Rapporteur Report : Managing Protected Areas in the Face of Climate Change.
Lara Hansen and Jennifer Morgan, chairs
Vk

PART I : PANEL PRESENTATIONS

Jennifer Morgan, World Wildlife Fund Climate Change Program
Jennifer gave an overview of climate change effects in general, projections for the future, and some specific effects on protected areas.

Lara Hansen, World Wildlife Fund Climate Change Program
Lara gave an overview of WWF User's Manual on Resilience Building in Natural Systems. Themes from the manual are: resistance (ability to withstand change) and resilience (ability to recover from change); protecting adequate and appropriate space (consider what things will look like in a climate change future); limiting non-climate stresses (must have lower tolerance for these threats than we would without climate change); using active adaptive management strategies (experiment with appropriate strategies); reducing greenhouse gases (adaptation strategies are not a solution).

Lee Hannah, Center for Applied Biodiversity Science, Conservation International
Lee discussed bioclimatic modeling using specific examples from his work in South Africa indicating probable declines in species richness in lowland parks as species migrate poleward or upslope. In South Africa, poleward migration is limited by southern coast. Most species have some range overlap between current and projected 2050 range; these areas of overlap should be focal points for protection. Lower mountain areas tend to have more "stay at home" species. 20% of species have no range overlap, 6% have no range left. Montane areas are very important. We need to verify models, and monitor species likely to experience range shifts. Needed resources for adequate GCC response by PA's include staff, budget, collaborations, landscape-level planning, regional coordination, and a long time horizon.

An audience member stated that fire is essential to consider, but hard to deal with in a proactive manner.

An audience member asked if models looked only at climate, or if they included variables such as soils, water chemistry, etc. Lee replied that yes, some other variables are included.

An audience member asked if hands-on transplanting might work to save species. Lee replied that it may or may not be possible.

Jennifer Hoffman, University of Washington, USA
Managers are told to plan for climate change but not how, and this workshop is addressing the "how" question. She reviewed teperate marine ecosystems and the diverse array of habitats and ecosystem services included, as well as threats to temperate marine ecosystems (e.g. development, pollution, overharvest, pollution, invasive species). She

then reviewed possible physical effects of climate change: temperature increases and decreases; sea level rise, which can cause ecotype change; water current patterns (extremely important for reproductive dispersal); upwelling patterns. Biological effects include individual, population level, and community level effects. The latter may be important in determining species' ranges as climate change progresses.

Questions for planners and managers to consider:

1) What does climate change mean for your region?
2) What variables control community structure in your area? How vulnerable are they to climate change?
3) How will temperature, sea level and current patterns change in my MPA?
4) What will physical features of my MPA look like in 50 years? 100 years?

What can reserve managers do?

1) Identify physical and biological features increase ecosystem resistance and resilience
2) Experiment with ways to support these features

Suggested ways to begin include spatial considerations (create/protect temperature refugia, create/protect networks of reserves, design reserves based on features unlikely to change, include a diversity of habitats and biogeographic regions), sociopolitical considerations (involve stakeholders from the beginning—essential for adequate and flexible GCC response), and reducing nonclimate threats, which can make a huge difference in increasing ecosystem resistance and resilience. Particular concerns include reduced freshwater run-off (reduces climate refugia), overharvest (limiting gene pool), invasive species (competition), nutrient pollution (algal blooms).

Adaptive management is the best approach given the degree of uncertainty.

Conclusions: Local action in temperature marine systems may support increased resistance and resilience…but adaptation is not a solution

Dang van Tao, International Federation of Red Cross and Red Crescent Societies
Dang provide a case study on mangrove restoration projects in Vietnam. People there are generally more concerned about typhoons than temperature increases. Disaster mitigation is a tradition. Typhoons damage people, ecosystem. Replanting mangroves was motivated by a desire to protect dikes and people. Effectiveness of replantation programs has been demonstrated.

Dang used an integrated approach to restoration:

1. Human and material resources
2. Organization development
3. New ideas emerged by providing training, education, active participation. [examples of new ideas?]

Training was provided for adults, children, and teachers on disaster preparedness, using drama and singing competitions. Community involvement in mangrove planting and protection of mangroves was strong.

In addition to successfully protecting the dikes, mangrove restoration had unexpected benefits: more crabs and shrimp, mollusks, better fishing around mangroves, and duck and honey bee rearing in mangroves.

Households were paid for planting mangroves (USD 20/ha). Over130 technical training courses were provided for thousands of people in many walks of life. Mangrove restoration was coupled with building typhoon-resistant houses.

Lynn Rosentrater, World Wildlife Fund Arctic Program
Lynn reviewed characteristics of artic ecosytems, pointing out that while remote, they provide global ecosystem services (e.g. peat bogs as carbon sink; huge fishing industry).

Threats to artic ecosystems:

Local: resource exploitation (will be easier with climate change), shipping, overfishing (little biodiversity, lots of productivity)

Global: toxic pollution (atmospheric pollutants end up in Arctic), ozone depletion, global climate change. Arctic temperature increases are predicted to be double the global average.

Terrestrial impacts: probable 5C increase; thawing permafrost→release methane, CO2, big ecosystem changes. Tundra will decrease by as much as two-thirds its present size (grasslands will become shrubby, which is darker and increases heat absorbance→1-2C temp increase in July). Reindeer foraging will decreased (partly due to inability to dig through frozen water on surface)

Marine impacts: sea ice is a canary in the coal mine. Ice is getting thinner, and decreasing in extent. Sea ice loss hard for pinnipeds, and polar bears.

Artic endemics are very vulnerable, and preventing extinction may be impossible. GCC will probably increase arctic biodiversity, but at the expense of existing species.

Adaptations: limit other stresses; protect habitat. Lots of glaciers are protected, but they are changing; it may be more effective to focus elsewhere. Arctic temperature changes will be greater than the 2C threshold necessarily for adaptation to work.

Consideration for planning: protect keystone species, culturally significant species. Land-sea linkages are critical for species that need ice and land. Indigenous participation: intimate awareness of local ecology, manage land well (by and large), cultural survival depends on existence of certain species.

Sustainable development will be critical as developers move into arctic.

Recommendations:

Engage on climate policy: slow/stop climate change, find indicators of change
Ecosystem-based management

Martin Price, Chair, IUCN Mountains Initiative Task Force; Centre for Mountain Studies

Mountains and ranges are isolated from each other. They have lots of endemics and alpha diversity, since small plant size means good use of microhabitats. There is also lots of genetic diversity.

Existing stresses: agriculture, forest plantation (suggested as means of carbon sequestration!), pollution, freshwater abstraction, tourism and recreation, infrastructure development (roads to cell towers, e.g.).

Future mountain climates are hard to predict: models don't recognize topographic variation. The density of climate data in mountains is sparse, so model validation is hard.

Glacial disappearance is a canary in coal mine.

Alpine plants are moving upwards, and upslope migration of climatic belts is predicted. Some climatic belts will expand, others contract.

Adaptation challenges: migration limited, dispersal capacity low, key species may not make it, dramatic changes in season length, timing of snowmelt, hydrological changes; extreme events—extremes as well as averages matter.

Adaptation: maximize landscape diversity in PAs; foster conservation networks; use bioregional approaches; actively involve locals, users; promote sustainability because best hope is to reduce climate change.

Lara Hansen, World Wildlife Fund Climate Change Program

Lara provided a case study on looking for factors that confer resilience to bleaching events, including protection in MPAs, watershed condition, and local population variability. Her program implemented monitoring, and responded to/involved stakeholders.

Watershed variables assessed were nutrients and UV blocking compounds. They were measured at top and bottom of watershed. Coral variables: bleaching, MAAs.

A large bleaching even allowed assessment of variability in resistance and resilience, although the results are not ready yet.

Stakeholder meetings will be held in November 2003. Governor of PNG wanted lots of reefs protected. Lara and her group wanted to provide good info for helping to choose good sites.

Lara also mention the friends of reef project in Bali, which includes comanagement, resilience-building, and outreach, and looks at effect of MPA, tourism, development, destructive fishing.

Nigel Dudley, Equilibrium Consultants/World Wildlife Fund
Threats to forests: disturbance, simplification (lower biodiversity, age diversity), movement (latitude/altitude), age reduction, extinction.

Forest types particularly at risk: tropical cloud forests, mangroves, cloud forests, tundra (will be replaced by boreal forests), tropical dry forests (but unnatural fire regimes for thousands of years).

Adaptation strategies: assess current status, impacts of other threats; assess present and future stress and vulnerability due to climate change; canvass and assess adaptation options; identify and select adaptation strategies; implement actions and policies.

Increasing resilience: reduce present threats; avoid further fragmentation, increase connectivity; use landscape approach; provide buffer zones; represent forest types across gradients; protect natural forest stands. (summary: think big!)

Active resilience management: protect functional groups and refugia; maintain fire regimes; actively manage pests; maintain forest diversity via management; actively restore degraded sites; use assisted migration.

Nassim

Nassim described approaches to mitigating climate change effects in Bangladesh. He reviewed the dramatic flooding cycles characteristic of normal ecosystems there, and the importance of normal flooding to ecosystems and people. To allow farming and flooding to coexist, they've begun using floating gardens, so plants can grow even when fields are flooded.

Threats to Bangladeshi environments from GCC include: increased pressure on freshwater availability due to drought; drainage congestion due to increased sedimentation and water levels in the main drainage system; increased riverbank erosion due to high peak flows; increased flood levels; low dry-season flows may lead to salinization, desertification, lower water tables; increased temperature will deplete organic carbon from topsoils as well as stress to fish in brackish water.

Agriculture uses 86% of Bangladesh's fresh water, so attempts at water conservation must start there. One approach would be looking for drought- and salt-tolerant species.

Adaptation to GCC may be physical (dikes, levees, trees) or institutional (attitude and policy changes).

Anticipatory adaptive measures include mitigation of reduced freshwater availability and adaption to drainage congestion, increased morphological dynamics, and flooding.

Possibly useful projects include: climate-water dialog country case study; coastal greenbelt project; reducing vulnerability to GCC project; Coast Climate Change Adaptation Center.

PART II: DISCUSSION

Jennifer Morgan began the discussion by presenting aspects of the Durban Accord and Action Plan where input on climate change might be useful. Her key points were:

Managers need to get their minds around climate change; We need more science (predictions, socioeconomic scenarios); We need to engage stakeholders in both protected areas and an understanding of climate change.

Leonardo (last name unknown) felt it important to consider equity issues, namely that the North produces most greenhouse gases, but the South suffers equally. Developed nations are creating huge costs in terms of biodiversity, people, etc., and should help pay.

David Obura: We need to manage all ecosystems, not just protected areas, and think on a landscape scale. Best practices for climate change may be best practices regardless of climate change.

M. Green: Reiterated need for data on climate and economic scenarios. He suggested a need for independently facilitated discussions with stakeholders, to avoid the impression that climate scientists/policy types are running the whole show. He also felt that getting managers to engage stakeholders, creating stakeholder concern, was the best way to engage policy-makers.

Polish parks manager, name unknown: Many policy and decision-makers still don't believe global climate change is happening, partly because effects aren't visible in temperate regions. He also urged managers to keep some parts of their PA's as control areas, unmanaged, so we can see what changes occur in the absence of management.

German man, name unknown: The IUCN should create categories for species sensitivity to climate change, like the IUCN red list. **Lee Hannah** said they already have a task force doing this.

Jennifer Morgan suggested shifting to discussion of the Accord and Recommendations.

Martin Price said the general approach was too traditional and inward-looking. He wants more discussion of effects of climate change on ecosystem services, as in Nassim and Dang's talks. He felt that there should be mention of and coordination among many relevant conventions, not only the CCC.

Anita Bryer, German Ministry on the Environment (??): the text of the recommendations and accord is too modest. Climate change needs prominent placement;

there must be clear suggestions for response, including a statement that all nations MUST work to stop global climate change (GCC).

David Obura seconded Anita's statement, and expressed dismay that GCC wasn't a cross-cutting theme, and that there wasn't a workshop stream on GCC. He felt that talking about 'global change' was too vague, and that GCC deserves particular attention because it is changing the physical parameters of our world.

Alan Marks, New Zealand stated that GCC is beyond our ability to manage, so we MUST take it seriously and work to stop it.

M. Green agreed that we must work to stop GCC, but that we also need to respond to the degree of change that is now inevitable because of climate inertia. We need a mainstreamed GCC response across PA's.

Nigel Dudley pointed out that while 10 years ago GCC was mostly a theoretical concern, we can now SEE effects, and specific suggestions to include GCC into PA management are essential. He also pointed out the role that PA's play in mitigating effects of GCC. He suggested a task for on incorporating GCC into management effectiveness in the WCPA.

Martin Price stated that PA's and people can make a difference for GCC, and that PA's should use Best Practices to reduce their own greenhouse gas emissions.

Jennifer Morgan asked if we should include a statement about trying to stay below the critical 2C temperature increase threshold. **Lee Hannah** replied that global averages may not be the most relevant endpoint for ecosystems. Some ecosystems are in trouble even now, while others may be able to tolerate greater temperature increases. He suggested using most sensitive ecosystems (e.g. coral reefs) to set goals, and working backwards from there. **Jordan West, USEPA**, agreed, and pointed out that temperature extremes as well as averages matter.

David Ogami suggested creating a network of monitoring activities, with 3-4 replicates per site type.

Martin Price suggested a 10-year target of including climate sensitivity analyses and action plans in all parks management plans, stating that while more rapid action would be good, it's hard to get policy-makers to move fast. **Lee Hannah** agreed, but suggested a short-term goal of targeting 12 or so parks for detailed climate vulnerability analyses.

Williams from Australia (First name unknown) said fast response IS possible as evidenced by the incorporation of climate vulnerability analyses by the wet tropics management authority in Australia. You just have to push hard.

M. Green said GCC has been discussed by his park already as well, and that they are part of a commission study of 27 parks using regional climate models.

Nigel Dudley said regional climate models take time to create, and people need to think about how to respond to GCC *now*, with or without models.

Nassim said that there needs to be continuing education, not just a one-time educational event on GCC, since our understanding of effects and responses is changing so fast.

Jennifer Morgan asked how parks managers share information. **David Ogami** said it varies a lot, and **Martin Price** said there are numerous networks. **Jordan West** mentioned the IUCN's new PALNET program, designed to ease communication about Best Practices.

David Ogami reiterated the need to bring up GCC as an issue, and to communicate this need to plenary session leaders. Most people in the room agreed.