

# Crisis of Global Biodiversity and Complexity Green Criminology

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## 1 Introduction

Global Biodiversity Outlook 3 (2010), produced by the Convention on Biological Diversity, made a new assessment of the current state of biodiversity and the implications of its continued loss for human well-being as follows. "Natural systems that support economies, lives and livelihoods across the planet are at risk of rapid degradation and the collapse, unless there is swift, radical and creative action to conserve and sustainably use the variety of life on Earth." It warns that massive further loss of biodiversity is becoming increasingly likely, and a severe reduction of many essential services to human societies as several 'tipping points' are approached. Many economies, however, remain blind to the huge value of the diversity of animals, plants and other life-forms and their role in healthy and functioning ecosystems from forests and freshwaters to soils, oceans and even the atmosphere, observes Dr. Steiner. (Secretariat of the Convention on Biological Diversity 2010)

Now we need a new vision for biological diversity for a healthy planet and a sustainable future for humankind. In this paper, from the perspective of complexity green criminology, the underlying causes or indirect drivers of biodiversity loss, such as land-based pollutions, destructive fishing practices, patterns of consumptions, harmful subsidies etc., are addressed, and urgent and effective actions to reduce the multiple pressures being imposed on biodiversity are suggested.

## 2 What does biodiversity mean for us ?

### 2.1 Ecosystem services and biodiversity loss

Nellmann and Corcoran mention that biodiversity and ecosystems deliver crucial services to humankind - from food security to keeping our waters clean, buffering against extreme weather, providing medicines to recreation and adding to the foundation of human culture. Together these services have been estimated to be worth over 21-72 trillion USD every year - comparable to the World Gross National Income of 58 trillion USD in

2008 (Nellemann et al., p.6).

They continue that human society is however living well beyond the carrying capacity of the planet and currently over 60% of ecosystem services and their biodiversity are degrading, compromising sustainability, well being, health and security. Environmental degradation is augmenting the impact of natural disasters such as floods, droughts and flash floods affecting 270 million people annually and killing some 124,000 people worldwide every year, 85% in Asia, and is, in some cases, even a primary cause of disasters. Degrading and polluted ecosystems are also a chief component in over 900 million lacking access to safe water. Poor management of activities on land and sea is further exacerbated by changing climatic conditions. In some scenarios loss of ecosystem services are depicted to result in up to 25% loss in the world's food production by 2050 along with hunger and spread of poverty in many regions (Nellemann et al., p.6).

## 2.2 Ecosystem services

They introduce that ecosystems and our natural environment constitute the platform upon which our entire existence is based. The services on which we depend include not only the air that we breathe and the joy of wildlife, but form the very basis of our food production, freshwater supply, natural filtering of pollution, buffers against pests and diseases and buffers against-disasters such as floods, hurricanes and tsunamis. The Millennium Assessment 2005 described four categories of services, provisioning, regulating, supporting and cultural (Nellemann et al., p.11).

They continue that an ecosystem is the dynamic complex of plant, animal and micro-organism communities and the nonliving environment interacting as a functional unit.

It assumes that people are an integral part of ecosystems. Ecosystem Services are the benefits that people obtain from ecosystems. They can be described as provisioning services (e.g. food, water, timber); regulating services (e.g. regulation of climate, floods, disease, waste and water quality); cultural services (e.g. recreational, aesthetic and spiritual) and supporting services (e.g. soil formation, photosynthesis and nutrient cycling) (Nellemann et al., p.11).

They explain that ecosystems ensure pollination, so crucial for agricultural production, estimated at 153 billion USD in 2005 and it includes supply of water not only for irrigation and household use, but also for cooling in industrial processes, dilution of toxic substances and a transportation route. It is also critical to health, not only through water supply and quality and through natural filtering of wastewater. 80 % of people in developing countries rely on traditional plant-based medicines for basic healthcare and three-quarters of the world's top-selling prescription drugs include ingredients derived from plant extracts", providing a string of services from rich to poor alike, but with particular value to the impoverished (Nellemann et al., p.11).

They continue that pest control is another key ecosystem service underpinned by biodiversity; it seems to be greatly determined by the abundance of natural enemies present to counter the pest species involved, such as in coffee production. Although biological systems are complex, improved pest control is often founded on a diversity of natural predators, and non-crop habitats are fundamental for the survival and presence of these biological control agents (predators, parasitoids). Landscape diversity or complexity, and proximity to semi-natural habitats tends to

produce a greater abundance and species richness of natural enemies (Nellemann et al., p.11).

They mention that global change will alter the supply of ecosystem services that are vital for human well-being. Without functioning natural ecosystems, water supply for the world's food production would collapse, not only causing economic collapse and crisis in the entire financial system, it would also endanger health and lives of billions, and, hence, ultimately our survival. The economic value of these ecosystem services were estimated at 16-54 trillion USD annually already in 1997 or corresponding to ca. 21-72 trillion USD in 2008 compared to an estimated World Gross National Income in 2008 of 58 trillion USD. (Nellemann et al., pp.11-12).

In addition, they say that, at the same time, almost one third of the world's ecosystems has been transformed or destroyed, and another third heavily fragmented and disturbed, and the last third already suffering from invasive species and pollution. Over 60% of the ecosystem services are considered degraded. The big five human threats to the environment in the form of 1) habitat loss and fragmentation; 2) unsustainable harvest; 3) pollution; 4) climate change; and 5) introduction of exotic invasive species, are combined or individually rapidly not only destroying and degrading our ecosystems, they are also depleting and ruining the very services from them upon which we base our health and prosperity (Nellemann et al., p.12).

### 2.3 Global land-use change and biodiversity loss

They mention that modern agricultural methods and technologies brought spectacular increases in food production, but are also a primary cause of habitat loss and ecosystem

destruction. Clearance for cropland or permanent pasture has already reduced the extent of natural habitats on agriculturally usable land by more than 50%, and much of the rest has been altered by temporary grazing. Habitat modification already affects more than 80% of globally threatened mammals, birds and plants, with implications for ecosystem services and human well-being. Of the world's land, coastal and ocean area, only 13%, 6% and less than 1%, respectively, are within protected areas (Nellemann et al., p.17).

## 3 Environmental crime

### 3.1 Environmental crime matters

Banks et al. insists that the indicators of environmental crime are evident in many areas of international development activities. Significant global threats, including the challenges addressed through the Millennium Development Goals (MDGs) are connected to, and exacerbated by, environmental crime, "affecting development, peace, security and human rights". These issues, some of which have been on the table for many years, are slowly starting to be addressed and only now are enforcement agencies worldwide beginning to recognize the role of organized criminal networks in environmental crime. Increasingly, illegal logging and wildlife trafficking are driven by organized groups who exploit natural resources and destroy habitats: robbing communities of their livelihoods, compromising the wider economy and further endangering threatened species and ecosystems (Banks et al., p.2).

### 3.2 Global impact of environmental crime

They continue that, as we destroy the Earth's protection from the sun through the

illegal use of ozone-depleting substances, more damaging ultra violet light hits the Earth's surface, increasing the risk of skin disease and decreasing plant productivity. Natural disasters are occurring with increasing frequency, and with growing populations the impact and consequences are greater than ever before. The impact of such disasters would be less severe were it not for the felling of forests resulting in flooding and landslides; and the removal of mangroves for development means there is no longer any natural protection for coastal areas against erosion or storms. Global warming also leads to increased sea levels and associated flooding. Increasing demands for threatened flora and fauna can lead to the extinction of species, and destruction of habitat results in some species disappearing before they have even been discovered. Furthermore, environmental crime in the forestry sector has been identified as a major contributor to climate change, perhaps the world's most pressing security and economic challenge (Banks et al., p.3).

### 3.3 Millennium development goals --- fighting transnational crime

They say that, if the international community is to eradicate extreme poverty and hunger (Goal 1), 'then immediate consideration must be given to the long-term effects of deforestation, unsustainable poaching and climate change upon communities and livelihoods through loss of habitat for dwelling, livestock farming and agriculture, not to mention the increasing likelihood of natural disasters. The effects of loss of biodiversity from environmental crime can not be overstated. The global impact of direct killing for trade of often endangered species, or indirectly through loss of habitat ? has a knock-on effect through species extinction,

increased conflict between communities and wildlife, and loss of potential for communities to benefit from wildlife from areas such as tourism.

## 3.4 Case studies

### 3.4.1 Illegal logging

They mention that serious organized crime in the forestry and timber industries is one of the most pressing environmental issues facing the global community. Driven by the low risks and high profits of a largely unregulated international market for cheap timber and wood products, illegal logging is threatening precious forests from the Amazon, through West and Central Africa, to East Asia. Illegal logging has dire consequences stretching far beyond the locus delicti of the crime. It threatens biodiversity, contributes to environmental catastrophes like flooding and forest fires, and is directly-linked to climate change as around one fifth of global greenhouse gas emissions are linked to forest loss. It also impoverishes forest-dependent communities ? it is estimated that illegal logging costs developing countries up to \$15 billion a year in lost revenue and taxes (Banks et al., p.6).

### 3.4.2 Wildlife crime

They say that it is seven years since the United Nations General Assembly declared the illicit trade in flora and fauna a form of serious transnational organized crime. Yet many countries affected by wildlife crime have been slow to invest in an appropriate enforcement response to identify and apprehend the key individuals who control the trade. Typically, wildlife crime is seen as a low priority for the professional enforcement community. However, the high profit - low risk (of being detected, apprehended and convicted), nature

of wildlife crime makes it attractive and the proceeds of wildlife crime may even be used to finance other forms of serious crime. This alone should stimulate agencies that are concerned with socio-economic stability, security, law and order to be more engaged in stopping wildlife crime. Aside from the loss of the endangered species that are targeted for their body parts, the communities that live around them are also robbed of a potential source of income through wildlife tourism. Wildlife crime therefore undermines global efforts to alleviate poverty and achieve the Millennium Development Goals (Banks et al., p.10).

#### 3.4.3 Smuggling ozone-depleting chemicals

In addition they mention that all life on Earth is dependent upon the ozone layer, a thin layer of gas in the upper atmosphere, which shields the Earth's surface from harmful solar ultraviolet radiation (UV). Severe depletion of the ozone layer is due to human activity introducing artificially high quantities of chlorine, bromine and other ozone depleting substances (ODS) into the stratosphere, where these chemicals destroy ozone molecules. Widely used chemical compounds are to blame? especially chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) used as refrigerants and halons used as fire suppressants. Increased exposure to UV directly impacts human health. Effects include suppression of the immune system, photo-aging of the skin, cataracts and skin cancer. Every year there are between two and three million new cases of non-melanoma skin cancers globally, with an estimated 66,000 annual deaths from various types of skin cancer. Children are most at risk from the damaging effects of UV radiation. It is not just humans that suffer the damaging effects of

UV radiation: plants and ecosystems are also at risk. Research shows that UV-B impairs the reproductive capacity and early developmental stages of aquatic organisms.<sup>28</sup> Increased exposure to UV light in terrestrial plants results in a reduction in height, decreased shoot mass, and a reduction in foliage area (Banks et al., pp.14-15).

#### 3.4.4 Illicit trade in ivory

They add that illicit trade in ivory constitutes a form of serious trans-national organized crime (TOC) and the infamous 'Singapore Seizure' continue to illustrate the many challenges facing law enforcement agencies in tackling such networks. The international trade in elephant ivory has been banned since 1989. However, in June 2002, 532 elephant tusks and over 40,000 traditional Japanese name seals, weighing in at over 6.2 tonnes, were seized from a ship arriving in Singapore from South Africa en route to Japan (Banks et al., p.18).

They continued that poaching of elephants is driven largely by market demand in Asia and Africa, although the United States and Europe also have illegal markets for ivory. This trade can be extremely lucrative: a kilo of ivory bought for US \$15 in Africa can fetch over US \$850 in wealthy markets like Japan. With growing demand for ivory, the last six years has seen an increasing trend in the number of large seizures of illegal ivory making its way on to market places in the Far East, predominantly China: three tonnes seized in Shanghai, China in August 2003; six tonnes seized in the Philippines in 2005; almost 4 tonnes seized in Hong Kong in May 2006; over five tonnes seized in Taiwan in July 2006; 223 tusks seized in Dar es Salaam, Tanzania, in 2007 (Banks et al., p.19).

They mention that the seventh UN

Millennium Development Goal (MDG) links environmental sustainability with sustainable development and poverty reduction.<sup>37</sup> The illegal ivory trade undermines this goal by fuelling elephant poaching in developing countries, amounting to the theft of natural resources worth millions of dollars by international criminal gangs. Much of the ivory procured by the Singapore syndicate was sourced from Zambia's South Luangwa National Park (SLNP). Besides damaging the ecological biodiversity of the park, poaching on such a scale poses a threat to Zambia's budding tourism industry. As in many developing African countries, wildlife tourism in Zambia makes a crucial contribution to national GDP (Banks et al., p.19).

## 4 Current status and trends of biodiversity

### 4.1 Species populations and extinction risks

According to GB03, the population of wild vertebrate species fell by an average of nearly one-third (31%) globally between 1970 and 2006, with the decline especially severe in the tropics (59%) and in freshwater ecosystems (41%) (Secretariat of the Convention on Biological Diversity 2010, p.24).

It continues that species in all groups with known trends are, on average, being driven closer to extinction, with amphibians facing the greatest risk and warm water reef-building corals showing the most rapid deterioration in status. Among selected vertebrate, invertebrate and plant groups, between 12% and 55% of species are currently threatened with extinction. Species of birds and mammals used for food and medicine are on average facing a greater extinction risk than those not used for such purposes. Preliminary assessments suggest that 23% of plant species are threatened (Secretariat of the Convention

on Biological Diversity 2010, p.26).

### 4.2 Terrestrial ecosystems

It says that tropical forests continue to be lost at a rapid rate, although deforestation has recently slowed in some countries. Net loss of forests has slowed substantially in the past decade, largely due to forest expansion in temperate regions. Savannas and grasslands, while less well documented, have also suffered severe declines. Abandonment of traditional agricultural practices may cause loss of cultural landscapes and associated biodiversity. Terrestrial habitats have become highly fragmented, threatening the viability of species and their ability to adapt to climate change. One-quarter of the world's land is becoming degraded. Despite more than 12 per cent of land now being covered by protected areas, nearly half (44%) of terrestrial ecoregions fall below 10 per cent protection, and many of the most critical sites for biodiversity lie outside protected areas. Of those protected areas where effectiveness of management has been assessed, 13% were judged to be clearly inadequate, while more than one fifth demonstrated sound management, and the remainder were classed as "basic". Indigenous and local communities play a significant role in conserving very substantial areas of high biodiversity and cultural value (Secretariat of the Convention on Biological Diversity 2010, pp.32-40).

### 4.3 Inland water ecosystems

It mentions that inland water ecosystems have been dramatically altered in recent decades. Wetlands throughout the world have been and continue to be lost at a rapid rate. Water quality shows variable trends, with improvements in some regions and river basins being offset by serious pollution

in many densely-populated areas. Of 292 large river systems, two-thirds have become moderately or highly fragmented by dams and reservoirs. Inland water ecosystems are often poorly served by the terrestrial protected areas network, which rarely takes account of upstream and downstream impacts. Governments are reporting increased concern about the ecological condition of wetland sites of international importance (Ramsar sites) (Secretariat of the Convention on Biological Diversity 2010, pp.41-43).

#### 4.4 Marine and coastal ecosystems

It continues that coastal habitats such as mangroves, seagrass beds, salt marshes and shellfish reefs continue to decline in extent, threatening highly valuable ecosystem services including the removal of significant quantities of carbon dioxide from the atmosphere; but there has been some slowing in the rate of loss of mangrove forests, except in Asia. Tropical coral reefs have suffered a significant global decline in biodiversity since the 1970s. Although the overall extent of living coral cover has remained roughly in balance since the 1980s, it has not recovered to earlier levels. Even where local recovery has occurred, there is evidence that the new reef structures are more uniform and less diverse than the ones they replaced. There are increasing grounds for concern about the condition and trends of biodiversity in deepwater habitats, although data are still scarce. About 80 percent of the world marine fish stocks for which assessment information is available are fully exploited or overexploited. While the extent of marine protected areas has grown significantly, a small proportion (less than a fifth) of marine ecoregions meet the target of having at least 10% of their area protected (Secretariat of the Convention on

Biological Diversity 2010, pp.46-49) .

#### 4.5 Genetic diversity

In addition, it mentions that genetic diversity is being lost in natural ecosystems and in systems of crop and livestock production. Important progress is being made to conserve plant genetic diversity, especially using ex situ seed banks. Standardized and high-output systems of animal husbandry have led to an erosion of the genetic diversity of livestock. At least one-fifth of livestock breeds are at risk of extinction. The availability of genetic resources better able to support future livelihoods from livestock may be compromised (Secretariat of the Convention on Biological Diversity 2010, p.51).

### 5 Current pressures on biodiversity

According to GB03, the persistence and in some cases intensification of the five principal pressures on biodiversity provide more evidence that the rate of biodiversity loss is not being significantly reduced. The overwhelming majority of governments reporting to the CBD cite these pressures or direct drivers as affecting biodiversity in their countries (Secretariat of the Convention on Biological Diversity 2010, p.55).

- \* Habitat loss and degradation
- \* Climate change
- \* Excessive nutrient load and other forms of pollution
- \* Over-exploitation and unsustainable use
- \* Invasive alien species

#### 5.1 Habitat loss and degradation

It mentions that habitat loss and degradation create the biggest single source of pressure on biodiversity worldwide. For terrestrial ecosystems, habitat loss is largely accounted

for by conversion of wild lands to agriculture, which now accounts for some 30% of land globally. In some areas, it has recently been partly driven by the demand for biofuels. For inland water ecosystems, habitat loss and degradation is largely accounted for by unsustainable water use and drainage for conversion to other land uses, such as agriculture and settlements. In coastal ecosystems, habitat loss is driven by a range of factors including some forms of mariculture, especially shrimp farms in the tropics where they have often replaced mangroves (Secretariat of the Convention on Biological Diversity 2010, p.55).

## 5.2 Climate change

It continues that climate change is already having an impact on biodiversity, and is projected to become a progressively more significant threat in the coming decades. Loss of Arctic sea ice threatens biodiversity across an entire biome and beyond. The related pressure of ocean acidification, resulting from higher concentrations of carbon dioxide in the atmosphere, is also already being observed (Secretariat of the Convention on Biological Diversity 2010, p.56).

## 5.3 Pollution and nutrient load

Moreover, it says that pollution from nutrients (nitrogen and phosphorous) and other sources is a continuing and growing threat to biodiversity in terrestrial, inland water and coastal ecosystems (Secretariat of the Convention on Biological Diversity 2010, p.59).

## 5.4 Overexploitation and unsustainable use

It insists that overexploitation and destructive harvesting practices are at the heart of the threats being imposed on the

world's biodiversity and ecosystems, and there has not been significant reduction in this pressure. Changes to fisheries management in some areas are leading to more sustainable practices, but most stocks still require reduced pressure in order to rebuild. Bushmeat hunting, which provides a significant proportion of protein for many rural households, appears to be taking place at unsustainable levels (Secretariat of the Convention on Biological Diversity 2010, p.62).

## 5.5 Invasive alien species

It mentions that invasive alien species continue to be a major threat to all types of ecosystems and species. There are no signs of a significant reduction of this pressure on biodiversity, and some indications that it is increasing. Intervention to control alien invasive species has been successful in particular cases, but it is outweighed by the threat to biodiversity from new invasions (Secretariat of the Convention on Biological Diversity 2010, p.64).

## 5.6 Combined pressures and underlying causes of biodiversity loss

It says that the direct drivers of biodiversity loss act together to create multiple pressures on biodiversity and ecosystems. Efforts to reduce direct pressures are challenged by the deep-rooted underlying causes or indirect drivers that determine the demand for natural resources and are much more difficult to control. The ecological footprint of humanity exceeds the biological capacity of the Earth by a wider margin than at the time the 2010 target was agreed (Secretariat of the Convention on Biological Diversity 2010, p.66).

It continues that the trends from available indicators suggest that the state of biodiversity is declining, the pressures upon it are



increasing, and the benefits derived by humans from biodiversity are diminishing, but that the responses to address its loss are increasing. The overall message from these indicators is that despite the many efforts taken around the world to conserve biodiversity and use it sustainably, responses so far have not been adequate to address the scale of biodiversity loss or reduce the pressure (Secretariat of the Convention on Biological Diversity 2010, p.67).

## 6 Complex green criminology and biodiversity loss

### 6.1 Nonlinear perception of biodiversity and its loss

GB03 foresees that continuing species extinctions far above the historic rate, loss of habitats and changes in the distribution and abundance of species are projected throughout this century. There is a high risk of dramatic biodiversity loss and accompanying degradation of a broad range of ecosystem services if the Earth system is pushed beyond certain thresholds or tipping points. The loss of such services is likely to impact the poor first and most severely, as they tend to be most directly dependent on their immediate environments; but all societies will be impacted. There is greater potential than was recognized in earlier assessments to address both climate change and rising food demand without further widespread loss of habitats (Secretariat of the Convention on Biological Diversity 2010, p.71).

The results of the Global Biodiversity Outlook 3 pay particular attention to the relationship between biodiversity change and its impacts on human societies. In addition to the analysis of existing models and scenarios, a new assessment was carried out of potential 'tipping points' that could lead to large, rapid

and potentially irreversible changes. The analysis reached four principal conclusions:

a) Projections of the impact of global change on biodiversity show continuing and often accelerating species extinctions, loss of natural habitat, and changes in the distribution and abundance of species, species groups and biomes over the 21st century.

b) There are widespread thresholds, amplifying feedbacks and time-lagged effects leading to "tipping points", or abrupt shifts in the state of biodiversity and ecosystems. This makes the impacts of global change on biodiversity hard to predict, difficult to control once they begin, and slow, expensive or impossible to reverse once they have occurred.

c) Degradation of the services provided to human societies by functioning ecosystems are often more closely related to changes in the abundance and distribution of dominant or keystone species, rather than to global extinctions; even moderate biodiversity change globally can result in disproportionate changes for some groups of species (for example top predators) that have a strong influence on ecosystem services.

d) Biodiversity and ecosystem changes could be prevented, significantly reduced or even reversed (while species extinctions cannot be reversed, diversity of ecosystems can be restored) if strong action is applied urgently, comprehensively and appropriately, at international, national and local levels. This action must focus on addressing the direct and indirect factors driving biodiversity loss, and must adapt to changing knowledge and conditions (Secretariat of the Convention on Biological Diversity 2010, p.71).

### 6.2 Towards a strategy for reducing biodiversity loss

GB03 mentions that well-targeted policies

focusing on critical areas, species and ecosystem services can help to avoid the most dangerous impacts on people and societies from biodiversity loss in the near-term future, which it will be extremely challenging to avoid. In the longer term, biodiversity loss may be halted and then reversed, if urgent, concerted and effective action is applied in support of an agreed longterm vision. The 2010 review of the strategic plan for the Convention on Biological Diversity provides an opportunity to define such a vision and set time-bound targets to stimulate the action required to achieve it (Secretariat of the Convention on Biological Diversity 2010, p.83).

The message of GB03 is that we can no longer see the continued loss of biodiversity as an issue separate from the core concerns of society: to tackle poverty, to improve the health, prosperity and security of present and future generations, and to deal with climate change. Each of those objectives is undermined by current trends in the state of our ecosystems, and each will be greatly strengthened if we finally give biodiversity the priority it deserves (Secretariat of the Convention on Biological Diversity 2010, p.87).

## 7 Conclusions: New concept 'crimes against biodiversity'

The pressures or drivers do not act in isolation on biodiversity and ecosystems, but frequently, with one pressure exacerbating the impacts of another. For example:

\* Fragmentation of habitats reduces the capacity of species to adapt to climate change, by limiting the possibilities of migration to areas with more suitable conditions.

\* Pollution, overfishing, climate change and ocean acidification all combine to weaken the resilience of coral reefs and increase the

tendency for them to shift to algae-dominated states with massive loss of biodiversity.

\* Increased levels of nutrients combined with the presence of invasive alien species can promote the growth of hardy plants at the expense of native species. Climate change can further exacerbate the problem by making more habitats suitable for invasive species.

\* Sea level rise caused by climate change combines with physical alteration of coastal habitats, accelerating change to coastal biodiversity and associated loss of ecosystem services. 2010 biodiversity target was agreed in 2002.

These pressures and drivers of biodiversity loss create multiple pressures on biodiversity and ecosystems. Facing the criticality of biodiversity, we have to make and develop a new concept 'crimes against biodiversity'.

### Note:

- 1) This paper is a part of results of "the research on global environmental crises and complexity green criminology", Grant-in-Aid of Scientific Research (c) 2008-2011, and is based on the presentation at the 10th Annual Conference of European Society of Criminology, Liege, Belgium, 8-11 September, 2010.

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