

WCS - HUNCHUN



WCS CHINA – HUNCHUN

Human-Tiger Conflict Resolution Framework

June 2010



Executive Summary

The main objective of WCS in Hunchun is to work with relevant stakeholders to protect the Wild Amur tigers. To achieve this objective, WCS has to create a sustainable environmental and economic ecosystem in Hunchun for humans, tigers and other species to coexist. This requires a comprehensive understanding of the habitats, i.e. the resource needs of the relevant species and the interconnection between those needs. This will help us identify the conflicts between humans, tigers and other species in the ecosystem. As we further understand the reasons and motives behind the different conflicts, we can develop better solutions to mitigate the issues. These issues need to be addressed simultaneously as they are often interconnected requiring a concerted and integrated solution.



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Vision & Mission

Vision: Create a sustainable environmental and economic ecosystem in Hunchun for humans, tigers and other species to coexist.

Mission: Understand the needs of individual species within ecosystem and the conflicts among the different need. Provide solutions that address the root causes of the conflicts. Implement the solutions.

Introduction

While the focus of Haas-WCS project is to develop a viable business model around one or more NTFPs¹, the Haas International development team believes doing so addresses only one of the many issues derived human-tiger conflict in Hunchun. So while the “WCS China – Hunchun NTFP Analysis” report dives into developing an economically and environmentally sustainable business model for NTFP, this “report attempts to summarize most if not all the conflict between Humans and their environment. This “WCS China – Human-Tiger Conflict Resolution Framework” report has a much broader perspective that attempts identify, analyze and solve the complex and interconnected issues. Due to the broadness of this report, we were only able to make cursory recommendations which will require further study and analysis prior to recommendation. That said, NTFP cultivation fall under only one of five major conflict categories. So when we make recommendation for cultivating NTFP, we are addressing only the specific behavior of Humans taking NTFPs to supplement their income. This single recommendation overlooks the other conflicts that need to be addressed.

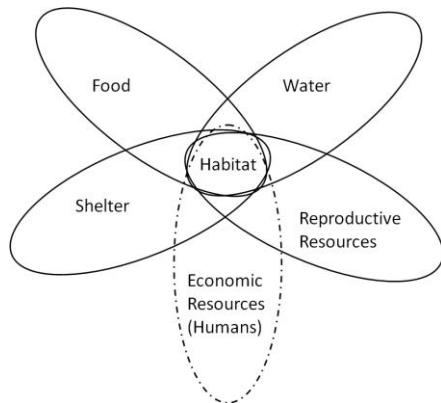
Conflict Category	Food/ Consumption	Shelter/ Territory	Water	Reproductive Resources	Economic/ Political
1	Humans Hunt Tiger Prey Species & Take NTFP	Humans turn the forest into farmland	Humans build dams	Human reduce the reproductive resource of all other species	Conflict of interest
2	Humans cut down forest	Humans use forest resources	Humans pollute the water		Moral hazard
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¹ NTFP = Non-timber Forest Products

Habitat Overlap & Conflicts Among Species

Habitat Diagram

Habitat is the combination of resources allows for individual species to survive. While very species have food, water, shelter, and reproductive needs, humans have the extra need of economic resources.



The above diagram illustrates the resources and territory needs of an individual specie. The overlap of these needs indicate a conflict between two or more species that may either be natural or human generated. For example, tigers hunting prey species conflicts with the reproductive resources of that species, but is entirely natural. However, cattle foraging in forest pasture conflicts with the food needs of the tiger prey species, which is a human generated conflict (HGC) that needs to be mitigated.

Outline of Needs by Species

Tiger Needs:

- Food – prey, cattle, livestock
- Water -
- Shelter: Forest
- Reproductive resources

Cattle Needs:

- Food – graze on grassland, NTFP
- Water
- Shelter – human villages, forest
- Reproductive resources

Human Needs:

- Food – cattle, prey species, NTFP,

- Water
- Shelter – villages, near forest
- Firewood for heat and cooking
- Economic & Political – growth
- Reproductive resources

Prey species Needs

- Food – graze on grassland, NTFP
- Water
- Shelter – forest, grassland
- Reproductive resources

Concerns:

- Tigers threaten villagers
- Tigers hunting livestock
- Villagers hunting tigers
- Villagers hunting prey species
- Villagers decimating tiger habitat
- Tigers need enough food

Conflict Diagrams:

We differentiate between conflicts that are within WCS scope and capabilities and those that are beyond. Our recommendation to WCS for issues beyond its scope is to either partner with organizations that have the appropriate mandate and expertise or simply leave those issues to those organizations.

Conflicts within Scope of WCS

<u>Food/Consumption</u>	<u>Humans</u>	<u>Tigers</u>	<u>Cattle</u>	<u>Prey Species</u>
Humans		1		
Tigers	1			
Cattle	3	2		
Prey Species	2	3	2	
Village Pastures			3	1
NTFP	2		2	3
Forest firewood	2			

<u>Territory/Shelter</u>	<u>Humans</u>	<u>Tigers</u>	<u>Cattle</u>	<u>Prey Species</u>
Forest	2	3	2	3
Village Grassland	2	1	3	2
Villages	3	1	2	1

= Frequency of occurrence: 3 = often | 2 = sometimes | 1 = rarely

Red = Major HGC² | **Orange** = Minor HGC **White** = Natural or No Conflict

The above diagrams attempts to display all of the potential conflicts among the various species for specific resources within their habitats. The numbers (1 through 3) represent the occurrence of a specific conflict where 1 = rarely, 2 = sometimes and 3 = often. The color represents the degree of human generated conflict (HGC) where red = major HGC, orange = minor HGC and white = natural or no conflict.

Conflicts Beyond the Scope of WCS

To be comprehensive, we felt it was important to discuss the Human-environment issues beyond the scope of WCS because these issues are interrelated with those that are within WCS scope.

<u>Water</u>	<u>Humans</u>
All other species	3
Environment	3

<u>Reproductive</u>	<u>Humans</u>
All other species	3

<u>Economics & Political</u>	<u>Humans</u>
Humans	3

² HGC = Human Generated Conflict

Framework for Conflict Resolution
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1. Assess Ecosystem
 - a. Understand needs of individual species with ecosystem
2. Identify conflict
 - a. Understand the conflicts among the different needs
 - b. Assess the reasons behind (or root cause of) the conflict
 - c. Differentiate between human generated vs natural conflicts
3. Resolve human generated conflict
 - a. Provide solutions that address the root causes
 - b. Implementation solutions
 - c. Monitor and assess results

Food & Consumption Conflicts

Using the above framework, we dive deeper into the root causes of each conflict and the potential resolution. We maintained a high level perspective on our analysis and recommended solution. This list is meant to be a living document that serves as a suggestion guide for future feasibility studies on new programs to conserve Amur tigers.

We have ranked some suggestions on level of importance from *= important to ***= very important.

Conflict	Reasons	Resolution
Humans Hunt Tiger Prey Species & take NTFP	To eat	<ol style="list-style-type: none"> 1. Find alternative food source <ol style="list-style-type: none"> a. Farming b. Livestock c. Market 2. Regulate and limit consumption => individual license <ol style="list-style-type: none"> a. Identify target groups to be in charge of self policing 3. Stop this activity by <ol style="list-style-type: none"> a. Legal policy
Humans Hunt Tiger Prey Species & take NTFP	To increase income	<ol style="list-style-type: none"> 1. Find alternative means of income <ol style="list-style-type: none"> a. NTFP b. Beekeeping *** c. Deer Raising d. Raise frogs e. Farming <ol style="list-style-type: none"> i. Farming NTFP * f. Livestock g. Ginseng farming h. Environmental Tourism ** i. Hired Labor j. Craft k. Light industry => tiger themed/ tiger friendly l. Leather industry 2. Create diversified economic programs *** <ol style="list-style-type: none"> a. 1 program will not work for all, b/c over production will impact market prices 3. Assist with vertical integration to include processing, branding, packaging, marketing, & distribution *** 4. Assist with green, organic, wildlife friendly certification *** 5. Make sure programs are economically self-sustainable *** 6. Make sure community is involved *** <ol style="list-style-type: none"> a. 5 families responsible for each other's loan 7. Mitigate damage by *** <ol style="list-style-type: none"> a. Community trap & snare removal b. Make it into a contest, <ol style="list-style-type: none"> i. everyone gets registered, community and

Conflict	Reasons	Resolution
		<ul style="list-style-type: none"> individual competition ii. maybe reward but ranking and # of snares removed associated with individual on a webpage may be sufficient *** iii. Involve city folks, maybe highschool students <ol style="list-style-type: none"> 8. Link snare removal with business model programs <ul style="list-style-type: none"> a. Household with most consistent snare patrols get higher priority for being selected 9. Regulated and limit market => commercial license <ul style="list-style-type: none"> a. Identify target groups to be in charge of self policing 10. Stop this activity by <ul style="list-style-type: none"> a. Legal policy
Humans cut down forest	For firewood to cook	<ol style="list-style-type: none"> 1. Provide electric stove ** <ul style="list-style-type: none"> a. electricity is already available to all villagers b. Government had previous programs of providing satellite dishes and TV to villagers 2. Replace firewood with biogas * <ul style="list-style-type: none"> a. Provide sustainable substitute 3. Substitute Firewood with other fuel
Humans cut down forest	For firewood to heat	<ol style="list-style-type: none"> 1. Clothing *** <ul style="list-style-type: none"> a. Technology on winter clothing b. Footed fleece pajamas with hood specified to withstand -40 degree weather c. Sleeping bag or sleeping arrangements that is thermo rated for -40 degree temperature 2. Leverage existing electrical infrastructure for electric space heater 3. Biogas technology that includes heating component * <ul style="list-style-type: none"> a. 4 in 1 models
Humans cut down forest	For firewood to build homes	<ol style="list-style-type: none"> 1. License logging <ul style="list-style-type: none"> a. Gives rights and responsibility to identifiable group b. Licensees become agents 2. Program for reforestation <ul style="list-style-type: none"> a. Provide economic incentives to
Humans Hunt Tigers for consumption	Body parts used for medicine alcohol	<ol style="list-style-type: none"> 1. Education *** 2. Policy <ul style="list-style-type: none"> a. Legal Consequences b. Enforcement
Tigers hunt cattle	To eat, because not enough prey for food	<ol style="list-style-type: none"> 1. Limit/Stop hunting prey species <ul style="list-style-type: none"> a. Hunting License b. Enforcement 2. Provide alternative to hunting See Food/Consumption Related Conflicts
Tigers hunt cattle	Easy prey, because cattle forage in the	<ol style="list-style-type: none"> 1. Keep cattle out of forest * <ul style="list-style-type: none"> a. See "Cattle eat NTFP" 2. Encourage villagers to train cattle to return from pastures to

Conflict	Reasons	Resolution
	forest	<p>fenced stalls using salt ***</p> <ol style="list-style-type: none"> a. Attacks occur during the nights from May to October when the cattle are let out to pasture land bordering the forest <ol style="list-style-type: none"> 3. Understand the patterns of attack <ol style="list-style-type: none"> a. Develop strategy to address patterns <ol style="list-style-type: none"> i. E.g. if attacks only occur at night, then fence the cattle in the evening 4. Protect the cattle with fences or ultrasonic <ol style="list-style-type: none"> a. Electric fences b. Ultrasonic devices on cattle c. http://www.pestproducts.com/birdx/BXcritterblasterpro.htm 5. Track tigers ** <ol style="list-style-type: none"> a. Tag the tigers (since only 4-6) b. Use bait or female tiger scent & sounds to lure tiger c. Internet delayed tracking to get social networks involved; university students d. System & open source monitor
Tigers hunt cattle	Because humans do not allow tigers to eat their kills	<ol style="list-style-type: none"> 1. Make it illegal to take meat away from a tiger kill <ol style="list-style-type: none"> a. Tigers would hunt fewer cattle if they were allowed to eat their entire kills. 1 cattle will last a tiger 1 – 2 weeks. If meat is taken, tiger will need to kill again. 2. Do not compensate villagers who remove the meat from their cows
Cattle eat NTFP	To forage, because humans do not feed the cattle	<ol style="list-style-type: none"> 1. Give owners an alternative method of feeding the cattle *** <ol style="list-style-type: none"> a. Feed cattle in stalls <ol style="list-style-type: none"> i. Supplied by hay production and market ii. Get higher premium for stall fed cattle 2. Herd or train cattle to enter tiger proof fencing in the evening. <ol style="list-style-type: none"> a. Remote monitoring of stalls 3. Cooperate with Korean cattle vender Tian Yi 4. Demonstrate return on investment to villagers in pilot programs
Cattle eat NTFP	Humans are not afraid to lose cattle because they are compensated. Humans allow cattle to forage on village grassland and forest	<ol style="list-style-type: none"> 1. Adjust compensation program to pay for owners who take standard measures to ensure their cattle does not wonder into the forest ** 2. Develop methods to distinguish & detect between a forest land attack and village land attack <ol style="list-style-type: none"> a. Hire detective to collect information and make decision b. OR hire amateurs to take LOTS of photo and post on a website for interested internet crowd to decide
Prey species eat	To forage. Generally not a	<ol style="list-style-type: none"> 1. Do nothing 2. Fence cattle ranch

Conflict	Reasons	Resolution
village grass	big problem, but they bring predators like tigers into human habitat and they compete with cattle	3. Ultrasound deterrent devices
Prey species eat village grass and crops	Because human consumption and habitation reduced food resources of prey species	<ol style="list-style-type: none"> 1. Stop cattle from entering the forest to forage 2. Stop or limit humans from taking NTFP 3. Develop alternative method of income
Traps set for prey species also kills tigers	Traps intend to capture prey species	<ol style="list-style-type: none"> 1. Incentivize humans to remove and not set traps ** 2. Ensure communal adherence and co-verification **

Shelter & Territory Conflicts

<u>Conflict</u>	<u>Reasons</u>	<u>Resolution</u>
Humans turn the forest into farmland	To farm, e.g. ginseng, other NTFP, or make new farmland	<ol style="list-style-type: none"> 1. Slow deforestation by not issuing land uses or limit the amount of land issued 2. Develop alternative method of income 3. Ginseng is particularly destructive, because the forest land is cleared, and the ginseng is grown for 4 to 6 year. After 1 harvest the land cannot be used again, and must be reforested by planting new trees.
Humans use forest resources	For survival, for economic development, b/c tradition	<ol style="list-style-type: none"> 1. Encourage the migration urban migration *** <ol style="list-style-type: none"> a. Reduce human to forest contact b. Once urbanized, subsequent generations will no longer return to the farmland and the forest to deplete forest habitat and resources <ol style="list-style-type: none"> i. e.g. most urban dwellers will not go into the forest to cut firewood or pick NTFP c. Remaining farmers will have more land per household, thus <ol style="list-style-type: none"> i. increasing income from farming ii. decreasing dependence on labor intensive forest resources iii. decreasing free time per individual and number of individuals to harm the forest d. This migration process is already happening in villages such as Madida, assisted by the fact that middle schools and highschools are located in Hunchun City, which on average is 1 to 2 hours away. So these student have to live in the dorms and typically find jobs in the city with no plans to return to farming. *** e. Improve education level, awareness, and attitude towards <ol style="list-style-type: none"> i. City dwellers are more willing to be protective of the forest wildlife and habitat as they become tourists and advocates
Humans mine the hills & river beds	For mineral and masonry resources	<ol style="list-style-type: none"> 1. Restrict mining licenses
Humans pollute environment	As a consequence of agricultural & industrial activity	<ol style="list-style-type: none"> 1. Implement environmentally friendly practices 2. Work with environmental organization to undertake education and monitoring activities
Humans	Growth of	<ol style="list-style-type: none"> 1. Limit the growth of pasture land and related industry ***

Conflict	Reasons	Resolution
turn forest into pastures	animal husbandry and aquatic industry	2. Encourage stall feed and stall production methods for cattle and frog raising
Humans mine the mountains	To extract minerals for industry	1. Limit the growth of mines 2. regulate the environmental impact of mines
Humans develop infrastructure in forest	To build roads and reservoirs	1. Difficult to stop the development of infrastructure, however, it is important to preserve the bio-corridors for animals migration ***
Humans enter forest	To farm frogs	1. Frog farm itself is not detrimental to environment 2. People who live in the forest to watch the frog farm have dogs that hunt prey species ** 3. They also set traps to catch prey species because they are bored 4. Frog farms are very profitable but only rich, powerful, and connect have access to land grants for the farm
Humans enter the forest	Hunt Prey species	1. Regulate activity a. Commercial/ individual licenses b. Identify target groups to be in charge of self policing 2. Stop this activity by a. Legal policy
Humans enter the forest	Gather NTFP	1. See "Hunt Prey Species"
Humans enter the forest	Tour the forest. This is GOOD THING	1. Provide forest services such as tourism brochures and information a. Charge fee to enter forest through major roads 2. Build camp grounds 3. Encourage eco-friendly tourism to build support from citizen to preserve the forest and its natural inhabitants ** 4. Build an economy based on environmental tourism so the local villages have a vested interest to protect the forest and citizens have a interest in visiting the forest
Cattle enter the forest	Forage NTFP	1. See "Cattle eat forest green"
Humans turn forest into farmland	For permanent farming	1. Provide light industry alternative 2. Provide tourism alternative 3. Encourage rural to urban migration
Humans want to kill tigers	Retribution for livestock losses	1. Protect livestock by a. Keeping livestock out of forest b. Fence livestock i. electrical c. Ultrasonic deterrent.
Human feel	Fear	1. Education

<u>Conflict</u>	<u>Reasons</u>	<u>Resolution</u>
threaten by tigers		2. Give tigers their space and keep their prey species numbers healthy by limiting the human hunting activities 3. Remove tigers that target humans
Tigers feel threaten by humans	Territorial and survival instincts	1. Limit the development or decimation of tiger forest territories **

Water Conflicts

<u>Conflict</u>	<u>Reasons</u>	<u>Resolution</u>
Humans build dams	To create reservoirs for irrigation	1.
Humans build dams	To create reservoirs for consumption	1.
Humans pollute the water	Due to agricultural and industrial activities	1.
Humans alter the environment	To control the direction flow of water for civilization	1.

Reproductive Conflicts

<u>Conflict</u>	<u>Reasons</u>	<u>Resolution</u>
Human reduce the reproductive resource of all other species	Due to higher per capita resource consumption and population growth	1.

Economic & Political Conflicts

<u>Conflict</u>	<u>Reasons</u>	<u>Resolution</u>
Conflict of interest	Forest Bureau is controlled by the logging industry	1. Create an independent forest bureau with independent funding and physically separated from the logging industry office as both organization are in the same building ***
Moral hazard	Compensation makes owner less careful about livestock	1. Only compensate owner whose cattle were attacked in village territory, NOT in the forest ** 2. See Incentivize Community
Fraud	Cattle owner can make fraudulent claims of tiger attacks	1. Verification process for tiger attacks 2. Incentivize Community validation by *** a. Creating a pooled insurance, at the end of each year livestock gets compensated from the pool. And the rest is PAID OUT, back to the community!
Adverse Incentive	Villagers can profit from every cattle killed	1. Compensate villagers ~80% of cattle price to remove adverse incentive a. 1 cow killed by a tiger = 100% compensation from the government + 80% of the meat left over for the villager. This means a 80% profit each time a cattle is killed. 2. Only compensate villagers if they DO NOT remove the meat from the tigers kill. * a. Otherwise, the villagers are incentivized remove the meat from the dead cattle and forcing the tiger to kill another cattle, which is another 80% profit!
Agency-principal	Agents who are unpaid liaison between the villages and the forest authorities have asymmetric information.	1. They may have incentives and loyalty aligned with the village and not with the forest authorities. 2. Crowd source the community by incentivizing the Community
Adverse selection	If tiger insurance was voluntary, only the most at risk would purchase the insurance	1. Make everyone participate in tiger insurance program *
Shirking	Patrols and monitor personnel do not complete their tasks	1. Crowd source monitoring through solar powered internet web cams *

<u>Conflict</u>	<u>Reasons</u>	<u>Resolution</u>
Lack of resources	Lack of labor, capital & knowhow	1.