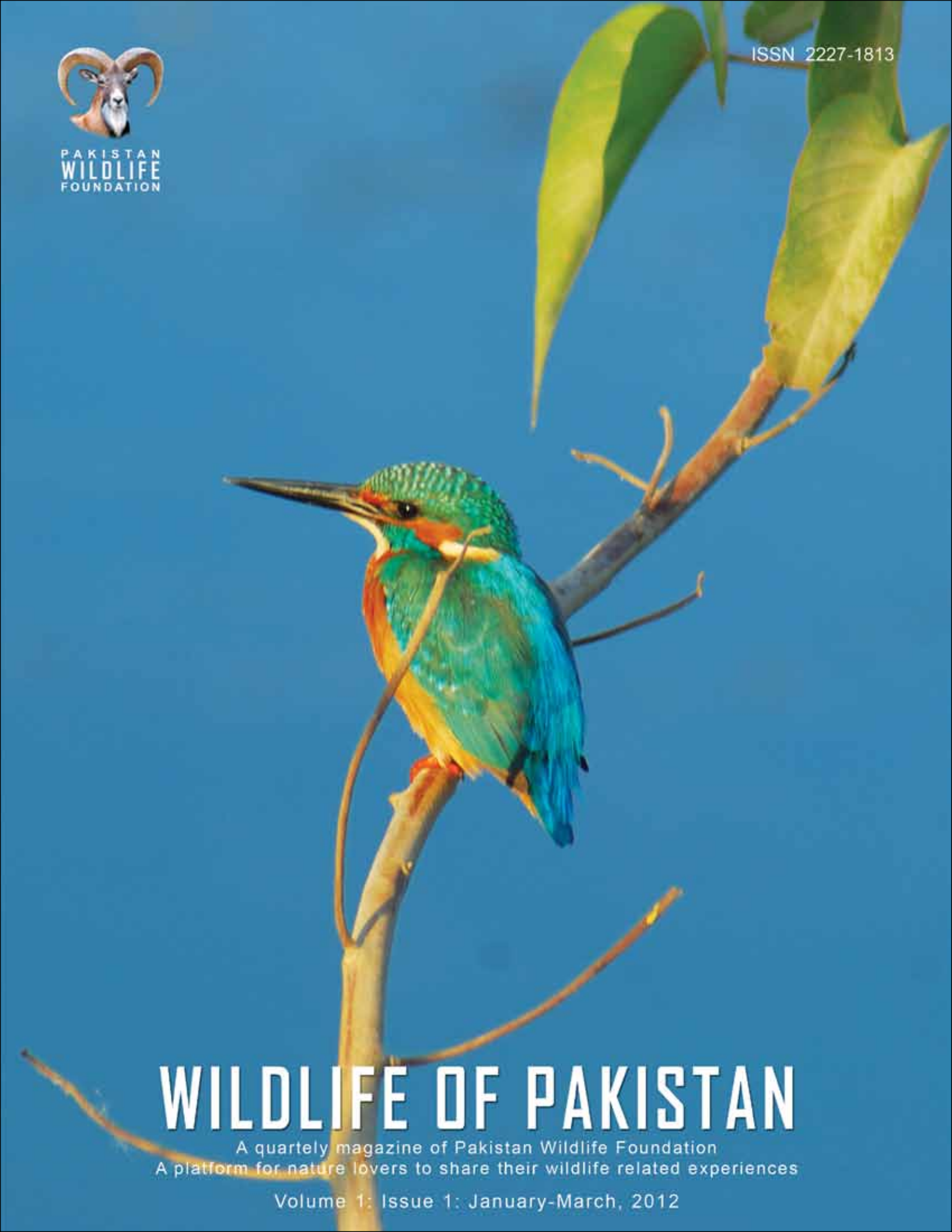
ISSN 2227-1813

PAKISTAN WILDLIFE FOUNDATION



WILDLIFE OF PAKISTAN

A quartely magazine of Pakistan Wildlife Foundation
A platform for nature lovers to share their wildlife related experiences

Volume 1: Issue 1: January-March, 2012

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Registration No.	25001 - Copr Intellectual Property Organisation, Government of Pakistan
ISSN	2227-1813
Printer:	Vision Graphics Blue Area, Islamabad. 0301-5538710

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Crested Lark (*Galerida cristata*) © Waseem Ahmad Khan, PWF
Cover Photo: Common Kingfisher (*Alcedo atthis*) © Waseem Ahmad Khan, PWF

EDITORIAL

Pakistan Wildlife Foundation (PWF) was established in June 2010 as a non-profit, conservation organization by a small group of likeminded conservationists, nature lovers and wildlife ecologists with the mission to enhance awareness among the masses in the country regarding biodiversity and environment and to change their attitudes towards positive, sensible and responsible actions for nature. The foundation was incorporated with Securities and Exchange Commission of Pakistan (SECP) in October, 2010 under the Corporate Universal Identification No. 0073723.

Pakistan Wildlife Foundation aims to provide a platform for the nature lovers, university students and researchers to share their wildlife related experiences and ideas besides help protect, preserve, conserve, management of wildlife, their habitats and their wise and sustainable utilization in the country. WILDLIFE OF PAKISTAN; a quarterly magazine has been launched to disseminate wildlife related news, issues, ideas and information for wildlife lovers in the country and abroad. The magazine encourages wildlife lovers to communicate effectively.

It also serves as a medium to propagate the national and the individuals' achievements and land marks of interest among youth for nature conservation in Pakistan. Pakistan Wildlife Foundation awards "Best Article Shield" to the writers on the basis of readers' evaluations to inculcate an interest in communicating among wildlife lovers and young writers.

Readers comments, suggestions and recommendations will be greatly appreciated by the Editors.

A separate section; "Letters to Editor" is allocated in the magazine for readers' feedback. The Editorial Board can be accessed / approached through Emails at;

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Observing Marcopolo Sheep (*Ovis ammon polii*) in Karchenai Nullah, Khunjerab National Park © Waseem Ahmad Khan, PWF

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WHAT IS WILDLIFE!

When we hear the term "wildlife", it generally refers to large ferocious animals living in jungles and forests such as tigers, lions, elephants, wolves, Wild boars, deer's etc. But in fact, "wildlife" implies to any living organism in its natural habitat which includes all plants, animals and micro organisms except cultivated plants and domesticated animals. From ecological view point, wildlife is a renewable resource. Wildlife also includes the flora present in the forests. Basically the flora is the collections of plants and fauna, the collection of animals. Precious plants and animals are becoming extinct or endangered as a result of clearing of the forests. The forests are home to many precious species of plants and animals. In fact, the wealth of wildlife is so much that we have not even identified a large number of the species. Many practices like poaching, encroaching forestland for cultivation and occupation, pollution, etc. have resulted in the decline in numbers of wildlife, both flora and fauna.

By far, various experts have attempted to define the term, “wildlife” in great many ways. Here is a brief account of how various experts quote wildlife.

The American heritage dictionary of the English language defines wildlife as animals and vegetation, especially animals living in a natural, undomesticated state. Oxford Advanced Learner's Dictionary defines the term wildlife as animals, birds, insects, etc. that are wild and live in a natural environment. According to the concise Oxford dictionary of zoology, “wildlife is any undomesticated organisms, although the term is sometimes restricted to wild animals, excluding plants”. Collin's concise dictionary and thesaurus terms wildlife as flora and fauna. Collin's English dictionary refers wildlife as wildlife animals and plants collectively. English Collins Dictionary terms wildlife as wild animals and plants collectively. Longman Cambridge advanced learner's dictionary describes wildlife as animals and plants that grow independently of people, usually in natural conditions. Longman dictionary of Contemporary English Advanced Learner's dictionary delimits the term wildlife as animals and plants growing in natural conditions. Dictionary of contemporary English quotes wildlife as animals and plants growing in natural conditions. The new International Webster's comprehensive dictionary of the English language states wildlife as wild animals, trees and plants

The Pioneer White / African Caper White (*Anaphaeis aurota*) © Waseem Ahmad Khan, PWF

Indian Tree Lizard (*Calotes versicolor*) © Waseem Ahmad Khan, PWF

collectively, especially as objects of government conservation. Macmillan dictionary refers wildlife as animals, birds, and plants that live in natural conditions. Saunder's veterinary dictionary: Animals running unrestrained in a natural environment.

According to Alan Gilpin Dictionary of environmental terms, "A collective term embracing several thousand different species of mammals, birds and reptiles is wildlife. No two species respond in precisely the same manner and degree to the influences of the environment; the differences in response are aspects of competition, selection and evolution." Dictionary of environmental science and engineering quotes, "Wildlife includes any animals, bees, butterflies, crustaceans, fish moths and aquatic or land vegetation which forms part of any habitat". Hanson Dictionary of Ecology describes wildlife as collectively the non-domesticated vertebrate animals, except fishes, such as deer, moose, birds, etc. Economic zoology – A dictionary of useful & destructive animals coins wildlife as wild animals and plants adding that there exists a multi-million dollar wildlife trade.

There may be extended views or may be different angles to limit and delimit the term wildlife. The above account, however, enables us to agree that rapidly growing understanding of wildlife is improving our concepts faster than ever before. No wonder, in future scientists may suggest normal flora (bacteria and other microorganisms living on wild animals and plants) as part of the wildlife as well. No one knows what comes ahead. The ever increasing scientific understanding of nature and ecology may sometime open new dimensions to us. To make an agreement, all life forms living in natural habitat are part and parcel of the term "wildlife". Since all living things, generally animals and plants, in all natural ecosystems, struggling to survive under various ecological and evolutionary forces, are interrelated and can never be parted; the term wildlife may refer to all of them.

Black buck (*Antilope cervicapra*) © Waseem Ahmad Khan, PWF

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UNDERSTANDING THE SNAKES

Most people fear snakes and several attempt to kill them, as they do not know that they are part of the natural ecosystems in which we live. These innocent victims of our ignorance about their important role in the control of rodents and insects and as part of food chain are at the top of the list of designated enemy species assumed by us. This brief article is intended to provide basic knowledge of our snakes.

Basic Types

Snakes live on land and also in the sea. Sea snakes have flattened tail from both sides and they have usually very long body. They need long body as they need more air in their single but very long lung. So they inhale lot of air and go submerged to hunt fish. After a lapse of considerably long time they need to come to the surface for another large quantity of fresh air. They are of course poisonous but I do not have the information of biting man in our country.

Land snakes have rounded tail. Because of elongated body some internal organs of snakes are also more or less elongate both in land as well as in sea snakes. The heart is slender or longish. There is only one lung in most snakes, which is very long. The lung forms an air sac towards tail end. This allows air storage. However, boas and pythons have two lungs. Python's left lung is much smaller than the right one, which is very long. Snakes inhale lot of air and can keep it in the lung for a long time. Food gut or esophagus is also long, thin-walled and without any muscles. The prey is not chewed but swallowed head first. It is pushed into the esophagus by the forward and backward movements of the left and right lower jaws. Once it down the throat further push is brought about by the body muscles. Stomach starts from esophagus without any distinct mark. It is also long and enormous. It is greatly distended when a large prey is swallowed. The body skin around it is then stretched and the scales separate from each other showing the skin beneath. The liver, urinary organs and genital organs are also elongated. The elongated liver is not lobed. The gall bladder and the pancreas are at the rear part of the liver. Some organs are missing in snakes, such as legs, ears, movable eye-lids, nictitating membrane, muscles of the eye-balls and urinary bladder.

Snakes swallow, not chew

The lower jaw is loosely attached to the skull. Front tips of the both lower jaw bones are also not united with each other. The lower jaw bones are joined with the upper jaw with cartilage. This enables a snake to open it mouth very wide and swallow a bigger size prey. The lower jaw

Indian Cobra (*Naja naja*) © Waseem Ahmad Khan, PWF

bones, the palate and the upper jaws have backwardly pointed teeth. In case of poisonous snakes fangs are present on the upper jaws. The lower jaw bones work alternately forward and backwards, enabling the backwardly curved teeth to hook the food into the throat. It is then pushed into the neck portion by the wriggling movement of the neck part of the body. Location of the food remains visible as a bulge for two day or three or for more days, depending on the size of the food, until it is considerably degraded or dissolved in the stomach and pushed into the intestine for digestion of soft parts. The food is digested in swallowed 'Myna' or pigeon takes more than ten days to be digested in summer months. After that defecation is done in a slime covering. The bones, feathers, scales and hair are not digested.

How the non poisonous snakes kill?

The prey is killed before it is swallowed. The python seizes its prey with a sudden dart of the head. It is held firm with its strong, sharp and backwardly curved teeth. Next the body is wrapped round the prey two or three or more times. The prey is constricted strongly by the muscular body of the snake so that it is suffocated and its blood circulation is blocked. The snakes have single set of muscles from head to tail on both upper sides of the vertebral column that makes the constriction very strong. After several minute the pressure is released and the dead prey is held from its head.

How the poisonous snakes kill?

The poisonous snakes have fangs on front side of their upper jaw instead of having a row of teeth. These are long hollow and sharp. The venom tube opens at the base of these teeth. The venom is injected deep into the body of the victim, which dies not far from the snake depending on the amount of venom injected. If the prey manages to run away for a distance or enters a burrow and dies after a lapse of time it is located by the snake.

Line Drawing of a Snake Jaw

How they prey is retrieved?

Snakes have long slender tongue, which is bifurcated at the front end. Each part of the tongue has a pointed tip. The rear end of is lodged in a sac. The sac has muscles on the outer side, which pull the sac forward when ever the tongue is protruded out of the mouth. The scale at the tip of the mouth has concave lower edge. That enables the tongue to come out without opening the mouth. An alert snake protrudes its tongue frequently and fast as well. The tips of the tongue are chemo and thermo sensitive. The sensation of slight variation in outside temperature and the chemical particles of odour or smell are carried by the tips of the tongue and touched in a pit in the front upper part of the palate or the roof of the mouth called Jacobson's organ. The sensitive lining of the Jacobson's organ transmits to the brain the taste or smell and the slight variation of temperature through a nerve. The snakes can find their prey even in complete darkness by feeling the heat left on ground by a prey short time ago. Himalayan Pit Viper has even two additional pits between the nostrils and the eyes. These pits have the same sensitivity as the Jacobson's organ. The snake comes to know when any thing passes by even when it is not alert. The same quality keeps the pairs in contact. Also this helps in escaping a predator much before a predator would discover it.

The dead prey is then swallowed head first. The snake venom is digestive in nature and helps dissolving of the body of the prey faster in the stomach. The snakes do not feed if large food is present in their body. During the winter

Blanford's worm snake (*Leptotyphlops blanfordii*) © Dr. M. S. Khan

sleep snakes do not need to eat at all. Even when some snakes come out of their burrows during sunny days in winter, they may not eat for several days.

Locomotion

Being without legs snakes not only have fast or slow locomotion but also several of these are good climbers. Several species are good swimmers. Many terrestrial snakes are also good swimmers. Some species like to be in water to keep cool, seek shelter or to hunt fish, toads, frogs and giant water bugs. Python prefers to remain completely submerged in water in summer season during the day time to keep cool. It may keep its eyes and nostrils above the surface to catch a prey on the surface or at the edge of the water. Out of water it creeps straight without undulating. Ribs, muscles and skin move the body forward. Groups of ribs on both sides move alternately by lifting and lowering the skin and scutes of that side. Each group of ventral scutes gives walking movement of legs. Many groups of ribs on each side of the body produce waves and the body moves forward. This movement is never rapid.

Most snakes show undulating movement. The snake anchors its hind part of the body to the ground and front portion is stretched forward. The front part of the body is then anchored to the ground and hind part comes forward. This is done with undulating movement of the long body.

Some snakes move sideward as the body forms a loop on one side only, which is held fast to the ground. The rest of the body is raised above the ground. The whole body then passes though this point of contact to the ground. When the tail end reaches this point at that time the front end of the body touches the ground and the same process goes on. This is achieved through the fast group movements of the ribs.

Breeding

Majority snakes lay eggs. The eggs are covered with soft but strong membrane. Some few snake that give birth to tiny snakes. Their embryonic stage is completed while the egg is still in the body. So the tiny snakes hatch out of the eggs short before their birth. Female snake stops feeding much before egg-laying. It finds a suitable place for egg laying and remains there passively. Longish eggs are laid. The eggs are hatched with atmospheric warmth. If the weather is cool the embryonic development slows down. In warmer weather incubation is faster. Usually most snakes eggs hatching is between 30 to 50 days. Parent snakes do not play any role in the incubation. However, python female keeps her eggs under her coiled body. While sitting on the eggs the female often expands and contracts its body to produce heat for the eggs. It may even go in the sun to warm its body and to transfer some heat to the eggs.

Growth

Young snakes do not depend on their parents and look after themselves, although they have to face many enemies as compared to the adult snakes. They are more active than the adults and grow faster. A snake keeps growing through out its life. However, the growth rate slows down with age. Young snakes hunt frequently. First they eat small creatures and insects and as they grow they catch bigger animals. The skin of a snake is dry and without glands. Outer part of the skin forms scales which protect its body. With the wear and tear of the outer part of the skin it becomes dead. The covering of the skin over the eyes does not remain clearly transparent. Snake's skin is highly sensitive but this sensitivity also

Saw-scaled Viper (*Echis carinatus*) © Syed Shamim Fakhri, ZSD

fades and finishes with the death of the outer cells of the skin. The snake becomes passive for a week or two. The dead skin is removed by expanding and contracting the body. The snake opens and closes its mouth and rubs its body to hard any surface. First the skin is removed from the head. Suddenly the vision becomes sharp as the dull eye covering is removed. With that the snake becomes agile and the dead skin is peeled off inside out from head to tail. Bright and glossy colour pattern of the body appears again. The snake becomes again active for hunting. The first removal of the dead outer skin takes place in early part of the life when body growth rate is faster. This occurs in first one week or so after hatching. Afterwards the dead skin is removed with the growth of the body once, twice or even three times during the summer season.

Snakes have no external ears

A snake has no external and middle ear. So it cannot hear. However, as the bones of the middle ear have become connected with jaw bone which are normally attached to the ear drum. As the under part of the head and the body are directly placed on ground any vibration from any movement or scratching on the ground nearby is communicated from the lower jaw to the brain through the auditory nerve which is connected to the internal ear. If a snake happens to be lying on a floor, any music or sound will not affect it. But if a chair is dragged on the floor the snake will respond immediately by its body movement. Swaying of Cobra with the snake charmer's flute is not because the cobra has enjoyed the music. The snake charmer first provokes the cobra in his basket. The excited snake expands its hood and exhales loudly, at the same time darts its head forward to bluff and frighten away the provoker. As the sensitive ventral plates below the neck receive sound waves of the flute the upset snake focuses its attention on to the flute.

It moves its head as the snake charmer sways the flute.

Vision

Eyes are placed on the sides of the head, so these can see on both sides, but both are unable to focus on an object together like we do. Each eye has its own independent focusing. Snake makes its lens to move forward or backward to focus. Snake's lenses are yellow which helps in night vision. Its eye sight is not sharp. It can detect moving creatures, however, things not moving become difficult to recognize, unless they are close enough to be felt by their heat.

Body temperature

The body temperature of snake rises or decreases with the rise or decrease of surrounding temperature. In winter days, as the atmospheric temperature lowers, the snakes cannot remain active as their body temperature also decreases. They look for some shelter from cold temperatures of the night in some burrow or heap of dead leaves. They remain passive in that place for the winter months. The body needs much less energy. However, even slow functioning of the body systems some energy is consumed. This energy is transferred from body fat. In late spring or early summer with the rise of atmospheric temperature their body temperature also rises. The snakes come out of their wintering places to look for food as their body has no fat.

Poisonous or Non poisonous

Majority snakes found in Pakistan are non-venomous. Only three categories are venomous. These categories are Cobra, Krait and Vipers. The basic difference in poisonous snakes is that these inject

poison in the victim through large fangs. The fangs are large size pair of inwardly folding sharp and hollow teeth at the anterior end of upper jaw. Rest of the upper jaw is without teeth. In non poisonous snakes the upper jaw has number of fixed teeth and no fangs. A poisonous has a poison gland and a poison pouch or sac little below and behind the eyes. A venom tube joins the venom pouch with the base of the fang. The poison gland secretes poison into the pouch. When a snake opens its mouth to attack the poison pouch is pressed by a set of muscles which are attached to lower jaw and the side of the skull.

Cobra spreads its hood when excited of frightened. If a dead specimen is examined closely, preferably with a hand lens, 3rd and 4th upper labial scale touch the eye and the 4th upper labial scale is the largest.

Krait is a glossy dark brown or black snake with white cross streaks. If a dead specimen examined closely, the mid dorsal row of scales is hexagonal and these scales are larger than the side scales.

Vipers have arrow head. If a dead specimen examined closely, the scales on the head are similar to the scales on the back side of the body. These also overlap each other on hind side.

Snakes avoid biting humans

Normally a snake would avoid a person coming closer. It would get waves of the steps of an approaching person through the ground. It would tend to creep away. A viper might take defensive posture out of fear. A person gets bitten if he steps on a snake or steps too close to it. Krait would never bite during the day time even stepped on or tortured or handled.

Snake bite symptoms

If a person is bitten by a cobra, heart beat and breathing slows down. Death can come in a day if full dose of venom is injected in the blood.

If a person is bitten by a Krait, the bite is slightly painful for a short period, and then it becomes painless. The venom is toxic to nervous system. The victim gets paralyzed and death may come very soon or as quickly as 4 - 10 hours, if full dose of venom has gone in the blood.

If a person is bitten by a viper soon bleeding starts due to hemorrhage of capillaries of soft parts like inside the nose or throat. Death can come in less than an hour if the victim got full dose of venom injected in the blood.

If a person is bitten by a non poisonous snake, it is safe but if the bitten person is ignorant about the facts he or she might react in fear and may be panic.

Common Krait (*Bungarus caeruleus*) © Dr. M. S. Khan

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NATIONAL PARKS IN PAKISTAN

Pakistan hosts a wide range of ecosystem / habitat types and associated biological diversity due to its unique geographical and climatic conditions. There are snow covered peaks, permanent snowfields, lush green as well as barren mountains, forests, irrigated plains, riverine tracts, sand dunes and deserts and coastal areas. For the conservation of such natural assets, a national government declares some specific areas as the protected areas. Protected areas are thosewhere the representative ecosystems, fauna and flora are protected and maintained under the natural conditions. Five categories of protected areas have been recognized in Pakistan that include; national parks, wildlife sanctuaries, game reserves, private game reserves and community controlled hunting areas / community conservation areas.

National park

A national park is not likeaacitypark or public garden withfenced boundaries and having play grounds, picnic spots, jogging and walking tracks etc. Rather it is a reserve of land usually declared and owned by a national government,meant for the protection and preservation of the outstanding scenery, natural landscape, majestic and awe-inspiring places, natural flora and fauna in natural state and protected from hunting, cutting of vegetation, developmental activities and pollution

History of National Parks

The idea for the establishment of a national park came from William Wordsworth (1810), who described the Lake District as a sort of national property, George Catlin (1832), who wrote about preserving the Native Americans in a magnificent park - A nation's park containing man and beast in all the wild and freshness of their nature's beauty. The first practical effort by any government was in USA on April 20, 1832, when President Andrew Jackson signed the legislation to establish Hot Spring Reservation in Arkansas to protect the natural, thermal springs and adjoining mountainsides. The next effort was again in USA on June 30, 1864 by President Abraham Lincoln ceding the Yosemite Valley and Mariposa Grove to the state of California. The first ever national park in the world was Yellowstone National Park (USA) established in 1872.

National Parks in Pakistan

There are now 6,555 national parks worldwide and 21 exist in Pakistan representing different ecological regions of the country and covering about 29,589 km², about 3 % of the total area (10,060,96 km²) of the country. A century after the establishment of first national park, LalSohanranational park was the

A view of Hingol National Park © Waseem Ahmed Khan, PWF

first to be established in Pakistan in 1972. The largest national park is the Northeast Greenland National Park, located in Greenlandand covering an area of 972,000 km².Minimum required area for a national park is 1000 acre (04 km²) and such a national park exists in Pakistan that is ToliPir National Park located in Poonch district of AJ&K. National parks in Pakistan are;

Purpose and Objectives of National Parks

Protection of biodiversity is the main purpose for the establishment of a national park however, being

01. **Margallah Hills National Park:** Islamabad, established 1980, area 15,883 ha.
02. **Hazarganji Chiltan National Park:** Balochistan, established 1980, area 15,555 ha.
03. **Hingol National Park:** Balochistan, established 1997, area 6, 19,043 ha.
04. **Kirthar National Park:** Sindh, established 1974, area 3, 08,733 ha.
05. **Ayubia National Park:** Khyber Pakhtunkhwa, established 1984, area 3,122 ha.
06. **Chitral Gol National Park:** Khyber Pakhtunkhwa, established 1984, area 7,750 ha.
07. **Sheikh Badin National Park:** Khyber Pakhtunkhwa, established 1999, area 15,540 ha.
08. **Saiful Maluk National Park:** Khyber Pakhtunkhwa, established 2003, area 12,026 ha.
09. **Lulosar Dodipat National Park:** Khyber Pakhtunkhwa, established 2003, area 75,058 ha.
10. **Broghil Valley National Park:** Khyber Pakhtunkhwa, established August 25, 2010, Area 134,744 ha.
11. **Khunjerab National Park:** Gilgit-Baltistan, established 1975, area 2, 27,143 ha.
12. **Hunderab Shandoor National Park:** Gilgit-Baltistan, established 1993, area 1, 65,000 ha.
13. **Deosai National Park:** Gilgit-Baltistan, established 1993, area 3, 63,600 ha.
14. **Central Karakoram National Park:** Gilgit-Baltistan, established 1993, area 9, 73,845 ha.
15. **Qurumber National Park:** Gilgit-Baltistan, established August 2, 2011, area 74,000 ha.
16. **Machhiara National Park:** AJ & K, established 1996, area 13,532 ha.
17. **Ghamot National Park:** AJ & K, established 2004, area 27,271 ha.
18. **Pir Lasoorha National Park:** AJ & K, established 2005, area 1,580 ha.
19. **Toli Pir National Park:** AJ & K, established 2005, area 1,000 ha.
20. **Musk Deer Gorez National Park:** AJ & K, established 2007, area 52,815 ha.
21. **Deva Vatala National Park:** AJ & K, established 2007, area 2,993 ha.
22. **Poonch River Mahaseer National Park:** AJ & K, established 2011
23. **Lal Suhanra National Park:** Punjab, established 1972, area 51,368 ha.
24. **Chinji National Park:** Punjab, established 1987, area 6, 097 ha.
25. **Kala Chitta National Park:** Punjab, established Dec. 2008, area 36,965 ha.
26. **Murree-Kotli Sattian-Kahuta National Park:** Punjab, established Sep. 2009

A view of Khunjerb National Park © Waseem Ahmed Khan, PWF

biologically, geologically and culturally important, the national parks also serve to cater for education, recreation and scientific purposes for the public. People visit the parks to see and share the wonders of their land and to learn about the forces and the people who have shaped it through the centuries. Outstanding scenery, majestic places, natural flora and fauna in natural state renders positive impacts on visitors' mind thus helping divert a nation's attitude towards a healthy tract. National parks ensure the preservation of national natural heritage, culture and monuments, and present them to the public.

A view of Hingol River, Hingol National Park © Waseem Ahmed Khan, PWF

Role of National Parks in Nature Conservation

Due to the growing threats to nature like global warming, population expansion, habitat destruction and worldwide reduction of biological diversity, the national parks are now being considered as the ecological laboratories, gene pools and bulwarks against the irreversible change or the loss of species and hence, preserving the nature and ensuring the ecological health of the planet. National parks are the ideal places for eco-tourism, tracking, bird and animal watch and nature photography. National parks with their lush green forest components neutralize the carbon emissions in the surrounding environments.

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WILDLIFE AND PARKS DEPARTMENT
PUNJAB

INTRODUCTION

Punjab Wildlife & Parks Department was established as Game Department in 1934. It served in this capacity under various departments and finally in 1973 it was given the status of attached Department of Forestry, Wildlife, Fisheries and Tourism Department. Accordingly, the responsibilities of the Department were re-fixed from sport hunting to entire focus on sustainable management, conservation, propagation and protection of wildlife under the umbrella of Punjab Wildlife Protection, Preservation, Conservation and Management Act, 1974. With considerable share of wildlife diversity from the world, the Department prioritized its functions as determined under the said Wildlife Act: -

i. **Protection**
Control illegal hunting / poaching

ii. **Preservation**
Captive breeding

iii. **Conservation**
Ensure survival of Wildlife in natural habitat

Grey Francolin (*Francolinus pondicerianus*) © Waseem Ahmad Khan, PWF

WILDLIFE DIVERSITY OF PUNJAB (Share from World)			
SPECIES	WORLD	PAKISTAN	PUNJAB
Mammals	4327	188 (4.3%)	56 (30%)
Birds	8700	666 (7.7%)	434 (65%)
Reptiles	5500	174 (5.5%)	69 (40%)
Total	18527	1028	559

iv. **Management**

a) **Planning**
Declaration of protected areas & their management planning.

b) **Regulations**
Regulate hunting for sustainable yield.
Extension and Awareness Campaign.

c) **Monitoring & Evaluation**
Research, Census & Surveys

As sole provincial wildlife conservation entity, 65-protected areas (Wildlife Sanctuaries-37, Wildlife Parks-4, Game Reserves-24 covering an area of 9.686 million acres were established. A chain of 16-Wildlife Breeding Centres / Zoos was established to preserve critically endangered species through captive breeding. Strict enforcement of Wildlife Act was ensured and vigorous publicity campaign was launched to motivate public for wildlife resources management. Within budgetary and establishment limitations, the Department succeeded to conserve wildlife resources of the province to a considerable extent. Trophy hunting, establishment of private game reserves / breeding farms, sale of surplus stock and arranged sport hunting were introduced by Department as new initiatives. Wildlife diversity profile of protected areas of Punjab province is as under:-

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PROTECTED AREAS				
	Category		Area in (Acres)	Associated Wildlife
1	National Parks	04	268917 excluding Murree, Kahuta Kotli Satian National Park.	Common Leopard, snow Leopard, Barking Deer, Rhesus Monkey, Urial, Francolins, Falcons, Chukar, See see partridge, Song birds, Snakes and Lizards.
2	Wildlife Sanctuaries	37	490744 excluding Head Panjnad Pond area	Urial, Barking deer, Common Leopard, Snow Leopard, Rhesus Monkey, Wolf, Hare, Porcupine, Caracal cat, White headed duck, Flamingo, Cranes, Spoon bill, Storks, Waterfowl, Partridges, Falcons, Song birds, Snakes and Lizards.
3	Game Reserves	24	7533878 excluding Border Belt area of 05 mile strip.	Urial, Barking deer, Nilgai, Chinkara, Fox, Common Leopard, Snow Leopard, Rhesus Monkey, Wolf, Hare, Porcupine, Caracal Cat, White headed duck, Flamingo, Cranes, Spoon bill, Storks, Waterfowl, Partridges, Falcons, Houbara Bustard, Great Indian Bustard, Song birds, Snakes and Lizards.
Total		65	8293539 (24012Km2)	

WILDLIFE BREEDING CENTRES / ZOOS		
Wildlife Parks	12	2861
Zoos	03	65
Lahore Zoo Safari	01	242
Total:	**16**	**3168**
Total Captive Stock		**5562**
Category	**Species**	**Numbers**
Animals	45	1214
Birds	75	4280
Reptiles	13	68
Total:	**123**	**5562**

TOOLS OF MANAGEMENT

a) Punjab Wildlife, Protection, Preservation, Conservation and Management Act, 1974.

b) Establishment

Total Establishment 1880 Nos.

Scale	01 – 04	482 Nos.
Scale	05 – 16	1324 Nos.
Scale	17 – 20	74 Nos.

c) Total Fleet of vehicles 105 Nos.

58 Nos.	20 years old
47 Nos.	10 years old

ANNUAL DEVELOPMENT PROGRAMME		
Budget	2010-11	2011-12 (proposed)
Development	203,000	350,000
Non Development	360,000	396,000
Revenue	Target	Achievement
2,80,00,000	2,80,00,000	2,68,11,639
Source of Revenue	Licence Fee, Compensation Realized from Offence Cases, Sale of Animals / Birds, Auction of Various facilities i.e. Canteens, Parking, Toilets etc., Falconing by Arab Dignitaries, Trophy hunting & Pheasant shooting	

IMPORTANT EVENTS

- June 12, 2010: 55 Nos. Sabar and Luggar Falcons were confiscated at Benazir International Airport, Islamabad being smuggled to self-state. The birds were released under natural habitat in Salt Range to facilitate back migration to breeding grounds.
- Different organization adopt animals / birds at Lahore Zoo, Lahore and contribute for feeding and medication. Elephant and Chimpanzee were adopted

A view of Urial (*Ovis vignei*) Habitat, Soan Valley, Punjab © Waseem Ahmed Khan, PWF

by High Noon Laboratories and University of Veterinary & Animal Sciences, Lahore. A ceremony was held at Lahore Zoo patronized by Chairman, ZMC and Tigress were adopted by University of Punjab, Lahore by Vice Chairman and a cheque amounting to Rs.11,00,000/- was honoured to Director, Lahore Zoo, Lahore.

- Salt Range and Cholistan deserts are potential wildlife habitats. In Salt Range, the population of Urial gradually increased appreciably from 1000 in 2006 to 2200 in 2011. Other species are also observing incline in population. In Cholistan population of Chinkara&Nilgai is also increasing and caracal has been conserved.
- Vigorous enforcement of Wildlife Act has been ensured and violation are given in Table below: -
- Captive breeding of Wildlife has been re-addressed on scientific lines and breeding season is being declared as “Monomat of the year”.
- Release of Hog deer, Nilgai, Monkey and Peafowls has been undertaken at Changa Manga, Daphar, Head Pajnad, Dodhla and TillaJogian.
- Mud leaping on infrastructure to harmonize with environment at Jallo, Changa Manga & Lahore Zoo Safari.

RECENT INTERVENTIONS

- Cancellation of leasing rights and vacation of pond areas from illegal occupies.
- Action plans for Wetlands.
- Anti poaching campaign.
- Publicity campaign in print & electronic media.
- Private Sector involvement in Wildlife resources management:

a) Establishment of Private Game Reserves.

b) Establishment of Private Breeding Farms.

c) Formulation of CBOs.

d) Trophy hunting and pheasant shooting.

White eyed Buzzard (*Butastur teesa*) © Waseem Ahmad Khan, PWF

Year	Case registered	Case decided	Fine (Rs.)	Case compounded	Compensation
2010-11 upto May, 2011	13,500	2722	4,024,300	957	5,028,800

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BIODIVERITY OF GILGIT-BALTISTAN

POTENTIAL, CHALLENGES AND OPPORTUNITIES

Gilgit-Baltistan (GB) formerly known as "Northern Areas" of Pakistan, lyingin the extreme north of Pakistan (75 08 48.12 E & 37 00 47.33 N to 77 41 11.82 E & 35 27 26.06 N) iscomprising of territory of seven districts amidst Karakoram, Himalayas, Pamir and Hindu Kush mountain ranges. It borders Pakistan's Khyber Pukhtunkhwa province to the west, Afghanistan's Wakhan Corridor to the north, China to the east and northeast, Azad Kashmir to the southwest, and Indian-administered Jammu and Kashmir to the southeast. GB covers an area of 72,971 km² (28,174 mi²) and is highly mountainous. It has an estimated population approaching 1,000,000. Its administrative center is the city of Gilgit.

Gilgit-Baltistan is unique in its wildlife resources;bird fauna in particular is of special importance. Its alpine and sub-alpine pastures are rich in plants of medicinal and economic importance. Mountains in this regionoffer the primary watersheds that addfreshwater toIndus River, the lifeline of Pakistan.Infinite resources, gorgeouslandscape, towering watersheds, famous glaciers, gigantic rivers, energetic streams, lively forests, pretty pastures and rangelands, that's what GB is all about.

The Hindu Kush Mountains, the climber's paradise, lies at north-west of the Karakoram, and extends eastward into Afghanistan. With the assemblage of 35 sky-high peaks, each over 24,000 feet (7,315m),many of them even exceeding 26,000 feet (7,925 m), K-2 (Mt. Godwin Austin) being the highest of them, second largest in the world after Mt. Everest,GB lures the attention of nature lovers worldwide; internationally known famous tourist spots attract thousands of tourists every year, thus contributing to economic growth at regional as well as national level.

This region is known to have the largest mass of glaciers afterNorth and South poles; Siachen (75 km), Hisper (61 km), Biafo (60 km), Baltoro (68 km), Batura (64 km), Kurumbar (5 km), etc. Snow melts trickling down the cheeks of the glaciers and peaks feed high altitude lakes, streams and rivers and serve as major source of freshwater for drinking, industry, agriculture and hydropower generation. Gilgit, Hunza, Ghizer, Astore, Shigar and Shyoke rivers make almost 72% of the total annual influx into the Indus, definitely the backbone of agro-based national economy. Freshwater lakes, rivers and streams also provide habitats to native and exotic species of freshwater fish. Rainbow and Brown trout are abundant in the rivers and lakes of Gilgit, Ghizer and Skardu valleys. The area is also famous for high altitude lakes and wetlands. Hundreds of lakes, such as Uttar, Karambar, Seosar, Handrap, Baha, Shandur, Phander, Gasho, Naltar, Rash, Shimshal, Pamir, etc. are important not only socio-economically but also ecologically, and host a number of migratory birds and waterfowls during the winter and spring migration seasons. These all resources are a source of inspiration for tourists, researchers, scientists, educationists, archeologists, gelogists, etc. With increase in human population, poverty, socio-economic constraints of the locals, and mismanagement

Black and White Glaciars in Khunjerb National Park © Waseem Ahmed Khan, PWF

Himalayam Rock Agama (*Laudakia himalayana*) © Waseem Ahmed Khan, PWF

and over-exploitation of these natural resources, their associated biodiversity has also been affected. Acute efforts are needed to boost the socio-economic status of the people living in GB, and to link their earnings to the conservation of these assets is the need of the hour.

Forest and rangeland resources that constitute4.4 % and 22% of GB respectively, host rich biodiversity.Most of this comprises of threatened species of wild animals and plants as well as some species that are endemic to the Karakoram, Himalayas and Hindu Kush mountain ranges only. Natural forests being primary watersheds of Indus River regulate freshwater for drinking, agriculture, industry and hydro power generation. High valued timber, firewood, medicinal herbs, food and fiber, worth millions are amongst other tangible benefits of the forest ecosystems. Carbon sink, carbon credit, mild climate, food and shelter to wildlife and aesthetics are also some of their invaluable non tangible benefits. Forests also stabilize slopes and control soil erosion, landslides and siltation into downstream precious dams and water reservoirs.

Golden Mormat (*Mormota caudata*) © Waseem Ahmed Khan, PWF

The natural forest in the GB covers an area of 2884.99 sq km (4.1% of the total land), which falls under two broad categories, viz., private forest and state owned forest. The area of private forest is around 1253.56 sq km (3.2%) and state owned forest is 652.77 sq km (0.9%). The natural forest is mainly in Diamer, southern parts of Gilgit, Punial area of Ghizer and few pockets in Baltistan district (NASSD 2003). Private forests are mostly in Chilas, Darel and Tangir while government protected forests are in Astore, Skardu, Ganche, Gilgit and Ghizer districts of GB.

Despite rigorous efforts by the custodian department and the private sector, the forests are confronted by wide array of threats and pressures. Direct causes of the forest degradation and loss are due to excessive exploitation of forest resources for commercial and subsistence purposes, encroachment and wildfire. Besides this, population growth, inequity, climatic change, poverty and insecure land tenure; indirectly degrade the forest ecosystems. Both direct and indirect causes are aggravated by poor forest management and planning, insufficient institutional capacities, inappropriate forest management, legal and administrative constraints and lack of appropriate strategies for managing forest resources.

People living in remote valleys nearer to forests and rangelands are often poor and hence depend largely on local forests for subsistence and livelihood. As a result, with increase in population and resultantly

demand for more food, space and shelter; encroachment, forest lands conversion, illicit cutting, over grazing and introduction of exotics have increased putting more pressure on natural forest and rangelands.

Gilgit-Baltistan is a living museum. It harbors a range of approximately 230 species of birds, 54 species of mammals, 23 species of reptiles, 20 species of fish and 6 species of amphibians. Astore valley is called the store house of medicinal plants. Deosai plains, adjacent to Astore is known to have over 10,000 species of wild plants, almost 50% are endemic to Karakorum – Himalayan mountain ranges. The government has established a network of 19 Protected Areas and 26 Community Managed Conservation Areas (CMCA) covering about 28% of the total area to protect and manage the precious wild resources of the area. Khunjerab National Park, for instance is a significant biodiversity hotspot in the cold desert eco-region. Snow leopard, Himalayan Ibex, Marcoplo sheep, Blue sheep, Astoremakhor, Musk deer, Tibetan wild ass, Ladakhurial, Wolf, Brown bear, Black bear and lynx are amongst key wildlife inhabitants of the area. Major Birdlife species include waterfowls, resident birds, birds of prey and pheasants. Community based wildlife conservation has become a great success. Through community based trophy hunting program, both government and local communities have earned huge amounts to cater for their social, economic and environmental needs. Currently, the trophy hunting fee for Himalayan ibex, Blue sheep and AstoreMarkhor is 5000, 8000 and 50000 USD, respectively. Eighty percent of the revenue from GB goes to local communities, whereas 20% is taken by the custodian department for vigilance and regulation. Though the area is also rich in bird, wildlife and fish resources, but appropriate mechanism for their effective conservation and sustainable harvest is yet to be introduced.

The treasures of this region are at stake. This can be estimated by ongoing activities such as holding festivities and cultural events in the ecologically sensitive areas without adequate prior care and protective measure,continuous dumping of solid wastes by touristsin snow covered peaks and glaciers,uncontrolled hunting and excessive fishing, etc. All of these, if remain unchecked, we may deprive our future generations to enjoy the aesthetic, ecological and economic values of this national treasure.

North-Pakistan Agama (*Laudakia pakistanica*) © Waseem Ahmed Khan, PWF

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IUCN RED LIST OF THREATENED SPECIES
CATEGORIES AND CRITERIA

The 'IUCN Red List of Threatened Species' is widely recognized as the most comprehensive, objective global approach for evaluating the conservation status of plant and animal species. The IUCN Red List is mainly used to guide conservation activities of governments, NGOs and scientific institutions. The scientifically rigorous approach to determine risks of extinction that is applicable to all species, has become a world standard. In order to produce the IUCN Red List of Threatened Species, the IUCN Species Program works with the IUCN Survival Commission (SSC) and with members of IUCN, draws on and mobilizes a network of scientists and partner organizations working in almost every country in the world, who collectively hold what is likely the most complete scientific knowledge base on the biology and conservation status of species.

The IUCN Red List Categories and Criteria are extensively reviewed. The revised Categories and Criteria (IUCN Red List Categories and Criteria version 3.1) were adopted by IUCN Council in February 2000 and the revised system came into use in 2001. Guidelines to use the IUCN Red List Categories and Criteria are regularly reviewed (the recent most review, Version 8.1; August 2010).

The goals of the IUCN Red List are to:

Identify and document those species most in need of conservation attention if global extinction rates are to be reduced; and

Provide a global index of the state of change of biodiversity.

To achieve these Goals, the IUCN Red List aims to:

Establish a baseline from which to monitor the change in status of species;

Provide a global context for the establishment of conservation priorities at the local level;

Monitor, on a continuing basis, the status of a representative selection of species (as biodiversity indicators) that cover all the major ecosystems of the world.

Nature of the categories

There are nine clearly defined categories into which every taxon in the world (excluding micro-organisms) can be classified (Figure

Pond heron (*Ardeola grayii*) © Waseem Ahmad Khan, PWF

Hume's Wheateer () © Waseem Ahmed Khan, PWF

2.1). Complete definitions of the categories are given in the Box below:

The first two categories viz., 'Extinct' and 'Extinct in the Wild' are relatively self-explanatory.

Extinct means that there is no reasonable doubt that the last individual has died. Extinct in the Wild means that the taxon is extinct in its natural habitat.

The following three categories, Critically Endangered, Endangered and Vulnerable, are Red List Guidelines 8 assigned to taxa on the basis of quantitative criteria that are designed to reflect varying degrees of threat of extinction.

The category Near Threatened is applied to taxa that do not qualify as threatened now, but may be close to qualifying as threatened. The category Least Concern is applied to taxa that do not qualify (and are not close to qualifying) as threatened or near threatened.

The remaining two categories do not reflect the threat status of taxa. The category Data Deficient highlights taxa for which sufficient information is lacking to make a sound status assessment. The inclination to assess taxa as Data Deficient may be very strong; it should be emphasized that assessors must use all data available in full when making a Red List assessment. Precise information on scarce taxa is usually lacking, and although the criteria are highly quantitative and defined, one can use projections, assumptions and inferences in order to place a taxon in the appropriate category. Since Data Deficient is not a category of threat, taxa placed in this category are not so obviously targets for conservation action, although their needs might be very great. Assessors should use whatever information is available and relevant to make assessments and place taxa into the Data Deficient category only when there is really no alternative. Guidance on handling uncertainty is especially relevant in the case of poorly known taxa. The category Not Evaluated applies to taxa that have not yet been evaluated against the Red List Criteria.

Taxa in all of the IUCN Red List Categories, except LC and NE, are normally presented in the Red List and, consequently, are referred to as "red-listed". The 2003 update of the IUCN Red List of Threatened Species and all subsequent updates (available up to 2010) include all taxa assessed as LC and information about them has been documented, although these taxa have not been referred to as "red-listed". This is especially important, for example, for taxa that were Red-listed in an earlier edition, but have since been down-listed.

Following is a brief description of IUCN Red List Categories:

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycles and life form

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

IUCN Red List Categories

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates

that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

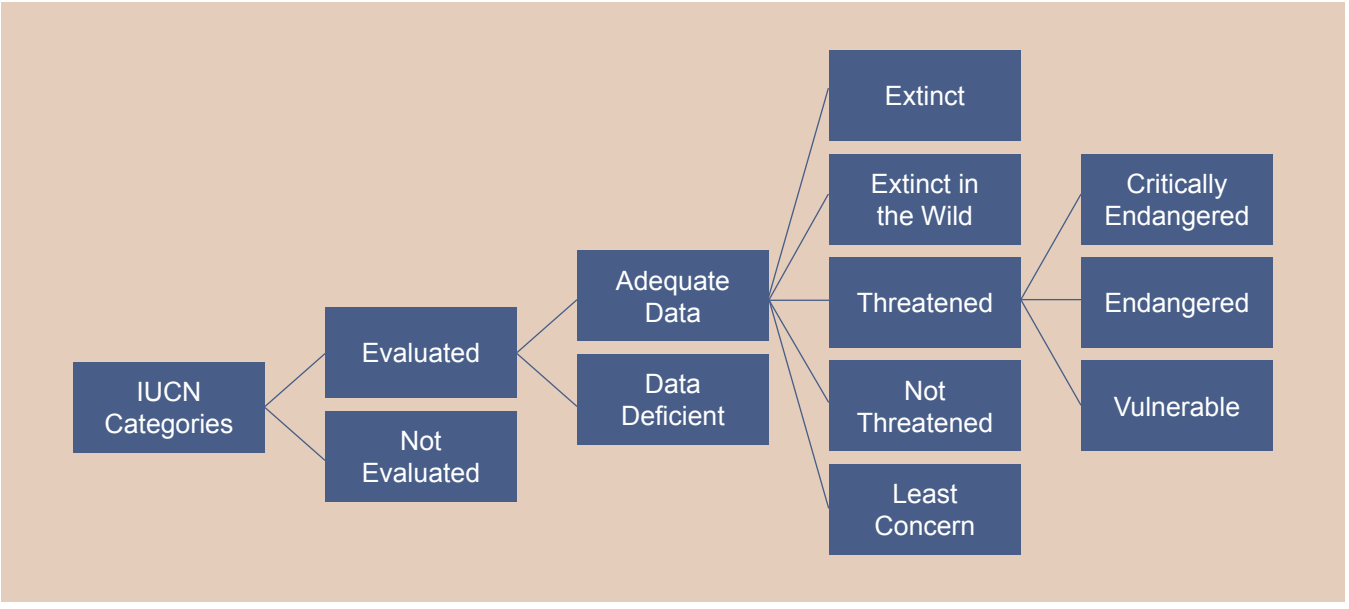
DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

A view of Hingol National Park © Waseem Ahmed Khan, PWF

NOT EVALUATED (NE)

A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.



Use any of the criteria A-E	Critically Endangered	Endangered	Vulnerable
A. Population reduction	Declines measured over the longer of 10 years or 3 generations		
A1	≥ 90%	≥ 70%	≥ 50%
A2, A3 & A4	≥ 80%	≥ 50%	≥ 30%
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND have ceased, based on and specifying any of the following: (a) direct observation (b) an index of abundance appropriate to the taxon (c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality (d) actual or potential levels of exploitation (e) effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.			
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on (a) to (e) under A1.			
A3. Population reduction projected or suspected to be met in the future (up to a maximum of 100 years) based on (b) to (e) under A1.			
A4. An observed, estimated, inferred, projected or suspected population reduction (up to a maximum of 100 years) where the time period must include both the past and the future, and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on (a) to (e) under A1.			
B. Geographic range in the form of either B1 (extent of occurrence) AND/OR B2 (area of occupancy)			
B1. Extent of occurrence (EOO)	< 100 km	< 5,000 km²	< 20,000 km²
B2. Area of occupancy (AOO)	< 10 km	< 500 km²	< 2,000 km²
AND at least 2 of the following:			
(a) Severely fragmented, OR			
Number of locations	= 1	≤ 5	≤ 10
(b) Continuing decline in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals.			
© Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals			
C. Small population size and decline			
Number of mature individuals	< 250	< 2,500	< 10,000
AND either C1 or C2:			
C1. An estimated continuing decline of at least	25% in 3 years or 1 generation	20% in 5 years or 2 generations	10% in 10 years or 3 generations
(up to a max. of 100 years in future)			

C2. A continuing decline AND (a) and/or (b):			
(a i) Number of mature individuals in each subpopulation: < 50 < 250 < 1,000 or	< 50	< 250	< 1,000
(a ii) % individuals in one subpopulation =	90–100%	95–100%	100%
(b) Extreme fluctuations in the number of mature individuals.			
D. Very small or restricted population Either:			
Number of mature individuals	< 50	< 250	D1. < 1,000 AND/OR
VU D2. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.			D2. typically: AOO<20 km² or number of locations ≤ 5
E. Quantitative Analysis			
Indicating the probability of extinction in the wild to be:	≥ 50% in 10 years or 3 generations (100 years max.)	≥ 20% in 20 years or 5 generations (100 years max.)	≥ 10% in 100 years

Spotted Owlet (*Athene brama*) © Waseem Ahmad Khan, PWF

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PITCHER IRRIGATION;

EFFICIENT AGRICULTURE FOR FOOD SECURITY & NATURE CONSERVATIONS

As agricultureis a dominant driving force for economical growth in Pakistan, therefore the sustainable output of the sector is imperative to stabilize the country. The declining productivity status of the sector since last pair of decades is alarming to pay intensive importance at different levels. Along with the water scarcity, irrigation system inefficiencies emerged as the main factor behind productivity deterioration in agriculture, especially with the peril of conventional water loss up to 40 % and land degradation, that not only consequent food insecurity & poverty but also potent environmental degradation leading biodiversity losses. On other hand a large area (28,170 squire kilometer) of the country is arid and characterized as too dry for conventional & even rain-fed agriculture (except few parts). Over a million of desert inhabitant's livelihood & food needs are threatened by droughts & desertification in account of human population growth, climate change, over exploitation of rangelands & other desert resources. If current trends in population growth continue, there will soon be millions more and these people will need food, so the wisest course for them is to produce their own food. The rapid growth in said issues, presents a strong case for paying more serious attention to the repercussions of the existing irrigation means in both human and ecological terms.

Pitcher irrigation is an indigenous technique being used in arid & semi-arid lands across the world. In addition to being water & cost-efficient, less labor-intensive and more productive, this irrigation system can also extend the growing season by efficiently providing water to crops throughout the dry season. This sub-surface irrigation technique entails burying an unglazed & porous clay pot encircled with seedlings for creating a steady supply of moisture into the root zone under hydrostatic pressure and/or suction to maintain plant growth, minimizing percolation & evaporation losses, and risk of salinization by accumulating the salts at the soil surface & wetted land boundaries, leaving the salt content of water in the root zone more favorable than the salinity

Pitcher Irrigation in Thar Desert, Sanghar © Haji Mola Bux, IFAP, WWF-P

Vegetables being harvested through Pitcher Irrigation © Haji Mola Bux, IFAP, WWF-P

of water used in the pitcher. Thus even saline water can be used for irrigation through this technique.

This farmer-friendly & most viable arid zone irrigation system is proved to be water efficient up to 90% (by A.A.Siyal, Sindh Agriculture University) over flood & other surface irrigation methods. Besides that the benefits include, increased productivity (2-3 times higher) since the plant's energies are diverted from developing root mass needed for acquiring water, to increasing overall plant yield, and decreased soil erosion & crusting, reduction in weeds, and higher efficiency & reduced rate in application of pesticides/insecticides & soluble fertilizers through the same pitchers as need to be applied only on defined/cultivated areas.

The prospects of this local made irrigation technique are practically high in the arid/semi arid regions (e.gThar&Cholistan) of the country where we have limited or no cultivation due to water scarcity & salinity. Pumped out saline groundwater can be used to grow creeping crop such as gourd, pumpkin, and melon, sponge vegetable "luffa", coliquentida (requires 2,000-2500 pitchers per hectare) and upright crops, or crops producing a canopy around the pot (requires up to 4000 pitchers per hectare). A farmer can easily cultivate about 0.5 hectare (on hand pump or pond) & 1 hectare (on motorpump) through the system on hand-pump or pond. Six to eight vegetable plants could be grown around one pot and may be refilled every few days instead of daily attention. To prolong the life of the pitcher, the mouth of the pot should be kept closed and the water used should be clean.

WWF-P Indus for All Programme team at Chotiari Wetlands Complex conceived all the existing issues and in response, established a Nature Resource based Enterprise supported with Pitcher Irrigation Technique for the herdsmen of Chotiari rangelands, with the title as "Backyard Gardening through Pitcher Irrigation System". The enterprise is intended to establish, financially assist and strengthen a participatory community vegetable product management enterprise on 1 hectares, aimed at sustainably manage indigenous core livelihood source for poverty reduction, food self-sufficiency and better nutrition of the people of three villages. The selected villages namely MajeedMangrio, MangioJunejo and RanoJunejo (with 400 population) are located at northern edges of Chotiari reservoir along with the widely spread sand dunes of AchroThar (white desert) and the dwellers are totally dependant on livestock. The ultimate objective of the intervention is to provide inhabitants an alternative to reduce their dependency on rangelands that consequently will support to conserve biodiversity richness of the resource which is being degraded due to overgrazing, increased human settlements, & decreased rainfall.

After formation, orientation through field trips & training of the entrepreneurship comprised of community member form targeted villages, an MoU addressing enterprise operations mechanism, WWF role and community contributions towards enterprise development & the conservation of natural resources of area rangelands is signed. The community is provided with only 1200 pitchers, a hand pump per 400 pitchers & vegetable seed at site, and the land preparation, pitchers installation, fertilizer (livestock manure) and crop management & marketing is at community part.

The first six month crop yielded an average of 10 kilograms (creeping crop vegetables) per pitcher with an approx net profit of Rs. 5 per kilogram. With the compiled crop harvest data from three villages, a total amount of Rs. 60,000 net profit is recorded that highly advocates the introduction of Pitcher Irrigation System in arid &semi arid regions at large scale in such a scenario of severe water scarcity and desertification issues that our country is experiencing.

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MUD VOLCANOES OF PAKISTAN

Nature has blessed Pakistan with a number of geographical wonders and mud volcanoes being one of them. Mud Volcanoes also known as Sedimentary Volcanoes or Gas-Oil Volcanoes are not very famous and not as devastating in action as their counterpart Magmatic Volcanoesare. They have existed on the face of this planetsince very beginning but their actual discoveries and studies date back only a few centuries.

They are one of the earth's most interesting natural phenomena. They may erupt abruptly and powerfully vomiting tons of muddy brackish water, which is chemically a mixture of water, mud, gases (CH4, C2H6, and SO2),a few elements, some traces of hydrocarbons, oil and some heat energy. The mud volcanoes therefore have a direct link to gas and oil fields and are excellent indicators to the presence of these natural resources.

More than 700 mud volcanoes have been reported around the world so far and according to Owais Mughal (2007), the managing editor of ALL THINGS PAKISTAN - a website highlighting Pakistan's beauty, there are 18 mud volcanoes in Pakistan and all being located in Balochistan.

The earliest account of the presence of mud volcanoes in Balochistan dates back to 1840. The first surviving account of their existence is by Major Frederick John Goldsmith who wrote a diary of his travels from Karachi to Gawadar in 1862 where he tells about thebubbling springs near RasKoocheri and the mud volcanoes near Ormara. There are two known groups of mud volcanoes in Balochistanviz.,Chandargup and JablulGhurab. According to Owais Mughal, seven out of 18 mud volcanoes are located near Sapat post in Hingol National Park (HNP) and the remaining 11 are located between Kutch and Gawadar.

Active Mud Volcano in Hingol National Park © Waseem Ahmad Khan, PWF

New Records of Mud Volcanoes in Pakistan

While conducting wildlife surveysinBabbroKaur and Laksar Plains in the northern HNP during February 2007 we (a team of five members; the author (team leader), two wildlife watchers from Balochistan Forest and Wildlife Department and two porters) heard rather strange stories from local residents about occasional blasts followed by fire and smoke in a mud mountain known as KundigoKurt. The last such blast was heard by locals about six months ago. This mountain is not very far from BabbroKaur and Laksar Plains. Visualizing that these could be active mud volcanoes, we decided to investigate the stories.

Access to the Area

Visiting the Kundigo Kurt Mountainisnot an easy task as it falls in a mountain range where only the professional hikers can venture. There are two access routes to the Kundigo Kurt Mountain and both are very difficult; One from Uthal (Tehsil of Lasbela District) - Jhau on RCD Highway leading toKhuzdar / Quetta, branching off atDhalliHinj village following a dirt track to KukreeBhent (a hamlet) along the AraKaur (Ara River) in HNP;the other route is from Traanch valley which is even more difficult especially its part known as Dozakh (Hell). KukreeBhent is accessible riding a four wheel drive jeep only as there are many small mounds, stony beds, streams and plains. It takes about two and a half hours to reach KukreeBhent from

Active Mud Volcano in Hingol National Park © Waseem Ahmad Khan, PWF

Jhau at RCDHighway (a distance of only 16 km). From KukreeBhent onwards starts the camel ride for about eight hours along AraKaur up to PishiBhent and then about four hours walk on footto reach the base of the KundigoKurtMountain in the east of AraKaur. It takes about two hours from the base of the KundigoKurtMountainto reach the top following a very difficult and risky track.

Our Findings

After a tiresome journey of about 12 hours both on camel back and on foot, we reached the base of the mountain in the evening therefore spent that night there.Climb to the mountain top started next morning (0700 hours).After following the difficult and risky track and passing through various gullies and depressions, we reached the top by 1100 hours and found seven magnificent and active mud volcanoes within about 150 m length and 70 m width at the top of KundigoKurtMountain at 1509 feet (460 m) above sea level and the deposited extrusions all around. We took photographs, GPS coordinates and measurements of craters of different volcanoes. We observed gas bubbles rising from the mud in the crater, a network of gullies, ridges and beautifully carved deep grooves made of mud extruded from the volcanoes by rain and wind erosion. We returned to the base camp at 1600 hours, very tired but jubilant and exited at this new find which is the 3rd mud volcano field in Pakistan after Chandargup and JablulGhuraband second in HNP located at N: 25º 52' .180" and E: 65º 45' .930". Local people use the word Borbroong for mud volcano. Wetherefore named these mud volcanoes as:

1. Borbroong I:About 100 x 70ft crater size, almost roundedin shape and at 1509 ft above sea level. Mud was oozing from three different points each of about 2 ft.
2. BorbroongII:About 15 x 12 ft crater size, almost rounded in shape and at 1490 ft above sea level. Surface was wet, about 5 ft deep and mud was not oozing.
3. Borbroong III: About 12 x 12 ft crater size, circular in shape and 1480 ft above sea level. Surface looked like a spring and mud with water oozing out.
4. Borbroong IV: About 4 x 3ft crater size, irregular in shape and 1480 ft above sea level. Actively oozing mud.
5. Borbroong V: About 3 x 3ft crater size, circular in shape and 1480 ft above sea level and actively oozing out mud.
6. Borbroong VI: About 40 x 60ft crater size, irregular in shape and 1470 ft above sea level. Mud was oozing from two points each of 2 ft diameter.
7. Borbroong VII: About 08 x 08ft crater size, rounded in shape and 1470 ft above sea level. Crater was elevated about 3 ft from the surface and mud was oozing.

One special thing about these mud volcanoes is that small glittering crystals of gold ranging 5 – 20 mm in size can frequently be seen around the craters. But instead being the real gold these are actually the crystals of pyrite or iron pyrite (FeS2); an ore of Iron also known as Fool's Gold.

As mud volcanoes have a direct link to gas and oil fields therefore, it is recommended that government should search these natural resources here but keeping in view that the area falls within the boundaries of a National Park .

A network of Gullies in Mud Mountains, Hingol National Park © Waseem Ahmad Khan, PWF

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ROLE OF CHILDREN
IN WILDLIFE CONSERVATION!

Wildlife plays a great part in the natural cycle of the world. To fully help preserve this cycle, we must educate the children. They are the future of the world, and may even live to see the first colonies out in space .Wildlife is important. It helps preserve culture and teaches us that we are not the only sentient life-forms on Earth. It shows us the ways other animals and plants use to live and gives us knowledge of how they adapt to their surroundings, whether the referred-to surrounding is a desert, a fish pond, a forest, or a school ground. It gives us a reason to know about what these other beings do for their survival, and how their ways compare to ours, so similar, and yet, so different.

Thinking about these goals of understanding the specifics and lives of other wild species, however, we stand at a considerable disadvantage. The human race seems impeccably determined not to let go of its prejudices, and delusions of grandeur. There are many sensible people in this world (sensible in matters like these, anyway), of course, but they, as the poor and poverty-stricken beggars often-mentioned, are in an unfortunate position, where their opinions matter little. This, I consider to be a sad (yet horribly true) fact. In a world where power, influence, wealth, among others, matter most, the wildlife is pushed to the farthest corner, and deprived of a very basic right; that of freedom. Freedom, not in its most literal sense, but in another sense; a deeper one. These animals that have done nothing to deserve the ruthless hunts, they are being attacked with. Most of these precious species have had their existences wiped from the Earth, and many are on the verge of extinction. Many of these beings are in no control of what they do, not, at least, in a complete way. They possess ostentatious fur costs, and/or a canine desire to tear all flesh-possessing beings apart. The first can be explained with the simple answer that this gift was given to them by God. The second, a desire: to live, and consequently, eat food. The actions of humans acting against these possessions cannot be explained, however. It would be a loss of valuable time to dwell on the point.

Hatchlings of Green Sea Turtle (*Chelonia mydas*) © Syed Shamim Fakhri, ZSD

It stands to reason that we do not owe these animals anything. Parallel to that, though, it must also be remembered that these animals do not owe us anything, either. They are faultless in the matter that man possesses more intelligence and understanding than they do (not much understanding in these matters), and that man misuses that intelligence to lord and overshadow these beings. This does not mean that all animals should be treated equal to or higher than mankind, but they should be treated with appropriate amounts of dignity and respect. In simpler terms, they should in no way, shape or form, should be mistreated.

So, therefore, we move to the children. As with all life cycles, nothing can sustain itself forever, not even in a physical way, much less a psychological one. It stands to reason that the children of this generation will be the leaders and men of the next. Seeing as how we cannot impose laws upon the public, to suffer a one-year sentence if caught in any way abusing a wildlife species, we have a much more foolproof and easier-to-implement method to go about saving and preserving the wildlife.

The children of this world undergo a lengthy process of education. It would be extremely benefiting for them to understand the morals and values-in respect to rights of wildlife-of a good society. They would be able to garner a deeper understanding of the way the world works, and know what basic rights all beings must have (as previously mentioned). They might even be able to work out ways to help and benefit humankind, without harming the environment or these wild animals and plants. (This is something known as sustainable development, though that is another topic.)

Thus, finding out an easy way to help wildlife, we conclude that we must educate the children on all the benefits, and moral righteousness of helping the wildlife. As previously stated, the powers of this generation will not be able to influence the next. The next generation will be able to create more suitable positions and rights for the wildlife. This would mean that the animals and plants would be well protected, pro bono mundum etuniversihomines

Common Kingfisher (*Alcedo atthis*) © Waseem Ahmad Khan, PWF

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HIMALAYAN MUSK DEER
MOSCHUS CHRYSOGASTER

Description

Himalayan Musk deer is a small member of the deer family, well tailored to the cold environment, having a head-to-body length of 86-100 cm and a weight of 13-18kg. The general body color of the coat, composed of brittle coarse hairs, is a slightly grizzly brown with the lower cheeks, throat and belly being whitish. The deer has two to three distinctive horizontal rows of paler creamy spots extending from shoulders to the pelvic region. The body slopes forward, as the hind legs are almost one third longer than the forelegs, causing the height at the rump to be at least 10 cm above the shoulder. This is recognizable by its distinctive jumping movement – more like the leaping steps of a kangaroo than a deer. The ears are large and rounded, generally lined with whitish fur. Musk deer have elongated well-developed upper saber like canine teeth, which in males can be up to 10cm long and protrude beneath the upper lip in a fang-like manner. This deer is very famous for musk gland or pod.

Cause of trade

The word 'musk' derives from the prehistoric Indian word (Sunskrit) Muska meant scrotum or testicles. This is probably due to the musk sac of the male musk deer which is located around their navel close to the male genital opening. The price of musk is more than five times the price of gold in international musk market. Traditionally musk deer have been hunted for centuries in order to excise/harvest the musk gland or 'pod', which, in the live animal, may play a role in attracting females during heat period. The high value of musk has been an incentive for the illegal hunting of musk deer. These glands contain a dense jelly-like oily substance (about 20-30gm) with strong odor and reddish-brown color becomes a powdery mass when dried and gradually turns black.

Musk Deer (*Moschus chrysogaster*)

Worldwide Distribution

These deer are normally found solitary and are highly shy animals depending on sense of hearing to locate sources of danger. When frightened, they make broad leaps and emit a loud double hiss if alarmed. They remain mostly active between dawn and dusk. At night, musk deer can be seen in the open areas of their habitat as they graze, while during the day, they remain in dense cover. These are sedentary, remaining within a defined home range throughout the year and usually do not undertake any seasonal migrations even in harsh weather conditions. Musk deer (M. chrysogaster) are found in the western region of the Himalayas, from Afghanistan and Pakistan to China, India and Nepal in alpine forest and sub-alpine scrub zone and upper line of coniferous forests at elevations of 2,200-4,300 meters on the steep slopes of the Himalayas.

Distribution in AJK

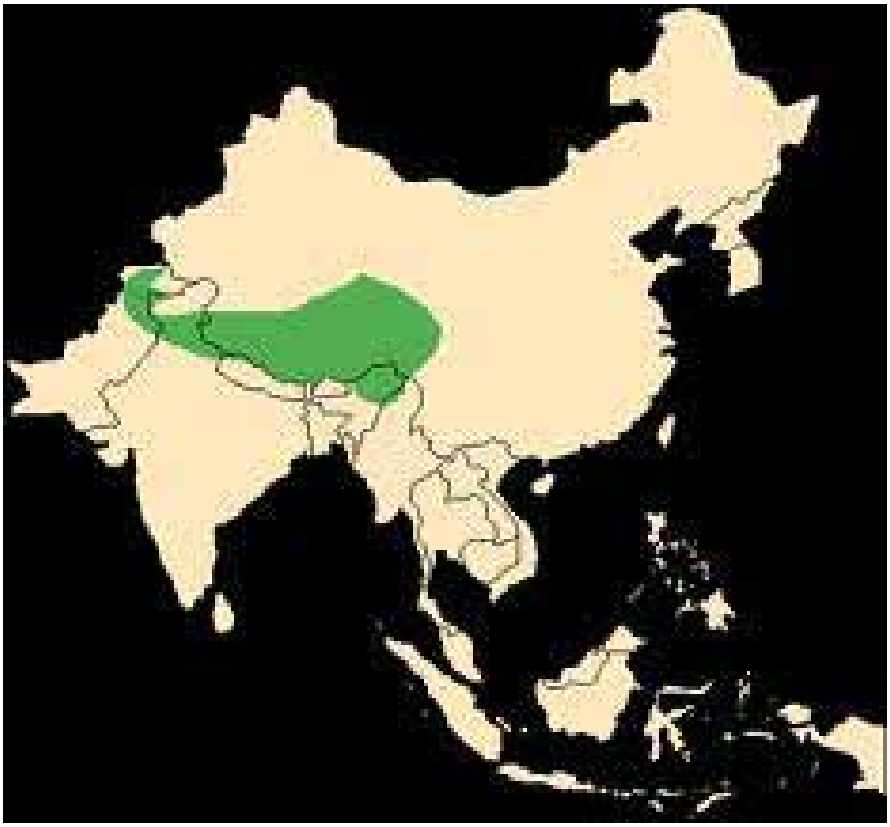
In Azad Kashmir, these deers are distributed through outNeelumValley, some areas of JehlumValley and

Musk pods extracted from Musk Deer (*Moschus chrysogaster*)

Tehsil Haveli of District Bagh. In Azad Kashmir Neelum valley is renowned Biodiversity hot spot for outstanding beauty, intact forests, floral diversity and key wildlife species of the temperate zone. Its forest is the most outstanding remaining tract of temperate forests in Pakistan. This valley hosts largest known population of globally threatened Musk deer Moschuscrysogaster, in Pakistan. At present,Neelum Valley is only the area in which biodiversity is still intact, so for the in-situ conservation of the biodiversity of Neelum, Government of AJK notified protected areas,includingMachiara National Park (MNP), Musk Deer National park (MDNP), Ghamot National Park (GNP) and Salkhala Game Reserve (SGR). In these protected areas musk deer alone gain the most attraction of international community and conservationists. It is very first time in protected areas history that an area, Musk Deer National Park was notified to conserve this specific species. MNP, Salkhala Game Reserve and MDNP are the areas in which a viable population of Deer is found, along with these areas Chogalli, Gahl, Rawtta, Pallri, Dudhnial, Tehjian, RattaPani, Sinjlinalla and Arangkail are its renowned hot spots, where illegal hunters remain active all round the year..

Threats to musk deer

- Although musk is used for the treatment of ailments but use of musk as traditional medicine is limited in AJK, which clearly reflects that international commercial illegal trade is the main reason for hunting. Hunting methods do not discriminate age and sex of animals. Musk deer are killed to excise the musk pod found in mature males for musk pod collection; both females without musk gland, and juveniles, which secrete little musk, are also killed in illegal harvesting. However, poaching activity fetches US $275–310 per musk pod while selling them to local market; hence musk trade, as an economic incentive, poses a major threat to the survival of the species.
- Population of Himalayan musk deer is on a rapid decline because of destruction of its natural habitat due to nomadic and local grazers activities, along with unsustainable commercial logging and extraction of medicinal plants by the government as well as



Worldwide distribution of Musk Deer (*Moschus chrysogaster*)

A view of habitat of Musk deer (*Moschus chrysogaster*), Neelum Valley, AJK © Qamar Zaman, AJK

by the locals. According to the official data Neelum Valley Development board, in addition to local livestock, a total of around 150,000 livestock heads enter every year in NeelumValley from lowlands for seasonal grazing. These nomads (Bakarwals) invade alpine and sub-alpine pastures of core habitat of musk deer in June and remain up to September. External nomads along with local grazers damage natural resources and habitat relentlessly. Habitat degradation is other major threats to survival of the species.

- Weak law enforcement is also a severe threat to its population. Weak law enforcement has made it easy for poachers and musk-pod traders to continue their illegal activities. Due to small size of the musk gland, it is easy to hide and transport, thus making detection of smuggling extremely difficult.
- Local people of the area could easily get the license of gun on the behalf of self defence from the relevant Deputy Commissioner, which may be used for hunting the deer. This weapon poses a drastic effect on musk deer population, as every individual could use the gun to kill the deer.
- Indiscriminate hunting methods such as trapping, over shooting and poaching of kids also pose severe decline in its population.
- Unawareness about its scenic, aesthetic, economic ecological importance and non custodian attitudes of the local community is also a main cause of decline in musk population.

Common methods of hunting

- Trapping: The hunters dig a pit in critical sites of the deer's territories, trench tops are covered by rotten vegetation and small sticks. As a nocturnal habit deer may move about in search of food, during this search voyage deer drops into the pit and get intertwined with traps. Experienced hunters could use this method effectively trapping the deer.
- Poaching of kids: This is the widespread practice of herders who are very memorable to breeding grounds of female musk deer in the scrub forest, just above tree line. They unswervingly locate the small kids, who could not detect threat and consequently poached as a fun by the merciless herders.
- Shooting: This is a widespread method used by majority of poachers, during which, a skilful hunter, locate the foot trekking of the deer on snow through binocular and exact location of its day cover is searched. Then a team of hunters come within reach of the specific site, spread in a burrow manner, uphill side of its day hide, one of the member flush the animal to upward direction, as the deer could not flee fast in a straight line or downward due to its kangaroo like leaping, instantaneously deer will leap uphill toward the hunter who are already posted there and ultimately get shot down.

Musk trade in AJK

Musk deer are mostly killed for the musk gland found in mature males around the genital opening near the umbilicus. Many professional hunters are involved in musk pod extraction and trade by killing the musk deer. Local hunters can earn about US $275– 310 per musk pod of 25 g average weight. According to existing data, in 2000 a total of 26 musk pods were sold, in 2001 it was to 31, in 2002 44,in 2008, 60, and in 2009, 70 musk pods were sold from upper Neelum valley alone. Tawbutt, Pholawai, Kail, Sharda, Dudnyal and Athmuqam are its local markets where middlemen purchase the pod and sell it in Muzaffarabad; at second step illegal traders of Muzaffarabad sell to traders in Rawalpindi, from where, finally handed over to the international smugglers in Lahore.

Current status within CITE

The international trade in musk deer and its products has been controlled by CITES since 1979 when musk deer populations in Pakistan was listed in Appendix1.

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BIOLOGICAL CONTROL
IN THE CONTEXT OF INSECT BIODIVERSITY

In the process of providing food and fiber to humanity, agriculture is putting serious burden on the environment. Agriculture has the complex relationship with natural resources and environment. Insects dominate pest problems and the injury by these insects may be so severe that economic yield of a crop may not be possible. These are managed by various means and one is Biological control. It is direct or indirect manipulation by man of living natural control agents to increase their attack on pest species. Biological control is self perpetuating, does not show resistance and with minimal adverse side effects. However, to use biological control agents is a tricky preposition. In biological control, the whole ecological niche has to be understood.

Biological control is the use of parasitoids, predators or pathogens to attack an insect and reduce its number. It control has been more successful against insect pests of perennial plants, especially those pests that feed externally on the plant and are more or less sessile in habit. It does not eradicate the target pest.

Classical example of biological control is of the cottony cushion scale by the ladybird beetle. The scale had critically ruined the citrus industry in California, USA by 1880. The scale was found to be native of Australia and exploration of the host country showed that Vadalia ladybird beetle fed on this scale. A few beetles were imported in 1888 and 1889 and released. The beetles multiplied rapidly and controlled the scale. Since then there had been 214 cases of complete or partial biological control in the world. Many attempts have failed when launched in the fields even if successful on experimental scale.

There are various agents. A parasite is an organism that is usually smaller than the host. The parasite feeds on its host, usually weakening it and sometimes killing it. Parasitoids are special kind of predators. A parasitoid is parasitic in its immature stages but is free living as an adult. Predators are free living organisms that feed throughout their life on other animals. They kill their prey. Viruses, bacteria, protozoa, fungi, rikettsia and nematodes infect insects.

Lacewing Insect (*Chrysoperla sp.*)
© Mohammad Irshad, NARC

There are several way of its use. Introduction, also known as importation is often considered the classical practice in biological control. Augmentation is a practice that includes any activity designed to increase numbers or effect of existing natural enemies. Conservation is allowing natural enemy to build up its population in appreciable number when man removes the detrimental effects. These are all methods used in applied biological control.

In Pakistan, work on biological control started in 1956 when Commonwealth Institute of Biological Control (CIBC) was established. The material mass explored in Pakistan is meager. It includes about 550 insect pest species and 600 parasitoid, 200 predators and 30 pathogens.

There are few outstanding examples of its use. In sugarcane crop releases of *Epiricrania melanoleuca* an ectoparsite were undertaken against *Pyrilla* in Mardan and Peshawar during 1975-76. It became widespread and after a lot of advocacy the aerial spray was stopped and the pest is under sufficient control. This resulted in saving of over Rs 20 million per year in the cost of insecticides at that time.

The interest of mass rearing of *Trichogramma* started in sugarcane around 1983 with success in Sindh. The success achieved in Sindh helped to spread among the sugar industry in other areas of the country. Despite of its importance, rearing of this parasitoid in Pakistan has not been done as should have been. A few other examples exists in some crops in the country.

About 30 Million Rupees have so far been spent on basic work of biological control of insect pests. Another 30 million may have been spent on practical biological control in Pakistan. With this meager amount the achievements are much greater. However more efforts are needed.

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BARN OWL
A FRIEND OF FARMERS

INTRODUCTION

The barn owl with nocturnal life style ghostly white appearance, silent flight, terrifying voice and birds of ill omen are association with ruins or churches and near old well where it likes to nest, have earned it a place in the folk lore of many cultures. In spite of these characters owls have been thought of a being very wise since the time of ancient Greece .The owl was associated with Athena, the Greek goddess of wisdom .In our country verbally it has deep effects .There are many idioms and phrases, which are directly concerned with this Creature and it is true that the idioms and phrases show a great role as indicates its importance. However, the barn owl is best known for its association is best known for its association with farmers .whenever crops are grown large population of rates and mice attracts the attention of barn owl .On this basis this creature is also known as “Rodent hunting “barn owl.

HABITAT

This species is an important predator of agricultural pests .it is commonly found on farmland, in marshes, deserts also occupies uses building such as barns, church, towers and ruins. It is often found in or near human habitations.

DISTRIBUTION

The barn owl is the world’s most widely distributed species ,ranging through North ,Central and South America ,Britain and Western Europe to the Black Sea ,Central and Southern Africa ,Madagascar ,India ,Burma, Australia and Tasmania .In Pakistan found in Sindh and Punjab .In Sindh specially in Karachi ,particularly in Malir where deep open wells provide daytime shelter .Barn owl is scarce in status .

CHARACTERS OF BARN OWL

Barn owl can not be mistaken because of its heart shaped face and large disc shape around the eyes .It is some time called” Monkey faced owl” .The bill are strongly curved as in other owls the eyes usually black ,are forward looking .The head large and round has no eartuffs. The neck is short and moveable edges of the face mask hide large ear openings. The long and slender legs are feathered ,claws are strongly curved as in other owls .The wings are long and board with rounded tips and soft feathers which make very little noise in flight .It is 34 cms in length ,with wing spans up to 95 cms .The weight of the owl is 350 g and vision is better.

DIET AND BEHAVIOUR

Food consists of small Mammals, Birds, Reptiles, Amphibians, Fish and large insects, but mainly rodents and shrews which constitute an average of 80% of all prey. The barn owl require 3 to 4 mice daily .They swallow their food and like many other predators regurgitate the bones and other indigestible parts in the form of pellets ,Pellets are black and smooth on the surface ,fairly large (3.5 to 8 cms and about 3 cms thick) and rounded at the tip .

Owl catch most of the prey in the open field .During hunting they suit quietly on a low perch .Watching and listening the noise of rodents, on hearing they rapidly rotate their head until the sound registers equally in both ears .They then directly face their prey .When the force of the sound is pin pointed, the barn owl glide silently down towards it .At the movement of impact it closes it eyes to protect .Often kills its prey and swallows it whole from head side.

REPRODUCTION

The barn owl is one of the few birds whose eggs can be found the whole year round .As a rule ,the eggs are laid in April or may .During favourable condition i.e. .When food supply is an abundant .The breeding period may extend from February to November .There is usually only one clutch a year .Each clutch usually may contain 4 to 7 eggs ,according to available food supply .It does not make a nest ,but lays the incubation ,a shallow hollow may be found in the soft earths .The female carrying out all the incubation duties while the male fetches food .The incubation period is 30 to 40 days.

LONGEVITY

Barn owls are fairly long lived .Larger species probably live even longer a 68 years.

Barn Owl (*Tyto alba*)

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CONSERVATION AWARENESS
OF MARGALLAH HILLS NATIONAL PARK: A SUCCESS STORY

Early start of summer season, late winters, prolonged dry spells, and short rainy seasons started environmental miseries, which we also share with other nations due to global climatic change. Locally we face the abnormalities of less flow of surface water, deepening of subsoil water and short duration flow of springs in the mountains. We have been attempting remedies rather than preventives. That's why we have many National Parks, with the hope to save parts of natural ecosystems. But it remained impossible for us to prevent ever-increasing pressure on our natural resources and natural ecosystems. For many reasons human population growth remains uncontrolled. At the same time majority population is uneducated and unskilled and poor, even lives below the poverty line. Many of these poor communities merely survive against starvation and live unhygienic life. Their negative impact on natural environment is of different nature than that of richer people.

Margallah Hills National Park has more than 125,000 people, native to the area, living in 34 village rural communities, within its notified boundary. Most of them are poor. Majority of these National Park dwellers, and several living around it, traditionally use natural resources of the area, such as fuel wood, fodder, water, land for agriculture and pastures for livestock grazing. This pressure keeps increasing with the alarming increase of population, making it ever difficult to achieve the objectives of the National Park.

As the ecosystems get degraded or modified by man, the urge to save nature, at least to see it intact in the National Parks has aroused determination to address issues among some nature loving enthusiasts. The Human Welfare and Nature Conservation Society (HWNCS) decided to interact with the communities living in the Margallah Hills National Park, to understand and address their issues, which in turn have negative impacts on this ecosystem. Under this conservation strategy creation of environment awareness was one of the projects, for which I was given the responsibility to take up with the communities. I chose school children of class 3 to 7. The age groups of students in these classes do not easily forget the message, which is given to them in series of slide shows. They were educated on the components of environment and their functions and linkages with each other. They were made to understand the unpleasant consequences of disturbing the balance of nature. Also once they learnt that the denuded lands are slow in replenishment of subsoil

Preparation of beds for kitchen gardening © Gulshan Ara Mirza, Islamabad

water, they were prepared to take up tree plantation campaigns, for which I gave them training including growing of their own nurseries. They took care of the young plants so religiously that all their young trees lived. HWNCS further increased the children's enthusiasm by giving incentives. The young plantations survived the unusual prolonged dry and hot season as the children watered them regularly. Now there are several trees in open spaces of the schools, courtyards and open areas of the villages. The incentives included informative books on scientific topics.

The young students were also made aware that by growing trees they contributed in addressing several environmental issues at global level, and also at local level. They hoped that not only their trees will be source of firewood for them but also their wells will no more be going dry in the drought seasons.

Poverty alleviation needs sustained efforts for a long time. However, in the mean time some regular benefits can be provided. For this purpose another well-conceived project, again through the school children was started for these HWNCS project villages. Average daily purchases of pulses and vegetables for cooking per family were estimated. This money was saved, by growing seasonal vegetables in courtyards of village houses through out the year. The school children were given training in growing vegetables in their respective schools. Quality seeds were provided to them for their household vegetable beds. Again the children were induced to compete for the incentive of first, second and third prizes. It was seen that the whole families got involved for their young daughters and sons. Soon they were eating their own grown fresh vegetables instead of purchasing at least day old withered vegetables from the village shops. During this healthy activity, the leisure time, which used to be wasted by sitting idle, was usefully utilized. Now the household vegetables growing have become routine in majority of houses in the villages of Margallah Hills National Park.

HWNCS celebrated even the small achievements of the target communities. Those who are praised for their work naturally feel distinct. The others also get filled with enthusiasm to work to help them selves. The villages in the project area now have their own grown trees and the green beds of vegetables in their houses.

Fuel efficient stove © Gulshan Ara Mirza, Islamabad

WILDLIFE PHOTOGRAPHY

Green Bee eater (*Merops orientalis*) © Waseem Ahmad Khan, PWF

Indian Roller (*Coracias benghalensis*) with Indus Valley toad (*Bufo stomaticus*) in its beak © Waseem Ahmad Khan, PWF

WILDLIFE PHOTOGRAPHY

Skittering frog (*Euphlyctis cyanophlyctis*) © Waseem Ahmad Khan, PWF

Collared dove (*Streptopelia decaocto*) © Waseem Ahmad Khan, PWF

UPDATES ON WILDLIFE (NEWS & VIEWS)

NEW RECORD FROM SINDH

Smooth coated otter (*Lutrogale perspicillata*) is a semi-aquatic mammal belonging to the Order Carnivora and Family Mustellidae. It is known as "Oodh Balao" in Urdu language, "Ludhro" (singular) and "Ludhra" (plural) in Sindhi language, "Ludhar" in Punjabi and "Khuwarr Spay" in Pushto language. It inhabits freshwater wetlands, including canals, rivers, lakes etc. and tends to be very secretive and shy in nature. It is nocturnal in habits but social and gregarious. Its food mainly (96%) consists of fish. It is distributed in Punjab, Sindh and a few areas in Khyber Pakhtunkhwa near DI Khan along Indus River.

According to literature, (Roberts, 2005), four cubs per litter are common among Smooth coated otter and five in rare cases. However, more than five cubs per litter have never been reported among Smooth coated otter. During a study in 2010 in Sindh Province funded by *Indus For All Programme* of WWF Pakistan, six otter cubs per litter were found at two different places; first near Jamrau Headwork in Khairpur District and secondly, around Chotiari Dam in District Sanghar. According to the local residents, six otter cubs per litter is a common observation in the study area.

LACK OF AWARENESS

An unfortunate Smooth coated otter had an accident with a motorbike on a road in Khairpur District of Sindh Province on January 4th, 2012. The otter was injured like the motorbike rider and was then taken by a group of local hooligan boys. The boys tied a rope around the neck of the otter and dragged it through the streets in the town claiming that they had got hold of a fearful creature. Finally, as a result of the cruel attitude of locals, lack of awareness about wild animals and violation of animal rights, the innocent otter died in a miserable condition. Mr. Ghulam Muhammad

Gadani, Deputy Conservator of Wildlife, taking notice of the incident, warned the culprits and the community elders took an oath on behalf of the motorbike driver and so the matter was settled.

This is not the first incident of animal rights violation but the one which has been highlighted. This incident also reflects the level of awareness among the local communities about wildlife, their importance and ecological role.

WOLF KILLED IN AJK

A Grey Wolf (*Canis lupus*) was killed by local community in Domail Bala village, in Upper Neelum valley, AJK in October, 2011. According to Mr. Usman Ali, a representative of Breath Foundation, AJK the wolf caused a damage of around Pak Rs. 150,000/- by killing more than 25 sheep and goats in the area during two months.

Wolves use to come down in the Neelum Valley during autumn (September) each year and go back to high altitudes in Karakorum Mountain Ranges after spring (April) using the Deosai Plateau as

a corridor. Local residents told that the killed wolf and its pack could not migrate backward during April due to prolonged winter season last year. When these animals found plenty of food with fewer disturbances, they preferred to stay here and the killed

wolf dared to live in close proximity of villages and kept on hunting livestock until October last year when it was killed finally.

UPDATES ON WILDLIFE (NEWS & VIEWS)

HUGE SIZED FRESHWATER MUSSELS (*NODULARIA PACHYSOMA*) FOUND IN CHASHMA BARRAGE

Prof. Z B Mirza and his team of Kinnaird College for Women University while studying the ecological linkages of fauna and flora of Chashma Barrage pond area under a WWF Pakistan funded project, found extraordinarily large sized Freshwater Mussels on 9th February 2012. These Freshwater Mussels are more than 19 cm long and 11 cm in width. Smaller sized shells were greatly abundant. These invertebrate animals belonging to the Phylum Molluska are found in the bottom mud of the ponds. They play important role in the fresh water pond habitats by eating algae, zooplankton and organic waste. So,

they convert organic matter into simple nutrients and also decrease the concentration of suspended particles from water through their filtration process. They are also part of the food of many types of fishes and birds. Their abundant presence indicates the healthy pond water habitat of Chashma Barrage.

BAER'S POCHARD (*AYTHYA BAERI*) SIGHTED IN CHASHMA BARRAGE

Mr. Sakhawat Ali, a research scholar in Prof. Z. B. Mirza's team while studying the ecological linkages of fauna and flora of Chashma Barrage under a WWF Pakistan funded project, sighted a Baer's Pochard (*Aythya* baeri) along the eastern flank of the Barrage on 9th February 2012. The Pochard was sighted in the middle of a sitting flock of over ten thousand ducks which were being counted by him along with two Kinnaird College M. Phil. scholars Ms. Azubah and Ms. Kamni. Mrs.

Mirza also thoroughly watched it through the spotting scope fitted on a tripod. The Pochard was a male and seemed molted to breeding plumage with black head and neck which blended into maroon-chestnut of the breast. This is a second record of its occurrence in Pakistan. In 1957 a specimen was shot in a pond area in district Gujrat by Brig. Haider. It is winter visitor to eastern part of India and other far eastern countries.

PLUMBEOUS REDSTART (*RHYACORNIS FULIGINOSUS*) SIGHTED IN CHASHMA BARRAGE

A Plumbeous Redstart (*Rhyacornis fuliginosus*) was sighted by Prof. Z. B. Mirza on 9th February 2012 at the reservoir on the eastern flank of Chashma Barrage at the fall of an escape canal, which is beyond Kundian towards Mianwali. The Redstart was a solitary bird feeding on insects as it found at the edge of the waterfall. Normally it is found near the mountain streams at high altitudes in summer. In winter it descends to lower altitude valleys. This winter, some birds dispersed to long distances in the plains, perhaps due to heavy snow fall even in the valleys.

YELLOW-BELLIED FANTAIL FLYCATCHER (*RHIPIDURA HYPOXANTHA*) SIGHTED

A Yellow-bellied Fantail Flycatcher (*Rhipidura hypoxantha*) was sighted in Margallah Hills National Park by Prof. Z. B. Mirza during early summer in 2011 in Margallah Hills National Park between Monal restaurant and Pir Sohawa. It was earlier recorded in winter 2010 in Margallah Hills and Sialkot. It was also seen by him in March, 1998 in Malkandi forest of Kaghan valley.

UPDATES ON WILDLIFE (NEWS & VIEWS)

PIED MYNA (*STURNUS CONTORA*) IS DISPERSING FURTHER WEST

Pied Myna (*Sturnus contora*) was first recorded from Pakistan by Prof. Z. B. Mirza in 1982 in Shahdara in district Sheikhupura. Its dispersal from India advanced to Lahore, Kasur, Changa Manga, Balloki, Nankana Sahib and northwards to Kharian and Rasul Head works in about twenty years. In early 2000's it was seen at Kalar Kahar and Dina. Recently, on 9th February, 2012 it was seen at Chashma barrage by Prof. Z. B. Mirza.

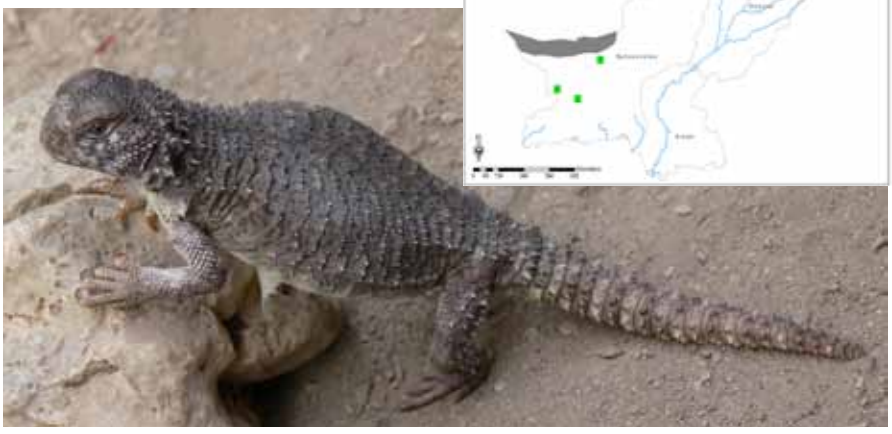
WAS THAT A FIRST RECORD OF TIBETAN LARK (*MELANOCORYPHA MAXIMA*) IN PAKISTAN?

The difficult mountainous terrain of extreme northern Pakistan is short of data on birds. Mr. Shahid Iqbal along with Mr. Waseem Ahmad Khan and Syed Shamim Fakhri were conducting a two-week baseline avian survey in Shimshal valley in Khunjerab National Park during July 2009. We observed a flock of eight larks, which appeared larger than other lark species in Pakistan. These were about the size of a common starling. That excited us, as we thought it could be Tibetan Lark (*Melanocorypha maxima*). We were watching these birds on ground from 35 to 40 meter distance and it was snowing light so the visibility was not very clear. The Length of the wing in this species reaches almost to the tip of the tail, which could not be noted, nor could we note the tail feathers, which are broadly white tipped, except the middle pair and the outer most feather is nearly white.

There is a similar lark *Melanocorypha bimaculata* that also occurs in the same area, but its size is little bigger than a House Sparrow. Under-parts of both the species are white. We attempted to photograph it twice but the flock was shy of our photographer and flew away each time he attempted to advance. Perhaps it was Tibtan Lark, a new bird record for Pakistan.

NEW DISTRIBUTION RANGE OF SEISTAN SPINY-TAIL GROUND LIZARD (*UROMASTYX ASMUSSI*) IN PAKISTAN

Syed Shamim Fakhri from Zoological Survey of Pakistan while conducting herpetological surveys in Balochistan Province during August 2009, found six specimens of the Seistan spiny-tailed ground lizard or Seistani sanda in Kharan, Washuk and Punjgur districts. It was previously reported from Chaghai in Balochistan along Pak-Afghan border whereas; the current findings extend the distribution range of the species to further south of the country. Seistani sanda is a herbivore lizard taking leaves and flowers of grasses and other vegetation around. Its burrow has a wide opening. It uses its spinose tail as a weapon by lashing it out and does not attempt to bite.



Indian Tree Lizard (*Calotes versicolor*) © Waseem Ahmad Khan, PWF

ABOUT PAKISTAN WILDLIFE FOUNDATION

Pakistan Wildlife Foundation is a Non-profit Conservation Organization set up under Section 42 of the Companies Ordinance, 1984. The foundation was incorporated with Securities and Exchange Commission of Pakistan (SECP) in October 2010 under the Corporate Universal Identification No. 0073723. PWF is governed by a board of directors supported by a technical advisory committee.

MISSION

To educate the masses in the country regarding biodiversity, environment and social aspects to change their attitudes towards positive, sensible and responsible actions for nature

OBJECTIVES

To help protect, preserve, conserve, manage and sustainably utilize wildlife and their habitats in the country and to provide a platform for the community at large and professionals to share their wildlife/environment related experiences and ideas and publicize them for students, researchers, policy makers, administrators and general public.

JOIN US

Pakistan Wildlife Foundation welcomes to all young scientists, researchers and nature lovers to come forward and join hands with Pakistan Wildlife Foundation for nature conservation, environmental protection and raising awareness about importance of nature and natural resources of Pakistan. The Foundation can be joined as;

- Life Fellow
- Fellow
- Young Scientist
- Earth Watch Volunteer
- Corporate Member

Joining procedure and contributions for each category is given below;

REGISTATION PROCEDURE

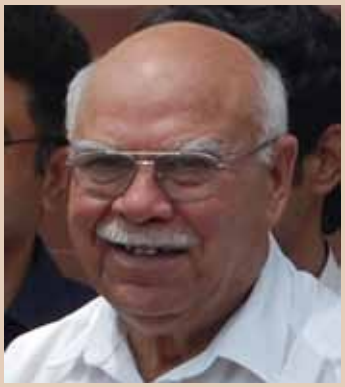
1. Download and complete the registration form
2. Deposit the membership fee in any branch of Standard Chartered Bank (Pakistan) Ltd.
3. Scan the completed membership form and fee deposit slip
4. Email the scanned registration form and fee deposit slip to PAKISTAN WILDLIFE FOUNDATION at; info@pakwildlife.org
5. Account details are;
   Standard Chartered Bank
   Account Title; Pakistan Wildlife Foundation
   Account No. 01-1887296-01
6. The completed form can also be posted at the following mailing address:

PAKISTAN WILDLIFE FOUNDATION

West Basement, Baluchistan Plaza, Fazal-ul-Haq Road, Blue Area, Islamabad.

CONTRIBUTIONS		
Category	**Pakistani Nationals**	**Foreigners**
Life Fellow	Pak Rs. 5000/- (Once in lifetime)	US $ 500/- (Once in lifetime)
Fellow	Pak Rs. 1000/- (For two year)	US $ 100/- (For two year)
Young Scientist	Pak Rs. 1000/- (For two year)	US $ 100/- (For two year)
Earth Watch Volunteer	Pak Rs. 1000/- (For two year)	US $ 100/- (For two year)
Corporate Members	Pak Rs. 25000/- (For two year)	-

FOUNDER FELLOWS



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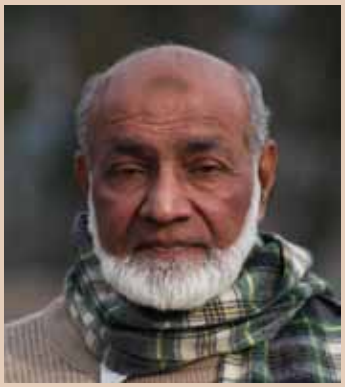

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White eyed Buzzard (*Butastur teesa*) © Waseem Ahmad Khan, PWF

OUR PARTNERS

Pakistan Wildlife Foundation has singed MoUs with the following Organizations, Institutes and Universities for joint ventures and cooperative research.

Punjab Wildlife and Parks Department

The Department was established as Game Department in 1934 and in 1973 was given the status of attached department of Forestry, Wildlife, Fisheries and Tourism Department. Accordingly, the responsibilities of the Department were re-fixed with entire focus on sustainable management, conservation, propagation and protection of wildlife under the umbrella of Punjab Wildlife Protection, Preservation, Conservation and Management Act, 1974. The department is supported by a squad of 1880 professional, technical and field staff with 74 members of scale 17-20, 1324 members of scale 5-16 and 482 members of scale 1-4.

Quaid-e-Azam University (Department of Biochemistry)

Quaid-e-Azam University is one of the top few universities of the country; located in the foot of the Margalla Hills in Islamabad Capital Territory of Pakistan. The University was initially founded as the “University of Islamabad” in July 1967 but later it was re-named after the title of the Founder of Pakistan as “Quaid-e-Azam University”. The University has qualified team of teachers, researchers, scientists and skilled and technical personnel. According to HEC ranking 2011, the university holds the top position in the country among 177 HEC recognized private and public sector universities.

National Welfare & Human Development Organization (NWHDO)

National Welfare & Human Development Organization is a registered Non Government Organization working in Sindh Province of Pakistan. Its head office is located in Nasarpur, District Matiari. The organization works in the areas of human development, education, poverty elevation and sustainable economic development in Sindh, Pakistan.

Breath Foundation AJK

Breath Foundation is Muzaffarabad (AJK) based Non Government conservation Organization established in 2011 and registered with Joint stock company and firm Azad Government of state of Jammu and Kashmir under Pakistan Societies act 1860/21. The mission of the organization is to empower the communities for active participation in the conservation of natural resources by addressing biodiversity, environmental, educational, economic and health issues and to play their role in the policy making for the sustainable utilization of natural resources.

University of Veterinary and Animal Sciences (UVAS) (Institute of Biochemistry and Biotechnology)

University of Veterinary and Animal Sciences, Lahore, is one of the oldest Veterinary Institutions in Asia established in 1882 and one of the top few universities of the country. The university has latest and well equipped research labs and a qualified team of scientists, researchers, teachers and skilled and technical personnel. The university comprises of 21 Departments and BS, MS and offers PhD program in different fields.

OUR SUPPORTERS

Following organizations and institutes are among our valuable supporters and we sincerely acknowledge their support in our endeavors.

Bio-Resource Research Centre

BRC is a non-profit, non-political, multidisciplinary base organization with it's headquarter in Islamabad, Pakistan. Main focus of BRC, till date, has been on the bear conservation in Pakistan, through curbing bearbaiting. Therefore, the major part of present strategies and projects of BRC are designed in this perspective and BRC has many successes at its claim with regard to these projects. BRC assisted Pakistani authorities in development of a bear registration scheme which can be used to monitor bears in captivity.

IUCN Otter Specialist Group

The Otter Specialist Group, founded in 1974 is part of World Conservation Union (IUCN) Species Survival Commission (SSC). The aims of the Group, as set out by IUCN, are to:

- Provide leadership for the conservation of all 13 otter species (Lutrinae).
- Determine and review on a continuing basis the status and needs of otters, and promote the implementation of necessary research, conservation and management programmes by appropriate qualified individuals, organizations and governments.
- Make known the status and conservation needs of otters, and promote the wise management of otter species.

The Otter Specialist Group has around 245 members representing 62 countries. It publishes a quarterly peer-reviewed research journal; *IUCN OSG Bulletin* and has an E-library with hundreds of research articles about otters available to its members. The Otter Specialist Group is represented in Pakistan by Mr. Waseem Ahmad Khan.

Zoological society of Pakistan

The Zoological Society of Pakistan (ZSP) was founded in 1968 as an interdisciplinary scientific society that would draw together members from diverse scientific backgrounds under the unified discipline of Zoology. The objectives of the Society are:

- Promotion of scientific knowledge of animals and related subjects through discussions, reports and publications.
- Stimulation of scientific investigations and their applications.
- Planning, organization and administration of projects for the advancement of scientific knowledge in Zoology.
- Improvement of education and professional qualifications in Zoology.
- Promotion of international cooperation in achieving the above objectives

International Otter Survival Fund

The International Otter Survival Fund (IOSF) is one of the world's leading otter charities. In the UK IOSF is the only charity solely dedicated to the conservation, protection and care of otters based on 20 years of scientific research in the UK and around the world. Through education, research, influencing policy and partner working the IOSF is making progress but there is still much to be done in the UK and other countries where otters are at risk.

WWF Pakistan

World Wide Fund for Nature - Pakistan was formed in 1970 to address the growing environmental and conservation issues in Pakistan that not only affected the flora and fauna, but were also affecting the human population. WWF - Pakistan is a proud component of the WWF International family network, one of the world's largest and most experienced independent conservation organizations, with almost four million supporters, 4,500 staff members and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- Conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption

Sindh Wildlife Department, Government of Sindh, Pakistan

Sindh wildlife department was established for the conservation, protection and Management of Protected Areas on scientific lines.

- Enforce anti-poaching measures under the provision of Sindh Wildlife Protection Ordinance 1972 and other legal enactments.
- Census and Surveys of important wild animals and birds.
- Encourage research and studies on different aspects of wildlife and their habitat.
- Promote and facilitate captive bred wildlife trade.
- Regulate lawful healthy sport of hunting.
- Promote wildlife related ecotourism, recreational, educational and awareness activities.
- Ensure Community participation in the management of wildlife resources

PMAS-Arid Agriculture University, Rawalpindi (Department of Zoology)

In the 1970, the Government of Pakistan constituted a Barani Commission to review and recommend measures for the development of rainfed agriculture and uplift of the poor masses through education, research and development of technology, and manpower. Pursuant to the recommendations of the Barani Commission, the Government of Punjab established the Barani Agriculture College, Rawalpindi which was later upgraded to University in 1994. The mandate of the University is to produce high quality agricultural scientist and to form an organized scientific infrastructure for teaching and research for the development of the dry land regions of the country, thus minimizing the income gap.

University of the Punjab, Lahore (Department of Zoology)

Established in 1882 at Lahore, the University of the Punjab is the largest and the oldest seat of higher learning in Pakistan. It was the first to be established in the sub-continent in Muslim majority areas. The fact that two Nobel laureates are from this University speaks volumes for its academic and research excellence. Located in the historical and culturally alive city of Lahore, this University has played a leading role in higher education in the country. The University strives to provide a conducive environment for the pursuit of the academic activities. On account of its quality degrees and pleasant environment the University remains the institution of first choice for admission seeking students.

ANNOUNCEMENTS

Letters to Editor

Dear readers, we will be happy to publish your letters, views, comments and suggestions.

The Editor

Readers Evaluation

Pakistan Wildlife Foundation awards 'best article shield' to the writers on the basis of readers' evaluations. Readers are requested to send their evaluation about the article they liked best in the following format:

Name of Article:
Name of the Evaluator
Postal Address / Email:
(Student should mantion their Class and the institution)

Wildlife Photography Evaluation

Pakistan Wildlife Foundation gives awards to the best wildlife photograph on the basis of the evaluation by the readers in the same way as written above. Photographes will be exhibited in the "Wildlife Photography section of the magaznine.

Name of the Phogograph:
Name of the Evaluator
Postal Address / Email:
(Student should mantion their Class and the institution)

Wildlife News

Readers are requested to share their observations on wildlife and any wildlife related News.

Name of the observer:
Postal Address / Email:
Phone Number:

Wildlife Safari / Eco-Internship

Students of grade 9 and 10 (Matric and O level's) are invited to join Eco-Internship program with Pakistan Wildlife Foundation. Eco-Internship is 1-day training in the field regarding biodiversity, environment, ecosystems and their importance. Eco-Internship facility is open for students from throughout Pakistan. A senior Wildlife Ecologist will be available for conducting the training in natural environment preferably in a Protected Area about one-two hours' drive from the main city. Travelling, food and refreshments will be provided by Pakistan Wildlife Foundation. Students will be offered a MCQ test in the field and the successful students will be awarded an Eco-Internship certificate. Group size will be 25 and groups from schools will be preferred. However, separate groups for male and female students can also be arranged. Fee for the training is Rs. 3,500/- per participant.

Registration form is available at; www.pakwildlife.org.

For further information contact us at;

Email: info@pakwildlife.org

Training Workshop in Taxidermy

A 3-day training workshop in Taxidermy is being organized in May, 2012 in Islamabad. Those interested in animal collection, preservation and stuffing can join the workshop. Key features of the workshop will be;

- The training manual
- Practical demonstrations for stuffing reptiles, birds and mammals
- Separate workshops for male and female participants
- Maximum 10 participants
- Fee Rs. 7000/-

This training can be organized in any city in Pakistan depending upon the number of participants. Registration form is available at; www.pakwildlife.org. For further information, send us an Email at; info@pakwildlife.org or contact Mr. Waseem Ahmad Khan at; 0333-5214333.

Training Workshop in Wildlife Photography

A 3-day training workshop in Wildlife Photography is being organized in second half of April, 2012 in Islamabad. Those interested in Wildlife Photography can join the workshop. Key features of the workshop will be;

- The training manual
- Practical demonstrations in the field
- Maximum 12 participants
- Fee Rs. 7000/-

This training can be organized in any city in Pakistan depending upon the number of participants. Registration form is available at;

www.pakwildlife.org

For further information contact us at;

Email: info@pakwildlife.org

ACKNOWLEDGMENTS

Wildlife of Pakistan is a platform for researchers, students and nature lovers to share their wildlife related experiences, ideas and information. Its main objectives are the education and awareness raising among youth about environment, biodiversity and wildlife. The editors are grateful to all those who have contributed the magazine through their articles and photographs and indirectly to the objectives of the magazine. The editors sincerely acknowledge the contributions of all those who have contributed to this magazine and look forward to their regular support to the magazine in future.

Wild rose (*Rosa webbiana*) © Waseem Ahmed Khan, PWF

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