

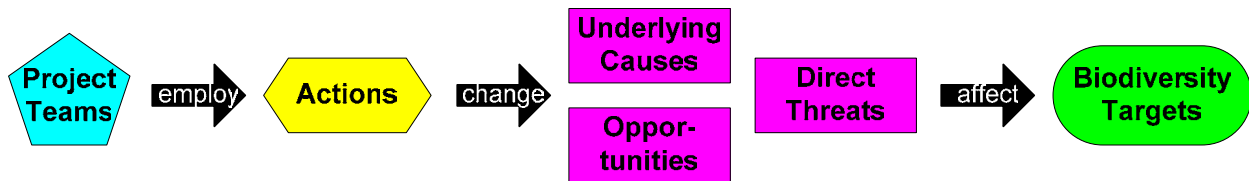
Conservation Measures Partnership Proposed Taxonomy of Direct Threats

Draft Version: 01 March 2005¹

This paper lays out some general issues and then proposes a draft taxonomy of conservation direct threats.

Q1: What do we mean by “direct threats”?

As shown in the following diagram, the work of conservation ultimately involves taking action to achieve certain desired outcomes among factors (direct threats, underlying causes, and opportunities) that affect biodiversity targets.



In this document, we are focusing on the *direct threats* (also known as *sources of stress* or *proximate pressures*) that immediately affect our conservation targets (for example, a forest might be affected by the direct threats of logging or hunting). We are not, however focusing on the *stresses* that a given threat puts on a target (e.g., soil compaction from logging skidders or reduced deer population size) or the *underlying causes* (also termed *root causes*) that lie behind these direct threats (e.g., logging policies or local people’s need for food).

Q2: What are we trying to do and why?

We are trying to develop a taxonomy of direct threats. There are three main reasons for developing such a taxonomy:

- To help practitioners figure out what threats occur at their site. A project team can scan this taxonomy and see if they recognize any threats that they may be overlooking in their analysis of the conditions at their site.
- To facilitate cross-project learning and the development of a science of conservation. A common taxonomy of conservation direct threats enables practitioners to search a database of conservation projects and find projects facing similar threats and (hopefully) to learn how these projects have dealt with these threats.
- To create general summaries or “roll-ups” for broader organizational purposes and/or use by senior managers, fundraisers, and external affairs staff. Summaries can tally the frequency of threats across projects at various organizational scales or be combined with other information for more detailed summaries.

Q3: How will we know if we succeeded?

A good taxonomy will meet the following criteria:

- **Simple** – Clear language, understandable to all practitioners.

¹ Please send comments to Dan Salzer (DSalzer@TNC.org) or Nick Salafsky (Nick@FOOnline.org). We hope to soon launch a website where people can comment on this overall document as well as specific categories and classes as a means of refining and improving this taxonomy over time. Check www.ConservationMeasures.org for details.

- **Hierarchical** – Creates a logical way of grouping threats that are related to one another.
- **Comprehensive** – Covers all possible direct threats (at least at higher levels of the hierarchy).
- **Consistent** – All entries at a given level of the taxonomy are of the same type; the hierarchy does not “mix apples and oranges.”
- **Expandable** – Is designed so as to enable new threats to be added to the taxonomy as they are discovered.
- **Exclusive** – Any given direct threat can only be placed in one cell within the hierarchy.
- **Scalable** – The same names can be used for direct threats at one site and across a continent.

As we developed the taxonomy found at the end of this document, we found that we were able to satisfy most of these criteria.

Q4: Is this the only taxonomy of its kind?

The taxonomy in this document has been adapted from previous work including:

- Salafsky, N., R. Margoluis, K.H. Redford, and J.G. Robinson. 2002. Improving the practice of conservation: A conceptual framework and research agenda for conservation science. *Conservation Biology* **16**: 1469-1479.
- Salafsky, N., D. Salzer, J. Ervin, T. Boucher, and W. Ostlie. 2003. *Conventions for Defining, Naming, Measuring, Combining, and Mapping Threats in Conservation: An Initial Proposal for a Standard System*. Draft Working Paper.

Other organizations have also attempted to develop taxonomies of threats, most notably IUCN which has developed a “threats authority file” which is a standard list of threats to endangered species (available at: <http://iucn.org/webfiles/doc/SSC/RedList/AuthorityF/threats.rtf>)

Also, Rob Sutter in TNC’s SE Regional office has applied a comprehensive threats analysis throughout the SE U.S. for helping to sequencing places for conservation action (see: http://www.conserveonline.org/2004/02/p/Sequencing_Talk_-_ACR_February_04).

It is our belief that the taxonomy presented in this paper does a better job of meeting the criteria stated in the above section than these other taxonomies and thus will be more useful to conservation practitioners. However, conservation practitioners themselves will be the ultimate judges of which taxonomy to use.

Conservation Measures Partnership

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This taxonomy is meant to be comprehensive in terms of the numbered categories and lettered classes. It only provides some examples of specific threat type in each class in *italic text*.

1) **Habitat Conversion & Degradation** – Complete loss of or damage to natural habitats.

- a) **Housing & Urban Development** – Expansion of human cities, towns, and settlements including non-housing development typically integrated with housing (*urban areas, suburbs, villages, ranchettes, vacation homes, shopping areas, offices, schools, hospitals*)
- b) **Commercial & Industrial Development** – Factories and other commercial centers (*factories, stand-alone shopping centers, office parks, train yards, docks, ship yards, airports, landfills*)
- c) **Farms & Plantations** – Agricultural operations (*commercial farms, household swidden plots, industrial plantations, feed lots, aquaculture*)
- d) **Recreation Areas** – Recreation sites with a substantial footprint (*ski areas, golf courses, resorts, cricket fields, county parks, afghan goat polo fields*)
- e) **Military Activities** – Actions by formal or paramilitary forces (*military bases, defoliation, munitions testing*)
- f) **Natural System Modifications** – Actions that convert or degrade habitat in service of “managing” natural systems to improve human welfare (*flooding from dam construction, land reclamation projects, wetland filling for mosquito control, rip-rap along shoreline, levees and dikes*)
- g) **Altered Fire Regime** – Suppression or increase in fire frequency and/or intensity outside of its natural range of variation (*fire suppression, inappropriate fire management, escaped agricultural fires, arson, discarded cigarettes, campfires, fires for hunting*)
- h) **Altered Hydrologic Regime** – Changing water flow patterns outside their natural range of variation (*surface water diversion, groundwater pumping, dam operations, desalination of seawater*)

2) **Transportation Infrastructure** – Long narrow corridors and the vehicles that use them that potentially alter, fragment, and disturb natural habitat and species.

- a) **Roads** – Surface transport on roadways (*highways, primary roads, secondary roads, primitive roads, logging roads, trails, roadkill*)
- b) **Railroads** – Surface transport on dedicated tracks (*freight/passenger lines, mining lines*)
- c) **Utility Lines** – Transport of energy & resources (*electrical and phone wires, aqueducts, oil & gas pipelines*)
- d) **Shipping Lanes** – Transport on and in freshwater and ocean waterways (*dredging, canals, shipping lanes, ships running into whales, anchor damage*)
- e) **Flight Paths** – Air and space transport (*flight paths, jets impacting birds*)

3) Energy & Mining – Production of non-biological resources.

- a) **Oil & Gas Drilling** – Exploring, developing, and producing petroleum and other liquid hydrocarbons (*oil wells, gas wells*)
- b) **Mining** – Exploring, developing, and producing minerals (*coal strip mines, alluvial gold panning, diamond mines, rock quarries, sand and salt mines, coral, deep sea nodules*)
- c) **Renewable Energy** – Exploring, developing, and producing renewable energy (*geothermal, solar farms, wind farms, tidal farms*)

4) Biological Resource Harvesting – Consumptive use of biological resources.²

- a) **Hunting, Trapping & Fishing** – Harvesting wild animals for commercial, recreation, subsistence, research, or management purposes (*commercial hunting, trophy hunting, trawling, blast fishing, spear fishing, shellfish harvesting, fur trapping, whaling, butterfly collecting, predator “control”*)
- b) **Gathering** – Harvesting plants, fungi, and other non-timber/non-animal products for commercial, recreation, or subsistence purposes (*wild honey & beeswax, seaweed, forage for stall fed animals, fuelwood collection*)
- c) **Logging** – Harvesting timber (*clear cutting, selective commercial logging, high grading*)
- d) **Grazing & Ranching** – Using natural habitats to support domestic or semi-domesticated animals that are allowed to roam in the wild (*livestock, hatchery salmon*)

5) Recreation & Research – Non-consumptive uses of biological resources.

- a) **Motor-Powered Recreation** – Vehicles and boats traveling outside of established transport corridors (*off-road vehicles, ATVs, motorboats, motorcycles, jet-skis, snowmobiles, ultralight planes, dive boats*)
- b) **Human-Powered Recreation** – People spending time in nature (*mountain bikes, hikers, cross-country skiers, hanggliders, birdwatchers, scuba divers*)
- c) **Scientific Research** – Ecological and other forms of research (*ecosystem manipulations, primate studies*)

6) Pollution – Introduction of exotic materials from point and non-point sources.

- a) **Chemicals & Toxins** – Industrial chemicals and toxins in the air, land, and water (*mercury from goldmines, heavy metals, PCBs, acid rain, smog, ozone depleters, oil from cars, chemical dumping, oil spills, agricultural pesticides, lead bullets, endocrine disrupters, caffeine in sewage*)
- b) **Nutrient Loads** – Excess nutrients (*nitrogen from farms or municipal sewage phosphates from detergents*)
- c) **Solid Waste** – Garbage and other materials (*garbage, litter, flotsam & jetsam*)
- d) **Waste & Residual Materials** – Large-scale byproducts of industrial activities (*dredge spoil, water treatment residuals, logging slash, mine tailings*)
- e) **Greenhouse Gasses** – Gasses that alter atmospheric composition (*CO₂, methane*)
- f) **Radioactive Materials** – Radioactive materials (*bomb test fallout, nuclear power waste, medical waste*)
- g) **Salt** – Excess salt (*snow removal chemicals, residue from irrigation, replacement of freshwater with seawater*)
- h) **Sonic Pollution** – Excess noise (*noise from highways, airplanes, sonar*)
- i) **Thermal Pollution** – Excess heat (*heat from power plants*)
- j) **Light Pollution** – Artificial light that disturbs animals and disrupts migration patterns (*urban areas, lamps attracting insects*)

7) Invasive Species, Pests & Pathogens – Introduction and spread of problematic exotic and native species.³

² Threats in this category include both the impacts on target species (harvest of desired trees or fish species) as well as "collateral damage" (trees damaged by felling or bycatch).

³ Note that this category includes both exotic species and problematic native ones, for example too many deer in Eastern Forests of the United States.

- a) **Invasive Plants** – Plants (*trees, shrubs, herbs, vines, algae*)
- b) **Invasive Animals** – Animals (*mammals, birds, herps, fish, invertebrates*)
- c) **Pathogens** – Disease causing agents (*parasites, fungi, bacteria, viruses, prions*)
- d) **Introduced Genetic Material** – Human-altered or created organisms and genes (*pesticide resistant crops, genetically modified insects, species hybridization*)

8) Climate Change – Long-term changes linked to global warming and other climate issues.

- a) **Habitat Shifting & Alteration** – Major changes in habitat composition and location (*sea-level rise, desertification, tundra thawing, coral bleaching*)
- b) **Climate Variability** – Intensification and/or alteration of normal weather patterns (*droughts, hurricanes/cyclones/typhoons, monsoons*)