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MEASURING IMPACT

Summary of Indicators for Combating Wildlife Trafficking

MEASURING IMPACT

Contract information

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BACKGROUND

Killing protected or managed species and the illegal trade in wildlife and their related parts and products (hereafter wildlife crime) are among the most severe threats to biodiversity. Globally, hundreds of millions of individual animals belonging to hundreds of species across all animal taxa are the targets of illegal harvesting and trade. Wildlife crime not only threatens the survival of focal species, but may also significantly alter ecosystem function and stability through biodiversity loss and the species introductions that are a common byproduct of this activity.

High-value wildlife products are often trafficked by organized criminal syndicates and the revenue generated is known to finance violent non-state actors including terrorist groups and unsanctioned militias. Armed conflict can exacerbate wildlife crime, and wildlife crime is frequently associated with other forms of crime, such as money laundering (Loucks et al. 2009; UNODC 2012). In addition, wildlife traffickers generate insecurity in rural communities and are responsible for killing park rangers, which hurts morale and park staff recruitment. This, in turn, reduces tourism and associated revenue needed for conservation and community development. For developing countries, loss of revenue from trade, taxes, and/or tourism can be significant and particularly damaging (Rosen & Smith 2010). Additionally, the illegal trade in wildlife can introduce and/or spread pathogens endemic to the exporting regions or transmitted during transit (Gómez & Aguirre 2008). This poses a major risk to human and livestock health, with implications for food security, commerce, and labor productivity (consider recent outbreaks of Ebola virus, SARS coronavirus, and avian influenza). Despite focused efforts often lasting several decades, wildlife crime remains a global threat (Broad & Damania 2010; Sharma et al. 2014).

The importance of wildlife crime as a threat to conservation and development has attracted the attention of governments, non-governmental organizations, research institutions, and multilateral organizations all over the world. Strategies to combat wildlife crime depend on accurate and reliable knowledge about the status of focal species and the basic attributes of illegal wildlife supply chains;¹ however, the clandestine nature of this activity, its geographic spread, the large number of people involved, and the size of the trade make analysis of status and trends, as well as measuring progress in combating it, a challenge (Blundell & Mascia 2005; UNODC 2012). A report by the United Nations Office on Drugs and Crime concludes that many of the available figures on wildlife crime “*are the result of guesswork rather than of systematic analysis*” (UNODC 2012). Global knowledge about wildlife crime remains fragmented and lacking in common standards, which hinders the design, implementation, and monitoring of strategies to combat it.

In July 2013, President Obama issued an Executive Order on Combating Wildlife Trafficking, resulting in a National Strategy to Combat Wildlife Trafficking released February 2014. A Congressional directive required \$45 million in FY2014 foreign assistance funds to combat wildlife trafficking, including a minimum of \$30 million managed by USAID. The Agency has a long history of investing in programs that support compliance with and enforcement of laws and regulations to protect wildlife, and in other strategies aimed at decreasing the threats to conservation and development that stem from wildlife crime. In 2014, the Agency’s Office of Forestry and Biodiversity/Bureau for Economic Growth, Education and the Environment (E3/FAB) identified a need to develop robust indicators with which to track progress on USAID’s investments in combating wildlife trafficking (CWC). As part of these efforts, Measuring Impact staff developed a CWC Situation Model (Activity 2.2.3.A from the Measuring Impact FY15 work plan; Figure 1), facilitated a workshop on CWC indicators and theories of change (Activity 2.2.3.C), and will produce a final report on recommended CWC indicators (Activity 2.2.3.D). Measuring

¹ The term “supply chain” is used in this context to describe the steps taken to acquire, transform, and transport an illegal wildlife product (from live, whole animals to specific valued-added parts) from wild, native habitat to the end consumer. Different wildlife products have different supply chains.

Impact also conducted a survey and analysis of existing wildlife crime indicators (Activity 3.1.2) to inform the development of USAID indicators and build the evidence base for better alignment of the Agency's monitoring efforts with best practices. This report summarizes the search strategy and main results of the survey.

MAIN FINDINGS

A substantial number of metrics exist to track wildlife crime. This survey identified over 200 such indicators used by a broad range of actors.

Existing indicators track attributes associated with all aspects of the trade, from the volume of high-value wildlife products found in markets, to law enforcement, to assessing the impact of specific strategies to combat crime.

Only a small subset of the indicators in this survey, most often metrics compiled and reported by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), are used consistently or have been monitored regularly. Many of the metrics in this report are part of discrete research initiatives or projects. Others have been used by international agencies or non-governmental organizations, but they are most often tracked for limited periods, and are not associated with long-term datasets.

Generally, the indicators most commonly associated with long-term data tend to be related to confiscations, normally reported by CITES, law enforcement agencies, or customs authorities.

Most indicators identified in this survey are neither normalized nor tracked to a baseline; therefore, these indicators may be limited in their capacity to identify trends in the state of the variable being measured. More complex normalized measures, such as numbers to biomass per capita or per year, or number of cases completed per year per prosecutor, were less common in this survey.

Most indicators identified in this survey are metrics associated with enforcement, including detection, arrests, and prosecutions. Other aspects, from the drivers of wildlife crime to the efficacy of campaigns to develop alternate income sources, appear to have received comparatively less attention from the actors surveyed.

Many of the existing indicators track general attributes of wildlife crime, i.e., are not limited to specific species or ecological, geographic, or socio-economic contexts. Further, some of these indicators are interchangeable with those used to track other forms of illegal trade or the success of efforts in other law enforcement or development sectors.

Illegal wildlife supply chains often require specialized indicators to effectively track specific attributes or monitor the progress of strategies to combat it. Wildlife crime encompasses a wide variety of activities across all spatial scales and for a variety of uses and consumer types. Further, programs to prevent or combat crime involve a broad diversity of approaches. This diversity suggests the need to design indicators tailored to specific contexts and needs and indicates that alignment to existing indicators requires evaluation of how these indicators fit to USAID's monitoring objectives.

These findings indicate that the design, implementation, and long-term application of indicators depends on carefully identifying key attributes of specific illegal wildlife markets or strategies, the key variables to be monitored, and then selecting or designing indicators that can be feasibly deployed across appropriate spatial and temporal scales. Further, this also indicates that reporting against existing indicators should be a decision based on systematic analyses of USAID's programs and theories of change.

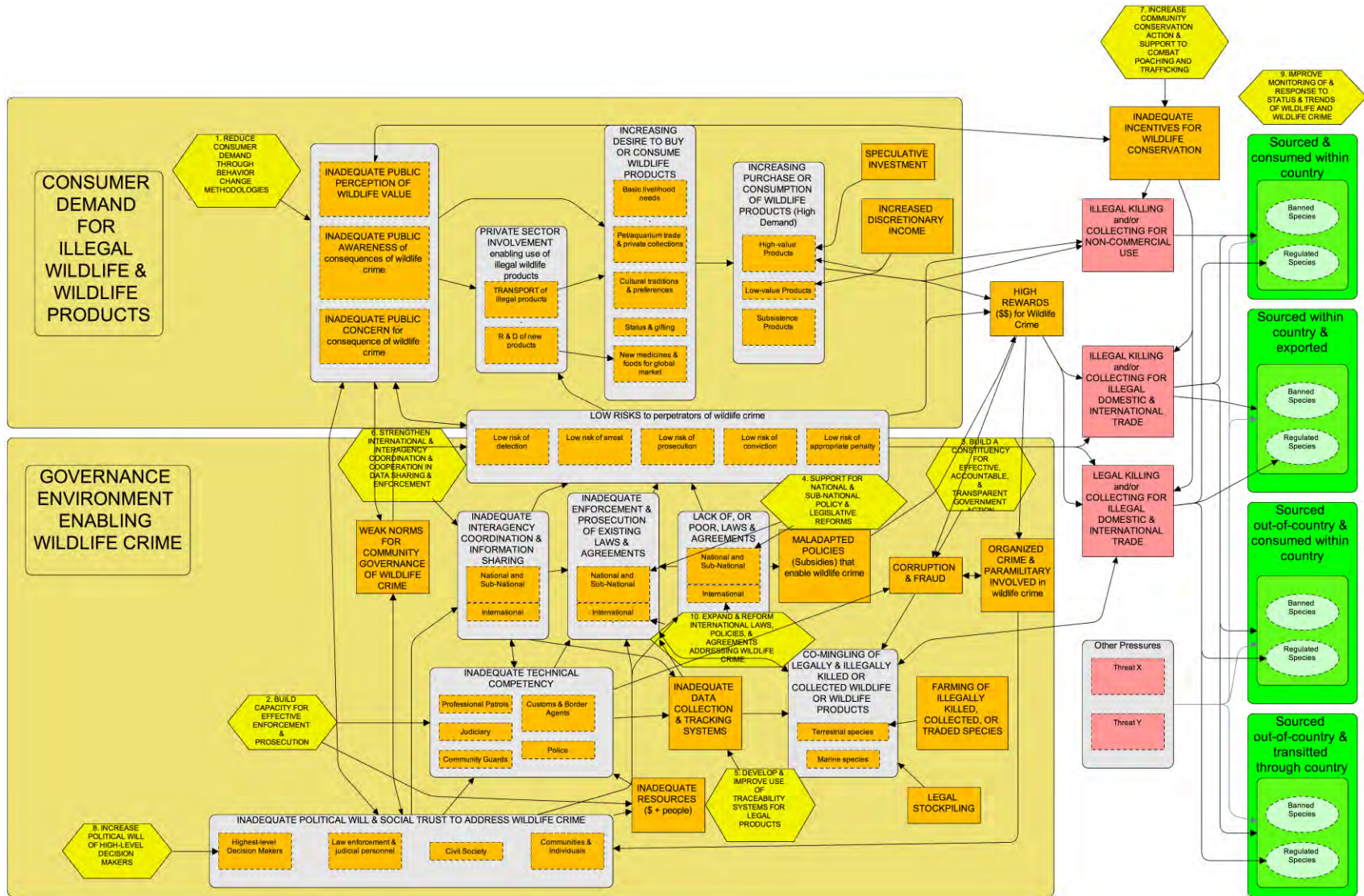
METHODS

In this survey, an indicator was defined as any metric that allows drawing inferences about the state of a variable through time. The focus was on the illegal trade in any wild animal species, including marine and terrestrial wildlife. A set of government agencies, research and academic institutions, multilateral instruments and agreements, and non-governmental organizations was identified as the main target of this survey (Annex Table I). We reviewed the websites and gray and white literature available from these sources. We searched the websites of the organizations listed on Table I in the Annex for any information leading to wildlife traffic indicators, including all relevant documents and the websites of specific programs within or related to the primary organizations. For example, an initial target was the United Nations Environment Programme and at a later stage we included the Programme's World Conservation Monitoring Centre. We also completed a search of the academic literature using Google Scholar and the Science Citation Index.

We compiled a list of indicators and associated them with the USAID Priority Strategic Approaches identified in the Combating Wildlife Crime Situation Model (Activity 2.2.3.A from the Measuring Impact FY15 work plan; Figure 1). When a particular indicator was used by more than one organization, we included only the first occurrence in the results section of this report (Tables B–H). That is, this report was designed to minimize redundancy. Use of this search protocol suggested that this survey resulted in a comprehensive set of indicators, as redundancy increased sharply as the survey progressed. However, the results of this survey should be viewed as comprehensive but not exhaustive.

This survey includes the metrics found during the searches described, regardless of whether they were in active use at the time of this research. That is, the presence of a metric in this survey does not imply that there currently exists an active program that reports on the particular metric, nor a database that aggregates the information gathered, other than any data included in the original source cited. The raw indicators are listed in Tables B–H. Table A lists common metrics, defined here as any metric used or reported by at least three of the sources included in this survey. Because different sources often use slightly different language, Table A uses generalized wording to encompass this variability; and therefore, the metrics included in Table A may not necessarily correspond exactly to the ones included in subsequent tables in the report.

Figure I. Current Draft Generalized Situation Model with Priority USAID Strategic Approaches (this version incorporates revisions up to the drafting of this report).



RESULTS

Tables B–H list the indicators used to track wildlife crime identified in the survey. Common indicators are listed in Table A. Metrics about the scale of the market, such as the number of individuals killed, traded, or seized; the total volume, weight, or value traded, seized, or transported; and the extent of implemented responses, such as area patrolled, people trained, and arrests made, which are basal to most analyses of efforts to combat wildlife crime, are among the most commonly reported by the sources we investigated (Table A).

Overall, WildAid contributed the greatest number of indicators included in this survey. Of donors other than the United States Government, the United Kingdom’s Department for Environment Food and Rural Affairs contributed the most indicators to the survey; for the multilateral organizations, CITES and the U.N. Office on Drugs and Crime (UNODC); and for the non-governmental organizations, WildAid and TRAFFIC. Most indicators in this survey are associated with the *Build Capacity for Effective Enforcement and Prosecutions* and *Improve Monitoring of and Response to Status and Trends of Wildlife and Wildlife Crime* strategic approaches in the Situation Model. These two strategic approaches are approximately equally represented, and combined they produced over 70% of the indicators in the survey. Table B, *Reduce Consumer Demand through Behavior Change Methodologies*, contains approximately 18% of the indicators in the survey. This finding is suggestive of an asymmetrical effort allocation to the potential detriment of other strategic approaches. For example, the strategic approaches *Increase Community Conservation Action and Support to Combat Poaching and Trafficking*; *Build a Constituency for Effective, Accountable, and Transparent Government Action*; *Strengthen International and Interagency Coordination and Cooperation in Data Sharing and Enforcement*; and *Support National and Sub-national Policy and Legislative Reforms* are represented only minimally. Further, the following strategic approaches in the Situation Model are not represented in the survey: *Increase Political Will of High-level Decision Makers*; *Develop and Improve Use of Traceability Systems*; and *Expand and Reform International Laws and Policies Addressing Wildlife Crime*. This may have resulted from bias in the sources included in the survey or represent true gaps in the state of the field.

Table C summarizes the indicators for *Build Capacity for Effective Enforcement and Prosecution*. It includes all metrics related to enforcement, including current capacity and outcomes related to patrols, interdiction, detection, arrests, and prosecutions. It also includes indicators of court staffing and performance.

Only two indicators are included for the *Build a Constituency for Effective, Accountable, and Transparent Government Action* (Table D) and *Strengthen International and Interagency Coordination and Cooperation in Data Sharing and Enforcement* strategic approaches. Similarly, few indicators in this survey were designed to track specific aspects of policy development and application (*Support National and Sub-national Policy and Legislative Reforms*). Table E lists these indicators. The scarcity of indicators associated with this strategic approach may be a result of the survey’s focus on broadly applicable indicators, and some regional efforts do report indicators designed specifically for use in their specific policy contexts. For example, see the extensive list of performance indicators in COMIFAC (2012).

Table F contains metrics for *Strengthen International and Interagency Coordination and Cooperation in Data Sharing and Enforcement*, most of which track consumer preferences and knowledge, and efforts to educate businesses and the public about the consumption of wildlife and wildlife products.

Table G includes indicators for *Increase Community Conservation Action and Support to Combat Poaching and Trafficking*. Most of these metrics are designed to measure the extent and effectiveness of incentives to substitute incomes formerly derived from wildlife crime.

Indicators for *Improve Monitoring of and Response to Status and Trends of Wildlife and Wildlife Crime* are included in Table H. The majority of these indicators are related to seizures (including data collected

and reported by CITES) and the size and composition of markets. This group also includes indicators related to harvesting levels and efforts.

Most of the indicators identified in this survey are reported as being part of discrete research efforts or investigations that last less than a decade. That is, a distinct minority of the indicators included in this report are associated with long-term efforts to periodically track and report specific metrics with a standardized methodology. Long-term monitoring and reporting is particularly important for measuring the impact that an anti-crime action may have on the status of wildlife populations, especially those with long generation times. This survey also suggests that most available indicators are associated with relatively simple accounting or record keeping. For example, several sources use some indicator of the size of the markets as measured by the total number or weight of wildlife or wildlife products for sale (CITES 2014; Scharf et al. 2010; Stiles 2004; Weinbaum et al. 2013). Less common are more complex normalized measures such as individuals or biomass per capita or per year (Bennett & Robinson 2000), the overall composition of the markets, or the relative contributions of specific species to the total volume traded (Dupain et al. 2012; Weinbaum et al. 2013). Several metrics track the total population reached by capacity building or awareness campaigns (ADF 2013) without reference to the outcomes of these strategies.

Generally, the indicators most commonly associated with long-term data are those related to confiscations. Beyond data collected by CITES, most of these metrics are reported on by law enforcement agencies or customs authorities (CITES 2014; Interpol 2014; UNODC 2012; WCO 2007), likely as a result of continued efforts by governments and law enforcement organizations to monitor international trade and criminal activities of all kinds. Data collected by CITES are monitored periodically and made publicly available (see trade.cites.org). The CITES Trade Database, which can be searched by taxon and provenance, provides data on the location of the seizures and importing and exporting countries, when available. By definition, CITES is limited to international trade of listed species and, therefore, is blind to other forms of trade regardless of their impact on conservation or development. Data produced by CITES, Interpol, the United Nations Office on Drugs and Crime, and the World Customs Organization have a high likelihood of being reported on in the future, and therefore, they provide opportunities for benchmarking and comparative analysis. The last three sources do not provide open access to their datasets.

Indicators used to track the status of wildlife populations are also used in efforts to combat wildlife crime, but they are not included here because they are general wildlife biology metrics and not uniquely developed for efforts to track crime. For example, see Pollock et al. (2002), IUCN (2006), and Dirzo et al. (2014).

Table A. Common indicators.

Metric	User/source
Total volume caught or traded	(Agnew et al. 2009; CI 2014; CI & FAO 2002; CITES 2014; COMIFAC 2012; Crookes et al. 2005; DEFRA 2014; Dupain et al. 2012; GRASP 2014; Interpol 2013, 2014; Ntiamoa-Baide 1997; Sharma et al. 2014; TRAFFIC 2008; WCS 2014; WildAid 2014a, b, c; Wingard & Zahler 2006; WWF 2014; Zeller et al. 2011)
Total value traded or seized	(CI & FAO 2002; DEFRA 2014; GRASP 2014; Interpol 2014; Ntiamoa-Baide 1997; TRAFFIC 2008, 2012; USFWS 2011; van Vliet et al. 2012; WCS 2014)
Number of species or individuals for sale	(CI & FAO 2002; Crookes et al. 2005; Dupain et al. 2012; TRAFFIC 2008; van Vliet et al. 2012; WCS 2014; Wingard & Zahler 2006)
Number, hours, or area of patrols	(ADF 2013; CAWT 2014; DEFRA 2014; Measuring Impact 2014; Muir et al. 2014; WA 2013; WildAid 2014a, c)

Metric	User/source
Number of species or individuals killed illegally	(CAWT 2014; CI 2014; GRASP 2014; WCS 2014; WWF 2004)
Number of people, officers, or groups trained	(ADF 2013; CAWT 2014; DEFRA 2014; Interpol 2014; Muir et al. 2014; USFWS 2011; WCO 2007)
Number or volume seized	(CITES 2014; Interpol 2014; Milliken 2014; USFWS 2011; WCO 2007; WildAid 2014a, b)
Number arrested, penalized, or convicted	(ADF 2013; GRASP 2014; Interpol 2014; Rosero 2010; Scharf et al. 2010; UNODC 2012; USDOJ 2015; USFWS 2011)
Catch per unit effort	(Eves & Ruggiero 2000; Kleiven et al. 2012; TRAFFIC 2008)
Number of sightings of illegal activities or actors (e.g. snares, hunters, vessels)	(Muir et al. 2014; Petrossian In Press; Rosero 2010)
Proportion of mislabeled products in market	(Baker et al. 2007; Clarke et al. 2009; Helyar et al. 2014)

Table B. Reduce Consumer Demand through Behavior Change Methodologies (Strategic Approach 1²).

Indicator	Source
Number of countries, persons and institutions reached by sensitization campaigns under the program	(ADF 2013)
Number of media and advocacy actions on poaching and illicit ivory trade	(ADF 2013)
Number of targeted awareness campaigns conducted annually	(ADF 2013)
% change in consumption of illegal wildlife products	(DEFRA 2014)
Increases in public awareness and changes in opinions from surveys held	(DEFRA 2014)
Number of visits (or % increase in visits) to relevant websites	(DEFRA 2014)
Price of wildlife products	(Wingard & Zahler 2006)
Changes in price levels	(CITES 2007)
Preferences of consumers	(CITES 2007)
Retailer or consumer prices	(CITES 2007)
Proportion of products derived from sustainable sources	(IUCN 2006)
Advertised value of all online ads by country	(IFAW 2008)
Number of online ads	(IFAW 2008)
Value of final online sales recorded	(IFAW 2008)
Number of China's top business leaders pledging to never purchase, possess or give ivory as a gift	(WildAid 2014a)

² Strategic approach numbers refer to the reference numbers used in the *Measuring Efforts to Combat Wildlife Crime* report. Note that the numbering of theories of change is provided for convenience only and is not meant to connote relative priority among the strategic approaches.

Indicator	Source
% believing rhino horns can be purchased legally from stores	(WildAid 2014b)
% believing trading rhino horns is illegal	(WildAid 2014b)
% of consumers believing in rhino horn's alleged aphrodisiac and medicinal value	(WildAid 2014b)
% of people surveyed who want to buy or consume rhino horn in the future	(WildAid 2014b)
% who believe poaching is a serious problem and could lead to extinction in less than 10 years	(WildAid 2014b)
% who do buy rhino horns and believe Chinese government should take stricter action	(WildAid 2014b)
% who do not buy rhino horns and believe Chinese government should take stricter action	(WildAid 2014b)
Proportion unaware that horns come from poached rhinos vs. natural mortality vs. from farmed rhinos	(WildAid 2014b)
% of population believing that shark fins grow back	(WildAid 2014c)
% decrease in China's shark fin consumption due to campaigns and government bans	(WildAid 2014c)
Number of people voting for ban of shark fin sales	(WildAid 2014c)
% decline in prices paid to shark fishermen	(Whitcraft et al. 2014)
% of (Chinese) population aware that shark fin soup comes from shark fins	(Whitcraft et al. 2014)
% of consumers stating they gave up shark fin soup	(Whitcraft et al. 2014)
% of respondents believing shark fin soup has caused decline in shark populations	(Whitcraft et al. 2014)
% of respondents stating they stopped eating shark fin soup in last 3 years	(Whitcraft et al. 2014)
Number of airlines, shipping lines, and hotel groups banning shark fin from their operations	(Whitcraft et al. 2014)
Number of restaurant reps reporting decline in shark fin consumption	(Whitcraft et al. 2014)
Normalized real price	(Crookes et al. 2005)
Number of retail outlets selling wildlife products	(Stiles 2004)
Price per kg for 5-10 kg tusk	(Stiles 2004)
Price (of carcasses) of wildlife and alternatives (sources of protein)	(van Vliet et al. 2012)
Price of game and alternatives	(Weinbaum et al. 2013)
% of target audience that adopts or continues behavior	(Muir et al. 2014)
% of target audience that receives message	(Muir et al. 2014)
% of target audience with desired knowledge	(Muir et al. 2014)
Availability of fish for local consumption (food and protein balance sheets)	(MRAG 2005)

Table C. Build Capacity for Effective Enforcement and Prosecution (Strategic Approach 2).

Indicator	Source
Number of poachers apprehended	(ADF 2013)
Number of convictions	(ADF 2013)
Number of joint patrols involving surveillance officers	(ADF 2013)
Number of hectares covered by improved approaches	(DEFRA 2014)
Number of legal actions taken	(DEFRA 2014)
Quality and quantity of inspection and controls	(DEFRA 2014)
Number of investigations or % increase in investigations	(DEFRA 2014)
New enforcement procedures (manuals, ID guides) produced	(DEFRA 2014)
Criminal convictions for illegal hunting nationwide	(Scharf et al. 2010)
Conviction rate for arrests made	(Interpol 2014)
Non-wildlife contraband seized (e.g., military firearms)	(Interpol 2014)
Number of violations properly documented	(UNDP 2007)
Field-based protection units, ranger stations, and substations established and operational in protected areas and buffer zones	(UNDP 2007)
Permanently manned protection posts established at main entry points to the protected areas	(UNDP 2007)
Number of rangers in protected area	(UNDP 2007)
Networks of community-based forest and wildlife crime monitors established and operational	(UNDP 2007)
% of crimes solved out of the total criminal incidents reported	(UNODC 2012)
Number of calls received and responded to	(UNODC 2012)
Response time	(UNODC 2012)
Officer utilization time	(UNODC 2012)
Total case burden (number of criminal offences per authorized police strength)	(UNODC 2012)
% of interceptions following physical customs controls	(WCO 2007)
Number of seizures	(WCO 2007)
% of follow-up investigations into illegal trade	(WCO 2007)
Number of specialized units or officers for wildlife enforcement	(WCO 2007)
Number of physical controls based on risk assessment	(WCO 2007)
Number of ivory factories identified and shut down	(Interpol, 2014)
Proportion of cases per year in which the offenders pleaded guilty	(UNODC 2012)
Proportion of cases per year in which a conviction was obtained	(UNODC 2012)

Indicator	Source
Proportion of cases that went to trial in which the offender was eventually acquitted	(UNODC 2012)
Number of cases of wrongful convictions per year	(UNODC 2012)
Proportion of cases per year that went to trial	(UNODC 2012)
Proportion of cases that were diverted away from the formal criminal justice process	(UNODC 2012)
Average number of trials per year	(UNODC 2012)
Average number of trials per judge	(UNODC 2012)
Average number of cases per judge	(UNODC 2012)
Average length of time for the completion of a criminal case	(UNODC 2012)
Average length of a trial, and the average cost per case	(UNODC 2012)
Average cost per case prosecuted during a given period of time, usually one year	(UNODC 2012)
Average number of cases per prosecutor	(UNODC 2012)
Average number of appellate cases per prosecutor	(UNODC 2012)
Number of cases completed per year per prosecutor	(UNODC 2012)
Number of cases in which a prosecution has been initiated and then abandoned or stayed	(UNODC 2012)
Number of reports on illegal activities	(CI 2013)
Number of patrols conducted per month (patrollers disaggregated by sex)	(CI 2013)
Number of snares removed per month (related to patrols)	(CI 2013)
% of wildlife trade intercepted	(Broad & Damania 2010)
Reported method of detection of large-scale (>500 kg) ivory seizures	(Milliken 2014)
Number of seizures	(Milliken 2014)
Status of investigations and judiciary proceedings	(Milliken 2014)
Total operational costs	(Bigue & Rosero 2014)
Number of vessels patrolling per km ²	(Bigue & Rosero 2014)
Number of patrols days per week	(Bigue & Rosero 2014)
Total miles patrolled	(Bigue & Rosero 2014)
Total violations	(Rosero 2010)
Number of violations and types	(Rosero 2010)
Probability of sanction	(Rosero 2010)
Probability of arrest	(Rosero 2010)
Vessels detained	(Rosero 2010)
Probability of detection	(Rosero 2010)

Indicator	Source
Number of vessels inspected	(Rosero 2010)
Number of fishing vessels observed per year	(Rosero 2010)
Annual seizures of fishing gear and vessels	(Rosero 2010)
Total detentions	(Rosero 2010)
Probability of prosecution	(Rosero 2010)
Number of cases opened, resolved, pending, unresolved	(Rosero 2010)
Number of cases resolved, lost, appealed, or delayed	(Rosero 2010)
Days spent patrolling	(Rosero 2010)
Number of hours of patrolling	(Rosero 2010)
Proportion of critical habitat for elephants/apes that is being effectively patrolled	(Measuring Impact 2014)
Area (number hectares) of biological significance and/or natural resources under improved management (number of hectares managed in compliance with land use plan)	(Measuring Impact 2014)
Number of raids against illegal ivory markets per year	(COMIFAC 2012)
Encounter rate of suspected poachers	(Muir et al. 2014)
% of patrols adequately trained and equipped	(Muir et al. 2014)
% of patrols operating as scheduled	(Muir et al. 2014)
Number of unlawful shipments interdicted containing CITES Appendix I wildlife parts and products	(USFWS 2011)
Value of unlawful CITES Appendix II and III shipments interdicted	(USFWS 2011)
Number of injurious animals interdicted	(USFWS 2011)
Reduction in catches and biodiversity of coastal areas	(MRAG 2005)
Armed resistance by illegal, unreported, and unregulated (IUU) fishing vessels to MCS (Monitoring, Control, and Surveillance) enforcement.	(MRAG 2005)
Number of illegal, unregulated and unreported (IUU) vessels sighted and identified in Australia's Exclusive Economic zone in the Southern Ocean	(ACBPS 2013)
Number of IUU vessels boarded in the Southern Ocean	(ACBPS 2013)
Number of IUU vessels apprehended in the Southern Ocean	(ACBPS 2013)
Pre- and post-fishing inspections (relates to the requirement for a vessel to be in possession of the correct permits)	(BHSFU 2013)
% of catch accounted for IUU fishing	(TRAFFIC 2012)
Patrol boats per 100,000 km ²	(Petrossian In Press)
Number of detectable fishing vessels	(Petrossian In Press)

Table D. Build a Constituency for Effective, Accountable, and Transparent Government Action (Strategic Approach 3).

Indicator	Source
Average time for the release of legitimate trade	(WCO 2007)
Number and % of legal efforts undermined by corruption	(Muir et al. 2014)

Table E. Support National and Sub-national Policy and Legislative Reforms (Strategic Approach 4).

Indicator	Source
Number of staff trained in policy	(ADF 2013)
Number of items of new legislation drafted or in place	(DEFRA 2014)
Number of national policies against transboundary poaching adopted	(COMIFAC 2012)
Number and % of trainees that demonstrate desired knowledge, skills, and attitudes in policy	(Muir et al. 2014)
Number and % of trainees successfully carrying out desired practices at least once to appropriate problems in policy	(Muir et al. 2014)

Table F. Strengthen International and Interagency Coordination and Cooperation in Data Sharing and Enforcement (Strategic Approach 6).

Indicator	Source
Number of inter-agency or cross-border coordination networks	(NOAA & USDoC 2009)
Regional fisheries management organizations and other international fishery management body/arrangement measures to deter IUU fishing	(NOAA & USDoC 2009)

Table G. Increase Community Conservation Action and Support to Combat Poaching and Trafficking (Strategic Approach 7).

Indicator	Source
Number of formal agreements with local communities on wildlife monitoring and conservation established	(UNDP 2007)
Increase in household income levels	(DEFRA 2014)
Diversity of income source	(DEFRA 2014)
Number of people with improved food security	(DEFRA 2014)
Number of people with access to credit	(DEFRA 2014)

Indicator	Source
Number of registered community based organizations or cooperatives	(DEFRA 2014)
Number of registered members of community-based organizations or cooperatives	(DEFRA 2014)
Community incentive systems for detecting and reporting wildlife and forest crime in place	(UNDP 2007)
Incentive programs in place for local communities to protect rhinos	(WWF 2014)
Rank order of bushmeat as income source	(Bennett & Robinson 2000)
Proportion of people (segregated by gender) targeted by alternative livelihood activities in the community that have reduced their unsustainable practices	(Measuring Impact 2014)
Proportion of time people (segregated by gender) in the targeted area devote on an alternative practices versus unsustainable practices	(Measuring Impact 2014)
Number of institutions receiving capacity support (disaggregated by strategy)	(Measuring Impact 2014)

Table H. Improve Monitoring of and Response to Status and Trends of Wildlife and Wildlife Crime (Strategic Approach 8)

Indicator	Source
% change in number of poaching incidents in the area covered	(DEFRA 2014)
Number of products of illegal wildlife available to purchase on open market	(DEFRA 2014)
Number of or value of border confiscations of illegal wildlife products	(DEFRA 2014)
Number of studies and research on wildlife crime	(World Bank 2012)
Changes in number of jobs linked to trade	(CITES 2007)
Number of ivory carvings	(CITES 2014)
Weight (kg) of ivory carvings	(CITES 2014)
Number of tusks	(CITES 2014)
Weight (kg) of tusks	(CITES 2014)
Number of horns	(CITES 2014)
Weight (kg) of horns	(CITES 2014)
Number exported	(CITES 2014)
Quantity exported	(CITES 2014)
Purpose of the trade	(CITES 2014)
Origin	(CITES 2014)
Number of live animals confiscated	(CITES 2014)
Number of bodies confiscated	(CITES 2014)

Indicator	Source
Musk (kg)	(CITES 2014)
Number of skins confiscated	(CITES 2014)
Number of skulls confiscated	(CITES 2014)
Number of teeth confiscated	(CITES 2014)
Teeth (kg)	(CITES 2014)
Number of trophies confiscated	(CITES 2014)
Importer country	(CITES 2014)
Exporter country	(CITES 2014)
Recorded weight of materials seized	(Interpol 2013)
Estimated weight of materials seized	(Interpol 2013)
Reduced illegal hunting (number of confirmed killings of threatened/targeted species due to illegal hunting)	(UNDP 2007)
Reduction in the killing of globally threatened wildlife	(UNDP 2007)
Proportion of hunted wild animals sold or consumed	(Ntiamoa-Baide 1997)
% of retailers selling or receiving bushmeat during the entire year	(CI 2002)
Quantity traded across international borders annually	(CI 2002)
Time taken to harvest a given quantity of plants or animals	(TRAFFIC 2008)
Catch per unit effort (quantity of harvest and time taken to harvest)	(TRAFFIC 2008)
Quality of raw harvested products	(TRAFFIC 2008)
% reduction of current green turtle trade levels	(WWF 2004)
Number of large-scale ivory seizures (in which 500 kg or more of raw or worked ivory in raw ivory equivalent terms is seized at a single time)	(Milliken 2014)
Frequency of large-scale ivory seizures	(Milliken 2014)
Number and estimated weight of large-scale (>500 kg) ivory seizures by year and mode of transport	(Milliken 2014)
Mean weight of large-scale (>500 kg) ivory seizures by year	(Milliken 2014)
Observed trade routes	(Milliken 2014)
Region of occurrence of large-scale seizures	(Milliken 2014)
Estimated number of sharks killed per year	(Whitcraft et al. 2014)
% decline in shark fin sales	(Whitcraft et al. 2014)
% decline of imports	(Whitcraft et al. 2014)
% meals containing bushmeat	(Bennett & Robinson 2000)
Method of capture	(Crookes et al. 2005)

Indicator	Source
Quantity in market	(Crookes et al. 2005)
Proportion of trade by species	(Crookes et al. 2005)
Proportion of individuals traded coming from the outer part of the hunting catchment	(Crookes et al. 2005)
Total biomass in the market	(Dupain et al. 2012)
Mean body mass in the market	(Dupain et al. 2012)
Rarity index in the market (species is widespread or restricted, abundant or rare)	(Dupain et al. 2012)
Game diversity in the market (Shannon diversity index)	(Dupain et al. 2012)
Game dominance in the market (number of species that were the principal contributors to the carcasses for that market)	(Dupain et al. 2012)
Dominant species in the market	(Dupain et al. 2012)
Number of species in the market	(Dupain et al. 2012)
Estimated rate of return (meat per unit time of effort hunting)	(Eves & Ruggiero 2000)
Number of craftsmen processing wildlife products	(Stiles 2004)
Number of workshops processing wildlife products	(Stiles 2004)
Minimum number of items traded	(Stiles 2004)
Weight index (estimated mean weight of all ivory classes per year)	(Underwood et al. 2013)
Transaction index (relative number of illegal trade transactions)	(Underwood et al. 2013)
Species composition (% carcasses) in the market	(van Vliet et al. 2012)
Number of carcasses in market per species	(van Vliet et al. 2012)
Total number of carcasses entering the market	(van Vliet et al. 2012)
Change in species composition at the village level in the market	(Weinbaum et al. 2013)
Harvest rates	(Weinbaum et al. 2013)
Change in distance required for hunting	(Weinbaum et al. 2013)
Quantity of species sold	(Weinbaum et al. 2013)
Trends in distance from source to market	(Weinbaum et al. 2013)
Signs of elephant poaching detected in the field (e.g. number of poachers, number of camps, amount of spent ammunition)	(Measuring Impact 2014)
PIKE (Proportion of Elephant carcasses Illegally Killed)	(Measuring Impact 2014)
Number of illegal killings by country	(COMIFAC 2012)
Poaching in protected areas and logging concessions	(COMIFAC 2012)
Volume of domestic trade in illegal wildlife products	(COMIFAC 2012)
Number of incidents of poaching detected in field (to what degree have poaching incidents changed since you started the patrols?)	(Muir et al. 2014)

Indicator	Source
% change in wildlife trade in project area	(Muir et al. 2014)
Number of individuals of targeted wildlife species at key sale or transport points (to what degree have poached items in sale or transport points changed since you started the patrols?)	(Muir et al. 2014)
Incidences recorded of conflict between IUU fishing vessels and local fishing fleets.	(MRAG 2005)
Percentage of positively certified nations (IUU)	(NOAA & USDoC 2009)
Estimated global value of IUU fishing	(TRAFFIC 2012)
Presence of internationally attractive species	(Petrossian In Press)
Source of illegal catch (unreported, discards, recreational)	(Zeller et al. 2011)
Proportion of mislabeled products in market	(Clarke et al. 2009)

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ANNEX

Table I. List of Sources for the Combating Wildlife Crime Indicators Survey

Source	Type
Google Scholar	Academic
Science Citation Index	Academic
Australian Agency for International Development	Government Agency
Australian Customs and Border Protection Service	Government Agency
Belize High Seas Fisheries Unit	Government Agency
Department for International Development of the United Kingdom	Government Agency
Japan International Cooperation Agency	Government Agency
National Oceanic and Atmospheric Administration	Government Agency
Norwegian Agency for International Cooperation	Government Agency
South Africa National Parks	Government Agency
United States Department of Agriculture	Government Agency
United States Department of Justice	Government Agency
United States Department of State	Government Agency
United States Fish and Wildlife Service	Government Agency
Convention on International Trade in Endangered Species of Wild Fauna and Flora	Multilateral
African Development Bank Group	Multilateral
Commission des Forêts d'Afrique Centrale	Multilateral
Convention for Biological Diversity	Multilateral
European Commission	Multilateral
Interpol	Multilateral
South Asian Cooperative	Multilateral
Southeast Asian Fisheries Development Center	Multilateral
United Nations Development Programme	Multilateral
United Nations Environment Programme	Multilateral
United Nations Food and Agriculture Programme	Multilateral
Wildlife Enforcement Monitoring System Initiative	Multilateral
World Bank	Multilateral
World Conservation Monitoring Programme	Multilateral

Source	Type
AidData	Non-governmental organization
Biodiversity Indicators Partnership	Non-governmental organization
Coalition Against Wildlife Trafficking	Non-governmental organization
Congo Basin Forest Partnership	Non-governmental organization
Conservation International	Non-governmental organization
EcoHealth Alliance	Non-governmental organization
Environmental Investigation Agency	Non-governmental organization
Global Tiger Forum	Non-governmental organization
Great Apes Partnership	Non-governmental organization
International Fund for Animal Welfare	Non-governmental organization
IUCN	Non-governmental organization
The Nature Conservancy	Non-governmental organization
TRAFFIC	Non-governmental organization
WildAid	Non-governmental organization
Wildlife Alliance	Non-governmental organization
Wildlife Conservation Society	Non-governmental organization

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