Protecting the Olive Ridley Turtle

The Story of the Dhamra Port

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Olive Ridley turtle hatchlings on Gahirmatha beach, Odisha India © IUCN

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Background

The road to Dhamra Port © IUCN

> "I am pleased that the Tata Group's tradition of corporate social and environmental responsibility continued in the development of Dhamra Port. We have appreciated the partnership with IUCN in achieving this together."
>
> Ratan N. Tata

The story of Dhamra Port is the story of a major corporation and a global environmental organization working together to ensure that the construction of a large industrial port in India would not harm a significant population of endangered sea turtles.

The eastern part of India is one of the least developed areas of the country, despite being one of the most resource rich. In early 2000, expanding links between the Indian and global economies brought opportunities for development of the area, but a deep port was needed to support this growth. The government of Odisha identified Dhamra, based on an Indian Institute of Technology[1], Madras (now Chennai) study, to be the most suitable location, and the development of the port was taken up by the Dhamra Port Company Ltd (DPCL), a 50:50 joint venture of Tata Steel and construction giant Larsen & Toubro (L&T).

From a development perspective, the site was perfect. But from a conservation perspective there were questions about its location close to a mass nesting site of the Olive Ridley turtle at Gahirmatha, about 15 kilometres to the south, and to the nearby Bitarkhanika Wildlife Refuge. The Olive Ridley is one of the world's seven remaining sea turtle species, and is vulnerable to extinction at a global level. It is also protected under Indian law.

Early on, a number of environmental organizations in India voiced strong opposition to the development of the port. Fortunately both Tata Steel and L&T were committed to establishing whether a port could be built in this area without harming the turtles.

They asked IUCN, the International Union for Conservation of Nature, to advise on the project. IUCN brought in its global experts on sea turtles who worked with DPCL to help implement significant mitigation measures.

Both IUCN and DPCL accepted that this was a challenging engagement from the beginning. There was major resistance and debate within the environmental community about whether IUCN should be involved. And DPCL and the Tata Group knew that once they had engaged with IUCN, there could be significant cost associated with the organization's recommendations.

Over a period of several years, the two organizations worked together through many challenges to demonstrate that development and conservation can co-exist, and that there are ways to develop in a responsible manner that meets both the needs of people and the needs of nature.

The story of Dhamra Port is a story of misunderstandings, technical difficulties and conflict. But it is equally a story of determined individuals, enlightened companies, innovative approaches and mutual benefit. Despite the challenges, it is a story that resulted in a happy ending, both for the Olive Ridley turtle and for the people of Odisha, and it is told here in the hope that the lessons learned can be applied to other projects that will have similar positive outcomes for people and for nature.

The Actors

Stories about nature are always complex. The diversity of species and ecosystems that make up the intricate and interconnected web of life still present us with many unknowns. When we add the human factor to this equation, the complexity expands further. This was certainly the case here.

The Dhamra Port project involved an array of diverse institutions, sub-institutions and informal groups, each with distinct values, ambitions, networks, history, and knowledge guiding their decision making.

As they interacted, the full complexity of the story began to emerge. But as much as this is a story about organizations, it is also a story about people. None of what was accomplished would have been possible without the vision, determination, commitment, and expertise of the people involved. Before we try to describe the interplay between the organizations and people, it is worthwhile to try to understand each of them and their motivations in turn.

Olive Ridley Turtles

Quietly going about their lives, the Olive Ridley turtles were the central actors in the drama, evoking passion among traditional people, conservationists, and almost anyone who knows them.

Beginning life in an egg buried in beach sand, the turtles eventually chip themselves free and, following light cues and magnetic forces, make a long, predator-threatened crawl to the water where they drift offshore to loll about in masses for a couple of years. Eventually settling in coastal

Olive Ridley turtle hatchlings on Gahirmatha beach, Odisha India © IUCN

feeding grounds, they pass about 10 years before returning to the beach to deposit their eggs in solitary or mass nesting migrations known as "arribadas". The mass nesting migrations can involve as many as 100,000 turtles approaching a beach to nest.[2]

It may have been this unique life cycle which prompted Hindus to see the turtle as bound up with everlasting life. In a second incarnation, Lord Vishnu, the supreme God of sustenance, transposes into a tortoise whose back becomes the foundation for the making of the elixir of everlasting life. Later, Vishnu, as turtle, saved the gods from mortality and humans from disappearance altogether.

As it turns out, it is the Olive Ridley which faces extinction now.[3] One of seven remaining species of sea turtles, the Olive Ridley, which breeds on beaches south of Dhamra, is classified as "Vulnerable" by the IUCN Red List™, which means it is considered to be facing a high risk of extinction in the wild.

Fishing boats at Dhamra jetty © IUCN

Fishers

Odisha fishers have likely roved the same seas as the Olive Ridley for centuries. In the past few decades, however, the number of turtles drowned in fishing nets each year has increased significantly. The Wildlife Institute of India[4] reported that 100,000 turtles, all breeding adults, were killed between 1998 and 2008 along the Odisha coast[5].

Government of Odisha[6,7]

Looking for means to support the economic development of North Odisha, the State Government of Odisha realized the value of a new industrial port on the east coast of India.

At the same time, the state government is the custodian of the rich biodiversity of its coastline and was equally concerned about the conservation of turtles, which were already facing an undesirable rate of mortality due to large-scale fishing along the coast.

Tata Steel[8]

In many ways, the work to save turtles at Dhamra Port could not have happened without the strong support of Ratan Tata, then Chairman of the Tata Group, and B. Muthuraman, Vice Chairman of Tata Steel. They initiated the effort to ensure the port would not harm the turtles and together they led from above to ensure corporate support was there throughout the process.

The century-old Tata Steel is a Fortune 500 company. It built the first integrated steel plant in Asia and is today the most geographically diversified steel company in the world. It has corporate presence in 50 countries and manufacturing facilities in 26.

Given the environmental concerns that would emerge from the port proposal, it was fortunate that Tata Steel, a company known for its high standards of corporate citizenship, was behind the project.

Two-thirds of the equity of Tata is held by philanthropic trusts that have created national institutions for science and technology, medical research, social studies and the performing arts.[9]

Larsen and Toubro Ltd.

Tata Steel's initiative on the environmental front was supported by their equal partner, L&T, a 70 year-old technology, engineering, construction and manufacturing company.

As the main engineering, procurement and construction contractor for the project, it was the engineers of L&T who implemented the environmental measures that were required.

Dhamra Port Company Limited (DPCL)

DPCL was created by L&T and Tata Steel to build and operate the port in Dhamra. When the controversy around the port started, it was, however, Tata Steel and Tata Group which bore the brunt of the storm.

But in many ways, it was within DPCL that the hard work took place. The company's CEO, Santosh Mohapatra, thoroughly committed to the cause and took responsibility for the conservation of the turtles. In an operation driven by complex schedules, technical challenges, a huge range of suppliers and subcontractors, and ultimately a bottom line to meet, it was Mr. Mohapatra who championed the turtles' cause within the company. Mr. Mohapatra had to commit resources to protect the Olive Ridley, while also completing the project within the given time and cost.

While not everyone on the staff understood why all this effort was being made to save the turtles, through long hours of working through the technical changes required, everyone did contribute to the result.

Environmental community

The environmental community played a major role in the evolution of Dhamra Port, from state actors to NGOs and individuals.

The relevant environmental divisions of the Government of India included the Ministry of Environment and Forests; Ministry of Shipping; Directorate General of Shipping, State Government of Odisha; the Odisha Forest Department; the Odisha State Pollution Control Board; the Odisha Directorate of Fisheries; and the Wildlife Institute of India, among others.

Then there were the NGOs. Among them were the Bombay Natural History Society, the World Wide Fund for Nature India, Wildlife Protection Society of India, Wildlife Society of Orissa, Winrock International India, the Sea Turtle Restoration Network, Greenpeace and many others.

Some of these organizations provided technical support to different aspects of the project. Some refused to engage in the debate at all. And some were very vocally opposed to it, running national and global campaigns to stop the project.

IUCN

IUCN is a unique global organization with some 1,200 government and NGO Members around the world. A number of the organizations listed above are, in fact, IUCN Members. IUCN has six Commissions of volunteer experts, the largest of which is the Species Survival Commission (SSC)[10], which played a key role in the Dhamra Port project.

The project was led by IUCN's Asia Regional Office, which saw the importance of this project – both to protect a species, but also to demonstrate the potential of conservation partnerships with the private sector.

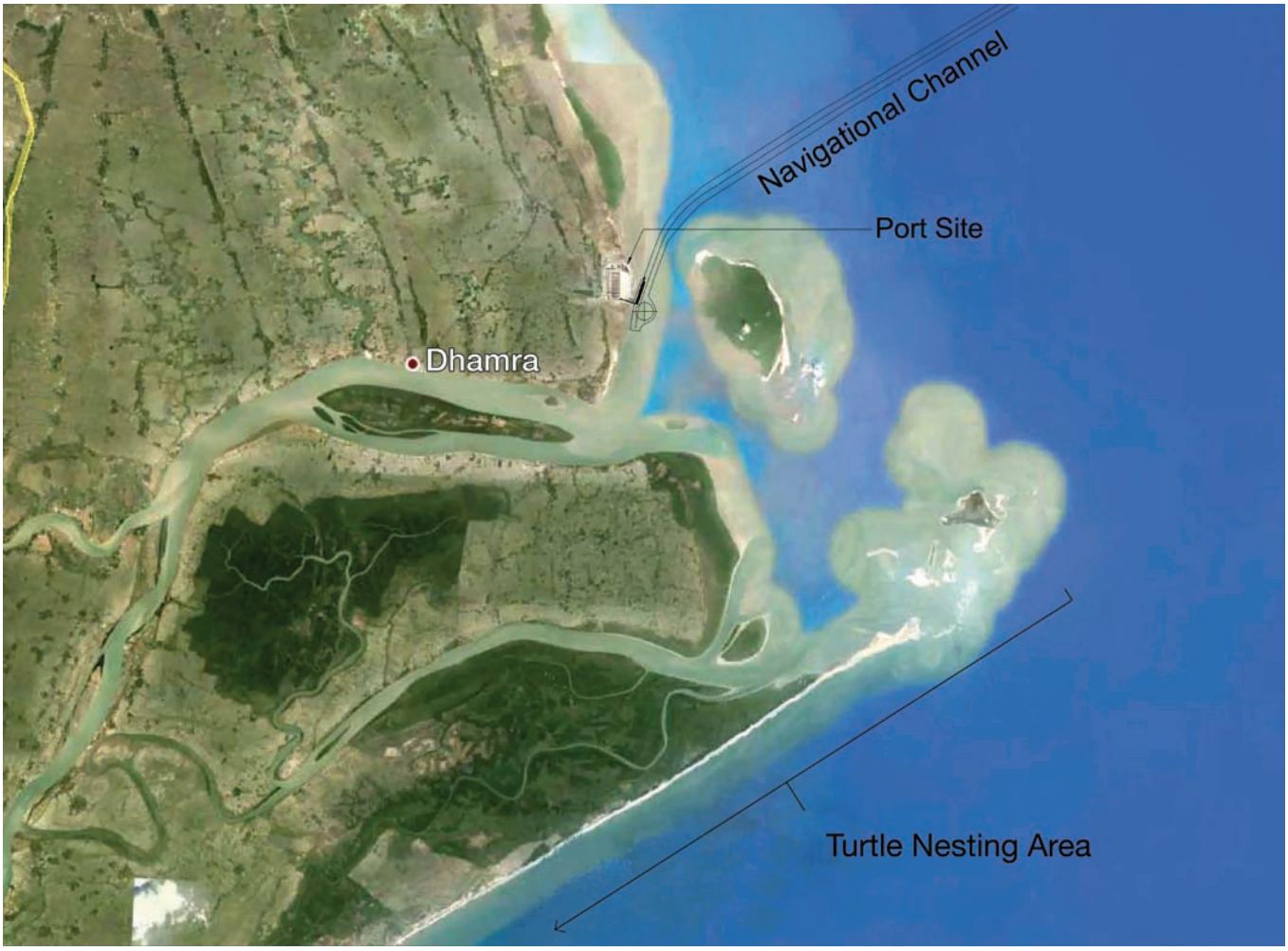
But it was Dr Nicolas Pilcher, the Co-chair of IUCN's Marine Turtle Specialist Group (MTSG)[11] under the SSC who really crafted IUCN's work at Dhamra Port.

Dr. Pilcher's impressive biological and technical knowledge, extensive global network of experts, and his practical and passionate demeanour were the drivers of change on the project.

The Dhamra Port project saw IUCN at its best. It engaged IUCN Members in India, it mobilized technical expertise from the SSC and the MTSG, it linked with the global Business and Biodiversity Programme, and it was supported by the IUCN Secretariat at both the global and regional levels.

At Dhamra Port, IUCN really did contribute to fulfilling its mission to influence, encourage and assist societies to conserve the diversity and integrity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

Laying Best Plans



The distance between the port site and the turtle nesting area on Gahirmatha beach is 15 kilometres point to point and 30 kilometres by sea. Ships enter and exit the port from the north. The fishing jetty is located in Dhamra town on the river. © DPCL

Initiation

Because Odisha and its neighbouring states, Jharkhand and West Bengal, were valued for iron ore, in the 1990s the state began exploring possibilities for building a minor industrial port, one that would support export of iron ore and import coking coal, steam/thermal coal, and limestone.

DPCL was formed in 1998 under a concession from the government of Odisha. Early on the project slowed due to an economic downturn but was revived in 2004, when the economy had revived and Tata Steel joined L&T as an equal partner in DPCL.

By 2007, expansion of the port had been incorporated into Odisha's Industrial Policy Resolution (227).[12]

The policy aimed to accelerate investment needed to develop industrial corridors and support exports from India's mining belt with the ultimate goal of increasing economic growth and employment, and reducing regional disparities within the state.

Environmental clearances

The environmental clearance for the port was obtained in 2000 after a two-year process.

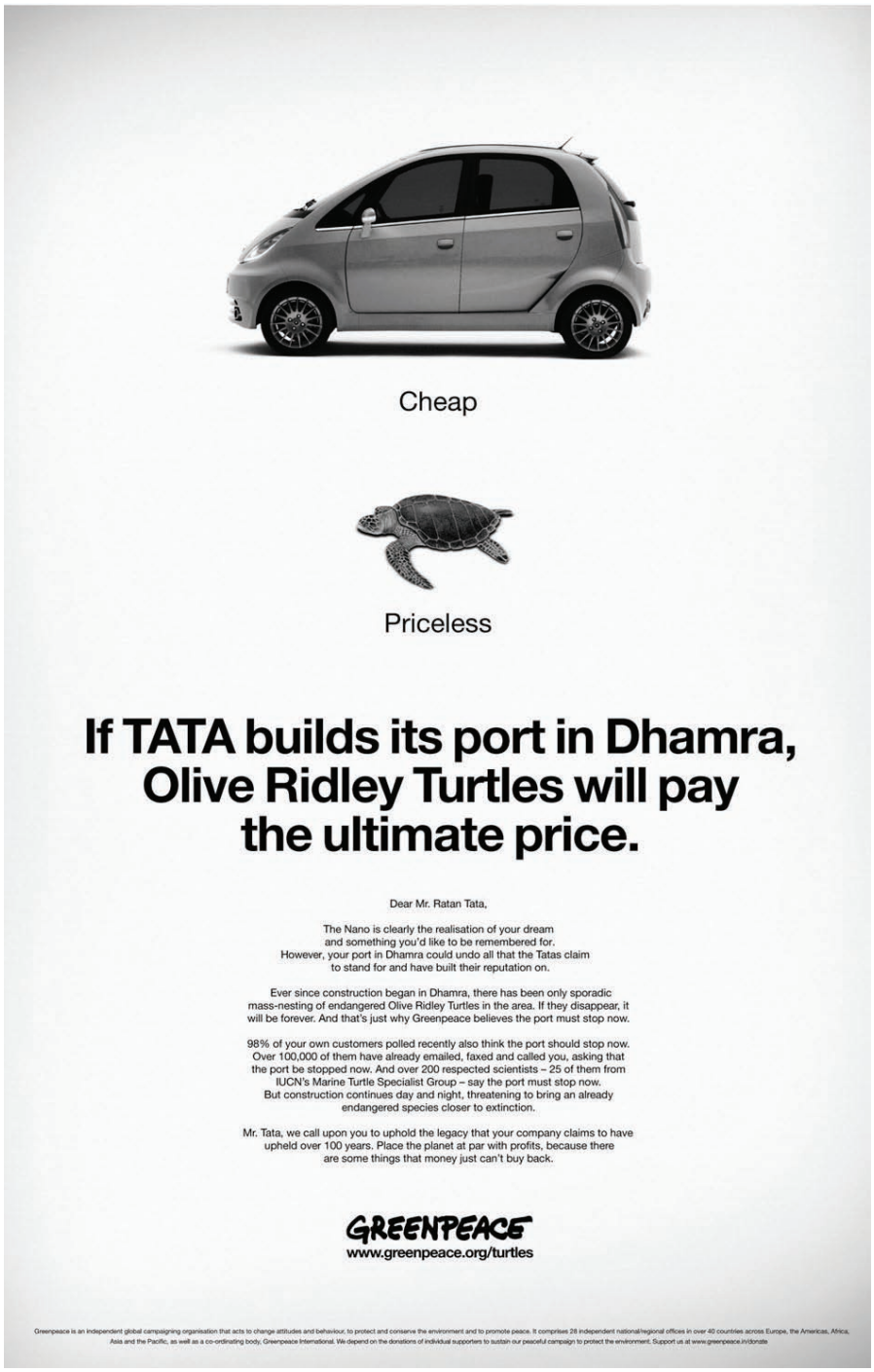
During this period, the Chief Wildlife Warden of Odisha confirmed that the site of the proposed port would not harm the turtles primarily due to its point to point distance of more than 15 kilometres from the nesting area.

Tata Steel enters

On the lookout for port sites on the east coast of India, Tata Steel became interested in the proposed development of Dhamra Port in the early 2000s. Before approaching L&T they found that the port had already received environmental clearance,

"…if there was anything to show that the turtles' well-being would be affected, we would either cancel the port or move its location."

B. Muthuraman
Vice Chairman, Tata Steel



Greenpeace ran this ad in the International Herald Tribune on 23 March 2009. The next day, a mass nesting of turtles was observed on Gahirmatha beach.

and in 2004 Tata Steel entered into a 50/50 partnership with L&T.

On learning about the situation with the Olive Ridley, however, Tata decided to do its due diligence, and approached the Bombay Natural History Society (BNHS)[13] to organize a meeting with concerned parties.

The NGOs in attendance recommended further studies and Tata supported them, stating that if there was anything to show that the turtles' well-being would be affected, they would either cancel the port or move its location. Tata did commission two studies from different NGOs, includ-

ing BNHS and WWF India, but unfortunately both withdrew from the work due to the highly controversial nature of the project among India's environmental community.

IUCN negotiations

In 2006 IUCN entered the scene when they were approached by Tata to provide environmental advice on the project.

The proposal offered opportunities and risks to IUCN. On the positive side, IUCN knew that it could rally the expertise within its ranks to provide scientifically based, unbiased data and felt confident that it could serve as a neutral negotiator.

On the risk side was political resistance from within IUCN's membership where development and conservation would be in perceived conflict. Moreover, other environmental organizations, some of them IUCN members themselves, had taken strong anti-port positions.

So, before full commitment, IUCN insisted on undertaking a scoping mission to find out the real story at Dhamra. Tata understood that IUCN would not partner in the project if it concluded that it could not be effective.

The company also agreed to comply with IUCN's scientific advice to mitigate port impacts on the Olive Ridley.

As required, IUCN's Business and Biodiversity Programme undertook a due diligence study on Tata Group. Once this was approved as per IUCN guidelines, the IUCN SSC and MTSG became involved.

Finally, the project was presented to the National Committee of IUCN India Members.[14] It was only following this official endorsement that IUCN became actively involved.

Exploration

At the time of IUCN's first involvement, initial exploration work had begun pending final decisions around whether the project should proceed. Land had been purchased and a small site office established. A bumpy access road over the levee had been laid down and contracts with major infrastructure firms had been signed and sealed.

In November 2006 a multidisciplinary IUCN delegation met with DPCL in India to acquaint themselves with the port site, investigate turtle protection problems, evaluate general environmental parameters and make an estimate of ways in which IUCN might help. This Scoping Mission set the scene for what was to be a five-year engagement with DPCL.

The port planned to dredge a 19-kilometre channel from a point northeast of the site where natural deep water ran closest to the shore. They planned to use most of the dredged material to landfill a tidal mud bank the size of some 200 football fields, creating the elevated port site, and disposing of the balance at a designated spot offshore. In all, they planned on dredging some 60 million cubic metres of sediment.

Phase I of the port design called for a dolphin-style jetty (on legs instead of land filled) running parallel to the shoreline. It would accommodate

"Dhamra Port was highly controversial in the India environmental community, and this debate was reflected within the BNHS membership. Because of this, BNHS simply could not proceed with the study at that time."

Homi Khusrokhan, President, BNHS

two large ships and be equipped with bulk cargo handling units to unload coal and to load iron ore. These materials would be laid out in long cargo handling areas using mechanical bucket loaders/unloaders and conveyor belt systems. Hundreds of such ports exist around the world.

The operational design called for an incoming vessel to unload its coal, which would then be stacked in a holding yard. A train loaded with iron would arrive from the opposite direction and wagon "tipplers" would spill iron onto a conveyor system and then move to a second stack yard. After cleaning, the same wagons would be filled with coal for the journey back to the interior and the iron ore would then be loaded onto vessels for the outbound trip. The port operations would be highly automated, requiring only a small staff contingent.

"IUCN would not engage in the project until we were convinced we could be effective, and if we did engage then the Tatas would have to comply with IUCN's scientific recommendations."

Aban Marker Kabraji
IUCN Asia Regional Director

IUCN recommendations

Having investigated the port site first-hand, the IUCN team knew there would be challenges, but also saw opportunities for demonstrating that industry and conservation can, if they are sufficiently committed, work together and meet the objectives of each side.

The team identified the two most important immediate threats to the turtles:

1. Dredging could impact turtles, as they could be sucked up by the dredger along the seabed; and
2. Lighting was also going to be a major problem both during and after construction. Adult turtles typically shy away from brightly lit areas but hatchlings are attracted to it, and might become distracted from their journey to the sea if the lighting was too bright.

There were also potential concerns related to spills, construction, dust, shipping, and the impacts on communities nearby.

IUCN proposed dealing with the two most pressing issues – dredging and lighting – first, and then to develop a world-class, stringent Environmental Management Plan (EMP) that could address all environmental threats and challenges.

The EMP was intended to go well beyond the existing EIA and the mitigating measures required by the government to raise the bar for environmental management. DPCL would end up with a comprehensive, best-practice EMP that addressed all environmental issues, potential impacts and mitigating measures. It would have a mechanism to address change over time and a document control system to secure records.

As work on dredging and lighting proceeded, IUCN established a panel of advisors and staff to help with technical issues, communications, and community and government relations. These activities would include education about turtles with a special emphasis on impacts from fisheries.

As construction neared completion and the port looked to commence operations, IUCN would help review the EMP according to scientific and conservation criteria, government requirements, and ordinances and laws. Looking further ahead, IUCN suggested that DPCL establish

a trust to address social and environmental issues well into the future.

Debate

IUCN's participation in the Dhamra Port project sparked heated conflict among environmentalists. The issues were many and complex. There were many criticisms and misunderstandings, including accusations from external bodies and from NGO members within IUCN, which clouded the discussion. There were also factual gaps and misinformation about the potential impact of port development.

There was significant internal debate among IUCN members and even within the organization's MTSG as to whether or not IUCN should be engaged in the project, and as to whether or not the port could be built without harming this important population of a vulnerable species.

The decision to engage

Most importantly, this was a project to save sea turtles. There was international evidence to show it was possible for ports and turtles to coexist, provided that standard operating procedures were followed. And by mobilizing its international network of experts, IUCN could bring much needed objective science and commitment to conservation to the table.

In many ways the project was a natural fit for IUCN. By partnering with a corporation (Tata/DPCL) it would be activating the strategy described by the organization's Business and Biodiversity Programme to influence and engage the business sectors that have a significant impact on natural resources and livelihoods including large 'footprint' industries such as mining, and oil and gas, and biodiversity-dependent industries including fishing.

IUCN is mandated by its Members to engage with the private sector. But as direct as the mandate is, it is porous enough for debate. In spite of the IUCN Council approved Business and Biodiversity Strategy mandating work with these "large footprint" industries, some IUCN Members still felt that industries – like mining – had such serious environmental consequences that IUCN should not engage with them. Some groups outside IUCN objected to the project loudly. Others emphasized taking a long-term view, arguing that compromises were worth it, considering the potential for influencing a large-scale development project and mitigating its impact on a valued species, not to mention setting an international example. The international science community by and large supported this position, concluding, on the basis of global best practices, that environmental damage could be adequately mitigated.

In the end, IUCN stood firm in its belief that it could act as a neutral and impartial partner in the project, using the best science to ensure that the best outcome was achieved for the turtles. IUCN also viewed the project as an important test case and learning opportunity around engaging with business in ways that provide the best results for nature and local communities.

"Many in the IUCN India National Committee felt that since the port was going to be built anyway it was important to provide scientific advice if possible. However several members did voice serious opposition to IUCN's engagement with the port at all."

Meena Gupta
IUCN Regional Councillor for South and East Asia, former Secretary Ministry of Environment and Forests, former Chair, IUCN India National Committee of Members

Implementation

Dredging mission. Left to right: Dena Dickerson, Erik Hawk, Nick Pilcher, Anjani Kant, Biren Bhuta © DPCL

"We have a golden opportunity to engage industry and help them get it right."

Nicolas Pilcher
Co-chair IUCN SSC Marine Turtle Specialist Group

Dredging

The dredging plan for Dhamra port called for using "trailing suction hopper dredgers". With their broad drag-head and powerful suction pumps they literally vacuum the bottom of the sea, dumping their "catch" in massive cargo holds. The challenge was manageable; experts agreed the channel area was an unlikely habitat for the turtles because the seabed, with its cloudy layer, was too soft, and they suggested sand borrow sites which were distant from the turtle assemblages should receive the bulk of attention. Despite this, there was still a possibility dredgers could entrain sea turtles along with sediment. No one was taking chances.

The IUCN team worked closely with the US Army Corps of Engineers[15], and with the DPCL team to come up with a turtle-friendly dredging system and develop regulatory measures to ensure effectiveness.

The IUCN team had spent a substantial amount of time with the dredging firm's engineers during its first visit to the site. They inspected the dredgers, observed operation cycles, and evaluated existing plans to install deflectors and inflow screens. They reviewed schedules, vessel design and specifications and locations of dump sites.

The IUCN team recommended immediate installation of deflectors to clear turtles from the path of the suctioning equipment. The deflector had a plough-like lead, similar to the

"cowcatchers" on old steam locomotives. Sleeping turtles would simply be shifted out of the path of the suctioning dredgers.

The first deflector design proved to be too cumbersome and would have weighed more than the drag-head arm could handle, so the IUCN team and the engineers devised a simpler deflector device, which could be built at sea at relatively low cost. The advantage to this design was that dredgers enroute to port could fabricate their own deflectors and have them installed by the time they arrived at port. Work could commence without delay.

They also recommended installation of inflow and outflow screens to monitor the process, along with the placement of on-ship observers to detect any turtles, which may accidentally be caught. IUCN established clear protocols for their independent observers including job requirements and terms of reference.

They provided decision-making tools, which established criteria for stop work orders if a dead turtle was observed in the in-flow screen. Observers had a hot line they could call should anything be found amiss.

The IUCN observers lived on the dredgers. They looked for turtles in the hoppers and in the inflow and outflow screens. They spray-painted the leading edges of the deflectors to make sure they were working properly. And the data they collected was passed to both the senior levels of DPCL and IUCN.

One slight unexpected cost of the intervention was stress on board the dredgers. Observers pressured already tight crew space. Dredging operators did not necessarily welcome the new environmental code or want to adhere to it.

Dredging plans often changed at a minute's notice depending on weather, vessel breakdowns and tidal fluctuations, making spot checks from IUCN staff an unwelcome burden.

The adoption of the deflectors did lead to extra claims by the dredging company for loss of productivity, but DPCL settled those claims rather than compromise on the extra measures.

But still, through 63 million cubic meters of seabed and nine different dredger vessels, it was clear that it is possible to deflect turtles away from dredging operations.

The dredger Antigoon with draghead on left © IUCN

The IUCN on-vessel observers © IUCN

Drag-head with triangular deflector (left underside of the drag-head) © IUCN

Lighting

Next was lighting. IUCN helped design the port's lighting plan and system with the engineers before they had drawn up their plans – saving money and retrofitting needs. The idea was precocious: How could one have a port meet industrial safety lighting standards and be a global example of light management? Globally, light pollution is rarely addressed, even though it affects a wide range of animals and insects.

Light gives predators an advantage, so many nocturnal mammals avoid open areas bathed in moonlight or man-made light; a caution that in turn compromises their own predatory activity. Artificial light can also disturb animals' biological clocks – an induced jet lag– keeping them awake until later in the day, when they again face higher rates of predation. Many insects attracted to man-made lights never make it beyond. They become fixated by the light, perishing as they strike the hot lamps. A slew of animals – birds, frogs and so on, quickly learn there is a ready meal beneath the lights. Other insects' movements are constrained by light, possibly decreasing important activities like pollinating food crops.

Of relevance to the Dhamra instance, scientific studies have shown that excess ambient light influences turtle hatchling orientation. If light spread from Dhamra port unchecked, hatchlings could possibly move towards it (inland) rather than to the sea. Adjustments to engineering 'business-as-usual' needed to be made.

Down-facing lights at the port reduce sky glow © Nicolas J. Pilcher

Lighting guidelines[16] were established for DPCL with the help of Phillips Lighting which contributed its expertise in developing and providing environmentally friendly fixtures to meet industrial needs. Working closely with DPCL and IUCN, Phillips delivered a range of down-facing fixtures and bulbs with wavelengths attuned to avoid the visual spectrum of the turtles; that is as much as possible they used wavelengths the turtles could not see. The fixture costs exceeded original budgets somewhat, but the eventual monthly savings in electricity costs were some 30% below what the engineers first projected. This was a massive savings for the port and a major advance in environmental sensitivity and protection. It was win-win: the port saved running costs, the turtles' biological sensitivities would not be disturbed, and global energy demand was even reduced a bit.

Community outreach

IUCN entered into the Dhamra port project because of concern about the port harming Olive Ridley turtles. As IUCN dug into the problems, however, it learned that the mortality rate of the turtles had already increased dramatically. A report[17] prepared by the Wildlife Institute of India indicated that turtle mortality had increased from a few thousand a year in the early 1980s to more than 10,000 by the mid 1990s.

During this period, fishers had shifted to mechanized trawl fishing. By then it had aleady been established that mechanized trawl fishing

The street theatre © IUCN

could be responsible for many of the mortalities along the coast, and while more studies were needed, many assumed that gill net fishing, which is also common along the coast, contributes to the problem.

It was clear that the local community was unaware of all the ways in which turtles were valuable. Changing their thinking meant convincing fishers that turtle protection was worth the trouble; enriching young peoples' appreciation of India's vast turtle mythology; and teaching them – the next generation of fishers – the scientific basics of the Olive Ridley and its value in the global environment, and to their own fisheries – their future.

The team created a blockbuster education and awareness program. The central intervention was street theatre, and travelling by motorbike, bicycles, and boat, they took the production to schools and village halls. They reached tens of thousands of school children of all ages and hundreds of families involved in the fishing industry, linking turtles to mythology, traditional customs and beliefs. The actors even became local stars.

In a more traditional outreach, community members were invited to ask questions of port people directly. IUCN advised DPCL to create a community training centre so local villagers could develop skills which would prepare them for jobs arising at the new facility. Computer literacy was on the list along with a number

The school programme © IUCN

"…it was important to convince them [the community] to understand the importance of turtles from an ecological, cultural and even religious point of view… and steer them towards the safeguarding of turtles."

Biren Bhuta
former IUCN DPCL Project Manager

of other skills. In addition, IUCN identified that the use of Turtle Excluder Devices (TEDs)[18] could be helpful in solving one of the biggest problems: reducing the accidental catch of turtles by local fishers in their nets.

A TED is a simple metal grid that fits into a trawl net allowing small fish to pass through and be caught while ejecting larger animals such as turtles and sharks back into the sea. They have been used successfully for years in the United States and other countries. The devices weren't new to fishers in the Dhamra area -- Indian NGOs and scientists had tested them with the fishers in the past – but they weren't being used.

The IUCN DPCL team consulted extensively with local fishing cooperative officers and communities to better understand the issues. A training workshop was organized and a number of practical trials of the TEDs for fishers in the area were facilitated.

Although the trials went well and many of the fishers agreed that the TEDs could potentially be effective in excluding turtles, there were still a number of objections to their use, both socio-economic and political in nature, and unfortunately these still continue to constrain the use of the devices. Changing the practices of local fishing communities remains a major priority, but will require long-term education programming combined with policy solutions.

The last human obstacle to be addressed in this public arena was governance. In the beginning, local authorities seemed more concerned about fishers' rights than turtle safety. However, as understanding spread, government agencies became partner advocates for the holistic, long-term solutions IUCN was promoting. There were alternative livelihood trainings to provide income generating options to the community besides fishing. Winrock International India was brought in to develop a study on the deployment of renewable energy technologies in communities around the port. The MS Swaminathan Research Foundation produced a study on mangrove regeneration nearby the port area.

These are small pieces of the ultimate solution, which would lie in addressing the entire social fabric. Still, the insights gained from these activities helped inform the Environmental Management Plan and the Turtle Trust, both described below, which are based on an awareness of

the complexity of the interaction between humans and the environment, so that these may be resolved to the benefit of both.

Environmental Management Plan

IUCN recognized during the very first scoping mission that there was a need to address the myriad threats a development such as a major port could have on the surrounding environment: What about extreme weather, acts of terrorism or a major accident? The port needed a mechanism to guide its precautionary approach to all matters environmental and to create preparedness plans. Instead of responding to crises when they happened, the port would always be better off addressing them before they materialized.

Rather than redoing the EIA, which might or might not address the above issues, IUCN recommended drafting and adopting a gold-standard Environmental Management Plan, one that would meet the requirements of India's Environment (Protection) Act of 1986[19] and go far beyond.

The EMP deals with the continued direct impacts of light and maintenance dredging on turtles, but is a much broader piece that addresses regulations, policy, planning, implementation, operations and management as well as quality assurance and monitoring. It details the procedures needed for change management, and the development of a corporate culture that prioritizes safety, environmental protection and the promotion of positive commu-

Port facilities © Nicolas J. Pilcher

Olive Ridley turtle hatchlings make their way to sea at Gahirmatha beach, Odisha India © IUCN

nity relations. Detailed protocols are outlined for monitoring and managing potential hazards including oil spills from a vessel or air pollution, or chemical contamination.

Finally the EMP deals with Cumulative Effects Management and describes how the port will consider the added effects of individual hazards. It also provides detailed protocols for the DPCL emergency response to address the whole range of potential accidents and natural disasters.

The EMP needed to be based on the best possible information, so DPCL supported the project outcome by providing details on operations, document flows, development plans, and client profiles.

IUCN brought in endangered species science and the precautionary principle[20] to the table. The EMP took shape and, following extensive discussions and revisions, was adopted by the port, and endorsed by IUCN.

The EMP draws on, and where needed, exceeds world standards. It is sufficiently detailed to address such issues as child labour, acts of terrorism and introduced species, and broad enough to consider the wide range of potential impacts the port could have on the surrounding environment and local communities.

As a 'world class' EMP, it raises the bar for port operations with respect to environmental protection in Odisha, and indeed throughout India.

Turtle Trust

The capstone of the whole engagement was the Turtle Trust. DPCL had always believed it had a long-term role to play in conservation of the turtle population and other biota.

The TEDs were good but DPCL believed there were a suite of opportunities for future conservation action waiting to be uncovered. They asked IUCN to help compile a status of knowledge and research on Odisha's turtles in order to prepare for further environmental efforts.

IUCN commissioned the Wildlife Institute of India to compile all past and ongoing studies on the Olive Ridley, collating all existing literature and identifying gaps in research. They produced a major document containing a wealth of information. Turtle mortality figures can be found here.

Studies indicated that sea turtles lived in discrete areas called reproductive patches off the coasts of Gahirmatha and Rushikulya; that the arribada (mass nesting) estimates were likely much lower than the annual figures reported by government agencies—some 50,000 turtles had been tagged by the Forest Department of Odisha, the Central Marine Fisheries Research Institute and Wildlife Institute of India; and that the Olive Ridley migrated between mass nesting beaches.

The study also identified substantial gaps in knowledge: there was much to be learned about beach erosion, accretion, predation, poaching, and the role of solitary nesting compared to arribadas. Practically nothing was known of the offshore environment: What drove turtles to congregate? What triggered nesting? Did turtles feed in the offshore areas? These unanswered questions were added to DPCL's environmental mapping of the area.

To fund ongoing research and intervention, IUCN proposed a Trust to support long-term conservation in the area. DPCL and IUCN have now initiated the process of establishing the "Dhamra Conservation Trust". Funded by DPCL and its promoters, the Trust will focus on turtle conservation along the coastline of Odisha with special emphasis on Gahirmatha Marine Sanctuary; improving the quality of life through alternative livelihoods; promoting opportunities for women; and empowering villagers.

The Trust will also support the protection of the Bhitarkanika National Park and it is planned to provide protection and health care facilities for the animals there.

For the Olive Ridley, the Trust envisions drawing on the services of a wide range of talent including India members of the MTSG, commissioning studies, implementing conservation action, and working together with local agencies towards turtle conservation.

The Trust also commits to raising awareness among the coastal villagers about the importance of turtles and the value of Turtle Excluder Devices and disseminating information on the conservation of turtles through educational and other institutions.

"These kinds of collaborations between the private sector and credible environmental organizations should increase. It was courageous of IUCN to collaborate, particularly in the face of different organizations voicing protest against the project. We felt IUCN to be an organization that combines scientific knowledge with practical solutions."

Santosh Mohapatra
CEO DPCL

Reflections

So what did we learn about collaborating with non-public sector actors?

The Team

Despite having the will from the partners, technical expertise, and all the other pieces of this complex puzzle in place, without having the right team it would not have worked.

This project worked because of the determination of a number of key people within IUCN, notably the leadership of the Asia Regional Office and the various technical experts and partner organizations they were able to mobilize to support the project.

It worked because the leadership of Tata Group and Tata Steel pushed from above, and because of a number of extraordinary people on the DPCL team who worked on a daily basis with IUCN to ensure recommendations were implemented on site. It also worked because of the specialist expertise and commitment brought by the leadership of IUCN's SSC Marine Turtle Specialist Group which did not waver in the face of the critics. This was a challenging project, and the group needed to work through complex issues together and to understand each other's perspectives. If it were not for the unique multi-sectoral and multi-disciplinary team that was assembled and the leadership involved, the project would not have come off as it did.

Recommendation: Build effective teams

Compatibility

The private sector is commonly described as being blind to environmental issues. The reality, however, is that across the planet, the private sector is heavily invested in biodiversity, from the smallest farmer to the largest mining company.

Today, there are a growing number of companies around the world that are highly sensitive to the importance of maintaining the resources they rely on. Those who can – foresters, farmers, etc. – are adding replenishment practices to their production cycles. Those who have been reckless with irreplaceable resources have learned from harsh experience that the company which ignores the environmental consequences of its activities is one which will suffer a high reputational cost. That is to say, it's cheaper to avoid environmental damage in the first place and, if it happens, to clean up completely and without excuses afterwards. Scientific expertise has been shown to be an extremely effective tool for guiding management in these operations.

Clearly, an environmental partnership will work better with a company that is sensitive to natural resources. A major reason for the success of the Dhamra Port project was Tata's culture of corporate responsibility. It was not just their commitment, but their experience. They encouraged thinking beyond immediate financial boundaries. They allowed for surprises and unplanned expenses. They were responsive to interest groups.

DPCL openly acknowledged IUCN's courage in collaborating on an infrastructure project, especially with internal and external resistance. They appreciated its scientific culture, its sensitivity to communities, and its willingness to search for practical solutions in ensuring the safety of the turtles. They also recognized the project would be a learning experience on all sides and that would imply unanticipated costs.

Recommendation: Choose partners thoughtfully

Timing

The IUCN team realized that the most efficient and effective method of influencing development is before it starts. This means seeking out companies with the heaviest environmental impact and working with them to embed environmental and social guidelines in the company business plan.

Obviously, this is an opportunity for companies to deepen their understanding of environmental issues and to develop the corporate habit of thinking beyond a narrow bottom line, as Tata has. Less obviously, it is an opportunity for environmental specialists to deepen their understanding of business and development dynamics and to acquire the habit of injecting bottom line analysis into their own evaluations.

At this time, however, as environmental specialists acquire knowledge of corporations, the surer

intervention is to partner at the beginning of a project, before contracts are drawn, supply lines established and infrastructure planned. This has the obvious advantage of helping the well-intentioned company avoid costly – if not prohibitive – changes down the line.

Recommendation: Start early

Resistance

The environmental and business communities have a long tradition of conflict. The environmental community, in its efforts to maintain the natural world, has often stood strongly against development. Many companies, with a central focus on profit, have garnered a reputation for refusing to recognize environmental hazards, or just giving them lip service. For sustainable development to be realized, these two disparate positions must be reconciled and this can only be achieved through better dialogue and understanding.

In the Dhamra case, the corporate leaders were genuine partners. Still the project did not escape resistance. For example, the dredging company, left on its own, had little incentive to change its equipment or work patterns. Change meant increased cost and decreased productivity.

IUCN took members of the dredging team to New Orleans to see the equipment at work. Once they saw it in action, they opened up to the idea. But getting it done took having the IUCN team on their boats, working together to come up with custom solutions that were acceptable to both sides.

Other kinds of resistance were more subtle. DPCL reported that some employees took proposed environmental changes too lightly. Here, DPCL leadership's willingness to ensure that staff and partners were motivated and compliant was critical.

In other instances, the problems were not psychological but financial. For example, there were significant costs associated with installing the turtle-friendly drag head, including equipment modification and scheduling delays. DPCL bore the costs of this. And fortunately, they recognized the non-financial value in bearing these costs.

One of the most challenging cases of resistance in the Dhamra case was with the fishing community. They needed to protect their livelihoods. But at the same time, their trawlers were pulling up turtles in big numbers. Direct interaction with the community allowed for deeper understanding of the issues and informed the content of public education programs. Not all the problems have been solved yet, but the discussion is moving in the right direction.

Recommendation: Engage on difference; learn from diversity

Communication

For IUCN to work effectively in this complex and controversial environment, it needed to rely on sound communication practices. Early on, it had to make its approach toward the project transparent and publicly available; it had to describe very clearly what it was doing and what it was not doing – and why. It did so responding personally to all queries from every quarter. It did so by developing fact sheets and a website on the project, and by engaging in public discussions and meetings. The website was updated on a regular basis with all status reports in order to keep this information in the public domain and ensure maximum transparency. A number of other efforts were made to ensure information was flowing freely between the key stakeholders. For example, in early 2009, IUCN held a Consultative Technical Workshop on Dhamra Port in Bhubaneswar, Odisha, followed by a trip to the port site. The interactive forum brought together a diverse mix of government representatives, the private sector, leading local and international scientists, technical experts, academics and local community representatives. Work with the press ensured that messages were disseminated at a national level.

These efforts encouraged participation and helped to dispel confusion about IUCN's role in the project.

Recommendation: Budget for communication; communicate fully

Connections

Dhamra Port helped establish trust between IUCN and the Tata Group, and this led to other forms of engagement. In 2007 Tata Steel entered into a joint venture to mine iron ore on Mount Nimba, West Africa's largest iron ore deposit. Spanning Guinea, Liberia and Ivory Coast and promising an estimated six billion

tonnes of high-grade iron ore, Mount Nimba is classified as a strict nature reserve because of its rich ecosystem of unique, endemic species of flora and fauna.

As might be expected, the mine project was criticized by environmental groups. In 2007, IUCN raised the issue with the Tatas, and they subsequently committed to respect all National Park protected area boundaries.

Similarly in East Africa, Tata Chemicals was pursuing a concession for mining sodium carbonate in Kenya and Tanzania on Lake Natron.

Lake Natron, which spans the two countries, is inscribed on the Ramsar List of Wetlands of International Importance[21] because it is the only regular breeding area in East Africa for 2.5 million lesser flamingos. Because of their dependence on this single breeding location, their survival is fragile.

At Tata Chemicals' request, the IUCN SSC reviewed the project and concluded the planned soda ash plant would seriously endanger the survival of the Flamingos. As this assessment was presented to them, Tata Chemicals withdrew from the project.

Recommendation: Build on trust

Governance

One of the key concerns about the port project was the impact of secondary development. Lighting from factories, hotels and other developments could be just as disturbing to turtles as port lighting. IUCN took the problem to representatives of Odisha state with the aim of promoting statewide lighting legislation.

While the government was open to the idea, there was no precedent for such a law in India and the means for implementing it were not clear. Should it be a bylaw, an amendment to the wildlife act or, perhaps, an amendment to the national building code? Further, who should take responsibility for the legislation: The Ministry of Environment and Forests, State Pollution Control Board or another body? These are common legislative hurdles which have not yet been resolved. However, with time and support from the Turtle Trust, legislation for Odisha is possible.

But can corporate responsibility for mitigating their environmental impact be standardized? Certainly, many companies say they would like to do the right thing, but in a competitive market, others will beat their prices because they are not required to assume environmental expenses. Laws can level the playing field and ensure that development is socially and environmentally sustainable. Organizations such as IUCN can contribute their global experience to support governments revising their legislation to ensure sustainability. Corporations like the Tata Group can lead the way.

Recommendation: Build bridges to governance early and widely

Accepting Risk

As the relationship between humans and nature becomes ever more sensitive and complex, environmentalists are becoming more aware of the necessity of working with the private sector. This means accepting the complexities involved and the creative challenges they imply, and it means taking risks. Environmental organizations can protect their talent, time and money by setting terms of engagement, ground rules, checks and balances, and causes for termination of a contract.

Recommendation: Assume risk responsibly

Lesser Flamingos © IUCN Geoffroy Mauvais

Conclusion

Cdr. A.K. Kar, DPCL and Col. Satapathy, DRDO on Gahirmatha beach, Odisha India © DPCL

With each passing milestone, it became apparent that the proposed port at Dhamra could indeed coexist with turtles.

Dredging went off without a hitch. Lighting was such that the port was hard to see at night. The management plan addressed a broad range of environmental issues, which would have otherwise been overlooked. And gradually the hostility that first surrounded the MTSG's involvement faded. DPCL was living up to its promises and turtles were nesting by the thousands.

Indeed several large arribadas estimated to comprise hundreds of thousands of turtles nested in the years when the port was supposedly causing their demise.

These are the legacies left behind by the IUCN-DPCL relationship: a major port built with little or no damage to the valued Olive Ridley turtles; a knowledgeable and caring workforce at the port site, backed by a committed DPCL management team; a world-class Environmental Management Plan for the port; draft lighting legislation for the State of Odisha; expanded knowledge and a Turtle Trust in the process of being set up to ensure the sustainability of DPCL's long-term commitment and help Indian scientists and NGOs move forward with conservation activities.

There is nothing here to suggest that the work is finished. Resolute ongoing commitment is needed on all sides – from governments, the private sector, the environmental community and local people – to ensure that life on earth is sustainable.

The Dhamra engagement between the conservation sector and industry was a trailblazer. It is widely scalable. It shows that industry and conservation can collaborate and solve together more than they could each solve independently. We hope this reporting of the story of the Dhamra Port will encourage others to follow the same path.

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Acronyms

BNHS	Bombay Natural History Society
DPCL	Dhamra Port Company Limited
IIT	Indian Institute of Technology
IUCN	International Union for Conservation of Nature
L&T	Larson and Toubro Limited
MTSG	Marine Turtle Specialist Group (IUCN SSC)
NOAA	National Oceanic and Atmospheric Administration, United States Department of Commerce
NOAA/NMFS	NOAA's National Marine Fisheries Service
SSC	Species Survival Commission (IUCN)
WWF	World Wide Fund for Nature, India
WII	Wildlife Institute of India

Notes

1 http://www.iitm.ac.in

2 The turtles' complex life cycle creates a suite of conservation challenges. They are evolutionarily suited to suffer high mortality rates in the early life stages, but the large juveniles and adults maintain substantially high reproductive capacity with each female laying about 100 eggs. Therefore the loss of a small proportion of eggs or hatchlings may be compensated by the sheer numbers of eggs laid. Hatchling orientation to the sea is guided by visual stimuli particularly the glow of light bouncing off water. Man-made ambient lighting may disorient turtles and cause high levels of mortality. If successful in their cross-sand journey, hatchlings collect in groups for two years or so. As adults, they migrate great distances between foraging and nesting habitats.

3 http://www.iucnredlist.org/details/11534/0

4 http://www.wii.gov.in/

5 http://cmsdata.iucn.org/downloads/olive_ridley_research_gap_wii.pdf

6 http://odisha.gov.in/portal/default.asp

7 In 2011, the Parliament of India amended the Constitution and passed a related bill for changing the name Orissa to Odisha.

8 http://www.tatasteelindia.com/corporate/vision-and-strategy.asp

9 http://www.tata.com/aboutus/sub_index.aspx?sectid=8hOk5Qq3EfQ=

10 http://www.iucn.org/about/work/programmes/species/who_we_are/about_the_species_survival_commission_/

11 http://www.iucn-mtsg.org/

12 http://orissa.gov.in/e-magazine/orissaannualreference/OR-Annual-2009/pdf/243-264.pdf

13 http://www.bnhs.org

14 http://www.iucn.org/about/union/secretariat/offices/asia/working_together/asia_members/members_list/india/

15 http://www.usace.army.mil/

16 IUCN recommended the use of low-pressure sodium vapor lamps or other light sources that exclude wavelengths less than 520 nm as these wavelengths are not visible to turtles. The recommended IUCN area lighting, for roadway, wharf, mast or elevated structure lights should use full 90° cutoff light fixtures. To minimize light spill to the sky, fixtures were to be installed at around 15° below the horizontal plane. All lighting should be of minimum lamp wattage, an alert to engineers who tend to err on the side of caution and provide more lighting than necessary. There should be no use of fluorescent, mercury vapor, metal halide, or other broad-spectrum high-intensity discharge lamps. There should be no flood lighting, up-lighting, or other forms of directional lighting aimed above the horizon.

17 http://cmsdata.iucn.org/downloads/olive_ridley_research_gap_wii.pdf

18 http://www.nmfs.noaa.gov/pr/species/turtles/teds.htm

19 http://envfor.nic.in/downloads/rules-and-regulations/eprotect_act_1986.pdf

20 The Precautionary Principle recognizes that delaying action until there is compelling evidence of harm will often mean that it is then too costly or impossible to avert the threat. Use of the principle promotes action to avert risks of serious or irreversible harm to the environment in such cases. The Principle is based on the recognition that a false prediction that a human activity will not result in significant environmental harm will typically be more harmful to society than a false prediction that it will result in significant environmental harm. The Principle therefore provides a fundamental policy basis to anticipate, avoid and mitigate threats to the environment.

21 http://www.ramsar.org/cda/en/ramsar-documents-list/main/ramsar/1-31-218_4000_0__

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