve people whose livelihoods may be affected is a *sine qua non*, but when ignored may have disastrous consequences.
- No landscape level conservation program can be sustained without the help of xvii) local communities. Confidence of local villagers should be won. Sarpanches (village head men), local leaders, teachers, social workers, religious figures and NGOs should be provided with a better stake in the conservation. Awareness programs should be run at schools, colleges and villages sensitizing people about the conservation problems and various schemes available with the forest department. Various pro-active rural development and eco-development projects such as construction and repair of village roads, financial and logistic aids for education and self-employment, construction of bridges, check dams, anicuts and cause ways, facilities to schools, clean drinking water facilities, sanitation (mobile toilets), medical facilities, solar street lights, solar cookers, improvement and repair of houses and protection from open irrigation well etc. should be introduced. Arrangements for armed chowkidars (night guards) and police patrolling can be thought of for protecting the surrounding villages from the dacoits so that villagers can consider surrendering their arms licenses. Range officers should hold regular meetings with the village Panchayats and other stakeholders about their problems and attempts should be made whole-heartedly to solve them by inter-departmental deliberations.
- xviii) Local communities, especially the resettled ones shall be incentivized and sensitized to co-exist with wildlife, particularly large predators, through proper training and communication programs. Suitable local NGOs will be involved in this task.
- A large majority of people in the area own weapons; mostly licensed guns. Gun culture in the region needs to be addressed appropriately without toppling down the socio-economic customs and fabrics. People from lower economic strata of the society dependent on livelihoods based on forest products should be provided with alternative livelihood options (like government jobs). It should be kept in mind that 40% of the revenue generated from the lion reintroduction project should percolate to the marginalized local communities of the society. This will substantially prevent them to join in anti-social activities. Continuous deliberations should be made to dissuade the gangs of local dacoits and poachers so as to rehabilitate them in main stream of the society.
- xx) Kuno has people who eat meat once a week or once a month on average. There is also a significant percentage that eats meat every day. Bush meat consumption is quite often in the region (Ranjitsinh & Jhala 2010). People in the area were found

to own country-made guns, bows and arrows and catapults (mainly for birds). If the natural prey population is to be enhanced, these poaching proclivities will have to be controlled. Collaborations with state animal husbandry department can be made to introduce poultry farms, piggeries and butcheries in the area.

Veterinary programs: All free-ranging dogs in the surrounding villages shall be vaccinated against rabies periodically, to prevent the contagion from reaching lions and other wildlife and to prevent infection of the local human population. Free-ranging dogs seen inside the lion habitat within the sanctuary harassing wild ungulates should be eliminated. Persons bitten by dogs or jackals would be inoculated against rabies free of cost by the forest department. To prevent spread of livestock borne diseases (such as anthrax) a veterinary monitoring system should be introduced wherein all the livestock of the surrounding villages shall be vaccinated for foot and mouth disease (FMD), rinderpest at free of costs by the forest department. Water points shall be cleared with lime annually. Continuous monitoring of the populations of wild ungulate and feral cattle within the sanctuary is essential.

17) Management of conflicts and compensation schemes:

- i) Rarely do forest-dwelling communities coexist in harmony with large predators. Either the communities suffer substantial economic loss due to predation on their stock and/or large carnivores suffer heavy losses and even extirpation due to retaliation. Understanding people-carnivore relationship, therefore, becomes crucial especially for the conservation of large carnivores and is key to determine success of the lion reintroduction program in Kuno. WII should carry out a continuous study to understand livestock predation pattern by large carnivores and aim to understand local people's perception towards conservation. Site specific mitigation measures should be implemented based on the inferences of such studies. Livelihood securities for the local communities need to be ensured at any cost. Reparative measures such as compensation schemes have no substitute in shaping successful conservation programs worldwide. Activities like paying compensation should be considered as ecosystem maintenance costs that need to be paid to the local communities. Study in Gir shows that the Gujarat government@s compensation scheme for livestock predation plays a significant role in maintaining the delicate balance of coexistence of lion and local pastoral communities, the *Maldharis* (Banerjee et al. 2013). Ranjitsinh & Jhala (2010) suggests that the magnitude of conflict in terms of livestock predation by carnivores is likely to be relatively high in Kuno-Sheopur landscape owing to presence of smaller sized livestock units such as goats and sheep. Such compensation schemes for livestock depredation therefore need to be implemented in and around Kuno WLS.
- ii) Currently most of such schemes are designed by including the market price of predated livestock unit accounting for the capital loss by the communities. But an

additional component known as lost opportunity cost (opportunity to earn from a livestock unit in years to come during its lifespan had it not been killed; Buchanan 2003) should also be incorporated in the proposed compensation scheme for Kuno. This would foster greater tolerance of the local communities toward lion conservation.

- iii) A forest officer not below the rank of a deputy ranger should visit the place of livestock predation within 24 hours of the occurrence and ascertain the damage to decide the compensation extent. Compensation cannot buy one tolerances but majority of the people see it as an instant financial relief. Therefore the compensation rates for livestock predation for various livestock productivity classes should be decided after a thorough market survey. The ingredients for a successful compensation scheme for livestock predation would be a) fair market price for capital loss, b) inclusion of lost opportunity costs while calculating the compensation and c) prompt and onsite payment (50% on detection of kill and 50% after a week of the predation event), the full payment should be made after the carnivore has stopped feeding on the carcass so as to ensure that retaliation in the form of poisoning etc. is minimized. A similar system exists in the Corbett Tiger Reserve and lessons should be learnt from there. The compensation scheme should be revised regularly (preferably every 3 years) to truly reflect the changing local market prices.
- iv) A majority of people have problems with crop raiding by ungulates in the area. Wild pigs and nilgai have been reported to be the highest damage-causing species (Ranjitsinh & Jhala 2010). Crop damage compensation in reflectance with market price should therefore be initiated urgently. A forest officer not below the rank of a Ranger should investigate the site within 24 hours of the occurrence and decide upon the extent of damage and compensation. Quantifying crop damage is not always an easy task because of a number of ambiguities. National NGOs having experience in working on similar front should be involved in this. Crop damage compensation is likely to diminish conflicts in two ways. On one hand it will allow farmers to stay away from fields thereby exposing them less to the carnivore attacks. On the other hand the farmers do neither need to possess guns nor need to fix snares and electric fences around their farmlands thereby decreasing the likelihood of accidental deaths by lions and other wildlife. Other crop damage mitigation measures such as pulsating electric fences (Chauhan 2006), barbed wire fencing of farms, erecting makeshift houses etc. should be subsidized. Collectively it would ensure greater tolerance of the local people towards wildlife.
- v) A study on the patterns of crop damage should be undertaken as a part of the research and monitoring plan of Kuno WLS so as to identify the areas prone to such damage and quantify the extent of economic loss faced by the communities. Based on the finding, fencing off boundaries of Kuno WLS at certain strategic points to reduce crop damage and livestock grazing inside the park could be considered.

- vi) Farmersø choice of cropping patterns shape human wildlife conflict considerably (Jhala 1993; Vijayan & Pati 2002). An awareness program involving officials and experts from agriculture and wildlife departments and agriculture universities should be initiated educating local communities about this important aspect as well as guiding them about the high yielding yet eco-friendly varieties of crops available.
- vii) Gir lions attack and maul humans in accidental interfaces mostly when a person acts as a deterrent against a lion predating on a livestock (Banerjee 2012). Such incidents cannot be ruled out in Kuno too. Moreover there are chances of people getting severely injured or even killed during the initial years of lion reintroduction as the local community in Kuno do not have any memorable experience of living with a large carnivore like lion or tiger. An *ex-gratia* compensation scheme in accordance with the NTCA norms should be introduced and revised regularly (every 2-3 years) so as to circumvent hostility among local communities. A one-time compensation may not always be adequate in case a severely injured victim loses his/her working abilities. Therefore provisions of employments with the MP forest department to the victims or his/her nearest kin could also be considered.

Compliance of Action Plan sections 16 (capacity building and training) and 17 (conflicts and compensation) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
16 (capacity building, training and peopleøs support) & 17 (conflict & compensation)	Sub-heading 2 of sub section 5.2 (social feasibility)	The sub-heading states that õtranslocation planning should accommodate the socioeconomic circumstances, community attitudes and values, motivations and expectations, behaviours and behavioural change, and the anticipated costs and benefits of the translocation. Understanding these is the basis for developing public relations activities to orient the public in favour of a translocation.ö
	Sub-heading 3 of sub section 5.2 (social feasibility)	The section says that omechanisms for communication, engagement and problem-solving between the public (especially key individuals most likely to be affected by or concerned about the translocation) and translocation managers should be established.ö
	Sub-heading 6 of sub section 5.2 (social feasibility)	The section states that othe design and implementation stages of a translocation program should acknowledge the

	potential for negative impacts on affected parties or for community oppositionö and should address that appropriately.
Sub-headings 8 and 9 of sub section 5.2 (social feasibility)	The section highlights inter- organizational collaborations and requirement of establishing õof special teams working outside formal, bureaucratic hierarchies that can guide, oversee and respond swiftly and effectively as management issues arise.ö

18) Wildlife tourism, eco-clubs, nature education camps and revenue generation:

- i) There should be a clear cut policy about the wildlife tourism in Kuno. The park authorities and the civil administration of the region will prepare a five to ten year site specific tourism policy in accordance with the Comprehensive Guidelines of the NTCA (memo no 15-31/2012-NTCA dated 15.10.2012) which will address the land-use and development of the surrounding areas as well. The plan prepared by the park management and civil authorities needs to be endorsed by an expert committee appointed by the MoEFCC. The plan shall explicitly demarcate the park roads and the tourism zones in the larger Kuno landscape. A tourism carrying capacity for the park should be estimated. This figure should be included in the Management Plan and be followed stringently without any violation. However, no tourism should be allowed for the initial 3 years after the first batch of lions are introduced. This will permit the founder and first supplemented lion populations to establish their territories without any external intervention.
- ii) Sustainable and conservative tourism subservient to the conservation needs of the Sanctuary and of the project shall be encouraged so that jobs and business opportunities for the local people can be created and the project and the Kuno WLS get adequate public support. An attempt to generate revenues through brand building, marketing, sponsorships, merchandising etc. shall be made, through private partnerships, but in complete consonance with the conservation activities and prerequisites.
- iii) Wildlife tourism strategy of Kuno should serve as a model for the rest of the country as here there is scope and the opportunity to plan. However, many site-specific strategies need to be implemented well in advance. The control of tourism and the entry of vehicles in the PA, will be as directed by the Director of Kuno Sanctuary.
- iv) Emerging hotels, resorts, other structures in the landscape and vehicles entering inside the park should be kept under strict vigil. No commercial

- establishment/activity should be allowed within 2 km from the sanctuary boundary.
- v) All gate and permit fees shall remain with the park as being done in other Tiger Reserves of Madhya Pradesh. Forty percent of the tourist revenue should be ploughed back in to local community welfare in the buffer zone. Preference should be given to those communities that have been resettled from within Kuno WLS. Mechanisms should be put in place so that all community members are aware of the financial benefits they are receiving are due to lion reintroduction. Awareness campaigns, school nature camps, illustrated talks, video shows, special films made on this topic need to be screened on regular intervals in all buffer zone villages.
- vi) There is potential for earning significant revenues from the project from filming, photodocumentation, merchandising, sponsorship and tourism on a competitive basis. This income shall be credited to the Vikas Nidhi of the Sanctuary and shall be spent on its management as well as for assisting the local communities, as per the system already prevailing in the State of MP. A proactive approach to market the project as a brand shall be adopted to promote conservation as an economic activity, after fully ensuring that it in no way hampers the conservation interest and priorities of the project and of the sanctuary.
- vii) In order to spread awareness among local people and sensitize the youth, ecoclubs, nature education camps, teacher training camps, street plays etc. should be organized regularly. A directory of local wildlife enthusiasts and nature lovers should be maintained for assisting the department in such awareness programs.

Compliance of Action Plan section 18 (wildlife tourism and revenue generation) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
18 (wildlife tourism and revenue generation)	Sub-heading 6 of sub section 5.2 (social feasibility)	The recognized objective of any translocation program is to contribute to the economic benefits of the locals/nation for long-term with special emphasis on the communities who bear the direct cost (if any) of such program.

19) <u>Publicity and media management:</u> Pro-active media management with scientific facts and not based on speculations or educated guesses should be adopted by both the state governments. A media spokesperson (preferably the CCFs) should only officially liaise with the media and statement from any other person from the departments should not be considered as ÷official@ A media note briefing the latest updates about the project should

also be issued/uploaded at a regular interval by both the forest departments of Gujarat and Madhya Pradesh. At present there is a interval by both the forest departments of Gujarat and Madhya Pradesh. At present there is a interval by that whole lion population from Gir will be translocated to Kuno and this has created social repercussions in many parts of Gujarat in recent time. Media should also acknowledge that they have an immense role in making local people (both in Gir and Kuno) aware of the scientific facts and figures about the project and they should act responsibly.

20) Annual Review and Monitoring: The Supreme Court judgment clearly mentions about co-opting experts apart from the existing members of the Reintroduction Expert Committee as and when required. Accordingly MoEFCC can consult wildlife managers and conservation biologists and agencies of the country with subject knowledge/working experiences to seek their expertise during several phases of the project implementation. This is also likely to broaden institutional representation in the committee and enhance its credence and credibility. After the lions are reintroduced in Kuno, the progress of the project shall be reviewed every year by the lion reintroduction committee appointed by MoEFCC, GoI along with the International experts (if required), decision makers of both the states and wildlife biologists of the country. Such monitoring should be a long-term (20-25 years) process and be coordinated by MoEFCC in association with MPFD. It is recommended that the results of reintroductions be published and peer-reviewed at frequent intervals to allow other reintroduction attempts to benefit from the experiences. This should be part of a continuous feedback loop with the results of the documented evaluation leading to alterations to the existing reintroduction program via an adaptive management strategy. Although the guidelines promulgated in the current Action Plan are likely to be relevant for long term (15-20 years); they could, however, be revised by the expert committee of MoEFCC as per emerging situations during various implementation phases of lion reintroduction.

Compliance of Action Plan sections 19 (publicity and media management) and 20 (annual review) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
19 (publicity and media management) and 20 (annual review)	Section 9 and Annexure 9 (dissemination of information)	The section and the annexure clearly suggest that õdissemination should aim to ensure that maximum information around a conservation translocation is available in timely and suitable fashion to target audiences. Hence, communication should start at the planning stage, followed by reporting on progress at key stages of the project, and with this information disseminated to all parties involved. It prevents conflict with interested parties in both source and destination areas, and generates trust that any translocation is

undertaken with integrity and without
hidden motives and allows the
evaluation of success whilst a
translocation is in progress.ö

21) Exit strategy: Success of lion reintroduction in Kuno within a span of 10 years form first batch of reintroduction should be judged by the following indicators: 1) establishment of a population of at least 20 lions (50% carrying capacity of Kuno WLS) that are breeding naturally with a good recruitment rate, 2) timely supplementation of lions adhering to the recommendations prescribed in the current Action Plan, 3) inclusion of more areas to the existing sanctuary by resettling villages and declaration of a larger Protected Area, 4) landscape scale conservation approaches through restoration and legislation (declaring community reserves, conservation reserves and eco-sensitive areas) and 5) stringent protection regime against poaching and gradual abatement of the prevailing gun culture in the region. All these mostly demand longterm tripartite financial, technical and administrative commitments from MoEFCC, GFD and MPFD. On the other hand, the project could be considered as a failure if 1) failure of securing lion habitats in the larger landscape by declaring them as PA (sanctuaries, conservation reserves and/or eco-sensitive zones), 2) lions with less than 10-12 breeding individuals after 10 years of the first batch of lion released with no natural births and 3) high premature mortality (>60%) of reintroduced lions due to human-induced causes (poaching, electrocution, poisoning, road accidents, retaliatory killings etc.). If these occur then the project needs to be rolled back and reconsidered in terms of legal, policy and alternative strategies (Appendix 4).

Compliance of Action Plan section 21 (exit strategy) with IUCN Guidelines

Kuno Action Plan Section Number	IUCN Guidelines' Section/Annexure Number	Compliance
Section I (uniform	Section/Innexare I (uniber	
21 (exit strategy)	Section 4.3 and Annexure 8.3 (Exit	The section and the annexure clearly
	Strategy)	suggest that oThe decision to
		discontinue is defensible if translocation
		design includes indicators of lack of
		success and the tolerable limits of their
		duration, or if undesired and
		unacceptable consequences have
		occurred. An exit strategy should be an
		integral part of any translocation plan.
		Having a strategy in place allows an
		orderly and justifiable exit.

Madhya Pradesh Forest Department should submit a detailed report to the MoEFCC & lion reintroduction expert committee at an interval of every three months wherein it should

<u>explicitly update about post-release developments.</u> The management limitations and unforeseen situations should be highlighted with suitable justifications.

Conclusion

Carnivore reintroduction is an appropriate conservation strategy to restore the integrity of ecosystems. It is a rapidly growing science which, if carried out accurately, has the potential to be a valuable component of the conservationistos toolkit. However, many pitfalls exist that can result in the total or partial failure of a reintroduction program and can potentially waste valuable and limited resources. This Action Plan developed in accordance with the IUCN protocols aims to guide the reintroduction program of the Asiatic lions based on science and pro-active management.

FIGURE A. Lion reintroduction protocol from Gir to Kuno

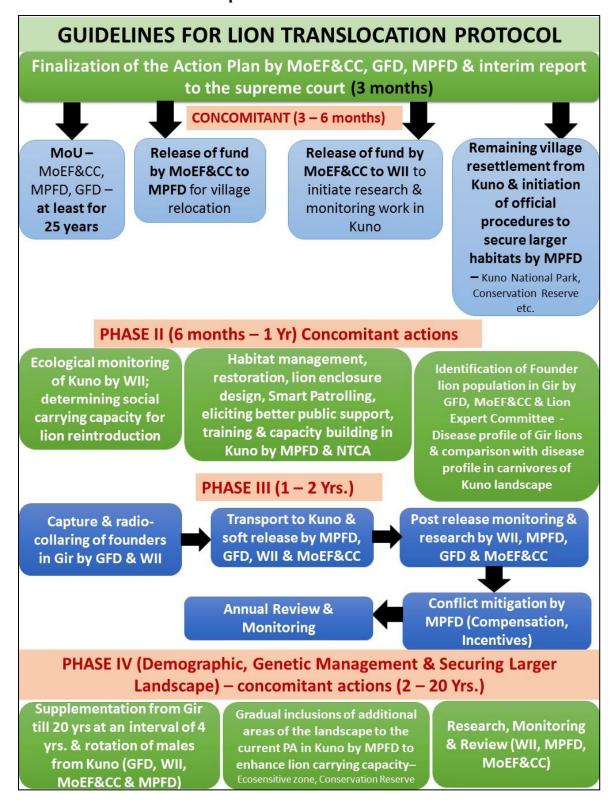
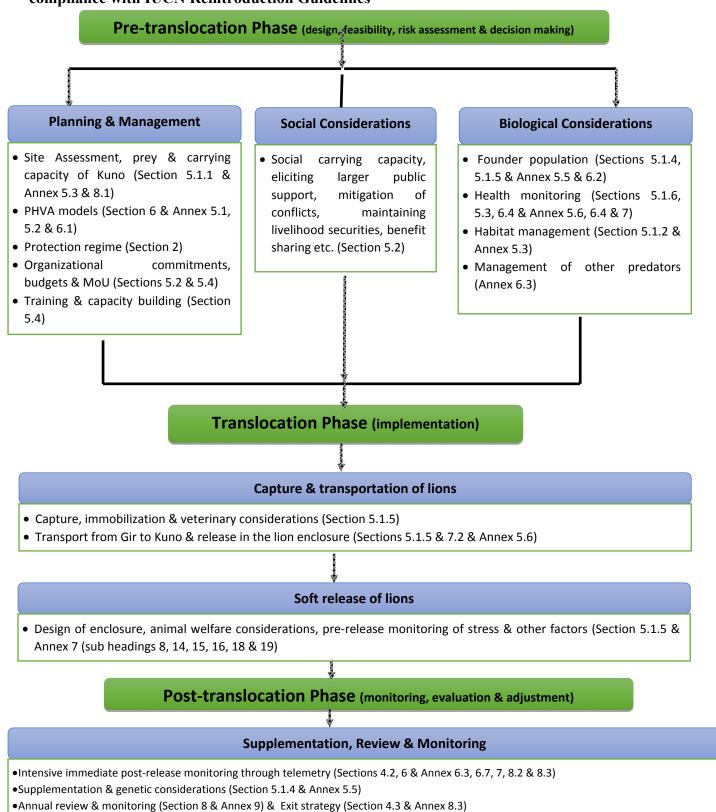


FIGURE B. Flow chart showing the chronological structure of the action plan in compliance with IUCN Reintroduction Guidelines



CHRONOLOGY OF EVENTS & ACTIONS TAKEN IN BETWEEN MAY 2013 & MAY 2016 FOR REINTRODUCTION OF ASIATIC LIONS FROM GIR TO KUNO

Under the direction of ADG (Wildlife), MoEFCC; this component of the Action Plan illustrates the important events and key progresses made during past three years towards reintroduction of Asiatic lions from Gir forest, Gujarat to Kuno WLS, Madhya Pradesh.

Important milestones

Date	Chronology of events
15th April, 2013	• Judgment of Hongole Supreme Court of India (I.A. No 100 in Writ Petition (Civil) No.
	337/1995).
	Directed MoEFCC to constitute an Expert Committee overseeing lion reintroduction
	comprising of senior officials of MoEFCC, Chief Wildlife Wardens of Gujarat &
	Madhya Pradesh, CEO, WWF India, representatives from the Wildlife Institute of India
	(WII), Dr. AJT Johnsingh and Dr. R. Chellam.
17th July, 2013	• Constitution of the expert committee by the MoEFCC with their roles explicitly
	mentioned pertaining to lion translocation.
29th July, 2013	• First meeting of the Expert Committee under the chairmanship of ADG (WL),
	MoEFCC.
	• Consent on drafting a zero action plan (ZAP) as per IUCN guidelines for
	reintroduction.
	Co-opting more members in the Committee.
19th August, 2013	Second meeting of the Expert Committee.
September 2013	• Submission of the Zero Action Plan to MoEFCC for circulation among the
	Committee members.
November 2013 -	Receipt of the comments from the Expert Committee Members on ZAP.
February 2014	
November 28, 2013	• Appeal by Empower Foundation, Mumbai to MoEFCC & the Expert Committee
	members regarding reconsideration of the lion reintroduction proposal in compliance
	with the IUCN guidelines.
30 th January, 2014	Submission of Madhya Pradesh Forest Department report on preparedness of Kuno
	WLS for lion reintroduction.
28 th April, 2014	Third meeting of the Expert Committee.
	Detailed discussion on the ZAP & the comments received on it.
	• ZAP was found amenable to the IUCN guidelines & consensus on its refinement while

	appropriately addressing the suggestions made by the members.
	WII & other universities/institutes need to undertake certain ecological & social studies
	as per IUCN guidelines prior to lion translocation.
	• The refined action plan should explicitly contain the abovementioned studies along with
	a specific time bound road map for translocation.
	• MPFD was requested to communicate their budgetary requirements for lion
	translocation to MoEFCC.
	Decision on communicating the Honøble Supreme Court on the progresses made by the
	Expert Committee through an interim report.
20th May, 2014 &	Submission of a budgetary requirement of ₹. 66.99 crores by the MPFD to MoEFCC
11th June, 2014	• MPFDøs request for expediting scientific studies by WII in Kuno as per IUCN
	Guidelines.
11th February, 2015	Fourth meeting of the Expert Committee.
	Reiteration on submission of the revised action plan in its final shape for approval.
	• WII requested to submit a project proposal undertaking the scientific studies imperative
	for lion reintroduction in Kuno.
April & May, 2015	• Submission of i) the revised action plan, ii) way of addressing the comments made by
	the committee members on ZAP in the revised plan, iii) a proposal for assessing &
	monitoring Kuno for potential of lion reintroduction, & iv) a status report of prey &
	predators in Kuno to MoEFCC.
	Circulated to the Committee members for comments
October, 2015 –	• Receipt of the comments on the revised action plan & WIIøs research proposal by the
May, 2016	CWLWs, Gujarat & Madhya Pradesh & some of the Expert Committee members.
12 th April, 2016	Review meeting on lion translocation at MoEFCC.
	Discussions on the revised plan & WIIøs research proposal.
	Review the status of progress made by the Expert Committee.
13th May, 2016	Fifth meeting of the Expert Committee.
	Detailed discussions on the revised action plan with point-wise suggestions/inputs made
	by the Expert Committee members. Another minor revision of the Action Plan
	suggested incorporating the abovementioned inputs.
	• The revised Action Plan would enlist a summary of actions taken after the apex courtes
	judgment & should contain a -way forward' section elucidating the detailed roles &
	responsibilities of different agencies involved in lion translocation.
	• Proposal on i) constitution of state specific Empowered Committee comprising of
	local forest officers & WII authorities & ii) a Steering Committee under the

- chairmanship of Director, Wildlife Preservation, MoEFCC overseeing the coordination among these Empowered Committees & iii) drafting a **tripartite Memorandum of Agreement (MoA)** among Gujarat, Madhya Pradesh & MoEFCC indicating roles, responsibilities & actions to be taken by each party.
- Detailed deliberations on each point submitted by CWLW, Gujarat state on the revised action plan.
- CWLW, Gujarat agreed to abide by the Committee
 øs decision as long as the
 Government of Gujaratøs issues are addressed & a scientific method on translocation is
 followed.
- From the list of 32 research/studies considered mandatory by CWLW, Gujarat; the Committee listed the studies those were already done in Kuno, done but still needed & not required.
- MoEFCC mandated WII to conduct studies in Kuno that were considered important for lion reintroduction. These included ó disease, resource partitioning among carnivores & local communitiesø awareness & attitudes towards lion reintroduction.

Summary of the actions by different agencies involved in lion reintroduction between May 2013 & May 2016

Agencies	Actions
Ministry of Environment, Forest & Climate Change (MoEFCC)	 Constitution of the Expert Committee comprising of senior officials of MoEFCC, Chief Wildlife Wardens of Gujarat & Madhya Pradesh, CEO, WWF India, Dr. YV Jhala from Wildlife Institute of India (WII), Dr. AJT Johnsingh and Dr. R. Chellam (July, 2013). Organizing Expert Committee meetings at regular intervals. Five meetings of the committee & one review meeting have already been arranged. Regular communications with the expert committee members for finalizing the Action Plan for lion translocation. Mandated WII to conduct research on a) disease, b) resource partitioning among carnivores & c) local communitiesø awareness & attitudes towards lion reintroduction.
Madhya Pradesh Forest Department	 Augmenting the current 345 km² Kuno WLS to 596 km² by addition of 351 km² area of the Wildlife Division to the existing WLS. MPFD plans to declare the current sanctuary as a National Park in near future (vide letter no S/11/3750 dated 12/05/2016 from CWLW MP to Joint Director (WL), MoEFCC). A Management Plan for 1,236 km² of Kuno Wildlife Division for the period of 2010 ó 2020 duly approved by MoEFCC in place. Increase in the strength of staff in Kuno. Compared to 19 staff posted in 1996; the number of staff posted in 2013 was 164 ó 47 (Sanctuary area); 116 (buffer area). A total of 1,543 families of 24 villages completely rehabilitated from Kuno Sanctuary with a cost of ₹. 16.05 crores. 62.6 km² revenue land incorporated into sanctuary area following village relocation. Request for an additional amount of ₹. 66.99 crores from MoEFCC for resettlement of Bagcha (195 families) & Jahangarh (393 families) from periphery of Kuno Sanctuary [vide letter numbers 3400 dated 11-06-2014 & 2961 dated 20-05-2014 from CWLW, Madhya Pradesh to ADG (WL), MoEFCC]. About 5 km² area has been identified as a pre-release site within Kuno Sanctuary. Existing lion enclosure in Kuno is old & MPFD has already sought technical assistance of WII & CZA for reconstructing a new one at an alternative suitable site within the sanctuary. Appointment of a veterinary doctor for the sanctuary in 2010. Vaccination program for about 3,500 livestock annually within 5 km

	 periphery of the sanctuary. ₹. 26.74 crores spent on habitat improvement & capacity building in Kuno. Identification of 373 water sources within Kuno Sanctuary. Complete ban on the collection of katha from <i>Acacia catechu</i> & resin from <i>Boswellia serrata</i>. 6 km² area is being treated annually for eradication of weed & woody regenerations for development of grasslands in the relocation lands. Construction of 10.1 km chain link fence & 40.05 km crop protection rubble wall to minimize man-animal conflict. Various state & centrally sponsored schemes for eliciting more public support for conservation & lion reintroduction ongoing.
Gujarat Forest Department	 Provided detailed comments on the Action Plan (drafts). Identified research gap in Kuno & prepared a list of 34 studies important for lion reintroduction in Kuno. Agreed to follow Committeeøs decision as long as the Government of Gujaratøs issues are addressed & a scientific method on translocation is followed.
Wildlife Institute of India (WII)	 Regular technical advice to the expert committee & MoEFCC for lion reintroduction. Assessment of prey & predator abundance based on camera trapping and distance sampling in Kuno Wildlife Sanctuary since 2005. Estimating prey abundance in the buffer area of Kuno WLS in 2014. Estimation of carrying capacity of Kuno WLS for lions based on preferred prey. Population habitat viability models for reintroduced lions in Kuno. Preparation of the Zero Action Plan in consultation with Dr. Ravi Chellam in compliance with IUCN Guidelines for reintroduction & subsequent modification of the plan incorporating the comments & suggestions received from the Expert Committee members. Submission of a research proposal to MoEFCC aiming at continued ecological assessment & monitoring of Kuno. The proposed research will address most of the relevant studies suggested by the CWLW, Gujarat.

WAY FORWARD

(A TIME BOUND ROAD MAP FOR LION REINTRODUCTION)

An ultimate goal of reintroduction programs is to establish a population that is self-sustaining with minimal management intervention. This is possible only in the long-term in the case of long lived species (Seddon et al. 2007). Carnivore reintroduction projects are complex, and need to address not only biological and technical aspects; but also public relation, public support, sociopolitical and organizational aspects [co-operation, leadership etc.] (Reading & Clark 1996; Breitenmoser et al. 2001). Implementing a carnivore reintroduction program is an expensive long-lasting task and needs long-term financial and political commitments from all agencies involved with the program (Breitenmoser et al. 2001; Jiménez Pérez 2009; IUCN 2013).

A robust understanding on the actual monetary investments and time commitments for different phases of the reintroduction program should become intricate part of planning so as to ensure success of the program. With this context, the current section of the Action Plan attempts to outline a time bound road map for translocating lions from Gir forest in Gujarat to Kuno Wildlife Sanctuary, Madhya Pradesh. This section summarizes i) the course of actions needed for lion reintroduction, ii) suggested timeframes for the actions, iii) delineates detail roles and responsibilities of different agencies at each stage of these actions and, iv) estimates a tentative budget for the initial 5 years of lion translocation.

<u>PHASE I: PLANNING, PREPARATIONS & POLICY DECISIONS (up to 4 months)</u>
(Time frames are from present i.e. the date of submitting the third draft of the Action Plan)

Actions	Time frame	Agency involved	Role of the Agencies
Finalization of the Action Plan	2 months	MoEFCC	MoEFCC needs to approve the Action Plan. The 3 rd draft of the plan may be discussed & finalized by the Expert Committee members in a meeting. (Action: ADG WL & JD WL, MoEFCC)
Involvement of other agencies	2 months	MoEFCC	As requested by CWLW, Gujarat State; MoEFCC may consider involving other national level agencies (apart from WII) in the reintroduction program & prepare a document explicitly mentioning about their roles in the program. (Action: ADG WL, MoEFCC)
Constitution of State level Empowered Committees	3 months	MoEFCC, GFD & MPFD	MoEFCC, Gujarat FD & Madhya Pradesh FD need to constitute two state specific Empowered/Coordination Committees. The committees should comprise of ó i) Chief Wildlife Wardens of both the states (Chairs), ii) Park directors of Gir & Kuno (CCF WL Junagadh, Gujarat & CCF Lion Project, Gwalior, MP) as Member Secretaries, iv) DCFs of

Actions	Time frame	Agency involved	Role of the Agencies
			Gir & Kuno (DCF ó Sasan, Gir East & Gir West in Gujarat & DCF Sheopur in MP), v) two scientific representatives from WII, vi) two senior officials from MoEFCC, & vii) veterinary officials ó one each in Gir & Kuno. Chairs & member secretaries of the committee of one state should also be the invited members in the committee of the other state. Primary role of these committees would be overseeing implementation of the Action Plan strictly adhering to the suggested timeframe.
Constitution of a Steering Committee	3 months	MoEFCC	 ❖ MoEFCC should constitute a Steering Committee comprising of i) Director, Wildlife Preservation as the Chair, ii) Joint Director (WL), MoEFCC, iii) Chief Wildlife Wardens of Gujarat & Madhya Pradesh (as their capacities of Chairs, State Empowered Committees), iv) Member Secretary, NTCA, v) Director, WII, vi) representative(s) of WII, vii) representative(s) from IUCN, viii) representative(s) from WWF India, ix) Dr. AJT Johnsingh & Dr. Ravi Chellam & ix) any other national or international subject experts (not more than two) nominated by the Chair. This Committee would closely monitor the time-bound progress of the actions in coordination with the State level Empowered Committees & ensure meeting once every 3 months (or as per requirement) to discuss & plan future strategies. ❖ The Steering Committee also needs to regularly (preferably every 6- monthly) update the progress of lion reintroduction to Honøble Supreme Court of India & DGF & SS, MoEFCC through interim reports.
Submission of an Interim Report to Hon'ble Supreme Court of India	2 months	MoEFCC	MoEFCC should urgently file an interim report to the Hon'ble Supreme Court of India communicating the progresses made by the Ministry & the expert committee on lion reintroduction till date & the future course of actions. The final version of the Action Plan must also be appended to this report.
Signing of Memorandum of Agreement	3-4 months	MoEFCC, GFD & MPFD	Finalization of the Action Plan by different agencies itself indicates their long-term commitments for lion translocation. Nevertheless, the MoEFCC should prepare a tripartite Memorandum of Agreement

Actions	Time	Agency	Role of the Agencies
	frame	involved	
			(MoA) at least for the next 25 years clearly indicating roles, rights,
			responsibilities & privileges among Government of Gujarat,
			Government of Madhya Pradesh, and MoEFCC. This document
			should be discussed & finalized in the 6th meeting of the expert
			committee & communicated to the respective State Governments for
			approval & endorsement.
Creation of	3-4 months	MPFD	❖ MPFD should complete the formalities related to declaring Kuno
National Park & initiation of			sanctuary (345 km²) as a National Park. MPFD has already
securing larger			submitted a proposal to the State Government for including
habitat patches in Kuno			additional 351 km ² of the Wildlife Division to the existing sanctuary.
			This area, when added, could serve as a Wildlife Sanctuary
			surrounding the National Park.
			❖ A landscape level Management Plan is required for the region
			wherein eco-sensitive zone is defined & mitigation strategies for any
			development project in the region are spelt out clearly.
Timely release of	3-4 months	MoEFCC	Lion reintroduction in Kuno would require long-term financial
funds		& MPFD	commitments by different agencies; especially from MoEFCC &
			MPFD. MoEFCC should explore various funding opportunities to
			support activities of the reintroduction program & ensure timely
			release of funds during the program. A tentative five yearsøbudget is
			in Appendix 5. Total budget requirement for lion reintroduction for 5
			years is likely to be Rs. 17.53 crores.

PHASE II: FEASIBILITY & PRE-RELEASE PHASE (up to 1.5 year)

(Time frames are from present i.e. the date of submitting the third draft of the Action Plan)

Actions	Time	Agency	Role of the Agencies
	frame	involved	
Initiation of	6 – 8	,	❖ MoEFCC should release fund for WIIøs research. Director of Wildlife
research & monitoring of	months	MoEFCC, GFD &	Preservation, MoEFCC & CWLW, Madhya Pradesh State should
Kuno		MPFD	grant WII with all necessary research permits involving capture &
			collaring endangered (Schedule I) carnivores in Kuno. (Action:
			MoEFCC & CWLW, MP State).
			❖ MoEFCC should also assist WII in pursuing permissions for

Actions	Time frame	Agency involved	Role of the Agencies
Procurement of radio collars for monitoring reintroduced lions	6 - 8 months	WII, MoEFCC	bandwidth allocation & procuring radio-collars from the Wireless Adviser, Ministry of Telecommunications, Gol. (Action: MoEFCC) Director of Wildlife Preservation, MoEFCC & CWLW, Gujarat state shall grant WII with all necessary permits to capture, radio collar & translocate lions from Gir to Kuno in the 1st year & subsequent years of supplementations. (Action: MoEFCC & CWLW, Gujarat State) WII will commence priority research in Kuno as soon as the funds are released by MoEFCC & necessary research permits are obtained. (Action: WII) CWLW, Madhya Pradesh must grant all necessary research permits to WII for the next 5 years & CCF Lion Project, Gwalior & DCF Sheopur should facilitate all necessary logistics for carrying out field works. (Action: CWLW, MPFD) WIIøs research activities will be concomitant with lion reintroduction. Lion reintroduction within Kuno WLS should not wait for completion of WIIøs research work. Currently Kuno WLS can support anywhere from 28 to 45 lions. It is envisaged that the reintroduced population will take about 10-15 years to reach current carrying capacity. All the founder lions should be fitted with radio collars (preferably with satellite link). MoEFCC should release fund for this purpose well in advance since the formal procedure of obtaining radio-telemetry equipment & permissions from DoT, GoI may take about 4-5 months (Action: WII & MoEFCC). Once the funds are released, WII may procure this equipment so that
			 Once the funds are released, WII may procure this equipment so that they are available when the founder lions will be captured from Gir. (Action: WII)
Erecting soft- release lion enclosure in Kuno	4 - 6 months	MPFD	MPFD should seek expertise of WII, CZA & other agencies for designing a new lion enclosure in Kuno. The construction of the enclosure should be complete within 4-5 months. (Action: MPFD)

Actions	Time frame	Agency involved	Role of the Agencies
Implementation of MSTrIPES in Kuno	6 months	MPFD & WII	 MPFD should start implementing technology aided smart patrolling (MSTrIPES) in Kuno on a priority basis. WII should assist MPFD in conducting training workshops for the officials, frontline & office staff in Kuno. (Action: WII) However, prior to such workshops, MPFD should also provide each Range office in Kuno with a computer, GPS, android mobile phones & recruit one computer operator in each Range. (Action: MPFD)
Training & capacity building of veterinary & lion tracking teams in Kuno	months	MPFD & MoEFCC	The following actions as delineated in the Action Plan need to be initiated at the earliest: a) Setting up of one - two veterinary clinics & rescue centers in Kuno with animal housing facilities. Construction of one temporary, in-field housing facility inside the park. (Action: MPFD) b) Veterinary teams should be equipped with a wildlife rescue van (preferably a mini truck with transport cages), wireless, adequate appropriate drugs, darting equipment and other necessary paraphernalia. (Action: MPFD) c) Deputing two well-equipped lion tracking teams as mentioned in the Action Plan. These could be trained in Gir initially for 2-3 months. (Action: MPFD) d) Organizing training & exposure tours for selected frontline staff, all members of the veterinary teams & tracking units to Gir before lions are released in Kuno. These tours should be designed in a way that each trainee gets ample hands-on experiences of tracking & handling lions (Action: MPFD). GFD should facilitate training & exposure. (Action: GFD) e) All other activities related to training, infrastructure development, capacity building & eliciting better public support in Kuno as mentioned in the Action Plan & MPFDøs Preparedness Report.
Identification & marking of founder lion population in Gir	6-8 months	GFD	The rationale, number, demographic compositions & process of selecting the founder lions were already discussed in the Action Plan. GFD in consultation with WII should identify these lions based on their field

Actions	Time frame	Agency involved	Role of the Agencies
			knowledge & experience & preferably radio collar them in Gir so that
			they are monitored individually prior to translocation. (Action: GFD)
Disease profile of the founder lions & comparison with the disease profile in the carnivores in Kuno	8 – 14 months	WII & GFD	 ❖ Founder population of lions need to be screened for antibodies, antigens, pathogens & epizoic that are prevalent in the region, before they are released in Kuno. (Action: WII with support from GFD) The findings need to be compared with the profile among the carnivore populations in Kuno (part of WIIøs research project). (Action: WII) ❖ If certain diseases are found prevalent in Kuno but not in Gir then these need to be addressed through vaccination of founder
			population.
Radio-collaring carnivores in Kuno	10 – 18 months	WII, MPFD	As per the approved WII research proposal, radio collars on carnivores in Kuno should be deployed so that the park management has an understanding on space use by carnivore communities in Kuno before lions are released. (Action: WII & MPFD)
A Review Meeting	12 months	MoEFCC	A review meeting of the Expert Committee, Steering Committee & members of the State level Empowered Committees should be convened for assessing the developments in both the parks & a final go ahead for the lion reintroduction should be flagged off. Honorable Supreme Court of India may also be updated about the progress after this meeting.
Capture & radio-collaring of founder lions	15 months	GFD, WII, MoEFCC	 The capture & radio-collaring protocol is mentioned in details in the Action Plan. Since founder lions would already have been identified & collared earlier; their captures would be relatively easy. All captures should be done by GFD-WII teams. (Action: GFD, WII) All the identified founder lions may not be captured on a single day. Therefore, the captured lions from Gir may be kept temporarily at the veterinary care center at Sasan under the supervision of a veterinary team. The entire capture operation should not exceed 7 - 8 days. WII research team in Gir should maintain the individual whisker profiles of all the members of the founder population & share these profiles with GFD, MPFD & MoEFCC officials. (Action: WII)

Asiatic Lion Translocation Action Plan DRAFT III (June 2016)

Actions	Time	Agency	Role of the Agencies
	frame	involved	
Transport of	15 – 16	/ /	Adhering to the Action Plan, transports should be carefully planned to
lions from Gir to Kuno	months	GFD, MPFD &	ensure that the fastest route is taken, with the fewest number of stops and
		WII	transfers. Indian Air Force helicopters can be used for direct air-transport
			of lions from Gir to Kuno. MoEFCC should seek all necessary prior
			collaboration/assistance from the Ministry of Defense in this regard. All
			lions should be transported to Kuno within 2 ó 3 days. (Action:
			MoEFCC)
			A veterinary officer and two trained staff in handling lions along with all
			the necessary supply and equipment should accompany each lion flight.
			(Action: GFD, MPFD & WII)
Housing of lions	16 – 18	MPFD	About 3-5 ha predator proof enclosure divided in four compartments of
in the Enclosure in Kuno	months (depending		about 0.5 ó 1 ha each with feeding facility chambers & squeeze cage
	upon soft		facility for treatment should be erected at some suitable place in Kuno
release situation)		WLS. Lions should be housed as per social compatibility & allowed to	
			acclimatize for 15 days to two months within the lion enclosure in Kuno
			(details in the Action Plan). MPFD must ensure round the clock presence
			of a well-trained & well-equipped veterinary team at this enclosure till
			lions are -softøreleased.
Sending of Lion	18 months	GFD	❖ GFD should send a lion tracking team comprising of a veterinary
Tracking Team to Kuno			officer & 3-4 expert lion trackers to Kuno before lions are released.
00 124110			This team should stay at Kuno for 3-4 months assisting the local staff
			at Kuno in post-release monitoring of lions & mitigating conflicts (if
			any). (Action: CCF WL Junagadh & DCF Sasan Gir)
			❖ MPFD must provide all necessary logistics to this team facilitating
			their work. (Action: DCF, Kuno)

<u>PHASE III: RELEASE OF LIONS & POST RELEASE MONITORING (1.5 - 5 years)</u> (Time frames are from present i.e. the date of submitting the third draft of the Action Plan)

Actions	Time	Agency	Role of the Agencies
	frame	involved	
Post-release research & monitoring	15 - 18 months 18 months - 10 years	MPFD & WII	Lions should be softø released in Kuno (males first, followed by the females & young) by MPFD under the supervision of officials from GFD, MoEFCC, & members of State Empowered Committees. National & International media teams may also be invited for covering this conservation milestone. Lion tracking team(s) in Kuno & local staff should intensively monitor the reintroduced lions in close association with the WII research team. Initial 5 years after release - Movements of lions immediately after release shall be radio-monitored several times in a day by the local staff assisted by WII research team. Once all the lions establish home ranges (3-4 months after the release), the monitoring frequency can be reduced to 2-3 locations/day and one visual observation weekly of all reintroduced founder lions. (Action: MPFD) Subsequently for the next 5 years, a minimum of one female in each group & all the male coalitions should be equipped with radio-collars. (Action: MPFD)
Managing inter specific strife	18 months – 5 years	MPFD	Research in all aspects of system recovery and interactions including ecology of the reintroduced lions and their population trends, as well as of their prey species, should be addressed by WII [vide Action Plan for detail research works]. (Action: WII) Other carnivore populations in the landscape (eg. tigers) may need to be managed during initial years of lion reintroduction (4-5 years) so as to avoid/minimize interspecific strife and allow the reintroduced lion population to establish. WII is research should address this by radio-collaring other carnivores in Kuno in the same temporal scale so as to monitor their movements and understand the underlying resource separation mechanisms. Based on this, management strategies to permit
			and promote coexistence or to manage the carnivore community in Kuno could be decided as required to facilitate the reintroduced lion population.

Asiatic Lion Translocation Action Plan DRAFT III (June 2016)

Actions	Time	Agency	Role of the Agencies
	frame	involved	
Mitigating Conflict (lion-human- livestock as well	18 months - long term	MPFD & WII	 MPFD should have long-term commitments mitigating conflicts to foster greater tolerance of local communities to lion conservation. An important component of conflict management should be paying
as crop raiding problem)			adequate and timely compensations for human death/injury, livestock depredations & crop damage. Simultaneous policy & management actions to deal with particular conflict animal need to be in place. (Action: MPFD) ❖ WIIøs research should aim to identify the hotspots of conflict in the region & changing dimensions of human perceptions (negative or positive) over the years. Policy actions should be planned based on
			these findings. (Action: WII)
Review & Progress Assessments	18 months - 5 years	MoEFCC, MPFD, GFD & WII	For the initial two years after reintroduction, the research and monitoring team comprising of WII and MPFD frontline staff should report lion movement and field updates weekly to the DFO, monthly to the CCF (Wildlife) Gwalior and quarterly to the Chief Wildlife Warden, MP state (Action: WII, RFOs & ACFs – Kuno). Progress of the project shall be reviewed every year for the first 5 years of reintroduction by the Expert Committee, members of the Steering Committee & State level Empowered Committees. (Action: MoEFCC)
Creation of tourism zone in Kuno	5 years	MPFD & MoEFCC	No tourism should be allowed inside the sanctuary for the initial three years after the first batch of lions are introduced to permit the founder & first supplemented lion populations to establish their territories without any external intervention. MPFD should prepare a ten year tourism policy in compliance with NTCA¢s guidelines ensuring no adverse impacts on traditional land-uses of the region & safeguarding local livelihood issues & get it approved from MoEFCC.

PHASE IV: LONG-TERM MONITORING OF REINTRODUCED LION POPULATION (5 - 25 years)

(Time frames are from present i.e. the date of submitting the third draft of the Action Plan)

Actions	Time frame	Agency involved	Role of the Agencies								
Genetic management & supplementation	5 – 20 years	MPFD, GFD, MoEFCC	Adhering to the Action Plan, six lions (two males & four females) should be supplemented in the Kuno population from Gir until 16 ó 20								
		& WII	years from the first reintroduction at an interval of 4 years. MoEFCC should coordinate this with the state forest departments of Madhya								
			Pradesh & Gujarat well in advance so that this could be executed in								
			timely manner.								
Purchase of equipment for	5 – 10	MoEFCC, MPFD &	The reintroduced lion population in Kuno needs to be intensively								
posterity	years	WII	monitored and managed at least for the first 10 years & then depending								
			upon the need further next 10 years with all the adult lions fitted								
			GPS/satellite collars for the first 10 years. Radio-collars on lions should								
			be replaced immediately in case the battery life ends abruptly or there is								
		a sudden technical snag. WII & MPFD should, therefore,									
		a sudden technical snag. Will & MPFD should, therefore additional collars in stock so that they could be immediately									
			without delay. (Action: WII & MPFD)								
Supporting monitoring & research in Kuno	Upto 20 years	MoEFCC, MPFD &	❖ MoEFCC & MPFD should continue supporting WIIøs project on ecological monitoring of Kuno for first 10 years so as to understand								
research in Kuno		WII	ecological & social impacts of lion reintroduction (prey predator								
			dynamics, change in habitat parameters, change in local								
			communitiesøperceptions etc.). This is crucial for assist in intensive								
			management, conservation planning, adaptive policy change & plan								
			an exit strategy if & when needed. (Action: MoEFCC & MPFD)								
			❖ WII should aim at getting the results of reintroductions & post-								
			release research in Kuno peer-reviewed & published at frequent								
			intervals to allow other reintroduction attempts to benefit from the								
			experiences. This should be part of a continuous feedback loop with								
			the results of the documented evaluation leading to alterations to								
			the existing reintroduction program via an adaptive management								
			strategy. (Action: WII)								

Asiatic Lion Translocation Action Plan DRAFT III (June 2016)

Actions	Time	Agency	Role of the Agencies
	frame	involved	
Landscape level conservation initiative by MPFD	5 years	MPFD	As discussed earlier, MPFD should be able to legally secure parts of Kuno-Shivpuri-Sheopur landscape latest by this time so as to curtail possible ill-impacts of urban sprawl and unplanned developments in the
Annual Review & Planning Exit Strategy	10 – 12 years	MoEFCC	MoEFCC in consultation with WII & other relevant organizations should regularly be reviewing (through field visits, meetings & technical reports) the progress & status of lion reintroduction program in Kuno. The project needs to be rolled back and reconsidered in terms of legal, policy and alternative strategies if the successø parameters mentioned in the Action Plan are not achieved.

SUGGESTED KEY ACTION SCHEDULE FOR LION REINTRODUCTION (FOR THE FIRST 10 YEARS)

(Each time period represents 6 months)

Activity	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
Approve Action Plan (MoEFCC)																				
Constitution of Empowered Committees & Steering Committee (MoEFCC)																				
Submission of an interim report to the Honorable Supreme Court of India (MoEFCC)																				
Signing of a Memorandum of Agreement (MoEFCC, GFD & MPFD)																				
Creation of Kuno National Park (MPFD)																				
Securing Kuno Landscape through legislation & eco- restorations in tandem with recovery of Kuno WLS (MPFD)																				
Timely release of fund for remaining village resettlement in Kuno & initiation of research (MoEFCC)																				
Permission for WII research in Kuno from MoEFCC, DoT, GFD & MPFD																				

Activity	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
Initiation of research & monitoring in Kuno (WII)																				
Designing & construction of new lion enclosure in Kuno (MPFD)																				
Implementation of smart patrolling (MSTrIPES), training & capacity building in Kuno (MPFD, MoEFCC & WII)																				
Identification of founder lion population in Gir (GFD & MoEFCC)																				
Purchase of radio equipment & deployment permissions for lions & other carnivores (MoEFCC & WII)																				
Disease profile of the founder lions & comparison with the disease profile in the carnivores in Kuno (WII)																				
Radio collaring carnivores in Kuno (WII & MPFD)																				
Capture, transport & housing of founder lions in Lion enclosure in Kuno (GFD, MPFD, MoEFCC & WII)																				

Activity	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX
Soft release of lions in Kuno (MPFD)																				
Post release long-term monitoring (MPFD & WII)																				
Managing inter specific strife in Kuno (MPFD)																				
Mitigating conflicts in Kuno (MPFD)																				
Creation of tourism zone in Kuno (MPFD)																				
Genetic management & supplementation (MPFD, GFD, MoEFCC & WII)																				
Annual Review Meetings (MoEFCC)																				
Exit Strategies, if needed (MoEFCC)																				

APPENDIX 1

Prey Density in Kuno Wildlife Sanctuary 2014

Methodology: To estimate population density of prey, Distance sampling on systematic line transect method was used (Buckland et al. 2001). Fixed line transects distributed across 1,280 km² of Kuno Wildlife Division, of length ranging from 2-3 km were sampled (Bipin et al. 2015). A total of 51 replicates inside the sanctuary (n = 240 km walk effort) and 26 replicates in the buffer zone (n = 59 km walk effort) were sampled. Distance to the prey was measured using a laser range finder (Bushnell pro800). All ungulates and other prey species observed along with their group sizes were recorded. The prey density was estimated using the program DISTANCE 6.0. (Thomas et al. 2010). DISTANCE enables the computation of detection probability for the sightings obtained during transects (Buckland et al. 2001). This detection probability enables estimation of animal abundances by correcting for the biases in detection of animals.

Results: Chital is the most abundant prey in the Sanctuary (Table 1; Bipin et al. 2015).

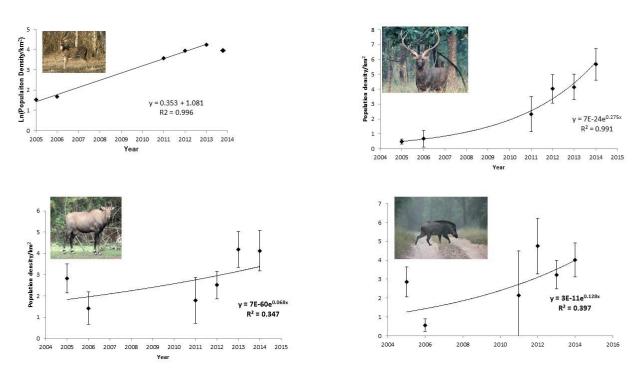
Table 1: Prey abundances in Kuno Wildlife Division, 2014

Species		Inside Sar	nctuary		Buffer								
	Density/km ² (SE)	Group Density/km² (SE)	Effective Strip Width (m)	Group Encounter Rate	Density/km ² (SE)	Group Density/km ² (SE)	Effective Strip Width (m)	Group Encounter Rate					
Chital	52.5 (8)	7 (0.8)	49.2	0.7	1.2 (0.9)	0.3 (0.2)	49.3	0.03					
Sambar	6.6 (1)	2 (0.3)	53.7	0.2									
Nilgai	3.5 (1)	1 (0.3)	57.6	0.2	2.8 (1)	1.2 (0.3)	63.9	0.2					
Wild pig	4.3 (0.9)	2 (0.3)	44.4	0.1	0.6 (0.4)	0.4 (0.3)	44.3	0.03					
Chinkara	0.6 (0.3)	0.4 (0.2)	62.9	0.05	0.35 (0.21)	0.41 (0.23)	62.3	0.05					
Chowsingha	0.8 (0.3)	0.6 (0.2)	51.5	0.05									
Langur	12.5 (3)	1.3 (0.3)	52.3	0.1	20 (7)	2 (0.7)	54.5	0.2					
Feral cattle	1.4 (0.7)	0.6 (0.3)	49.1	0.06									

WII has been conducting population estimation in Kuno WLS since 2005 (Banerjee 2005; Johnsingh et al. 2007; Ranjitsinh & Jhala 2010; Pabla et al. 2011; Bipin et al. 2013; 2015) and the data suggests an exponential increase in the prey population, especially chital. The

natural log transformed population estimates when regressed against time provided an estimate of the realized rate of increase (Caughley 1977). Chital and sambar populations grew at an approximate realized growth rate of r = 0.30 (Figure 1) and finite rate of population change, =1.42, where = e^r (Bipin et al. 2013; 2015). The observed r is exceptionally high suggesting a growth rate close to r_m (intrinsic growth rate) and is likely due to good management practices and protection offered in Kuno WLS during the past 10-15 years (Bipin et al. 2013; 2015).

Figure 2: Lion prey population (chital, sambar, nilgai and wild pig) growth in Kuno Wildlife Sanctuary since 2005



Population growth rates of chital (0.33) and sambar (0.27) in Kuno WLS is comparable to the maximum annual population growth rate of similar body sized mammals in the tropics and temperate countries; i) red brocket deer (*Mazama americana*) (r_m= 0.4) (Robinson & Redford 1986) and Elk (*Cervus elaphus nelsoni*) (r_m=0.28) (Eberhardt et al. 1996) respectively in the Americas, ii) fallow deer (*Dama dama*) (r_m=0.35) (Bright 1993) and reindeer (*Rangifer tarandus*) (r_m=0.3) (Skogland 1985) respectively in Europe, iii) kewel bushbuck (*Tragelaphus scriptus*) (r_m=0.29) (Cowlishaw et al. 2005) and common tsessebe (*Damaliscus lunatus*) (r_m=0.29) (Sinclair 1995) respectively in Africa.

APPENDIX 2

Lion Carrying Capacity in Kuno WLS

Methodology: There are several approaches to predict carnivore density at a site; but studies have shown that it can be obtained more reliably by regressing against prey biomass (Carbone & Gittleman 2002). The carnivore density derived from this relationship only works as long as no other mechanisms besides prey availability limit a carnivore population. A regression model (Hayward et al. 2007) that related prey biomass and lion density was used to estimate the current ecological carrying capacity of Kuno WLS for lions. The models based on lionsø preferred prey species and preferred prey weight range were used. The equations were y = -1.363 + 0.152x ($r^2 = 0.271$, P < 0.001, n = 23) and y = -2.158 + 0.377x ($r^2 = 0.626$, P < 0.001, n = 23) respectively where y is the log_{10} of lion density and x is the log_{10} of preferred prey biomass (Hayward et al. 2007). Chital, sambar, nilgai and wild pigs were considered to be the preferred prey species based on lionsø diet in Gir (Chellam 1993; Meena et al. 2011; Banerjee 2012; Banerjee et al. 2013). Prey biomasses of different species were deduced by multiplying their densities (Bipin et al. 2014) with 75% of their respective average unit female body weights (Karanth & Sunquist 1995).

Models provided in Hayward et al. 2007 are statistically robust since the estimates are based on large sample sizes and the relationships they describe between predator density and either the biomass of significantly preferred prey or the biomass of prey in the predator preferred weight range is highly significant for lions (P = 0.009 for preferred prey weight range and P < 0.001 for prey species; see Table 4 of the Paper). Moreover, compared to other models available for predicting k, the relationships in Hayward et al. 2007 are more conservative and more or less accurately explained the confounding factors such as difficulty in estimating carnivores, variations in methodology, appropriate definitions of food density, interspecific competition and intra-guild predation, genetics and disease. In absence of any such model specific for the Asiatic lions, the Action Plan resorted to Hayward et al. 2007.

We also used Keithøs model [k/ (-1)] (Fuller 1989) to estimate the number of prey units required to sustain a lion population of certain size (K) without causing declining trends in the prey population.

N = k/ (-1); where N = number of ungulates needed per lion to maintain stable ungulate population, k = number of ungulates killed/lion/year and = intrinsic growth rate of the prey.

We considered only 10% of each of langurs and peafowl as potentially available lion prey. Intrinsic rate of increase () for prey was adopted from Bipin et al. 2014. We use consumption rates and inter-feeding interval rates of lion as reported by Schaller (1972); Singh (2007) and Banerjee (2012), which translate to about 125 ó 150 prey killed by a lion annually.

Results: With the preferred prey species, the lionsø carrying capacity for the Kuno WLS was estimated to be 12.44 (95% CI 11.6 ó 13) lions/100 km² while with the preferred prey weight range the lionsø carrying capacity was estimated to be 10.43 (95% CI 7.96 ó 10.47) lions/100 km². With an area of 345 km² from where the prey density information was used, the total number of lions that can be currently supported in Kuno ranges between 28 and 45.

Keithøs model predicted a lion carrying capacity ranging between 19 ó 23 lions in Kuno WLS without causing any declining trend in the prey populations.

APPENDIX 3

Population Viability Analysis (PVA) for Kuno Lions

The examination and the analysis of the interacting factors that place a population or a species at risk is called population viability analysis or PVA (Burgman et al. 1993). PVA contributes in the two broad objectives of the threatened species management; i) the short term objective of minimizing extinction risks and ii) the long-term objective of promoting conditions in which species retain their potential for evolutionary change without intensive management (Lacy 1993). PVA was carried out for Kuno lions to evaluate the likelihood that it will persist for a given time into the future once reintroduced. Simulation models were run in the Program VORETX 9.50 (Lacy et al. 2009). All the models were run for 1,000 iterations for 100 and 200 years and a *quasi-extinction* was defined when only one gender remained.

Lion demographic parameters used for PVA

Age of first reproduction: The first littering age of wild breeding females in Gir was estimated at about 4 years (Banerjee & Jhala 2012) while males were found to attain reproductive maturity and acquire a territory at 4.3 years (Banerjee 2012). Since density dependent factors are less likely to operate in Kuno during the initial phases of the reintroduction therefore the first ages of offspring for females and males were entered as three and four years respectively for the PVA models.

Maximum age of reproduction: VORTEX models all living adult animals as potentially part of the breeding pool (Lacy et al. 2005). The average life expectancy for wild lions in Gir is about 16 years (Singh 2007) and therefore 15 years has been set as the maximum age of reproduction for the PVA models.

Density dependent reproduction: VORTEX models density dependence with an equation that specifies the proportion of adult females that reproduce as a function of the total population size. Normally, the proportion of females breeding would decrease as the population size becomes large. For the current PVA models the percentage of breeding females at low density was set at 100 while the percentage of breeding females when the population reaches carrying capacity was set at 70.

Litter size and distribution of number of cubs per breeding female: The average litter size of the Gir lions was estimated at 2.3 (Chellam 1993; Banerjee & Jhala 2012). Thirteen percentages of the litters were with one cub, 51% were with two cubs, 29% were with three cubs and 7% were with four cubs (Banerjee & Jhala 2012) and these parameters were used for the current PVA models.

Lion mortality: Even successful reintroduction projects go through a series of ups and downs and one of the factors that needs to be reckoned with is the post-release lion mortality. There can be lion deaths from diseases, intraspecific strife, injury from hunting of prey, human causes etc. as recorded for Gir lions (Singh 2007; Banerjee & Jhala 2012). Lion age-specific mortality rates for the PVA models were adopted from the parameter estimates given by Banerjee & Jhala (2012).

Initial population size: Initial population size of lions for the PVA models has been kept at 10 - 12 (four breeding females and two breeding males) as suggested by Chellam et al. (1995) and Johnsingh et al. (2007).

Carrying capacity: Carrying capacity for the PVA models was set at 45. This is based on the figures deduced from the prey biomass models (discussed earlier). PVA models were also run at a higher carrying capacity of 80 to mimic a situation when the Kuno lion population becomes self-sustaining.

Supplementation: Two scenarios of supplementation have been modeled. The first one was without any supplementation while the second scenario incorporated supplementation of six lions (four breeding lionesses and two breeding male lions) every four year until 16 years from the reintroduction.

Lion Mortality: This mimicked human-induced lion mortalities. For the current PVA models, two adult lions (one male and one female) were removed from the population in an interval of every four years.

Several combinations of the above parameters were run in the program VORTEX to understand the sensitivity of a particular parameter in predicting the future risks of the reintroduced lion population.

Results:

With conservative and realistic lion population parameters, the PHVA incorporating environmental, genetic and demographic stochasticity, suggests that the lions reintroduced in Kuno will have high probabilities of long-term population persistence (Table 2 and Figure 3). The salient features that permitted population persistence were a i) carrying capacity of over 45 lions, ii) an increasing trend in the carrying capacity of the habitats from the current situation (minimum of 75 - 80 lions) due to implementation of recommendations suggested in this report, till the potential carrying capacity is achieved (over a span of 20 - 25 years), iii) introducing an initial population of a minimum of twelve individuals (5-7 breeding females and 2-3 breeding males) and iii) supplementation with a minimum of six individuals (two males and four females) every four year for the next 16 - 20 years.

Table 2: Results of PVA models for Kuno lions

PVA model scenario	Model rationale	Number of years	Intrinsic rate of population increase (r)	Probability of extinction (PE)
IP: 12, K = 45, No Supplementation, No Human-caused lion	without any management intervention except	100 years 200 years	0.013	0.27
mortality	protection against poaching	200 years	0.004	0.03
IP: 12, K = 45, No Supplementation, Human-caused lion	without any future	100 years	0.005	0.51
mortality of 2 lions every 4 years	poaching of 2 lions every 4 years.	200 years	0.002	0.78
IP: 12, K = 45, Supplementing 6 lions every 4 year till 16	is a supplementation	100 years	0.029	0.05
years of the initial reintroduction. Human-caused lion mortality of 2 lions every 4 year		200 years	0.014	0.41
IP: 12, K = 80, Supplementing 6 lions every 4 year till 16	Mimicking a scenario where the park	100 years	0.098	0.00
years of the initial reintroduction. Human-caused lion mortality of 2 lions every 4 year	management will try to enhance the carrying capacity of the park for lions by adopting appropriate core-buffer strategies (detail description within the Action Plan)	200 years	0.090	0.00

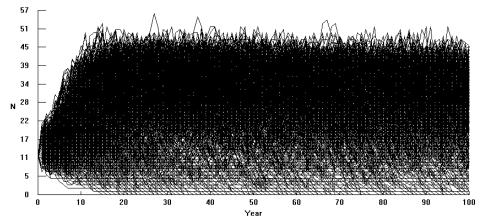
Abbreviations used in the table: IP = initial population size of lions at reintroduction, K = carrying capacity

Figure 3: Long-term (100 and 200 years) extinction probability of reintroduced lion population in Kuno WLS under different modelled stochastic scenarios in VORTEX.

Scenario 1 (IP: 12, K = 45, No Supplementation, No Human-caused lion mortality)

100 years:

Final statistics: r= 0.013, SD(r)= 0.129, PE= 0.27, N= 28, H= 59

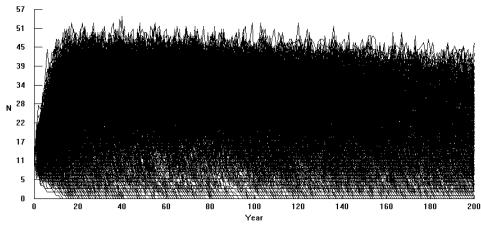


Project:Lion Kuno Scenario:K=45: IP 12, No Suppl, No Harvest,

Iteration 1000

200 years:

Final statistics: r= 0.004, SD(r)= 0.133, PE= 0.63, N= 20, H= 35



Project:Lion Kuno Scenario:K=45: IP 12, No Suppl, No Harvest,

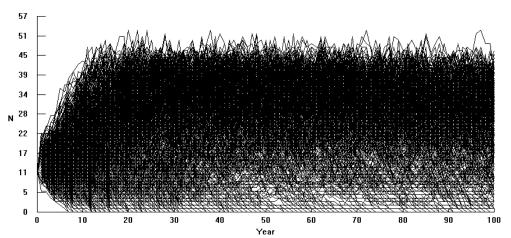
Iteration 1000

Fig 3 contd...

<u>Scenario 2 (IP: 12, K = 45, No Supplementation, Human-caused lion mortality of 2 lions every 4 years)</u>

100 years:

Final statistics: r= 0.005, SD(r)= 0.146, PE= 0.51, N= 27, H= 56

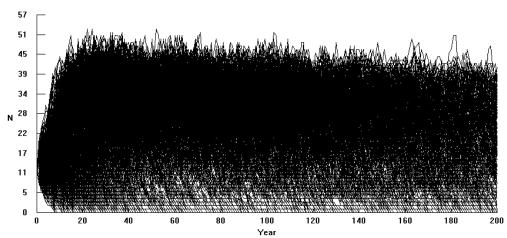


Project:Lion Kuno Scenario:K=45: IP 12, No Suppl, Harvest - 2

Iteration 1000

200 years:

Final statistics: r= -0.002, SD(r)= 0.143, PE= 0.78, N= 21, H= 34



Project:Lion Kuno Scenario:K=45: IP 12, No Suppl, Harvest - 2

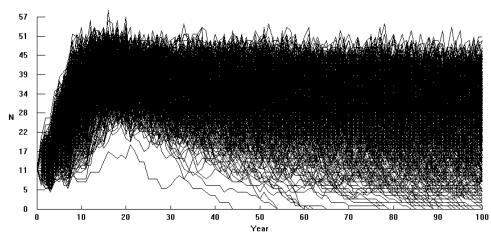
Iteration 1000

Fig 3 contd...

Scenario 3 (IP: 12, K = 45, Supplementing 6 lions every 4 year till 16 years of the initial reintroduction. Human-caused lion mortality of 2 lions every 4 year)

100 years:

Final statistics: r= 0.029, SD(r)= 0.121, PE= 0.05, N= 30, H= 67

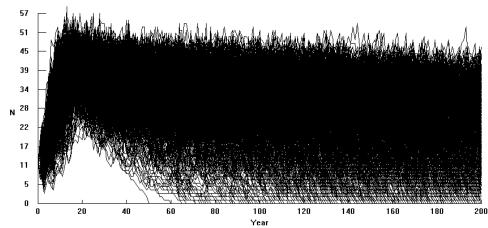


Project:Lion Kuno Scenario:K=45: IP 12, Suppl - 6 L every 4 yr

Iteration 1000

200 years:

Final statistics: r= 0.014, SD(r)= 0.126, PE= 0.41, N= 22, H= 41



Project:Lion Kuno Scenario:K=45: IP 12, Suppl - 6 L every 4 yr

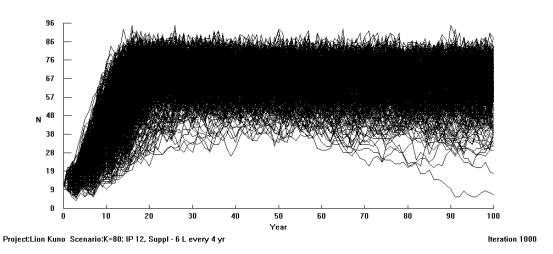
Iteration 1000

Fig 3 contd...

Scenario 4 (IP: 12, K = 80, Supplementing 6 lions every 4 year till 16 years of the initial reintroduction. Human-caused lion mortality of 2 lions every 4 year)

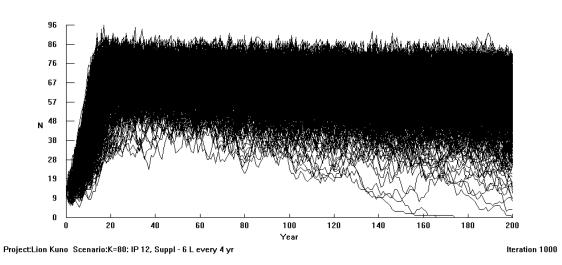
100 years:

Final statistics: r= 0.037, SD(r)= 0.098, PE= 0.00, N= 67, H= 81



200 years:

Final statistics: r= 0.025, SD(r)= 0.090, PE= 0.00, N= 61, H= 64



Gradual increase in the habitat carrying capacity would allow lions to populate new areas of the landscape and is likely to encourage their dispersals in the adjacent districts of Madhya

Pradesh. If and when this happens in future, this action plan propose to manage the different sites together as a õmetapopulationö (Hanski 1994), thereby enhancing the survival chances as well as maintaining the genetic diversity of the founding population (Kuno). However, by the time Kuno lion population reach that stage it may be too late for them to colonize newer areas owing to the loss of potential habitat corridors, breeding and *refuge* patches. Therefore, foreseeing the larger picture of lion conservation in Madhya Pradesh, it is imperative that the state Government should start adopting a conservation friendly land policy and implement strong legislations at the earliest so as to curtail possible ill-impacts of urban sprawl and unplanned developments in the region.

APPENDIX 4

Risk Analysis Checklist as per IUCN Guidelines for Reintroducing Lions in Kuno

Risk parameter	Addressed	Remarks
Is there a need to reintroduce lions?	Yes	Disease (chance of an epidemic) still remains a serious threat to Gir landscape which is about (20,000 km²) half the size of Serengeti with different populations having genetic connectivity with each other. Free-ranging dogs & other carnivores, potential carriers of disease, are common throughout the Gir lion landscape & freely move between lion populations.
Does Kuno lie within historical range of lions?	Yes	Well documented (vide Joslin 1973; Divyabhanusinh 2005)
Threats that caused previous extinction of lions in Kuno have been correctly identified and removed.	Yes	Asiatic lions got exterminated from their entire historical range due to indiscriminate hunting & loss of habitat (<i>vide</i> Appendix 1 of Joslin 1973; Edwards & Fraser 1907; Kinnear 1920; Divyabhanusinh 2005). Hunting is legally not permitted in India currently but commercial poaching for body parts could be a threat for reintroduced lion population in Kuno. The Action Plan clearly highlights need of a strong protection regime by Madhya Pradesh Forest Department in the area against poaching (of lions, other carnivores & prey). Chief Wildlife Warden, Madhya Pradesh has already communicated MoEFCC about the patrolling efforts in place in Kuno. Recovery of Kuno WLS suggests good control of poaching in the WLS.
Is there sufficient protected habitat in Kuno for the translocated lions to survive?	Yes	An ecological assessment by WII indicates that the current wildlife sanctuary (345 km²) can sustain about 40 lions. However, for a viable population, a minimum number of 80 lions is required. MPFD has already submitted a proposal for declaring the existing sanctuary area as a National Park & the Protected Area extended to about 700 km² within a forested landscape of >3,000 km².
Are there suitable animals available from the source population so that the source is not compromised in its genetic & demographic parameters?	Yes	Current lion population in Gir is about 523. Removal of 5-6 individuals (as mentioned in the Action Plan) from that will not be detrimental for the population. The Action Plan explicitly illustrates a guideline for cautiously selecting/supplementing founder population(s) so as to capture the gene pool of Gir

Risk parameter	Addressed	Remarks
		population in Kuno without disrupting social dynamics in Gir.
Is there sufficient knowledge to formulate a plan of action and evaluate its success?	Yes	Long-term monitoring data of lion population in Gir by WII & Gujarat State Forest Department has generated data on lion demography, ranging, diet, social behavior & conflicts. This information were available & used for drafting the Action Plan.
Assessment of ecological risk	Yes & ongoing	 WII (along with other independent agencies) has already evaluated prey abundance in the core & buffer zone of Kuno. The viability models developed in the Action Plan were robust & based on long-term demography data on Asiatic lions. Scenarios mimicked in the models were realistic & conservative. WIIøs proposed research in Kuno is likely to throw light on mechanism of niche separation among various carnivores in a multiple predator guild in Kuno & would assist management in avoiding inter specific strife with reintroduced lions. The Action Plan arrived at the lion numbers to be released in Kuno based on the current prey density & prescribed a long-term post-release monitoring of Kuno ecosystem (predator, prey & habitat) for addressing this.
Potential benefits and potential negative impacts covering social & economic aspects	Yes & ongoing	 CWLW, MP has already informed the Lion Reintroduction Expert Committee about various centrally & state sponsored schemes (lucrative resettlement incentives, ecodevelopment, compensation, Koushal Vikas etc.) in Kuno for fostering better support & tolerance of the local communities towards conservation. An eco-tourism policy that would specifically benefit local communities is being prepared by MPFD.
Habitat suitability of Kuno for lions	Yes	Kuno was within the historical range of the Asiatic lions. The prey base community & density in Kuno is almost the same as that found in Gir (Appendix 1; Jhala et al. 2016). Many of the vegetation communities & topography are similar between Gir & Kuno. Therefore, there is sufficient habitat for lions in the landscape of Kuno.

Risk parameter	Addressed	Remarks
Risk assessment of parasites and diseases in translocated Lions	To be addressed	Shall be an important part of WIIøs proposed research as mentioned in the Action Plan.
Potential financial risks	Yes	 Carnivore reintroductions are expensive & require long-term financial commitments. The Action Plan acknowledges this & therefore suggested signing of a tripartite Memorandum of Agreement among MoEFCC, GFD & MPFD whereby this will be addressed. A tentative budget for the next 5 years is annexed (Appendix 5).
Measure of Success		 Short term: Reintroduced lions feeding on natural prey. Establishment of territories. Natural social structure & behavior & commence breeding. Long-term: Attain an annual population growth rate of >5% similar to what observed in Gir Landscape.

APPENDIX 5: Tentative Budget (Indian Rupees) for the Initial 5 Years for Lion Reintroduction in Kuno WLS

Activity/Items	Description & Quantity	Cost calculation	Year I	Year II I	Year III Iabitat Develo	Year IV	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget
Resettlement of two villages from Kuno WL	Rs. 10 lakh/family for 195 families in Bagcha & 393 families in Jahangarh	588,000,000	588,000,000					588,000,000	MoEFCC to MPFD		588,000,000
Habitat improvement & restoration in Kuno	Weed eradication cost @ Rs. 9,000/ha/yr + fire line work & grassland management @ Rs. 5 lakh/yr + Plantation of native species @ Rs. 2 lakh/yr + soil moisture conservation work (construction & maintenance of anicuts, check dams) @ Rs. 20 lakh/yr within 2,000 ha of Kuno WLS	20,700,000	20,700,000	20,700,000	20,700,000	20,700,000	20,700,000	103,500,000	MPFD		103,500,000

Activity/Items	Description & Quantity	Cost calculation	Year I	Year II	Year III	Year IV	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget	
Creation &	Anicuts, water											
maintenance of	holes, solar pumps,											
waterholes (core & buffer)	dug & bore wells @ Rs. 20 lakh/yr	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000	MPFD		10,000,000	
(core & burier)	KS. 20 lakii/yi	2,000,000	/ /					10,000,000	MITTD		10,000,000	
MSTrIPES for Smart Patrolling and Ecological Monitoring												
									MPFD &			
	Rs. 3								MoEFCC			
Workshop	lakh/workshop	300,000	300,000					300,000	to WII	300,000		
Implementing MSTrIPES	Purchase of android phones, internet connections, software, computers, deployment of GIS/data entry operators in each range during the 1st year, maintenance costs during the subsequent years	1,200,000	1,200,000	200,000	200,000	200,000	200,000	2,000,000	MPFD	2,000,000		
			Lion	Soft-release e	enclosure & V	eterinary Uni	ts at Kuno					
						·						
Establishment cost of Lion holding facility & Veterinary clinic	Construction of clinics with animal housing & treatment facility, infrastructure development for veterinary operation theatres during the first year & subsequent maintenance cost	50,000,000	50,000,000	1,000,000	1,000,000	1,000,000	1,000,000	54,000,000	MPFD & MoEFCC	54,000,000		

Activity/Items	Description & Quantity	Cost calculation	Year I	Year II	Year III	Year IV	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget
	Rs. 65,000/month (consolidated) for two veterinary doctors & an	1,560,000	1,560,000	1,560,000	1,560,000	1,716,000	1,716,000	8,112,000	MPFD	8,112,000	
Veterinary doctor salary	increment of 10% after 3 years										
Veterinary	Rs. 25,000/month (consolidated) for 6 veterinary staff & an increment of	1,800,000	1,800,000	1,800,000	1,800,000	1,980,000	1,980,000	9,360,000	MPFD	9,360,000	
staff salary	Portable x-ray, pulse oximeter, gas	7,500,000	7,500,000	100,000	100,000	100,000	100,000	7,900,000	MPFD &	7,900,000	
Vet Clinic Equipment	anesthesia applicator, autoclave, etc. & their maintenance cost subsequently								MoEFCC		
Constructions of Transport Cages	Rs. 50,000/cage for 10 cages in the veterinary clinics & each Range of Kuno WLD	500,000	500,000					500,000	MPFD	500,000	
Purchase of darting equipment & drugs	Rs. 2 lakh during the 1st yr; Rs. 1 lakh/yr subsequently	200,000	200,000	100,000	100,000	100,000	100,000	600,000	MPFD & MoEFCC	600,000	
Operational & maintenance cost of the units	Housing & feeding of rescued animals, medical treatments, salaries of staff/labors & monitoring cost @ Rs. 10 lakh/yr	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	5,000,000	MPFD	5,000,000	

Activity/Items	Description & Quantity	Cost calculation	Year I	Year II	Year III	Year IV	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget
Cost for livestock vaccination program in the	Rs. 7.5 lakh/yr	750,000									
surroundings of Kuno			750,000	750,000	750,000	750,000	750,000	3,750,000	MPFD		3,750,000
			· ·		Tracking Tear						
Salaries of lion trackers	Rs. 25,000/month (consolidated) for 6 lion trackers & a increment of 10& after 3 years	1,800,000	1,800,000	1,800,000	1,800,000	1,980,000	1,980,000	9,360,000	MPFD	9,360,000	
				Train	ing & Capaci	ty Building					
Training of selected staff, veterinary & tracking team members in Gir	Rs. 2 lakh for a training of about a month	200,000	200,000	77,000	ing & Supuci	<u>, , , , , , , , , , , , , , , , , , , </u>		200,000	MPFD & MoEFCC	200,000	
Supporting the travel & staying of Gir Lion tracking team for 3-4 months in Kuno	Rs. 5 lakh	500,000	500,000					500,000	MPFD	500,000	

Activity/Items	Description & Quantity	Cost calculation	Year I	Year II	Year III	Year IV	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget		
Purchase of vehicles for veterinary units & lion tracking teams	Two mini trucks (TATA 4WD Pick Up) @ Rs. 9 lakh/each + three Bolero Camper @ Rs. 7 lakh/each + five motorcycles @ Rs. 50,000 each	4,150,000	4,150,000					4,150,000	MPFD	4,150,000			
Purchase of walki talkies for tracking & veterinary teams	25 units @ Rs. 10,000/unit	250,000	250,000					250,000	MPFD	250,000			
Purchase of additional weapons & ammunitions for patrolling	Purchase of 8 units of .303 Lee Enfield Rifles @ Rs. 28,000/unit (during 1st year) & 50 shots/gun/yr @ Rs. 150/cartridge	3,824,000	3,824,000	3,600,000	3,600,000	3,600,000	3,600,000	18,224,000	MPFD		18,224,000		
Construction & operational costs of additional check posts	Construction of five check posts @ Rs. 8 lakh + operational cost of Rs. 1 lakh/yr subsequently	6,000,000	4,000,000	500,000	500,000	500,000	500,000	6,000,000	MPFD		6,000,000		
	Research & Ecological Monitoring												
Grant for research & monitoring of Kuno	As per MoEFCC's mandated research to WII		23,448,650	5,918,200	4,929,600			34,296,450	MoEFCC to WII	34,296,450			

Activity/Items	Description & Quantity	Cost calculation	Year I	Year II	Year III	Year IV	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget
					aries & Staff A	Amenities	<u> </u>				
Filling of vacant posts	Salaries of 40 staff (2 Rangers @ Rs. 45,000/month + 5 Range Assistants @ Rs. 35,000/month + 23 beat guards @ Rs. 28,000/month + additional 15 drivers, monitoring staff @ Rs. 23,000/month)	15,048,000	15,048,000	15,048,000	15,048,000	15,048,000	15,048,000	75,240,000	MPFD		75,240,000
Engagement of higher number of daily labors	Salaries of 30 daily wage labors @ Rs. 7,000/month	2,520,000	2,520,000	2,520,000	2,520,000	2,520,000	2,520,000	12,600,000	MPFD	12,600,000	
Other basic staff amenities (solar power, mosquito net, camping kit											
etc.)	Rs. 5 lakh/yr		500,000	500,000 Transpor	500,000	500,000	500,000	2,500,000	MPFD		2,500,000
				ттанарог	t of Lions iro	in On to Kun	0				
Cost for capturing lions in Gir	Drugs, field supplies, transport cost, honoraria & consultancy fee		750,000			750,000		1,500,000	MoEFCC	1,500,000	
Cost of hiring IAF helicopters between Gir & Kuno	Rs. 50 lakh		3,000,000			2,000,000		5,000,000	MoEFCC	5,000,000	

Description & Quantity	Cost calculation	Year I	Year II	Year III	Year IV	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget			
Managing Conflict & Eliciting Public Support Provision for													
Rs 50 lakh/vr		5 000 000	5 000 000	5 000 000	5 000 000	5 000 000	25 000 000	MPFD		25,000,000			
Rs. 50 lakh/yr		5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	25,000,000	MPFD & MoEFCC		25,000,000			
Rs. 25 lakh/yr		2,500,000	2,500,000	2,500,000	2,500,000	2,500,000	12,500,000	MPFD		12,500,000			
·	<u>'</u>		Tra	vel & Accomn	nodation				<u> </u>				
Rs. 7 lakh/yr		700,000	700,000	700,000	700,000	700,000	3,500,000	MoEFCC	3,500,000				
	Rs. 50 lakh/yr Rs. 50 lakh/yr Rs. 25 lakh/yr	Rs. 50 lakh/yr Rs. 50 lakh/yr Rs. 25 lakh/yr	Rs. 50 lakh/yr 5,000,000	Rs. 50 lakh/yr 2,500,000 2,500,000 Rs. 25 lakh/yr 2,500,000 2,500,000	Quantity calculation Year I Year II Year III Managing Conflict & Elicities Rs. 50 lakh/yr 5,000,000 5,000,000 5,000,000 Rs. 50 lakh/yr 5,000,000 5,000,000 5,000,000 Rs. 25 lakh/yr 2,500,000 2,500,000 2,500,000 Travel & Accomm	Quantity calculation Year I Year II Year IV Managing Conflict & Eliciting Public Su Rs. 50 lakh/yr 5,000,000 2,500,000	Quantity calculation Year I Year III Year III Year IV Year V Managing Conflict & Eliciting Public Support Rs. 50 lakh/yr 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 5,000,000 2,500,000 <t< td=""><td> Rs. 50 lakh/yr</td><td> Cost Cost </td><td> No. Pescription & Cost Quantity Cost Quantity Pear II Pear III Pear III Pear IV Pear I</td></t<>	Rs. 50 lakh/yr	Cost Cost	No. Pescription & Cost Quantity Cost Quantity Pear II Pear III Pear III Pear IV Pear I			

Activity/Items	Description & Quantity	Cost calculation	Year I	Year II	Year III	Year IV	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget
Accommodation cost for the officials of MoEFCC, GFD, MPFD, WII & different Committee members at Delhi, Gir & Kuno	Rs. 5 lakh/yr		500,000	500,000	500,000	500,000	500,000	2,500,000	MoEFCC	2,500,000	
Fuel & operational cost of vehicles for research, monitoring, veterinary teams & tracking teams	Rs. 1 lakh/yr/4W vehicle for 10 vehicles + Rs. 50,000/yr/motorcyc le for 13 motorcycles	1,650,000	1,650,000	1,650,000	1,650,000	1,650,000	1,650,000	8,250,000	MPFD & MoEFCC	8,250,000	
Costs for arranging meetings of different committees	Rs. 2 lakh/yr		200,000	200,000	200,000	200,000	200,000	1,000,000	MoEFCC	1,000,000	
				Devel	opment of To	urism Zone					
Master Plan & infrastructure development	Rs. 5 crore for the 2nd & 3rd year & Rs. 1 crore as maintenance cost during subsequent years			25,000,000	25,000,000	10,000,000	10,000,000	70,000,000	MPFD		70,000,000
Construction of Interpretation center	Rs. 1 crore for construction & Rs. 30 lakh as annual maintenance cost				10,000,000	3,000,000	3,000,000	16,000,000	MPFD		16,000,000

Activity/Items	Description & Quantity	Cost calculation	Year I	Year II	Year III Other Exper	Year IV 1ses	Year V	Total Amount	Agency to provide fund	Absolutely essential for lion reintroduction	Additional Budget
Field supplies	For research, monitoring & other purpose		300,000	300,000	300,000	300,000	300,000	1,500,000	MPFD & MoEFCC	1,500,000	
Publication & media	Rs. 1 lakh/yr		100,000	100,000	100,000	100,000	100,000	500,000	MPFD	500,000	
Contingencies	Rs. 5 lakh/yr		500,000	500,000	500,000	500,000	500,000	2,500,000	MPFD & MoEFCC	2,500,000	
TOTAL BUDGET (Rs.)								1,131,092,450		175,378,450	955,714,000

Overall budget = Rs. 113 crores 10 lakhs 92 thousands four hundred fifty

Budget requirement absolutely for lion reintroduction – Rs. 17 crores 53 lakhs 78 thousands four hundred fifty

Additional Budget requirement - Rs. 95 crores 57 lakh 14 thousand

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Government of India Ministry of Environment, Forest and Climate Change (Wildlife Division)

6th Floor, Vayu Wing, Indira Paryawaran Bhawan Jor Bagh Road, New Delhi-110003

F. No. 1-63/2007-WL (pt) Dated: 29th December, 2016

Sub: Summary records of the '6th Meeting of the Expert Committee on Translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh'-reg.

Kindly find the enclosed copy of Summary records of the '6th Meeting of the Expert Committee on translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh' held on 19th December, 2016 at 3:30 PM at Shivpuri Tourist Complex, Shivpuri, Madhya Pradesh.

Yours faithfully

Scientist 'C'/ Deputy Director (WL)

Email: rs.ratti@gov.in

Distribution:

- Addl. Director General of Forests Member secretary, NTCA i)
- Director, Wildlife Institute of India ii)
- Dr. J.A. Khan, PCCF & HoFF Gujarat iii)
- Chief Wildlife Warden, Madhya Pradesh iv)
- Chief Wildlife Warden, Gujarat V)
- Dr. Ravi Chellam, Wildlife Biologist and Conservation Scientist vi)
- Dr. Y.V. Jhala, Scientist 'G', WII vii).
- The Secretary General & CEO, WWF-India viii)
- Dr. A.J.T. Jonhsingh, Member, NBWL ix)
- Shri P.R. Sinha, Country Director, IUCN-India X)
- Shri M.B. Lai, Ex-Addl. Director General of Forests (WL) xi)
- Dr. M.K. Ranjitsinh, Member, NBWL xii)

Copy to:

- PPS to ADG (WL) 1.
- PPS to IGF (WL) 2.
- PA to JD (WL) 3.

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Summary record of discussions held during 6th Meeting of Expert Committee on 'Translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh'

Date: 19th December 2016 Venue: Shivpuri Tourist Complex, Shivpuri, Madhya Pradesh

The sixth meeting of the Expert Committee on 'Translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh' was convened on 19th December, 2016 at 2:30 PM at Shivpuri Tourist Complex, Shivpuri, Madhya Pradesh, under the chairmanship of Shri B.S. Bonal, Additional Director General of Forests (Wildlife). Before the meeting, field visits of the Committee were conducted on 18th afternoon and 19th forenoon in the Kuno-Palpur Wildlife Sanctuary. The list of participants in the meeting is at **Annexure 1**.

- 2. PCCF & CWLW, Madhya Pradesh welcomed the members to the Kuno-Palpur Wildlife Sanctuary.
- 3. ADG (WL) & the Chairman of the Expert Committee made introductory remarks.
- 4. The PCCF & CWLW, Gujarat raised the issue that the Action Plan Draft-III was received very late and hence, some more time should be given to them to provide their comments on the same. The Committee agreed that the members would submit their final comments to the Ministry on the Action Plan (Draft-III) latest by 7th January, 2017.

- 5. The Committee took note of the summary records of the fifth meeting of the committee and discussed the agenda wise Action Taken Report (ATR) circulated between the members. The Chair stressed upon the need for the cooperation of both States in achieving the same. The actions perused in respect of the decision taken in the 5th Meeting were elaborated by him. ATR was accepted.
- 6. A brief presentation was made by Dr. Kaushik Banerjee, Tiger Cell, WII on the revised Action Plan Draft-III incorporating the comments of the Expert Committee members. He informed about the additions made in the latest Draft-III and gave a brief overview on the Need of translocation of Asiatic Lion from Gir National Park, Gujarat to Kuno Wildlife Sanctuary M.P. He also informed to the Committee that a Tentative Budget of Rs. 113,10,92,450 would be required during the initial 5 Years for Lion Reintroduction in Kuno WLS.
- 7. Shri Uday Vora, Conservator of Forest (Wildlife), Gujarat informed about the CWLW, Gujarat's earlier proposal for 33 Ecological Studies in the context of Lion reintroduction. He requested the Committee to have the results and findings of these studies as he was of the opinion that directly preparing the Action plan without considering the final results of the studies would not solve the issue. In response to this, JD (WL) clarified that, this issue was disused in the 5th Meeting of Expert Committee held in May, 2016 and WII had shared a document clearly indicating the relevance and current status of these studies with the committee members. According to the document, the current status of the studies is as follows:
 - (i) 7 Studies completed
 - (ii) 12 Studies are not required to be conducted
 - (iii) 14 Studies are essential

- (iv) 11 Studies are part of present proposal of WII
- 8. The same document was again circulated to the Committee for perusal and all members agreed to have the document as a part of the 'Action Plan for the Reintroduction of the Asiatic Lions (Panthera Leo Persica) in Kuno Wildlife Sanctuary, Madhya Pradesh'.
- 9. Dr. M.K. Ranjitsinh commented that the formulation and preparation of the Action Plan for the Reintroduction of the Asiatic Lions should not be dependent on the results and findings of the research studies. The finalization of the Action Plan could be done simultaneously and in parallel. All the Committee members also agreed to his comment. He also referred to the minutes of 5th Meeting of Expert Committee and emphasized to expedite the process of formulation of tripartite Memorandum of Agreement (MoA) between the three parties i.e. MoEF&CC, Govt. of India, Forest Department, Government of Gujarat and Forest Department, Government of Madhya Pradesh. He mentioned that it is the responsibility of the Ministry to get inputs from WII on the detailed roles, rights, risks and privileges of each of the three parties and finalize the tripartite Memorandum of Agreement (MoA).
 - 10. Shri Uday Vora, commented that Kuno-Palpur Sanctuary has an area of only 343 sq.kms and as per the initial plan prepared in 1994 by WII for translocation of Lions, the area was indicated as about 700 sq.kms. However, till date the Government of Madhya Pradesh had not notified additional areas to the Kuno Sanctuary.
 - 11. In response to this, PCCF & CWLW, Madhya Pradesh informed the Committee that the State Government of Madhya Pradesh has already taken action

to enhance the total area available for translocation of Lions by notifying the additional forest area as Protected Area under the provisions of the Wildlife (Protection) Act, 1972 and declare the Kuno Wildlife Sanctuary as Kuno National Park. It is proposed to increase the present area of 343 sqkm to 758 sqkm. In this process, 195 families in the 'Bagcha Village' would have to be relocated, imposing an additional expenditure of Rs. 19 crores. A brief presentation was made by Shri Brijendra Srivastava, DFO, Kuno Division on the demography of Kuno- Palpur Sanctuary and gave a brief overview on the proposed surrounding areas which would be added to the present area of 343 sq.kms of the Kuno Sanctuary. Dr. M.K. Ranjitsinh suggested that State Government of Madhya Pradesh should expedite the process of notifying and declaring the Kuno Sanctuary as National Park at the earliest and if the buffer area is not sufficient then it should be declared as Conservation reserve. It was decided that the State Government of Madhya Pradesh should complete formalities for declaration of Kuno Wildlife Sanctuary to Kuno National Park before 28th February, 2017 with extended area.

- 12. The Chair informed the Committee members that, taking into notes from the 5th Meeting of Expert Committee, Government of Madhya Pradesh has already constituted the State specific empowered/coordination committee. But State Government of Gujarat is yet to initiate the action on the same. Constitution of the Steering Committee is under process in the MoEF&CC.
- 13. In response to this CWLW, Gujarat informed the Committee that State Government of Gujarat would constitute their State Empowered/ coordination committee within one month. Dr. M.K. Ranjitsinh mentioned that the State Empowered Committee of Government of Gujarat should be constituted with clear

Terms of Reference and the Committee should also identify the 'Pride' of Lion which would be selected for translocation.

- 14. The PCCF & CWLW, Madhya Pradesh appreciated the efforts of Gujarat Forest Department in conservation and for successful population increase of Asiatic Lion since 1994 (523 Lion during 2015 census) but he again emphasized on the need of translocation of Lion from Gujarat to Madhya Pradesh.
- 15. Dr. Ravi Chellam emphasized on the clear commitment from State Government of Gujarat for translocation of Lion. To this, PCCF & CWLW, Gujarat mentioned that if all the guidelines of IUCN are followed, Gujarat does not have any issue in translocation of Lion from Gir, National Park to Kuno Sanctuary, Madhya Pradesh.
- of Madhya Pradesh for restoring the whole Sanctuary and augmenting the vegetation and other species. He suggested the immediate complete eradication of certain plant species such as Opuntia (Cactus) and other weeds which were growing at some places within the sanctuary. The Chair emphasized to expedite the process.
- 17. Shri P.R. Sinha commented that habitat recovery and augmentation in the Kuno Sanctuary is fantastic but it does not correlate with the prey based density. The density of prey must be increased. To this, CWLW, Madhya Pradesh informed the Committee that the prey based density has increased in a few years time and in addition to this, around 550 Feral cattle also roam the sanctuary, which were left

behind by the relocated 'Sahariya' tribal herders. The cattle are intended to serve as buffer prey for Asiatic lions.

18. Dr. M.K. Ranjitsinh informed the Committee that as per the prior reports submitted by the State Government of Madhya Pradesh, it was proposed to vaccinate 3500 cattle of the surrounding villages around the Sanctuary to prevent spread of cattle diseases inside the Sanctuary also. He also raised issue of increasing movement of nomadic tribes such as 'Rabbaries' which also bring their cattle with them and hence, there are always chances of transfer of communicable animal diseases. He also enquired about the present strength of Forest Staff in the Kuno Sanctuary, Steps taken by Forest Department, Govt. of Madhya Pradesh to train the local people and forest staff to manage the issues related to Lion conflicts and status of Comprehensive Management Plan of the State Govt. of M.P.

To this, the PCCF & CWLW M.P. responded that Forest Department, M.P., along with the Animal Husbandry Department, Govt. of M.P. and local N.G.Os. conduct vaccination program of cattle in the surrounding villages of the Sanctuary regularly and promised to complete the process before 28th February 2017. He also agreed to stop the entry of nomadic tribes (carrying their cattle along with them) into the surrounding areas of the sanctuary. CCF, Shivpuri, MP informed that there are 187 staff at present against the total positions of 234 staff in the Kuno Sanctuary and the remaining vacant position would be filled in this financial year. PCCF & CWLW, M.P. informed that it is planned to conduct some skill development and training programmes at Kuno Sanctuary for the M.P. Forest officials and local villagers by inviting officials from Gujarat Forest Department to tackle issues related to Lion management. He also informed that it is also planned to send a veterinary Doctor and other officials to Gir National Park, Gujarat for the

training on the management of diseases related to Lion. PCCF & CWLW M.P. informed that Comprehensive Management Plan of Kuno Wildlife Sanctuary was approved by the CWLW, State Government, Madhya Pradesh. Scanned copy of the same would be shared with the State Govt. of Gujarat. PCCF &CWLW Gujarat, welcomed the Govt. of M.P. for providing requisite trainings prior to Lion translocation. It was decided that the filling of vacant post is a definite requirement for the project. Hence, expedite for the same before the translocation takes place.

- 19. After detailed discussions, the following actionable points emerged out:
 - Members would submit their comments to the Ministry on the 'Action Plan for the Reintroduction of the Asiatic Lions (Panthera Leo Persica) in Kuno Wildlife Sanctuary, Madhya Pradesh Draft-III' latest by 7th January 2017.
 - Palpur Wildlife Sanctuary as National Park inclusive of extended area, completion of vaccination of cattle and filling up of vacant post in the Kuno Division, by last week of February 2017.
- iii. WII would submit their research proposal 'Ecology assessment and monitoring of Kuno landscape as a potential reintroduction for the Asiatic Lions' to the Wildlife Division of the Ministry for seeking financial assistance.
- iv. The Ministry would expedite the process of constitution of Steering Committee to oversee the working of Empowered Committees of State Government of Gujarat and Madhya Pradesh.
- v. State Government of Gujarat would expedite the process of constitution of State Empowered/ coordination Committee along with Terms of Reference (ToR) of the Committee by 7th January 2017.

- vi. WII would provide inputs on the detailed roles, rights, risks and privileges of each of the three parties for finalization of the tripartite Memorandum of Agreement (MoA) between the three parties i.e. MoEF&CC, Govt. of India, Forest Department, Government of Gujarat and Forest Department, Government of Madhya Pradesh. The Ministry would then prepare the draft tripartite MoU and circulate to both the State Governments and members before its final submission to the Law Ministry.
- vii. The next meeting of the Committee shall be convened at the earliest at convenient place and time to Finalize Action Plan (Draft-III).
- 20. The meeting ended with vote of thanks to the Chair by JD (WL).

6th Meeting of the Expert Committee on translocation of Asiatic Lions from Gir National Park, Gujarat to Kuno Sanctuary, Madhya Pradesh

<u>Date:</u> 19th December 2016 <u>Venue:</u> Shivpuri Tourist Complex, Madhya Pradesh

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