INTOSAI
Working Group
on Environmental
Auditing

Auditing the sustainable management of fisheries

Guidance for Supreme Audit Institutions

This publication was prepared by the INTOSAI Working Group on Environmental Auditing (WGEA). The WGEA aims to encourage the use of audit mandates and audit methods in the field of environmental protection and sustainable development by Supreme Audit Institutions (SAIs). The WGEA has the mandate to

- help SAIs gain a better understanding of the specific environmental auditing issues,
- facilitate exchange of information and experiences among SAIs, and
- publish guidelines and other informative material.

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Page

Table of Contents

Acronyms

APEC	Asia – Pacific Economic Cooperation
CCAMLR	Conservation of Antarctic Living Marine resources
CCRF	FAO Code of Conduct for Responsible Fisheries (CCRF)
CFP	The Common Fisheries Policy
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO2	A colorless, odorless, tasteless gas, formula CO_2, about 1.5 times as heavy as air. Under normal conditions, it is stable, inert, and nontoxic. The decay (slow oxidation) of all organic materials produces CO_2. Fresh air contains approximately 0.033% CO_2 by volume. In the respiratory action (breathing) of all animals and humans, CO_2 is exhaled. Carbon dioxide gas may be liquefied or solidified. Solid CO_2 is known as dry ice.
COFI	Committee on Fisheries
CSD	Commission on Sustainable Development
EAF	The ecosystem approach to fisheries
EI	Ecological Integrity
EIA	Environmental Impact Assessment
EU	European Union
FAO	Food and Agricultural Organization
FSI	Flag State Implementation
GAO	Government Accountability Office - United States
GEF	Global Environment Facility
GIS	Geographical Information System
GMO	Genetically Modified Organisms (see also LMO)
HACCP	Hazard Analysis Critical Control Point
IEA	International Environmental Agreement
ILO	International Labour organization
IMO	International Maritime Organization
INTOSAI	International Organization of Supreme Audit Institutions

IPOA-IUU	International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing
IUCN	International Union for Conservation of Nature and Natural Resources (also named the World Conservation Union)
IUU	Illegal, Unreported and Unregulated
LMO	Living Modified Organism
MCS	Monitoring, control and surveillance
NBSAP	National Biodiversity Strategy and Action Plan (prescribed in the Convention on Biological Diversity)
NGO	Non-governmental Organization
NPOA	National plans of action
OECD	Organization for Economic Co-operation and Development
RFB's	Regional fishery bodies or arrangements
RFMO	Regional fisheries management organizations
SAI	Supreme Audit Institution
SEAM	Environmental Secretariat—Paraguay
UNFA	United Nations Fish Stocks Agreement
UNCCD	United Nations Convention to Combat Desertification
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICPOLOS	United Nations Open ended Informal Consultative Process on Oceans and the Law of the Sea
WGEA	Working Group on Environmental Auditing
WSSD	World Summit on Sustainable development
WSSD-POI	World Summit on Sustainable Development: Plan of Implementation

Foreword

The paper, *Auditing Fisheries: Guidance for Supreme Audit Institutions* was written to support the central theme (Biodiversity), as well as the INTOSAI WGEA paper: Auditing Biodiversity: Guidance for Supreme Audit Institutions.

This paper is aimed to be an indispensable resource for audit practitioners, describing

- what fisheries means, why it is important, what threatens it, and what action governments are taking;
- a suggested process for choosing and designing audits of fisheries; and
- practical guidance, information, and case studies related to audits of fisheries.

The writing of the paper was led by the SAI of South Africa. I would like to thank the SAIs of the Bahamas, Botswana, Canada, Netherlands, New Zealand and Norway for their inputs, review and comments. My thanks also go to the other individuals who contributed to this paper (see Acknowledgements).

Auditing fisheries: Guidance for Supreme Audit Institutions is one of four guidance papers developed by the WGEA in the 2008–2010 work plan period. The other four papers are

- Minerals and Mining
- Climate change.
- Forests
- Sustainable Energy
- Study on Natural Resources Accounting

Readers are encouraged to consult these papers as well as Appendix 3 of this paper for information on other WGEA products and services.

INTOSAI WGEA Chair

INTOSAI

Executive Summary

Auditors have traditionally not been associated with the conservation or environmental movement.

However, as providers of information, reports, and assurance on which business and government decisions are frequently based, they have increasingly been drawn into the environmental arena.

The influence of accountants and auditors comes from their access to financial and performance information. They analyze, report, and communicate information on which decisions are based and performance is evaluated. They can encourage greater transparency and informed decisions about the application of resources and the impact of activities on environmental outcomes.

An overview of the most important activities carried out by the WGEA can be found in the 2008-10 work plan which includes a series of projects, organized around the goals set out below, which are intended to respond to the SAIs variety of needs and to recognize their different levels of development:

- **Goal 1**: Expand the guidance materials available to SAIs.
- **Goal 2**: Facilitate concurrent, joint and coordinated audits.
- **Goal 3**: Enhance information dissemination, exchange, and training.
- **Goal 4**: Increase cooperation between the WGEA and international organizations.
- **Goal 5**: Ensure ongoing and effective governance of the WGEA

The 2008-10 work plan include amongst other themes the developing of audit guidance materials for the natural resource sector of fisheries. Fisheries are seen as important as the numbers of most species of marine fish are at an all-time low, and the chief culprit is overfishing to meet an unprecedented demand for seafood. Modern, technologically-advanced fishing fleets have the capacity to push most fish populations to the brink.

Governments have put legislation, policies, and programs in place to deal with the audit of sustainable management of fisheries. Supreme Audit Institutions (SAIs) can play a major role in protecting fisheries by auditing their government.

Content and structure of the document

The main objectives of this document are to increase knowledge about auditing the sustainable management of fisheries by identifying different approach to the problem and encourage more audits in this area. The document should assist Supreme Audit Institutions (SAIs) with or without experience to conduct audits on various aspects of management of fisheries resource in respective countries.

The Introduction section covers the purpose of the document, the ecosystem approach to fisheries, what are the problems, why it is important to solve the problems, what are the international responses to the problems, what are the roles of SAIs and how SAIs could make a difference on fisheries issues and audit related definitions of terms.

Chapter one presents the background information, Chapter 2 specifies a five step approach of how to choose and design audits of fisheries. Chapter 3 covers the examples of audits conducted by SAI's on fisheries.

Finally there will be the Appendices which will be as follows:

- Appendix 1: Potential Methodological Tool: Data gathering and analysis tool
- Appendix 2: Potential Methodological Tool: Scoping Methodological Tool
- Appendix 3: WGEA Resources
- Appendix 4: Regional and International Agreements and Legislation
- Appendix 5: Lists of audits conducted by SAIs
- Appendix 6: Articles
- Appendix 7: Open and limited access regulations
- Appendix 8: Questionnaire
- Appendix 9: Summary of survey results
- Glossary
- Bibliography

Introduction

1. Purpose of this document

The document will provide auditors with a common approach by all INTOSAI Regions worldwide. It is aimed at assisting auditors to conduct the audits on the sustainable management of fisheries management, involving social, cultural and economic aspects.

SAIs play a vital role in facilitating the transparency of government operations and ensuring that an informed public guides the actions of governments. SAIs promotes sound financial management and public accountability—both of which are essential elements of sustainable development. Moreover, SAIs' independence in carrying out financial, compliance, and performance or value-for-money audits puts them in a unique position to legitimately and credibly evaluate the efficiency and effectiveness of government policy and obligations.

The use of this paper should provide a common approach by all INTOSAI Regions worldwide. Moreover, the document will be aimed at assisting SAIs to easily identify and design environmental audits and to conduct environmental auditing issues. It may also be used as a Training Programme for SAIs that is keen to embark on environmental audits, including fisheries.

By reporting on issues such as the unsustainable use of the fisheries resources and lack of conservation and maintenance of the fish stocks, the SAIs may influence governments, to make adaptive management decisions for the protection and sustainable utilisation of the fisheries resources. Additionally due to the outcomes of the audit, there might be:

- Improved institutional and stakeholder capacity in fisheries resources
- Governments proactively ensuring the prevention of further degradation and overfishing in oceans/seas through enforcement of regulations of fisheries both regarding the establishment and implementation of quotas and steps to address unreported and unregulated harvest.

2. Why fisheries are important

Fisheries are an important source of food, employment, economic activity, and recreation for the people of many nations around the world. The management of these fisheries resources is vital for both current and future generations.

Food and food security

Fisheries provide a food and protein source to fishers' households and the wider population. Fish provide the main source of animal protein to about one billion people globally and in coastal areas the dependence on fish is usually much higher. Inland fisheries are particularly important for the food security of poor people, as most inland fish production goes for subsistence or local consumption.

Social and cultural benefits

Beyond the food, employment and financial benefits, there can be significant social and cultural outcomes attached to fishing. Fishers, their families and their wider communities benefit.

In fisheries that are community managed and fished, the income from fishing may go towards community projects and improving infrastructure and services for the community, or towards support for needy families. For example, in Lao PDR, increased production from inland enhancement fisheries provided greater community income for community projects such as building health centres, or to support poorer community members.

Fishing is rarely carried out alone and is often a very social activity, strengthening bonds between people and community cohesion.

People often turn to natural resources when other livelihood options are limited, and fisheries can act as a 'safety net' for the poor. For example, during years of conflict in Mozambique, many people who were displaced from their agricultural lands in the hinterland migrated to the coast and turned to fishing. However, problems are often associated with open-access arrangements which fail to control exploitation of the fish stock. The result may be overexploitation and reduced productivity of the fishery.

Employment

Around 38 million people worldwide are employed in fisheries and aquaculture, 95% of them in developing countries. The majority are involved in small-scale fisheries [3]. Related industries such as processing and marketing also provide employment for approximately 50 million people. In some areas, a large proportion of the population is involved in fishing, for example a study in Tanga (Tanzania) found that 70-80% of males were involved in fishing. Migrant fishers may employ agricultural workers as crew, providing seasonal employment and contributing to village economies.

Financial benefits

Fisheries can provide an important contribution to household cash income. A study in Tanzania found that between 65 and 90% of fish production is sold, compared to only 15% of agricultural production in the same communities. This cash income gives access to other benefits such as education, health services, clothing, other foodstuffs etc. It also allows investment in other assets or enterprises such as land, livestock or fishing gear, which in turn can further reduce vulnerability to poverty.

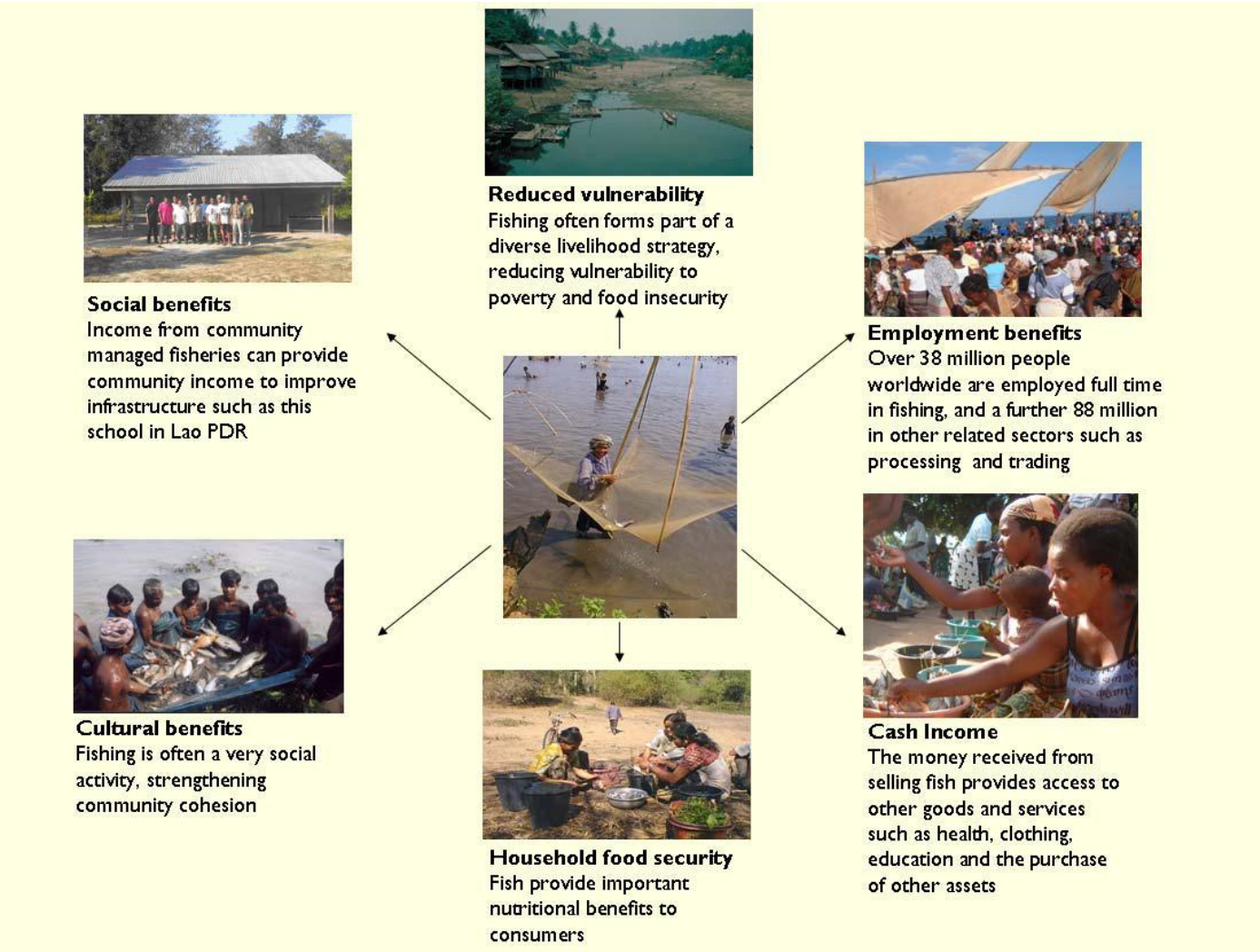


Figure 1: Contributions of fisheries to livelihoods
(*Source: Fisheries and livelihoods. FMSP Policy Brief 4.*FMSP Policy Brief 4, Marine Resources Assessment Group Ltd, UK, 4 pp. *Creator:* Marine Resources Assessment Group Ltd. http://www.mrag.co.uk/Documents/PolicyBrief4_Livelihoods.pdf)

Chapter 1: Background on Fisheries

1. Trends in world fisheries

There has been an increase in the world production of fish and fishery products over the last ten years almost all of which has come from the increase in aquaculture production rather than from the capture fisheries. Total production of fish and fish products reached about 141 million tonnes in 2004 an increase of 9 million tonnes since 2000. Capture fisheries and aquaculture supplied the world with about 106 million tonnes of food fish in 2004, a record. The increase in production has kept pace with the growth in population so the contribution of fisheries to food sources has remained relatively constant.

1.2 Marine capture fisheries plateau

In the past, the largest contributor to the world production of fish and fisheries products has come from the marine capture fisheries. For the last 20 years, the marine capture fisheries production has remained relatively stable at about 85 million tonnes. The FAO has raised concerns that the marine capture sector has reached its maximum harvest level. In 2006, the FAO reported that 75 percent of the fish stocks, where assessment information is available, are fully exploited or overexploited. The FAO reported that the proportion of overexploited and depleted stocks, about 25 percent of all stocks, has remained unchanged in recent years after showing a marked increase during the 1970s and 1980s. The situation is more serious where fisheries are exploited solely or partially in the high seas and, in particular for straddling stocks.

The FAO has called for a more cautious and closely controlled development and management of fisheries resources. In the short-term there is little potential to increase the contribution of the marine capture fishery to the overall production of fish and fishery products. However, the FAO believes that should national governments adopt more sustainable fishing practices the overexploited and depleted stocks could rebuild. From this belief, the FAO projects that marine capture fishery could provide a greater production providing an estimate of a potential future production of 93 million tonnes.

.Beyond the over-reporting issue, the catch statistics may not tell the whole truth about the state of marine fish stocks. Although production has stayed steady or declined, if you factor in the over-reporting, for the last twenty years, the fishing capacity and the effort exerted to maintain this production has increased dramatically. Advancements in technology have increased the ability of fishers to target fish stocks while at the same time reducing the per unit harvesting cost. The willingness of consumers in developed countries to pay an increasing price for fish and fish products provides incentives to fishers to fish harder and in areas that may not have been previously fished.

1.3 Freshwater capture fisheries

Freshwater resources cover a very small area compared to total land surface. Yet, they contain about 40 percent of all fish species. Freshwater capture fisheries are important to the livelihoods of rural people, especially in the developing world. The FAO reports that the state of freshwater capture fisheries is not well known but is a concern. This is based on the known environmental concerns associated with freshwater fish habitat. These habitats have been impacted by human activity. The FAO reports that the biodiversity of freshwater ecosystems appears to be in worse condition than any other ecosystem. Land-based sources of pollution from urban areas, agricultural practices, and natural resource development all contribute to freshwater habitat degradation.

1.4 The rise in aquaculture

Aquaculture or fish farming continues to grow more rapidly than all other animal food-producing sector, with an average annual growth rate for the world of about 9 percent per year since 1970. In 2004, aquaculture accounted for 43 percent of the world's production of fish and fish products and over 11 million people were employed in the aquaculture sector, the vast majority being in Asia.

More recently the FAO has stated that aquaculture has the potential to provide fish and fish products by 2030 sufficient to maintain the current average per capita consumption. The FAO indicates that it will depend on the ability of individual countries to set realistic goals to develop and expand their aquaculture sector.

However, there remain many concerns about the environmental impacts of aquaculture operations.

1.5 Employment and trade continue to rise

Fishing and aquaculture continue to be important economic activities for nations. Where these activities are most often carried out along coastal areas where jobs can be scarce, the employment and economic impact tends to be disproportionately high. Worldwide employment of fishers and fish farmers rose to over 41 million in 2004 compared to over 27 million in 1990.

As an economic resource, fisheries and aquaculture continue to grow in significance. The FAO reported that the 2004 total world trade of fish and fish products reached a record value of US$71.5 billion (export value), representing a 23 percent growth relative to 2000 and 51 percent increase since 1994. Note that consumption of seafood is steadily increasing:

- 14.4.kg per capita in 1990
- 16.6 kg per capita in 2002
- 16.7 kg per capita in 2006

2 What are the problems

Overfishing, illegal, unreported and unregulated fishing

The fish that once seemed an inexhaustible source of food are now almost everywhere in decline: 90% of large predatory fish (the big ones such as tuna, swordfish and sharks) have gone, according to some scientists. In estuaries and coastal waters, 85% of the large whales have disappeared, and nearly 60% of the small ones. Many of the smaller fish are also in decline. Indeed, most familiar sea creatures, from albatrosses to walruses, from seals to oysters, have suffered huge losses.

The habitats of many of these creatures have also been affected by man's activities. Cod live in the bottom layer of the ocean. Trawler men in pursuit of these and other groundfish

like pollock and haddock drag steel weights and rollers as well as nets behind their boats, devastating huge areas of the sea floor as they go.

Coral reefs, whose profusion of life and diversity of ecosystems make them the rainforests of the sea, have suffered most of all. Perhaps only 5% of coral reefs can now be considered pristine, a quarter has been lost and all are vulnerable to global warming. Illegal, unreported and unregulated fishing is fishing which does not comply with national, regional or global fisheries conservation and management requirements. It can occur within areas of national jurisdiction, within areas of control of regional fisheries management organizations, or on the high seas.

- **Illegal fishing** takes place where fishers operate in violation of the laws of a fishery, either within areas of national jurisdiction, the regional fisheries management organizations or the high seas.
- **Unreported fishing** is fishing that has been unreported or misreported to the relevant national authority or regional organization, in contravention of applicable laws and regulations.
- **Unregulated fishing** refers to fishing by vessels without nationality, or vessels flying the flag of a country not party to the regional fisheries management organization governing that fishing area or species.

Climate change

Global climate change is impacting and will continue to impact marine and estuarine fish and fisheries. Projections of future conditions portend further impacts on the distribution and abundance of fishes associated with relatively small temperature changes. Changing fish distributions and abundances will undoubtedly affect communities of humans who harvest these stocks. Coastal-based harvesters (subsistence, commercial, recreational) may be impacted (negatively or positively) by changes in fish stocks due to climate change. Interpretations of evidence include many uncertainties about the future of affected fish species and their harvesters. Therefore, there is a need to research the physiology and ecology of marine and estuarine fishes, particularly in the tropics where comparatively little research has been conducted. As a broader and deeper information base accumulates, researchers will be able to make more accurate predictions and forge relevant solutions

Habitat loss and pollution

Habitat loss and fragmentation are important threats to biodiversity, including in marine and freshwater ecosystems. Marine and coastal ecosystems have been degraded or altered by changes in land use and habitat destruction (development, tourism, fisheries, deforestation, mining and aquaculture). Freshwater ecosystems can be physically altered by dams and reservoirs, and by introducing water, drainage, canal and flood-control systems.
Bottom trawling is now being recognized as an important risk to fish habitat, especially as it is generally conducted in areas that contain productive fisheries resources. There are many studies from around the world that document the long-term impacts of bottom trawling, including the destruction of deep sea corals.

Fertilizers such as nitrogen, sulphur, and phosphorus that increase agricultural productivity run off into natural ecosystems and cause nutrient loading. Excessive nutrients negatively affect the ecosystems' nutrient cycles, their functioning, and, ultimately, the species they contain.

Eutrophication (the depletion of oxygen from an environment due to over-dense flora), nutrient pollution, and sewage are threats to freshwater and marine ecosystems, as they threaten the survival of many aquatic organisms. Pollution in water significantly threatens the health of species and contributes to the destruction of biodiversity.

Fishing down the food web

Scientists have recently begun to observe that fishers have systematically over-exploited larger, highly valued predatory fish, leading them to shift their harvesting effort towards less valued species lower in the food chain. Scientist have called this "Fishing down the food web" and believe that it points to a future where less valued species, such as jellyfish, will dominate marine ecosystems.

Traditional fisheries strategies have fishers target larger fish in a stock rather than smaller ones. These strategies ignore the important role played by these larger fish in ensuring the genetic integrity of fish stocks. Some scientists believe that this has played an

important role in the decline in the average size of some important fish stocks, for example Northwest Atlantic cod.

Further, scientist are now also concerned about the decline in highly migratory, large predator fish, such as sharks and tuna, and the impact that this may have on marine ecosystems.

Non-selective fishing gear

Some fishing gear can be highly destructive for species that are not being targeted. Traditionally, bottom trawling, drift nets and surface long line fishing technologies have been the most destructive. These non-selective fishing gears have had adverse impacts on fish stocks, turtles, seabirds, and marine mammals, such as dolphins. The by catch and discard problems associated with these gears have had an impact in terms of the loss of human food and significant impacts on entire ecosystems. By-catch also presents economic costs to fisherman, in terms off wasted time and effort.

There have been international efforts to eliminate or limit the impacts of these gear types. In addition, the fishing industry itself has developed technology to reduce the negative impact of the gear. For example, many fishers now employ technology to divert non-targeted species from bottom trawl gear.

In some developing countries, dynamite and poisons are used to harvest fish. These practices can have considerable negative impacts on fish habitats, such as coral reefs, and can represent a health and safety risk.

Impacts of aquaculture

Aquaculture is increasingly being relied on as a source of fish and fish products but this new industry comes with risks to freshwater and marine ecosystems. It is now recognized that for aquaculture to continue to grow in a sustainable manner issues such as the efficiency in resource use and minimizing environmental impacts will have to be addressed.

Pollution from aquaculture operations, the release of pesticides and antibiotics used to maintain the health of farmed species, and the escape of farmed fish that interact with wild species are all problems that arise from this industry. Escaped farmed species can displace existing wild species or breed with wild species leading to a genetic weakening of the wild stocks.

Aquaculture is not efficient in its use of resources. Many of the species that are farmed consume other fish resources as feed. For example, farmed salmon take at least three kilograms of fish meal to add one kilogram of weight to the farmed fish.

The ability to find the last fish

In 1883, Thomas Huxley, one of Britain's leading biologists of the day, declared that "probably all the great sea fisheries are inexhaustible" and attempting to regulate them was pointless. The significant advances in fishing technology in the years following the Huxley statement, especially in the last fifty years, has changed the ability of the commercial fishing industry to have a significant impact on fisheries resources.

Fishers now pursue their prey using technology such as satellites, acoustic fish-finders, and modern, efficient nets. Long gone are the days of simple line and hook fisheries. Given the advances in technology and larger, more powerful vessels, it only seems a slight overstatement to say they man has the ability to catch the last fish.

Limited knowledge of aquatic ecosystems

The international community has recognized that fisheries operate in a large, complex, and interconnected ecosystems, which are subject to natural fluctuations and in some cases impacted by long-term man-induced trends.

The FAO believes that the functioning of marine ecosystems is only partially understood and that there is a need for a greater understanding of the impacts of human activities, including fishing, and the potential reversibility of these impacts. While the FAO has been gathering statistics on fisheries since the 1950s, with a few exceptions, the information available on the fisheries themselves is incomplete and often biased.

An investigation of the management and control of fish resources in the Barents Sea, a parallel audit conducted by the Office of the Auditor General of Norway and the Accounts Chamber of the Russian Federation (refer exhibit 12), revealed that:

- there were many sources of uncertainty in the stock estimates and forecasts, and;
- that there is a limit to the extent to which research vessels can examine large ocean areas where there is uncertainty associated with interpretation of data and limited knowledge of how the different stocks in the area affect one another.
- In addition, the statistics on total catches are very deficient, partly because of illegal, unregistered and unreported fishing, and this creates a major problem for stock estimation.

Combined effect

Each of these problems would be bad enough on its own, but all appear to be linked, usually synergistically. Whereas misfortunes that came singly might not prove fatal, those that come in combination often prove overwhelming.

3. Exhibit 1: Summary of the above-mentioned main threats to fisheries and their causes

Threat to fisheries	Causes	Consequences
Overexploitation (especially overfishing).	• Illegal practices (logging, fishing, and poaching) • result of IUU fishing, • lacking management/control resources r • Lacking knowledge about the stocks. • Economics: incentive to maximize fishing effort. • Social and politic factors: create employment;	Collapse of fisheries and other resourcesI think the problem of over exploitation could be emphasised even more. In my understanding, over exploitation can be considered the main threat against the survival of fish stocks (pollution and climate change maybe being the other major threats).

	stimulate economic activity, increased demand and harvesting above or near maximum sustainable levels. Unsustainable management of ecosystems	
Climate change and global warming	Changes in human population, lifestyle and consumption patterns	Changes in the distribution of species, population size, and reproduction timing or migration events and an increase in the frequency of pest and disease outbreaks Major episodes of coral reefs being bleached due to higher water temperatures at surface level
Habitat loss and fragmentation	Change caused by damage to damage to sea beds due to trawling	Decline in distribution, size and genetic diversity of species.
Illegal, unreported and unregulated fishing	Illegal fishing takes place where fisheries operate in violation of the laws of a fishery, either within areas of national jurisdiction, the regional fisheries management organizations or the high seas. Unreported fishing is fishing that has been unreported or misreported to the relevant national authority or regional organization, in contravention of applicable laws and regulations.	Overfishing fishing habitat loss, fishing down the food web.

	Unregulated fishing refers to fishing by vessels without nationality, or vessels flying the flag of a country not party to the regional fisheries management organization governing that fishing area or species.	
Limited knowledge of aquatic ecosystems.	Complexity of ecological systems. Practical limits to the amount of data that can be gathered. Uncertainty in scientific assessments. Lack of clear and forceful scientific advice.	Overfishing
Invasive alien species: Bio-invasion	Introduction of (non-native) alien species (intentional and accidental dispersal by human activities)	Native species threatened or extinct through predation, competition, parasitism and hybridization.
Pollution and nutrient loading	Discharge and runoff (from agriculture and industry), municipal sewage.	Pollutants: disease or death of aquatic populations Nutrient loading: algal blooms and dense flora leading to oxygen depletion and mass mortality of fish and bottom-dwelling organisms .
Mining activities e.g. gold, diamonds, coal, platinum, exploration and production of oil and natural gas,	Explosives, giant drilling and production platforms anchored in sea, waste, dust, chemicals. Most hydrogeologic problems from mining activities are related to the modification of existing groundwater flow	Destroying of fish habitats

sand mining.	system or the creation of new flow systems, the oxidation of sulphide ore deposits during weathering is accelerated by the mining activities, and any resulting effluent may be strongly acidic. Acid mine waters can cause serious environmental degradation to receiving waters. Gold mines use a large amount of mercury. Unfortunately, the mercury is Released into the rivers and land, which is dangerous and harmful.	
Coral bleaching	Fertilizers or pesticides	Coral reefs and plankton lives are destroyed by pollution. Killing of fish.
Ability to find the last fish	Technology	Overfishing.
Destruction of seabed	Ocean trawlers and smaller bottom trawlers	Destroying of fish habitats
Artificial islands	Urbanisation. Tourism development. Infrastructure development.	Destroying of fish habitats. Interrupting the food chain

4. What are the international responses

United Nations Convention on the Law of the Sea

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) and associated agreements provide the framework for establishing a system of international oceans governance, including for fisheries. UNCLOS defines the rights and responsibilities of nations in their use of the world's oceans, establishing guidelines for the management of marine natural resources. In addition, it provides for an exclusive economic zone,

extending 200 nautical miles from the nations shores, within which the state has sole exploitation rights over all natural resources.

Article 61 of UNCLOS establishes the expectation that states manage their fisheries resources sustainably “The coastal State, taking into account the best scientific information available to it, shall ensure through proper conservation and management measures that the maintenance of the living resources in the exclusive economic zone is not endangered by over-exploitation.”

In addition, UNCLOS requires states to either harvest their entire allowable catch within their exclusive economic zone or give the surplus to other nations. This requirement has lead many developing nations that do not have the capability to fish the resources within their areas of responsibility to enter into agreements with developing nations to harvest the surplus stocks.

United Nations Fish Stocks Agreement

UNCLOS only covered fishing matters that occurred within the states 200-mile exclusive economic zone. However, there are many important fish stocks that either live straddling the states exclusive economic zone or that migrate through such zones. The 1995 United Nations Fish Stocks Agreement (UNFA) provides a framework for the conservation and management of straddling and highly migratory fish stocks in high seas areas regulated by regional fisheries management organizations.

UNFA provides for the obligation to use the precautionary and ecosystem approaches when managing these fisheries. It requires states to minimize pollution, waste and discards of fish. It reiterates requirements of states to control the fishing activities of their vessels on the high seas. It provides for the right of states party to UNFA to monitor and inspect vessels of the other state parties, to verify compliance with internationally agreed fishing rules of regional fisheries management organizations. UNFA provides a compulsory and binding dispute settlement mechanism to resolve conflicts in a peaceful manner.

Code of Conduct for Responsible Fisheries

The 1995 FAO Code of Conduct for Responsible Fisheries identifies an internationally agreed upon statement of fisheries management objectives
"recognizing that long-term sustainable use of fisheries resources is the overriding objective of conservation and management, States and sub regional or regional fisheries management organizations and arrangements should, inter alia, adopt appropriate measures, based on the best scientific evidence available, which are designed to maintain or restore stocks at levels capable of producing maximum sustainable yield, as qualified by relevant environmental and economic factors, including the special requirements of developing countries."

The measures promoted by the Code of Conduct include

- Avoiding excess fishing capacity and maintaining the economically viability of fisheries;
- Promoting responsible fisheries;
- Decision-making that takes into account the interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries;
- Protecting the biodiversity of aquatic habitats and ecosystems, including endangered species;
- Allowing depleted stocks to recover or, where appropriate, actively restored;
- Assessing and, where appropriate, correcting the adverse environmental impacts on the resources from human activities; and
- Minimizing pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species, both fish and non- fish species, and impacts on associated or dependent species, through measures including, to the extent practicable, the development and use of selective, environmentally safe and cost-effective fishing gear and techniques.

Also, the Code of Conduct indicates that nations adopt an ecosystem approach. They should assess the impacts of environmental factors on target stocks and species belonging to the same ecosystem or associated with or dependent upon the target stocks, and assess the relationship among the populations in the ecosystem.

The Code of Conduct addresses the role and responsibilities of fisheries management authorities, either for nations or regional fisheries management organizations. It indicates that they should have the capacity for, or recourse to services which provide the following functions:

- the collection of information on the fishery;
- the collection of data on the nature, timing and distribution of fishing effort; and information on the social and economic characteristics of the each fishery;
- the analysis of the relevant information to identify trends in the resources and ecosystem, and in the performance of the fishery to allow for the appropriate changes to management measures to ensure that the objectives for the fishery are being achieved;
- consideration of all relevant information in a decision-making process, including the appropriate participation by the key stakeholders, in order to select appropriate management measures and ensure effective, sustainable management; and
- Monitoring, control and surveillance, designed to encourage compliance with the management measures and, where necessary, to enforce the regulations.

The Code and Conduct calls for precautionary mechanisms to be put in place to ensure conservation, protection, sustainable use and management of fisheries resource for sustainability purpose (a precautionary approach).

Regional Fisheries Management Organizations

Regional fisheries management organizations play an important role in contributing to sustainable fisheries management on a global basis. These organizations bring nations together to address common issues and concerns for conserving and managing mandated fish stocks. The FAO believes that regional fisheries management organizations are the only effective means to govern fish stocks that straddle national jurisdictions or which occur on the high seas. The effectiveness of regional fisheries management organizations depends on the member nations themselves.

National fisheries governance

Experience has shown that fisheries resources are at greatest risk in the absence of strong governance arrangements. Fisheries governance sets out the overarching objectives and principles for the management of fisheries resources. Fisheries governance is international, national and local in scope and has both long and short-term implications. Most of the global fish catch is taken within areas of national jurisdiction which provides an incentive for nations to put in place strong governance and management frameworks.

- ## Fisheries governance and management framework

  Due to the complex nature of the social, economic and environmental factors in which fisheries exist around the world, it is not possible to have one fisheries governance and management approach. Rather, it is appropriate to talk about the diverse and complimentary actions or attributes that could be considered in a nation's fisheries governance and management framework.

  - Adopt relevant international agreements;
  - Adopt national fisheries policies that consider social, economic and conservation objectives;
  - Adopt fisheries legislation that establish the requirements agreed to through international agreements and sets out the legislative framework for the agreed upon fisheries objectives and principles;
  - Establish a national fisheries management authority with the mandate to perform specified management functions set out in legislation and policy;
  - Establish a science capability to understand the status, trends, cause-effect relationships of fisheries resources, and the environment in which they live;
  - Establish the capability to understand the social and economic dynamics of the capture fishery, and the markets in which it trades;
  - Establish strong monitoring, control, and surveillance approaches; and
  - Establish effective enforcement

- ## Monitoring, control, and surveillance approaches.

Monitoring, control, and surveillance approaches need to be adapted to the nation's fisheries resource and the socio-economic circumstances in which the fishery is conducted. A comprehensive approach includes:

- Monitoring – Collection, measurement and analysis of fisheries activity information;
- Control – Specification of the arrangements under which fisheries resources can be harvested; and
- Surveillance – Overview of fishing activity to ensure that legislation, conditions of access, and approved management measures are being followed by participants.

Effective monitoring, control, and surveillance approaches have both preventive and deterrent features. The preventive features encourage voluntary compliance with the legislation, conditions of access, and approved management measures. The deterrence features support enforcement in ensuring compliance by participants. In the end, the strength of the monitoring, control, and surveillance approaches is reflected in the level of compliance that is achieved.

• Enforcement

Enforcement includes inspection, investigation, and legal processes to enforce the national fisheries legislation. Voluntary compliance is undermined when participants see others evading the law and receiving economic returns from their illegal activity.

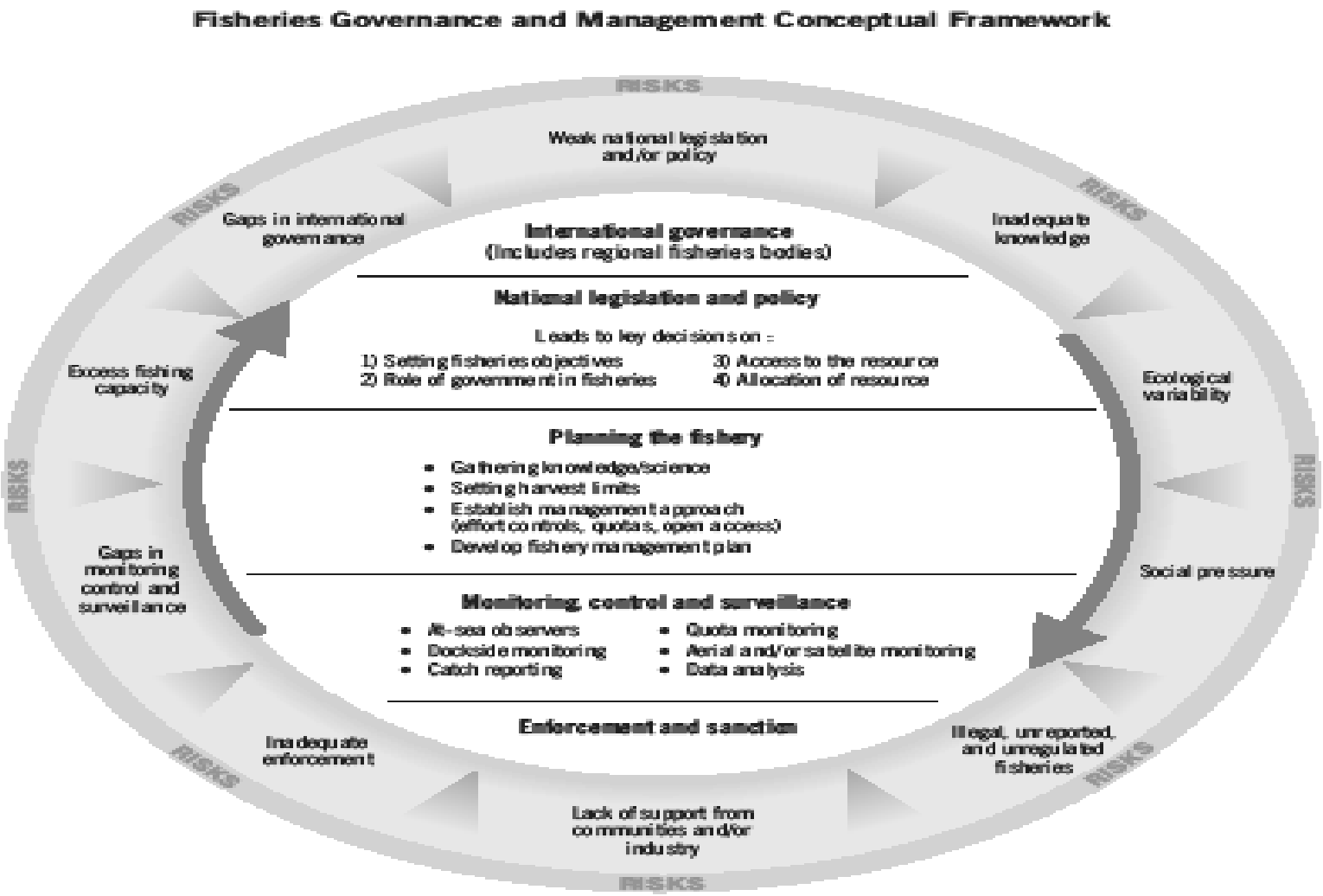
5. Conceptual framework

The idea behind the conceptual framework is that it should provide auditors using the fisheries guidance document with an overview graphic image of potential areas to audit fisheries. The guidance document itself provided information on each of the main subjects covered by the conceptual framework.

Examples of some specific areas that were considered included:

- the role of indigenous peoples
- recreational and subsistence fisheries

- The role of aquaculture (some may see this as a risk to the wild fisheries!)
- Broader environmental issues, such as biodiversity and ecosystem interactions.



Chapter 2: Choosing and Designing Audits of Fisheries

1. Purpose of this Chapter

The purpose of this chapter is to guide Supreme Audit Institutions (SAIs) and auditors, as they choose and design audits of fisheries in particular. There are so many ways of describing the scope (from genetics to species to ecosystems), the threats and the responses of governments (from international conventions to national parks to environmental impact assessments). Even deciding where to start can be difficult.

This chapter is designed to help SAIs and auditors make sense of it all. It includes the following five basic steps that are described in more detail in Exhibit 3.

Step 1. Identify the country's fisheries and threats to it.
Step 2. Understand the government's responses to these threats and the relevant players.
Step 3. Choose audit topics and priorities.
Step 4. Decide on audit approaches: audit objectives and lines of enquiry.
Step 5: General considerations (use of experts, etc).

These steps are only suggestions, and they can be adapted to the situation and needs of a particular SAI. They can be used to define the objectives, scope, and criteria of a single audit of fisheries audit. Even though the steps are presented in a linear way, they are, in fact, highly inter-related and iterative.

2. Comprehensive auditing

An audit of fisheries could examine financial and compliance issues as well as performance issues, depending on the SAI's mandate. For more information about the

SAI's mandate and environmental auditing, see the WGEA paper, *Evolution and Trends in Environmental Auditing* (2007). See Appendix 3 for a list of WGEA resources for SAIs.

3. Cooperation between Supreme Audit Institutions (SAIs) in conducting environmental audits

Cooperation between Supreme Audit Institutions (SAIs) in conducting environmental audits has become more and more common in recent years for good reason: There are many benefits, for both the institutions and the environment. For the institutions, cooperative audits facilitate mutual sharing and learning, capacity building, networking, and identification of best practices. For the environment, many environmental problems transcend political boundaries. Thus, combining forces through cooperative environmental audits allows SAIs to take a broader view of the situation, to consider the various upstream and downstream impacts of domestic actions, and to benchmark best practices.

The paper entitled *Cooperation between Supreme Audit Institutions: Tips and Examples for Cooperative Audits* responds to the ongoing demand for information and ideas on how to make cooperation work effectively.

5. Five basic steps

4.1 Exhibit 2: Five basic steps for an audit of fisheries

Step 1: What are main threats to fisheries?

- Climate change and global warming
- Pollution and habitat loss
- Overexploitation of fisheries and excessive fishing
- Illegal, unreported and unregulated fisheries
- Red tides
- Invasive alien species
- Mining methods (use of explosives)
- Aquaculture methods (Fertilisers and pesticides).
- Tourism development (e.g. artificial islands, theme parks).
- Combined effects of one and more of the above mentioned phenomena

Step 2: What are the government's responses and who are the players?

What?

- Create fisheries management bodies/organisations
- Create FAO Code of Conduct
- Create FAO compliance agreement
- Implement the IPOA-IUU
- Adopting resolutions
- Progress towards World Food Summit and Millennium Development goals
- Implementation of the WSSD-POI
- Launching of task force to address problems
- Establish and implement recovery plan for endangered species
- Control and eradicate invasive species
- Increase fisheries enforcement
- Reduce catch levels

Who?

- National, state, provincial and local (municipal) governments
- Government owned agencies and enterprises
- Non-government organizations: civil institutions, professional associations, local communities, scientific institutes

How?

- International Conferences
- Sign international conventions
- Enact legislation
- Establish policies
- Set programs
- Use economic tools and incentives
- Promote voluntary partnerships
- Conduct environmental impact assessments
- Fund research
- Promote public education

Step 3: What audit topics to prioritise?

- How government regulates fish industry
  - Sub topics:
    - Signatory to International agreements
    - National strategy on fisheries
    - Fishery legislation, policies, etc
    - Law enforcement
- Over-exploitation
- Pollution
- Invasive species
- Endangered species
- Marine & fresh water habitats
- Impact of climate change on fisheries

Step 4: What audit approach to adopt?

- Financial management and regularity
- Compliance with agreements, laws and policies
- Policy coherence
- Performance measurements and results
- Auditing of performance information
- Natural resource accounting
- Accountability, coordination and capacity
- Scientific research and monitoring
- Public education
- Reporting to clients and the public

Step 5: General considerations (use of experts, etc).
Management may require technical advice from specialists in areas, such as ecology, waste, pollution, water, fisheries or other environmental experts to assist in developing accounting estimates and disclosures related to environmental matters, including identifying situations where the recognition of liabilities and related estimates is required, gathering the necessary data, designing the appropriate remedial action plan and calculating related financial consequences.

6.2 Step 1. Identify threats to fisheries

Chapter 1, exhibit 1 gives a general background on fisheries and some of the common global threats and concerns. The conceptual framework in Chapter 1, par 5 provides auditors with a graphic overview of potential areas to audit fisheries. The degree of relevance and urgency of certain issues is unique to each country and, therefore, raises unique concerns about fisheries. To develop domestic approaches for auditing fisheries issues, SAIs must understand the situation in their country and the main threats to fisheries

Key Question How important are fisheries resources economically (e.g. % of GDP, employment, source of foreign currency, royalties earned for the treasury, etc.), and socially (importance to coastal communities, importance for indigenous peoples, etc.)?

Key Question Are the fisheries important as a food resource, recreational activity, commercial enterprise, or to support important indigenous historical customs?

Chapter 1, figure 1 provides an overview of the contributions of fisheries to lively hoods. This includes social benefits, cultural benefits, house hold food security, and employment benefits and cash income.

In addition to their value as sources of food, fisheries resources are valued by the community in many other ways. For example, they have values deriving from people knowing that the environment and the diversity of species are maintained and that fisheries resources exist.

Significant economic benefits from **recreational fishing** flow to many regional areas including jobs in the tourism, tackle, boating, and charter industries. Charter boats support game fishing, estuarine and coastal fishing, skin-diving and whale-watching activities, and there is a diverse boat-hire and service industry.

Indigenous people fished for cultural and religious reasons for thousands of years. Fish are important to them in their daily life, not only as a food source for basic nutrition, but fish and fish habitats also have a strong social, economic and educational value for communities. Fish are caught to supplement the diet not only for health reasons but also for economic reasons as many people, particularly those in remote communities and regional areas, are on a very low income. Fishing restrictions can mean people have to buy fish or alternative food, affecting their economic situation.

Commercial or industrial fishing is the activity of capturing fish and other seafood for commercial profit, mostly from wild fisheries. It provides a large quantity of food to many countries around the world. Fishing methods vary according to the region, the species being fished for, and the technology available to the fishermen. A commercial fishing enterprise may vary from one man with a small boat with hand-casting nets or a few pot traps, to a huge fleet of trawlers processing tons of fish every day. Commercial fishing gears today are surrounding nets, trawls (e.g. bottom trawl), dredges, hooks and lines, gillnets, entangling nets and traps.

Key Question What is the status of important fish stocks in the country? Are they fully utilized, endangered or is there potential to derive further "untapped" benefits from the existing fisheries resources?

FAO's global list of fish stocks; ranked as either "overexploited," "depleted," or recovering by region: -

Underexploited: Undeveloped or new fishery. Believed to have a significant potential for expansion in total production;

Moderately exploited: Exploited with a low level of fishing effort. Believed to have some limited potential for expansion in total production;

Fully exploited: The fishery is operating at or close to an optimal yield level, with no expected room for further expansion;

Overexploited: The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse;

Depleted: Catches are well below historical levels, irrespective of the amount of fishing effort exerted;

Recovering: Catches are again increasing after having been depleted

Snapshot of the global situation: Of the 600 marine fish stocks monitored by FAO:

3% are underexploited

20% are moderately exploited

52% are fully exploited

17% are overexploited

7% are depleted

1% is recovering from depletion

Source: FAO's report "Review of the State of World Marine Fisheries Resources", tables D1-D17, ftp://ftp.fao.org/docrep/fao/007/y5852e/Y5852E23.pdf

Key Question What is the status of important fish habitat (disappearing, degrading in quality, or supporting healthy fish populations, etc.)?

Fish habitat is any area in an aquatic ecosystem that provides something important that fishes need to live. This can include:

Food: Like all animals fish must eat. The type of food an area can provide for fish depends on both the type of river or lake bottom (substrate) and the type of land along the shoreline (the riparian zone).

Shelter: Fish need places to hide from predators and competitors. They may also need places to rest if there is a strong current. Areas behind rocks, around sunken logs and branches, among patches of vegetation, or in deep pools or undercut banks all provide fish with places to escape.

Migration routes: Fish often travel a great distance between where they live and eat, and where they reproduce. Fish must be able to swim through all the areas in between if they are to be successful in their travels.

Places to reproduce: Most fish are very particular about where they will lay their eggs and raise their babies. They will only reproduce if they can find the right type of substrate and the right water quality.

Water quality: Most fish species have very specific temperature ranges in which they can live. They are also sensitive to sediments, pesticides or any other pollutants in the water. All of the places fish need for habitat must have the right water quality or they will not be able to live there.

Key Question: What are the fisheries resources in the country?

What are the global situation with regard to fishery resources?: The large number of stocks that are either fully or over-exploited indicate that the maximum potential for the world's marine capture fisheries has been reached and that management measures are needed to reduce exploitation. In particular, more attention has to be given to highly migratory species, to stocks that are shared between two or more administrative regions, and to stocks in the open ocean. Despite the social and economic importance of fisheries, attempts at sustainable management have been unsuccessful in many parts of the world and a global response is urgently needed. An ecosystem approach to fisheries is called for, protecting and conserving ecosystems while providing food, income, and livelihoods from fisheries in a sustainable manner. A combination of measures has been proposed within this framework, including banning some fishing practices, setting up marine protected areas, and constraining access rights.

The products of inland fisheries provide an essential part of the diet of many people around the globe, especially in developing countries yet they are difficult to assess consistently or comprehensively. Human impacts on ecosystems – in the form of invasive alien species, pollution, habitat fragmentation and changes in the flood cycle – reduce the ability of fish stocks to recover from fishing pressure. Fishery management should take these threats into account in order to safeguard and enhance existing inland fisheries that provide food security for millions of people

(**Source**: Scientific Facts on Fisheries: Latest data. http://www.greenfacts.org/en/fisheries/#3.)

Auditors could consider the following:

- **Economic sectors and activities that depend on fisheries resources.** The fisheries sector could occupy a very important place in the socio-economic development of a country. It has been recognised as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries, and is a source of cheap and nutritious food besides being a foreign exchange earner. Most importantly, it could be the source of livelihood for a large section of economically backward population of a country. The main challenges facing fisheries development in the country includes accurate data on assessment of fishery resources and their potential in terms of fish production, development of sustainable technologies, yield optimization, harvest and post-harvest operations, landing and berthing facilities for fishing vessels and welfare of fishermen. In a country with a large fishing industry, sustaining the fish population is crucial and should be managed in a way that maintains integrity of the ecosystem.
- **The nature and sensitivity of various types of ecosystem in the country.** For example, are the ecosystems mainly marine, freshwater, or terrestrial, or are they combinations? Ecosystems of coral reefs, wetlands, mangroves are more fragile and often need specific protection.
- **The contribution that the country's ecosystem goods and services make to the national economy and well-being.** For example, are wetlands and mangroves important to protect against flooding?
- **The nature and status of species in the country.** For example, are any fish species endemic or endangered?

Key Question: What are the key threats to fishery resources?

Chapter 1 focuses on the threats (and their causes) to the resources, such as described in the section, The auditor must now understand the specific threats that exist in the country and the risks that these threats pose to economic development, social prosperity, and the sustainable management of fisheries.

In general, it is not the SAI's role to assess the main threats—it is the government's role. To identify local threats, the SAI can seek information from the government agencies that

are charged with controlling and overseeing fisheries in the country. Other sources of information include universities, non-governmental and international organizations, local and state councils, laws, and the media.

When identifying threats to fisheries, auditors should remember that behind the direct drivers are indirect drivers, such as demographic, economic, socio-political, cultural, religious, scientific, and technological factors that cause changes to fisheries.
In some cases, governments may not have adequately assessed the threats to fisheries. As a result, auditors may have to consult NGOs, universities, or any organizations that have done this kind of assessment, or SAIs may hire consultants to help them. Depending on what their mandate is, SAIs can make recommendations based on audit findings to the government. However, most of the time, they will simply report that the government has not yet assessed the threats to fisheries and their consequences.

Finally, SAIs need to understand the causes behind these threats (see Chapter 1, Exhibit 1 and 2). Many factors can drive or aggravate the threats discussed in the section

6.3 Step 2. Understand the government's responses to these threats and the relevant players

Governments play a crucial role in protecting fisheries. The conceptual framework in Chapter 1, par 5 refers.

Once a SAI has understood the threats to fishery resources, it needs to understand what the government is doing to mitigate or prevent them (what programs exist and which policy tools are used) and who is responsible. Armed with this information, SAIs can then consider the traditional questions, such as audit mandate, risk, auditability, and materiality, to select and prioritize audit topics.

Governments also manage fishery stocks using a variety of methods, such as assigning fishing rights under authority of a permit, determining fishing quotas to each permit, setting minimum size limits, placing restrictions on the type of gear that may be used to catch, having closed seasons, having closed areas and restricting the effort (e.g. limiting the number of fishermen on a squid jigging boat, controlled access to the resource, etc. Refer Appendix 7 for more detail.

Key Question: What is the government doing about these threats?

As noted in the section, How can fisheries be protected (Refer to Chapter 1), governments can and do take action to protect and conserve fishery resources. They regulate fishing, exploitation of resources; and they control pollution. They can and do use a variety of public policy tools to authorize, finance, and implement these actions. Public policy tools include international agreements, laws, programs, and public education. The following are descriptions of most common environmental policy tools and questions for auditors.

International conventions and treaties. Since many environmental issues affect the entire planet, they require the concerted action of national governments. Various bilateral, regional, and international environmental agreements (IEAs) have been signed by national governments to conserve natural heritage. SAIs can play a major role in auditing these agreements and to what extent governments comply with them and in reporting on the government response on obligations.

To learn more about international conventions and treaties, see the WGEA publication, *The Audit of International Environmental Accords* (2001), at http://www.environmental-auditing.org/intosai/wgea.nsf/viewContainerPub/eng01pu_studyaudinterenvaccord.pdf/$file/eng01pu_studyaudinterenvaccord.pdf

Auditors should find out from the agency responsible for international relations if the country has signed any regional agreements related to fisheries. These agreements are numerous, and it is not the objective of this paper to describe them. However, Appendix 4.contains a list of regional agreements, by continent.

Legislation and regulations. Governments have a variety of legal powers and tools that they can use to address environmental problems and activities. Legal powers include legislation (acts of Parliament or Congress), regulations, permits, licences, bylaws, and ordinances. Governments have varying roles and responsibilities.

Usually, national laws are required to give effect to international agreements. For example, if a country has ratified an agreement, the auditor should find out whether corresponding national legislation has been introduced, and whether it is being enforced. In some cases, countries enact specific laws to implement specific agreements. More often, a single piece

of legislation (such as an environmental protection act) can be used to address a number of agreements.

In other cases, national laws are unrelated to international agreements and are simply intended to respond to national needs. Legal powers are used broadly to establish national parks, protect species, limiting pollution, and control invasive species.

For many SAIs, the existence of national laws (and the supporting legal tools) is a prerequisite for conducting compliance audits.

Policies and programs. Governments can also formulate national policies on fisheries in particular. Policies tend to set direction, but are usually not prescriptive or enforceable. A policy might be a statement of intent or of a desired outcome. In some cases, policies can be supported by specific procedures (action plans) and (funded) programs. Success implementation of programs requires that they have sufficient monetary resources, skilled people, goals and authorities. Government should set performance measurements regarding the implementation of their policies or programs.

Governments also establish and support research programs on fisheries. These research programs are often linked to monitoring databases.

The Auditor General of Canada conducted an audit on fisheries and its findings were that the implementation of the Oceans Act and subsequent oceans strategy has not been a government priority. Fisheries and Oceans Canada has fallen short of meeting its commitments and targets: It has finalized no integrated management plans and designated only two marine protected areas, Refer Exhibit 6.

Economic tools and incentives. As other types of policy tools, governments use grants, loans, subsidies, taxes, user charges, and service fees. In some cases, using these types of tool is grounded in financial or environmental legislation.

Environmental impact assessments. Environmental impact assessments (EIAs) are used to examine projects, programs, policies, or activities to ensure that potential impact on the environment, including on fisheries, is carefully considered before legislation is enacted. EIAs are critical planning tools, given the serious and irreversible damage that humans can cause to the environment. Failure to consider such damage and set appropriate mitigation measures before a policy, program, or project is launched can lead to significant

environmental degradation, damage to human health, and economic costs. In some governments, such EIAs are legislated. In others, they are part of the policy tools.

Voluntary partnerships. Voluntary partnerships are agreements between governments, non-profit organizations, or corporations that come together for a common purpose without legislation.

Key Question: Who are the players and what are their roles and responsibilities?

Potential role players: Government, Managers of factories, Angling clubs, Boat clubs, Conservation NGOs, Civil Society, Community, Health and safety inspectors.

The auditor needs to identify the major players involved. Players can be numerous and can have both converging and diverging interests. The auditor must define each player's role, activities, and scope of influence.

Players may include government departments and agencies at the national (federal), provincial, state, or, local (municipal) level. Government control and preservation frameworks for fisheries vary from country to country. In many countries, a government authority is in charge of the major environmental policies at the national level, including the conservation of fisheries). Among other activities, this authority is responsible for

- ensuring that environmental laws are being enforced by public and private entities
- preparing environmental standards,
- defining environmental policies,
- issuing licences to limit the volume or concentration of pollutants discharged into the environment,
- monitoring to identify potential environmental damage, and
- applying fines when laws are violated.

In some countries, national (federal) agencies are responsible for these activities. In others, responsibilities may be delegated to lower administrative levels. National (federal), state, provincial, and local (municipal) governments have different powers, and their specific roles and responsibilities can vary widely. For example, national governments tend to develop and formulate policies, and lower levels of government often implement those policies. National governments enact national legislation and regulations, and local levels of

government use tools, such as permits and licences. These are not fixed rules, however, so it is important for auditors to understand where an issue fits into the hierarchy, which level of government is involved, and how that level is involved.

Non-government organizations, such as civil institutions, members of social movements, professional associations, local communities, non-governmental organizations, business sectors, academic institutions, and scientific institutes, may have a role to play. In some countries, it is also important to highlight the key role played by indigenous communities. Many countries have established knowledge resource centres, databases, and networks to preserve and disseminate traditional ecological knowledge.

In addition to their roles as policy-makers and regulators, some governments may be "operational enterprises" in their societies. Government actions and projects, can have a negative impact on fisheries. Auditors may wish to identify the state-run agencies and enterprises that affect fisheries.

In 2005, the Office of the Auditor –General of Botswana conducted a performance audit of the fishing industry to determine how unregulated fishing activities, the absence of a policy framework, and operational mechanisms have affected the sustainability of fisheries and the environment. Refer Exhibit 5.

6.4 Step 3. Choose audit sub topics and priorities

The auditor is now ready to identify possible audit sub topics (Exhibit 3 refers). As noted throughout this paper, there are many ways of framing and defining audit sub topics related to fisheries.

SAIs may select an overall threat to fisheries (for example, invasive species) or select a topic as it affects a specific habitat (for example, invasive species in marine habitats). The important thing is to define the focus of the investigation. Refer exhibit 3. It is up to the SAI to choose audit (an) sub topic (s) and set priorities, which involves answering the following questions:

Key Question: What are the highest risks to fisheries?

The SAI will need to do a risk analysis to define where its actions will be most relevant and useful. When assessing threats to fisheries, the auditor should consider the magnitude of the actual and potential impact on the environment, society, and the economy. When determining the damage to the environment, the auditor should question how reversible that damage is—irreversible damage is especially risky. In addition, the auditor must consider how intense the damage is, since it is a priority to address and prevent acute threats. Usually, auditors rely on their government's assessments.

However, if necessary, they may request help from experts in the field.
In the case of specific ecosystems, auditors need to consider existing threats, the level of habitat degradation, and the effects of the damage on the local communities that benefit from the goods and services. For example, a SAI may decide to audit the government's actions to protect mangroves, because they are a very important spawning area or because they play an important role in protecting shores against tsunami. Since fisheries are important for the survival of coastal communities, a SAI may audit how the government is assessing the role of mangroves in assuring sustainable fisheries.

For some SAIs, the level of expenditure by the government is a critical factor; some monies can be earmarked for specific legislation and directives.

The Netherlands Court of Audit, tabled a Report on 30 October 2008, entitled Sustainable fisheries. This audit was conducted due to the worldwide concern about the consequences of intensive fishing at sea. Many species of fish are being overfished. EU policy to combat overfishing in European waters is directed at the "sustainable management" of marine live, taking account of both environmental and economic interests. The Netherlands Court of Audit investigated whether the Netherlands was succeeding in implementing and enforcing EU fisheries policy and whether the sustainability goals were being achieved. Refer Exhibit 8.

Key Question: Does the SAI have the mandate and authority?

After identifying the players, the SAI should determine which ones it has jurisdiction over. Even in the government sphere, it may be able to act only at the national (federal), state, provincial or local (municipal) level. Private players (for example, the private sector, state-run enterprises, or non-government organizations) that are financed by public resources may also fall under the SAI's jurisdiction. Despite the lack of jurisdiction over some players,

the auditor must know who they are and what role they play, since the government can regulate or influence their behaviour through public policy tools and instruments. If the most influential players are not subject to the SAI's jurisdiction, auditing the issue may have little value.

Key Question: Is the topic (fisheries) auditable?

Appendix 9 provides the auditor with information of countries which conducted audits on fisheries since 1995. It contains the name of the country, title of the audit, type of audit, type of fisheries and the main risk investigated.

First and foremost, the auditor should decide whether there are suitable sources of criteria against which to conduct the audit.

Has the government signed international fisheries-related agreements?

- Has the government enacted laws and regulations?
- Has the government made policy statements clear?
- Are fishery-related topics included in state budgets?
- Does the government receive external funding from international organizations (for example, the Global Environmental Fund or the European Union) to fulfill its fisheries obligations related to international agreements?

Key Question: Can an audit make a difference?

A SAI will also have to assess where it will be most effective in improving the way the government protects and conserves fisheries. The auditor may consider the following questions:

- What are the interests of the users of the audit report, particularly the primary users (e.g., Parliament)?
- What is the relative significance of the topic to overall governmental activities?
- What is the impact of the audit likely to be? Is the audit likely to make a significant difference?
- Has fisheries been audited before?

- What is the relevance of fisheries to protect basic human needs?

The SAI may then decide that it is not worthwhile to audit fisheries at this stage. On the other hand, the SAI may include a line of enquiry related to biodiversity in an environmental audit, even though biodiversity is not the main issue. For example, in an audit of climate change, a SAI may include a line of enquiry on the effect of climate change on biodiversity.

After determining where their actions will be most useful and choosing the sub topic (s), auditors can start planning the audit

6.5 Step 4. Decide on audit approaches: audit objectives and lines of enquiry

For this last step, the auditor needs to select an audit approach and choose audit objectives and lines of enquiry .

Key Question: What are the most relevant objectives and lines of enquiry for this audit?

The following are some possible lines of enquiry and associated researchable questions. **See Exhibit 3** for more information on how auditors can combine various topics and approaches.

Financial management and regularity. A supreme audit institution (SAI) can undertake an audit with an environmental focus using a regularity (financial and compliance) mandate. It is not necessary to have a performance audit mandate to conduct an audit with an environmental focus. A SAI may feel that their greatest skills and experience lie in the audit of financial and compliance issues. It would make sense for them to use this experience in an environmental audit. The INTOSAI WGEA 2003 paper " Environmental audit and regularity auditing illustrates the possibilities for conducting audits with an environmental focus using a financial and compliance framework.

The costs to governments of developing and implementing environmental policies and obligations are increasingly significant. A SAI should recognize that environmental costs, liabilities and asset impairments affect the preparation and audit of financial statements.

The regularity auditor will need to assess the completeness and accuracy of the figures reported.

The objective of an audit of financial statements is to enable the auditor to express an opinion on whether the financial statements are prepared, in all material respects, in accordance with an identified financial reporting framework. Material respects can be directly linked to environmental costs, obligations, impacts, and outcomes. The audit of financial statements requires the auditor to consider environmental matters as part of the regularity audit.

Having acquired a sufficient knowledge of the business, the auditor assesses the risk of material misstatement in the financial statements. This would include the risk of misstatement due to environmental matters, namely environmental risk.

Examples of environmental risk include:

- compliance costs arising from legislation; and
- impact of non-compliance with environmental laws and regulations.

Using traditional financial audit techniques, auditors can investigate the use of public funds in projects and programs that focus on conservation and biodiversity.

- Are the funds spent on biodiversity (fishery) programs correctly administered, according to spending authorities and regulations?
- Are adequate financial resources allocated to protection programs?
- Is the disbursement of funds monitored?
- Against what criteria is the disbursement of funds measured?
- Do official trade-offs exist in policies? If so, how do the estimated benefits balance against the losses in biodiversity?

In 2006 the Board of Audit of Japan conducted a regularity audit of the payment of subsidies to Japanese Fisherman. These subsidies were intended for fisherman that disposed of unnecessary boats or equipment. The objective of the audit was to evaluate the regularity of the national fisheries policies. Refer Exhibit 9.

Compliance with agreements, laws, and policies. An audit of fisheries can address the consistency of government strategies, actions, and programs with laws and regulations,

or with the international conventions, to which the country is a signatory. It may answer the question: Is the government meeting commitments it made in treaties, laws, policies, and programs? The following are some of the lines of enquiry:

- Are there international agreements that protect fisheries within the country's geopolitical borders or shared protected areas?
- Is the country following the rules and agreements determined by the international conventions that it is a signatory to?
- Has the government enacted laws and regulations to implement its international commitments and domestic policies?
- Are there any conflicts or gaps between national policies on fisheries and the country's environmental laws?
- Are environmental laws and regulations being adequately enforced?
- Is there any conflict between national policies and the international conventions that the country is a signatory to?

The SAI of the European Union tabled a Special report on the control, inspection and sanction systems relating to the rules on conservation of community fisheries resources. The objective of this audit was to find out if the Commission and the Member States are taking the necessary steps for an effective system of control, inspection and sanctions for the conservation of fisheries resources. Refer Exhibit 10.

Policy. Auditing policies and programs on domestic biodiversity can be valuable. Policy on biodiversity usually provides a macro vision. Interesting lines of enquiry include the following:

- Are government policies being complied with?
- Has the government developed policies that address the protection and conservation of biological resources in the country? Do the policies deal with the most important threats?
- Have general policies on biodiversity been addressed, specified, and executed in laws and other legal instruments such as plans and budgets?
- What protective measures, with the support of bordering countries, can be taken to protect ecosystems that straddle geopolitical borders?

- What kinds of changes can be suggested that would make national policies achieve better results?

Performance measurement and results. Audits of fisheries can assess the performance of government programs' actions to deal with threats to fisheries and ensure the conservation of habitats or ecosystems. SAIs may wish to evaluate the traditional three E's—effectiveness, efficiency, and economy—of the programs. They may also wish to assess the processes used to define and measure success and the results of these processes.

- Have the relevant agencies defined expected results for their programs?
- Have they developed indicators and measures for these results and are they being monitored and tracked?
- Is the data used to measure performance reliable?
- Are policies and programs on fisheries achieving their objectives and intended results?
- Why are policies and programs not achieving their objectives and intended results, and how can the causes be countered?

In 2003 the National Audit Office (NAO) conducted an audit of the role of the Department for Environment, Food and Rural Affairs in enforcing fisheries regulations on vessels fishing in the waters around the English coast and in respect of fish landed at English ports. The report examined (1) the role of the Department in enforcing fisheries regulations, (2) the effectiveness of the Department's methods in detecting, dealing with and deterring infringements of regulations, and (3) the management of its enforcement activity, which ultimately sought to maintain the economic viability of the fishing industry. Refer Exhibit 11.

Auditing reported information on environmental performance

When information is available to do so, the audit of the reported performance information is a preferred way of auditing the performance of an entity. This is done by evaluating the management measures in place to ensure that information on the performance against identified indicators is valid. In other words, when an implementing agent claims successes in achieving, for example a reduction in fishing of certain species (e.g. cod), the auditors would audit the validity of these claims by asking questions such as:

What measures did management put in place to ensure that the information reported is accurate reflection of reality?

How does management know that the entity:

- Achieving its objectives in terms of services, delivered and reaching targets (effectiveness).
- Required resources have been obtained economically (economy).
- Resources have been utilized to deliver services in an efficient manner (efficiency).

When looking at the information management reported against the objectives, the auditor is only establishing whether reliance can be placed on the information presented and the statements made by management. The validity, accuracy and relevance of reported information is further investigated.
When reported information does not exist, this indicates that there is no way of knowing whether the action plans are working and resources have been used to their potential.

Natural resource accounting

Natural resource accounting is one of the tools which may be used to support environmental policy, alongside instruments such as environmental impact assessments at a project level, integrated environmental and economic analyses for policy work at the sectoral and macro-economic levels, and public investment/expenditure reviews (Kirk and Hamilton, 1996). The provision of information on the income and expenditure associated with the maintenance or restoration of natural resources can also be an aim of natural resource accounting. Generally speaking, natural resource accounting is seen as a means of demonstrating linkages between the environment and the economy (Refer to the INTOSAI WGEA preliminary study paper "Natural Resource Accounting, Working Group Document, 25 May 1998. This paper is currently revised by the SAI of America, as part of the WGEA 2008-2010 work plan).

- Did government compile a plan of approach for natural resource accounting and is there policy for encouraging such accounts to be complied and used?
- Is natural resource accounting used by government in the decision-making process and did government departments create environmental accounts?

Accountability, coordination, and capacity. Because biodiversity topics such as fisheries, frequently involve many government entities and other players, SAIs could

assess how departments and agencies have demonstrated good governance, for example, whether they can meet their responsibilities for environmental programs and actions, and whether they have the mechanisms to coordinate those actions.

- Are the roles, responsibilities, and accountability of relevant entities (for example, ministries and departments) clearly defined?
- Are any necessary mechanisms to coordinate action in place?
- Do the entities have adequate financial and human resources to carry out their roles and responsibilities?
- Has the staff received adequate training?
- Have the entities developed robust internal management systems?

Scientific research and monitoring. The government's capacity to undertake research and monitor ecosystems can directly affect how fisheries is protected. In many countries, this responsibility is legally defined. The following are suggested lines of enquiry:

- Does the government have the scientific knowledge (in-house or consultant-based) to prioritize its actions on biodiversity?
- Are there adequate systems in place to monitor the status of fisheries?
- Is the government developing and maintaining databases on fisheries either in-house or with research institutions?
- Is information being shared between the national and international monitoring systems?
- Does the public have access to information on monitoring activities?

SAI of Norway: The Office of the Auditor General's Investigation of the management and control of fish resources in the Barents Sea and the Norwegian Sea – a parallel audit conducted by the Office of the Auditor General (Norway) and the Accounts Chamber of the Russian Federation. The Joint audit report covered six topics: (1) extent of illegal/unregistered cod fishing in the Barents Sea and the Norwegian Sea; (2) implementation of decisions taken by the Joint Norwegian-Russian Fisheries Commission; (3) Resource control in Norway; (4) Sanctions for violations of laws/regulations relating to the use of living marine resources; (5) distribution and filling of quotas in Norway; (6) Norwegian-Russian research programmes in Norway.

Objective: To assess the efficiency and effectiveness of national follow-up and implementation of bilateral agreements between Russia and Norway and decisions taken by the Joint Norwegian-Russian Fisheries Commission. Refer exhibit 12.

Public education. National and international, environmental protection programs often have a public education component. Large sums of money can be spent even though the success of these programs has not been measured. SAIs may include, among others, the following lines of enquiry:

- Is the government allocating appropriate funds for public outreach and education at each phase (formulation, planning, implementation, and evaluation) of a policy?
- Is the government encouraging the public and private sectors to protect fisheries?
- Has the government integrated fisheries concerns into its public outreach strategies?
- Is the government measuring its public outreach results?

Reporting to clients and the public. The reporting requirements of public policies can be an important source of audit evidence. For example, many international environmental agreements require that national governments report to United Nations agencies or other international agencies (e.g., donor organizations). In addition, regulated entities within a country may be required to report to regulatory agencies that, in turn, may report to their Parliament or equivalent.

Proper monitoring, reporting, and accountability processes—which include collecting data, performing analyses, and reporting on findings—should be in place. SAIs can ensure that such reports and performance comply with appropriate standards, rules, and regulations. SAIs may consider:

- How are departments and agencies reporting their results?
- Are departments and agencies meeting international and national reporting obligations?

Summary of audit approaches

Exhibit 3 summarizes the many possible ways auditors can combine biodiversity topics and audit approaches. An audit of fisheries may cover more than one of the listed sub topics, and more than one audit approach can be used for each sub topic. However, as with any audit, auditors need to be careful when they decide what the scope will be. In particular, those who are new to auditing fisheries need to try and choose an audit scope that will be manageable.

Exhibit 3: Fishery sub topics and audit approaches

Fishery sub topics	Audit approaches (lines of enquiry)							
	Financial management and regularity	Compliance, agreements, laws and policies	Policy	Performance measurement and results	Accountability, coordination and capacity	Science, research and monitoring	Public education	Reporting results
National strategy on fisheries								
Fishery legislation, policies, etc								
Law								

enforcement								
Overfishing								
Discards								
Invasive species								
Endangered species								
Impact of climate change on fishery resources								
Illegal trade of species								

For example, one SAI decided to audit a government program that was implementing the international Convention for the Control and Management of Ships' Ballast Water and Sediments. The audit will cover two sub topics: endangered species and marine fishery resources, and the audit team decided to evaluate the program to determine whether

- funds allocated to the program are being managed according to national financial law (financial management and regularity);
- the management plan for ballast water, adopted by the responsible authority, respects the international convention (performance measurement and results);
- the authority has been measuring the results of its program (performance measurement and results);
- the program is bringing expected results (performance measurement and results);
- the authority responsible for the program is reporting to the Secretariat of the convention, as requested, and to the relevant players involved with invasive species and marine transport (reporting results and compliance and agreements, laws, and policies); and
- the authority is using the information from its reports to improve its program (reporting results).

6.6 Step 5: General considerations (use of experts, etc).

Since biodiversity issues can be complex and difficult to understand, many SAIs hire experts to help them understand particular issues or to clarify some points. For more information, see the WGEA paper, *Evolution and Trends in Environmental Auditing* (2007)—in particular, the Frequently Asked Questions (FAQ)—for advice on using experts.

External experts can be useful at various stages of an environmental audit. SAIs use external experts for the following purposes:

Identifying specific issues or audit topics—External experts can provide advice on current or potential issues or identify major work for a SAI. Experts can identify issues to be raised to elected assemblies. Experts can also identify emerging environmental and sustainable development issues for SAIs to consider. Some SAIs have a "panel of advisors" made up of leading governance and policy thinkers on topics including the environment. They can meet regularly (semi-annually or annually) to discuss issues and potential audit topics. Experts can identify the most important aspects of a large environmental topic for audit. With respect to guidance on a specific audit or environmental topic, external experts can help auditors scope audits into a manageable scale, provide guidance on audit objectives, and identify areas of higher risk or weaker areas of management.

Providing expert opinions against which to compare government performance—Expert opinions can be gathered for a specific audit, a specific environmental assessment, or a specific environmental topic. Experts have been used to assess the sustainable use of a natural resource examined within an audit. Experts are often affiliated with universities, and the opinions presented by the experts can be included in appendices to the audit report.

Cooperating with carrying out the audit or completing specific work on behalf of the SAI—Experts may directly assist with the examination of certain types of audit work.

Reviewing and communicating reports after they have been published—Experts may be consulted after an audit has been published. Experts can be used to advise on technical details when quantifying the impacts of their audits.

Risks associated with using external experts—The SAI remains responsible for ensuring that the auditing standards are applied.

- This means that the auditor should obtain reasonable assurance about the expert's reputation and competence. In addition, it is necessary to ensure that experts do not have close relationships to the auditees. This can be challenging in a smaller country.
- If the auditor intends to use the results of such work as part of the audit, the auditor considers the adequacy of the work performed by environmental experts for the purposes of the audit, as well as the expert's competence and objectivity. The auditor may need to engage another expert in considering such work, to apply additional procedures, or to modify the auditor's report.
- As the environmental area is an emerging specialty, the expert's professional competence may be more difficult to assess than is the case with some other experts, because there may be no certification or licensing by, or membership of, an appropriate professional body. In this situation, it may be necessary for the auditor to give particular consideration to the experience and reputation of the environmental expert.
- Timely and ongoing communication with the expert may assist the auditor to understand the nature, scope, objective and limitations of the expert's report. It is also necessary for the auditor to discuss the assumptions, methods, procedures, and source data used by the expert.

Resources: Audits on fisheries

For list of audits performed on fisheries, please refer to Chapter 3, Appendix 5 and 9.

Examples of additional Resources

- **INTOSAI WGEA Guidance material of auditing climate change:** The SAI of Norway, as the Project Leader introduced during May 2008 a project plan about developing guidance material on how to audit climate change, or rather on how to audit the governmental response to climate change. The guidance material, which must be finalized by 2010, has to be relevant for all SAI's/countries, but allow them to take into account their differences.

- The Common Fisheries Policy (European Union's instrument for the management of fisheries and aquaculture. It is increasingly formulated from the perspective of sustainability). http://ec.europa.eu/fisheries/cfp_en.htm

- The economist of 3 January 2009 issue "Special report on the SEA

- *A Performance Audit on Biodiversity — Some Lessons Learned* (Norway), INTOSAI WGEA 11th Meeting Workshop Paper, 2007

- *Increasing the Impact of Environmental Audits* (Norway), INTOSAI WGEA 10th Meeting Workshop Paper, 2005

- *Guidance on Conducting Audits of Activities with an Environmental Perspective*, INTOSAI WGEA Publication, 2001

Chapter 3: Examples of audits of fisheries

The main objective of this chapter is to give Supreme audit institutions (SAI's) information about audits of fisheries from around the world. Whenever possible, the examples include information on the audit, objectives, scope, findings and recommendations. A questionnaire (Appendix 8) was distributed to all members on 29 September 2009.

Examples of audits on fisheries: Exhibits 4 – 11 represent examples of audits on fisheries. Appendix 9 shows a summary of the outcome of the survey. As with any synopsis, there is a risk that some part of the intended message of a report could have been lost in the process.

Exhibit 4: Audit of fisheries. An Australian Perspective

Since late 1997, the Australian Customs Service (Customs), the Department of Defence (Defence), and the Australian Fisheries Management Authority (AFMA) have been patrolling Australia's Southern Ocean Exclusive Economic Zones (EEZs) and apprehending fishing vessels operating there illegally. Following an incursion into Australia's extensive Southern Ocean EEZs by an illegal fishing vessel in August 2003 the then Government announced a program to deter, detect, and apprehend vessels conducting illegal, unreported and unregulated(IUU) fishing in this zone.
The Government contracted an armed vessel capable of year round patrols in the challenging conditions of sub Antarctic weather. The vessel is the *Oceanic Viking*.

Audit scope and objective

The objective of the audit was to assess whether Customs has implemented effective measures to control IUU fishing in the Southern Ocean. The audit examined Customs' management and coordination of enforcement operations in the Southern Ocean, with particular emphasis on (1) the approach to assessing and reporting SOMPR program performance, and whether outcomes are being met; (2) coordination with other stakeholder agencies to meet program outcomes; (3) the operational planning framework, management of human and physical resources and contract management; and (4) the management of the deployment and operation of program maritime assets.

Conclusion

Customs procured and operates a vessel capable of patrolling. Customs has consistently exceeded its target of at least 200 sea days patrolling annually, and has performed that work within its budget. Customs completed negotiations with France (which shares common Southern Ocean

maritime boundaries with Australia) to patrol the Southern Ocean Patagonian Toothfish fisheries. This has improved patrolling effectiveness for both countries by reducing the likelihood that patrols in the Southern Ocean are duplicated, and increasing the number of patrols, and time spent patrolling, the Southern Ocean. One IUU vessel has been sighted and apprehended in Australia's Southern Ocean EEZ.. This low level of IUU activity indicates that one of the original desired outcomes of the SOMPR program to protect Australia's Patagonian Toothfish Fishery from IUU fishing is being achieved. Customs has successfully implemented measures to control IUU fishing in the Southern Ocean. It is important that Customs continues to update its assessment of the threat of IUU fishing. To enable Customs to provide this assurance and to support policy decisions about the future shape of the program, it should: develop an approach which provides an assessment of the SOMPR program's performance and the extent to which the program's activities contribute to the intended outcomes; and develop a strategic plan for Southern Ocean patrolling, identifying patrolling options for government after the conclusion of the program on 30 June 2010.

Customs receives services and advice from other Australian Government agencies. Customs leases the *Oceanic Viking* from a private firm. The measures Customs has introduced to manage the contract could be improved by specifying clearly the roles and responsibilities of Customs' Contract Manager.

Source: The Auditor-General Audit Report No. 6 2008-09, Performance Audit, Illegal, Unreported and Unregulated Fishing in the Southern Ocean, Australian Customs Service, ISSN 1036, ISBN 0 642 81035 4

Exhibit 5: Audit of fisheries: Botswana experience

SAI of Botswana: Fisheries in Botswana

In 2005, the Office of Auditor General of Botswana conducted a performance audit of the fishing industry to determine how unregulated fishing activities, the absence of a policy framework, and operational mechanisms have affected the sustainability of fisheries and the environment.

Audit objectives

Determine whether the Fisheries Division of the Department of Wildlife and National Parks (DWNP) had adequate guidance and operational mechanisms to manage and protect the fishing industry by determining the following (1) whether the Division had a policy framework with clear objectives; (2) how much information was collected to devise long term management plans and usage strategies for the fisheries to provide protection, regulations, and the sustainable use of resources; (3) how much open fishing affected fish stocks; (4) whether routine inspections were carried out; (5) whether the Division fulfilled its obligations to protect the aquatic environment, as specified in the Southern African Development Community (SADC) Protocol on fisheries and (6) whether there was appropriate monitoring in place.

Scope

- The Fisheries Division of the DWNP
- Department of Animal Health and Production (DAHP)
- One district in the north of Botswana, where fisheries activities are conducted

Criteria

- *Fish Protection Act* of 1975 and draft Fisheries regulations.
- DWNP's and DAHP's strategic plans.
- Southern African Development Community (SADC) Protocol on fisheries

Findings

(1) The Division had not developed a policy framework to provide the necessary direction and guidance to the fishing industry. (2) The *Fish Protection Act* of 1975 had become obsolete, since it did not provide for all aspects of fishing, such as managing fish stocks and (3) There was no data in the database, on the number of fish (the "catch") and the effort needed for traditional (hook, line, and basket) fishing, recreational, and competition fishing, to measure how much of the total catch is the result of these activities.

Exhibit 6: Audit of fisheries. Canada's experience

What we found

Implementing the *Oceans Act* and subsequent oceans strategy has not been a government priority. After eight years, the promise of the *Oceans Act* is unfulfilled. Fisheries and Oceans Canada has fallen far short of meeting its commitments and targets: it has finalized no integrated management plans and has designated only two marine protected areas.

The Department has had difficulty developing and implementing a workable and consistent approach to integrated oceans management. As a result, arrangements are not yet in place to resolve increasing conflicts among users of the oceans over access to space and resources.

The government acknowledged in Canada's Oceans Action Plan that oceans-governance arrangements are still not up to dealing with modern-day challenges, including threats to the health of the oceans. Further, it recognized that the approach remains fragmented and exceedingly complex, lacks transparency, and focusses on solving problems as they arise. This assessment is consistent with our audit findings.

Parliament has not been given the financial and other performance information it needs to hold the Department accountable for its *Oceans Act* responsibilities. Nor has the Department met its commitment to report periodically on the state of the oceans.

The new oceans action plan is the government's framework for sustainably developing and managing our oceans. However, it does not address all the barriers to implementing a national oceans strategy. These include the need for strong leadership and co-ordination over the long term, adequate funding, and an accountability framework with appropriate performance measures and reporting requirements.

The Department has responded. Fisheries and Oceans Canada is in agreement with all of the audit recommendations. Its responses, which follow the recommendations in the report, indicate what actions it intends to take and when these will be completed.

Source: Office of the Auditor General of Canada.

http://www.oag-bvg.gc.ca/internet/English/parl_cesd_200509_01_e_14948.html

Exhibit 7: Audit of fisheries: New Zealand perspective

Ministry of Fisheries did not have enough information to ensure that the fisheries were being managed in a sustainable way, and to their full economic potential. Risks - (1) particular stocks could be over-fished, risking the survival of the stocks; and (2) particular stocks could be under-fished, depriving New Zealand of export income, employment opportunities in the fishing industry, and tax revenue. **Audit objective**: To assess the information used to support management decisions for 8 key species and the 44 fish stocks containing those species.

Conclusion: Ministry was uncertain if 31 of the 44 fish stocks examined were being managed to their potential. Ministry managed most fish stocks without being sure if the management was sustainable. Scientific understanding of the complex biological, ecological, and environmental factors that affect fish stocks would always be incomplete. Uncertainties should be explicitly stated so that decision-makers were aware of the limitations of the information they used to make decisions on the size of the total allowable catch. Ministry should ensure that it gathered enough research-based data to allow stocks to be fished for maximum sustainable yield. Ministry had been slow to fulfill the environmental requirements of the Fisheries Act.

Recommendations: Priority to legal obligations to protect the marine environment. This would also require more research-based information.

2005 follow up report

Aim: Whether the Ministry had acted on the recommendations of 1999 report. Outcome indicated that it had done so. The Ministry (1) provided clear assessments of the limitations of the information it holds on fish stocks. (2) prepared a series of 3- to 5-year research plans for the major fish species, to address the gaps (3) priority to fulfilling the environmental requirements of the Act. Some fishing areas had been closed to fishing methods that damage the seabed. Action taken to limit the by-catch of New Zealand sea lions, dolphins, and seabirds (4) prepared environmental standards for the management of fisheries, and their marine environment, (5) begun work on a website that will contain up-to-date information through a set of environmental performance indicators.

Recommendations

Provide in annual stock assessment reports consistent, up-to-date, and complete information on the sustainability of fish stocks, improve proposed strategy for managing the environmental effects of fishing by implementing the improvements to its reporting on the status of species and habitats affected by fishing, complete the work on its website for the environmental performance indicators programme, ensure that data for the website is kept up to date. **Source**: Ministry of Fisheries: Follow-up report on information requirements for the sustainable management of fisheries, June 2005, ISBN 0-478-18135-3

Exhibit 8: Sustainable fisheries: Netherlands experience

There is worldwide concern about the consequences of intensive fishing at sea. Many species of fish are being overfished. EU policy to combat overfishing in European waters is directed at the 'sustainable management' of marine life, taking account of both environmental and economic interests. We investigated whether the Netherlands was succeeding in implementing and enforcing EU fisheries policy and whether the sustainability goals were being achieved.

Conclusions

The Netherlands is not fulfilling its ambitions of protecting fish stocks and biodiversity in the North Sea. Economic interests take precedence in policy decisions. Both the economic position of the fishing industry and the ecological condition of the North Sea suffer as a result. Four factors play a role: (1) ***EU policy on catch quotas is ineffective.*** The policy is directed solely at maintaining species of fish that are sold for consumption and takes no account of the undesirable impact on the ecosystem, (2) ***Compliance with and enforcement of*** **regulations are under pressure.** The enforcement capacity formally satisfies EU regulations but there are shortcomings in practice. There is large-scale evasion of the rules by fishermen. Dutch Minister of Agriculture, Nature and Food Quality has not taken a decision on the required compliance rate. There is therefore no criterion to assess the adequacy of enforcement capacity. **(3) *Innovations in fishing methods* could reduce damage to the North Sea**. Although the problems and the potential solutions have been known for many years, innovation policy did not get off the ground until 2007, partly on account of rising fuel prices. **(4) *Rationalisation of the fishing industry* would help the industry remain profitable despite the catch quotas**. Although the Dutch cutter fleet has fallen in number since 1994, it is uncertain how effective the rationalisation has been.

Recommendations

At national level, measures should be taken to protect biodiversity in the North Sea. The Minister of LNV should also actively encourage innovation in the fishing industry. She should also take a decision on the optimal size of the sea fishing fleet in relation to the catch quotas. Furthermore, she should set a required compliance rate in order to decide on the necessary enforcement capacity. At EU level, the Minister should bring pressure to bear in Brussels to coordinate fisheries policy, nature policy and water policy. The Minister should also call at European level for an amendment of the regulations on landing fish in order to address the discard problem. In other areas, European rules should be simplified in order to increase fishermen's willingness to comply with them.

Response of the Minister

The Minister of LNV takes most of our conclusions and recommendations to heart. She does not accept our recommendations on the required enforcement capacity and optimal fleet size.

Current status: The report was submitted to the House of Representatives on 30 October 2008.

Source: Netherlands Court of Audit. Report entitled: Sustainable Fisheries, dated 30 October 2008. www.rekenkamer.nl

Exhibit 9: Financial management and regularity

The SAI of Japan: Contribution of subsidies for a project to dispose of unnecessary fishing boats/fishing equipments and calculation of subsidies for a support project to encourage suspension of fishing

Background

In 2006 the Board of Audit of Japan conducted a regularity audit towards the payment of subsidies to Japanese fishermen. These subsidies were intended for fishermen that disposed of unnecessary fishing boats or equipment.

Objective

The objective of the audit was to evaluate the regularity of the national fisheries policies.

Scope

BOA`s audit activities covered “a project to dispose of unnecessary fishing boats and equipment” implemented by the Fisheries Agency between the fiscal years 2003-2006.

Criteria

The criteria used are set in the national expenditures for fisheries

Findings

Funds were not allocated to the appropriate parties subsidies were paid despite fishermen did not meet requirements. Even if the fixed costs of fleet eligible for subsidies decreased due to the decreased number of boats, the same amount of subsidies were paid as before disposal of boats. As a result, the subsidies were overpaid

Exhibit 10: Compliance with agreements, laws and policies

The SAI of the European Union: Special Report on the control, inspection and sanction systems relating to the rules on conservation of Community fisheries resources

Background

In a compliance audit report published in 2007 the European Court of Auditors (ECA) assessed systems in place in the Commission and in the six principal fishing Member States: Denmark, Spain, France, the Netherlands, Italy and the United Kingdom

Objective

To find out if the Commission and the Member States are taking the necessary steps for an effective system of control, inspection and sanctions for the conservation of fisheries resources?. Four specific audit objectives were investigated: (a) Are catch data reliable and monitored effectively? (without stating an opinion as to the quality of individual declarations), (b) Are the inspection systems as effective as possible?, (c) Are the systems for following up infringements appropriate and effective?, (d) How far is the inherent risk constituted by overcapacity in the fishing industry dealt with in reality?

Scope

The ECA assessed mainly the data of 2006. looked also at more recent data (2007). The scope included: (a) Catch data reliability and effectiveness of the monitoring, (b) Effectiveness of the inspection systems? (c) Appropriateness and effectiveness of the systems for following up infringements?, (d) Actions related to the overcapacity in the fishing industry

Criteria

The EU regulations provision and in the absence of specific regulatory requirements the criteria adopted were the standards recognised by international organisations and generally applicable to this area

Findings

Catch data are neither complete nor reliable, due mainly to weaknesses in the Member States. The inspection systems do not provide assurance that infringements are effectively prevented and detected. The procedures for dealing with infringements are such that not every infringement is followed up and, even when they are, they do not always attract penalties. The deterrent effect of penalties is, on the whole, limited. The European Commission has insufficient instruments at its disposal to take action against Member States for failure to apply with European Community legislation. Overcapacity detracts from the profitability of the industry and incites non-compliance

Recommendation

The report recommended that the present control, inspection and sanction systems must be strengthened considerably if the Common Fisheries Policy of the European Community is to achieve its objective of sustainable exploitation of fisheries resources.

Exhibit 11: Performance measurements and results

SAI of the UK: Fisheries enforcement in England

Background

In 2003 the National Audit Office conducted an audit of the role of the Department for Environment, Food and Rural Affairs in enforcing fisheries regulations on vessels fishing in the waters around the English coast and in respect of fish landed at English ports.

Objective

The report examined (1) the role of the Department in enforcing fisheries regulations, (2) the effectiveness of the Department's methods in detecting, dealing with and deterring infringements of regulations, and (3) the management of its enforcement activity, which ultimately sought to maintain the economic viability of the fishing industry

Scope

(1) Covered the effectiveness of enforcement activities in detecting, dealing with and deterring infringements of the regulations the effectiveness of the Department's management of enforcement activity. (2) focused on the over 10 metre fishing fleet (>80% of the fishing activity in England), (3) covered the work of the Department, the Sea Fisheries Inspectorate and Sea Fisheries Committees as they related to England, (4) examined data primarily for the period 2000 to 2002.

Criteria

Status of fish stocks numbers of inspections; expenditure on enforcement; enforcement staffing levels and distribution; numbers of infringements and outcomes (e.g. prosecutions); good practice approaches on compliance and deterrence; good practice approaches of fisheries enforcement agencies in other countries; good practice approaches of enforcement agencies outside the fisheries sector; principles established by the Better Regulation Task Force.

Findings

Some fish stocks were under threat of total collapse and sustainability was essential for the economic survival of the fishing industry; the likelihood of detection and prosecution of any particular offence was low, as were the penalties imposed by comparison with the potential gains from infringements; Department lacked flexibility in the way it deployed resources and people to improve enforcement.

Recommendations

Make more use of landing patterns and surveillance data to target vessels suspected of breaking regulations; increase the options for pursuing and penalising infringements; maximise the likelihood that illegal landings of fish will be detected; enforcement legislation; use the Regional Advisory Councils to help inform the development of enforcement practice, encourage more widespread support from the industry; promote co-operation with others.

Exhibit 12: Scientific research and monitoring

Investigation of the management and control of fish resources in the Barents Sea and the Norwegian Sea – a parallel audit conducted by the Office of the Auditor General (Norway) and the Accounts Chamber of the Russian Federation. Joint audit report covered six topics: (1) extent of illegal/unregistered cod fishing in the Barents Sea and the Norwegian Sea; (2) implementation of decisions taken by the Joint Norwegian-Russian Fisheries Commission; (3) Resource control in Norway; (4) Sanctions for violations of laws/regulations relating to the use of living marine resources; (5) distribution and filling of quotas in Norway; (6) Norwegian-Russian research programmes in Norway.

Objective: To assess the efficiency and effectiveness of national follow-up and implementation of bilateral agreements between Russia and Norway and decisions taken by the Joint Norwegian-Russian Fisheries Commission.

Scope

Common general audit questions and audit criteria. Two separate reports but a joint memorandum. Investigation was limited to 2004 and 2005 for most topics. The investigation was limited to cod, haddock and capelin north of 62°N.

Criteria

Bilateral fisheries agreements, Protocols of the 32nd, 33rd and 34th sessions of the Joint Norwegian-Russian Fisheries Commission. Convention on the Law of the Sea, Fish Stocks Agreement of 1995, National goals for resource control, fish stock size and sanctions for violations of acts and regulations, as adopted by the Norwegian parliament

Findings

(1) unregistered catches of cod is considerable; (2) uncertainty attached to the estimates of these catches; (3) measures adopted not fully implemented; (4) considerable differences between the Norwegian and Russian fisheries laws/regulations and fisheries control apparatuses; (5) both countries have experienced difficulties in carrying out research cruises**.**

Recommendations

Data is required about the quantity removed by fishing and various forms of harvesting, Implementing the Joint Commission's decisions on the exchange of information relating to satellite-based tracking, Trans-shipment and landings in third-country ports, Work of implementing bilateral provisions regarding control cooperation should be given priority, Strengthen the exchange of knowledge, development with regard to fishery laws and regulations, Acknowledge that the situation for scientists is unsatisfactory.

Source: http://www.riksrevisjonen.no/NR/rdonlyres/BAA1BCE2-F8BC-4A69-B66A-330FB509AC50/0/Doc_3_2_2007_2008_eng.pdf

Appendix 1

Potential Methodological Tool: Data gathering and analysis tool

(SAI of Canada responsible for writing this appendix).

Appendix 2

Potential Methodological Tool: Scoping Methodological Tool

(SAI of Canada responsible for writing this appendix).

Appendix 3— WGEA resources

All the documents referred to in this appendix are available at: **http://www.environmental-auditing.org**

WGEA meetings and compendia themes

For the past several WGEA meetings, a call for papers has been issued to all SAIs prior to the meeting. From these papers, a compendium is compiled to facilitate information sharing. This list provides the themes of the papers for each year.

INTOSAI WGEA 8th Steering Committee meeting (SC8), Bali, Indonesia on 3 to 6 August 2009.

- Presentations and discussions on the draft of the guidance materials: climate change, sustainable energy, forestry, minerals and mining, and fisheries

12th Meeting of the WGEA - Doha, State of Qatar (25 to 29 January 2009)

- Auditing Environmental Agreements,
- Auditing the Management of Natural Resources,
- Emerging Topics and Lessons Learned on Environmental Auditing,
- Sustainability in a Modern Audit Office

11th Meeting of the WGEA—Arusha, Tanzania (25 to 29 June 2007)

- Audits of Global and Regional Environmental Issues
- Audits of Domestic Environmental Issues
- Emerging Topics in Environmental Auditing
- Supreme Audit Institutions' Approaches to Building and Managing Environmental Auditing

10th Meeting of the WGEA—Moscow, Russian Federation (27 October to 1 November 2005)

- Auditing Biological Diversity
- Auditing Climate Change
- Increasing the Impact of Environmental Audits
- Environmental Auditing: Facing the Challenges

9th Meeting of the WGEA—Brasilia, Brazil (30 May to 2 June 2004)

- Environmental Auditing and Biological Diversity
- Concurrent, Joint or Co-ordinated Audits
- Environmental Audit and Regularity Auditing
- Environmental Auditing: Facing New Challenges
- Supreme Audit Institution Approaches to the World Summit on Sustainable Development

8th Meeting of the WGEA—Warsaw, Poland (24 to 27 June 2003)

- Environmental Audit and Regulatory Auditing
- Sustainable Development: The Role of Supreme Audit Institutions
- Water Issues, Policies, and the Role of Supreme Audit Institutions
- Towards Auditing Waste Management

WGEA studies and guidelines

- *Auditing Water Issues: Experiences of Supreme Audit Institutions* (2004)—English, French, German, Arabic
- *Auditing Biodiversity: Guidance for Supreme Audit Institutions* (2007)—English
- *Cooperation Between Supreme Audit Institutions: Tips and Examples for Cooperative Audits* (2007)—English
- *Environmental Audit & Regularity Auditing* (2004)—English, French, Spanish, German, Arabic
- *Evolution and Trends in Environmental Auditing* (2007)—English
- *Guidance on Conducting Audits of Activities with an Environmental Perspective* (2001)—English, French, Spanish, German, Arabic
- *How SAIs May Co-operate on the Audit of International Environmental Accords* (1998)—English, French, Spanish, German, Arabic

- *Sustainable Development: The Role of Supreme Audit Institutions* (2004)—English, French, Spanish, German, Arabic
- *Study on Natural Resource Accounting* (1998)—English, French, Spanish, German
- *The World Summit on Sustainable Development: An Audit Guide for Supreme Audit Institutions* (2007)—English
- *The Audit of International Environmental Accords* (2001)—English, Spanish
- *Towards Auditing Waste Management* (2004)—English, French, German, Arabic

Audits related to environment

Audits and audit summaries from SAIs are available on the WGEA website (in the section "Environmental Audits Worldwide"), listed by environmental issue and by country. Many are available only in their national language.

WGEA / IDI environmental auditing training program

In partnership with the INTOSAI Development Initiative, a two-week training course was created for SAIs. The course was designed by IDI training specialists, has a learner-centred participatory approach, and reflects regional needs. It includes a standardized design for course materials and detailed instructor manuals.

WGEA work plan summaries

2005–2007 Activities and projects focussed on providing guidance, facilitating information exchange and building relationships, and were organized under the following six goals:

1. To expand the number and breadth of environmental auditing tools available to SAIs.
2. To increase information exchange among SAIs and to expand their training in the techniques of environmental auditing.
3. To increase the number of concurrent, joint, or coordinated audits by SAIs.
4. To increase communication of WGEA activities.
5. To increase cooperation between the WGEA and other international organizations.
6. To explore the potential for external funding for the WGEA activities.

2002–2004 Activities carried out included developing training materials and providing courses in environmental auditing, coordinating environmental audits with other Supreme Audit Institutions (SAIs) related to commitments under the World Summit on Sustainable Development, exchanging information with other SAIs, and preparing environmental auditing papers on such topics as water policy and waste management. Waste management was the central theme.

1999–2001 The “fresh water” theme, first adopted in 1995, continued to be a focus of the Working Group through this period. One of the key issues of this work plan was to emphasize cooperation with the INTOSAI regions in order to effectively cope with environmental issues that are transboundary in nature. Other activities included developing an inventory of international environmental accords and increasing the dissemination of information.

1996–1998 Two specific issues were addressed: audits or coordinated audits of international environmental accords and natural resource accounting. There was also a focus on institutional learning—facilitating the exchange of information and experience between audit institutions, and developing guidelines, methods, and techniques for environmental auditing. “Fresh water” was first chosen as a theme in an attempt to concentrate activities on an issue considered relevant for all countries in all stages of development

Appendix 4

Regional and International agreements, legislation and policies

The following is a list of some biodiversity-related agreements by geographic region. These agreements may have a direct or indirect link with the protection of biodiversity. Information on these agreements can be found on the Web through a search engine.

Geographic region	Regional biodiversity agreements
Europe	• The Common Fisheries Policy (European Union's instrument for the management of fisheries and aquaculture). • Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) • Kyiv Resolution on Biodiversity • Convention on Co-operation for the Protection and Sustainable Use of the Danube River (Danube River Protection Convention, also called the Sofia Convention) • Gothenburg Target of the European Union • Natura 2000: European Union countries adopted legislation to protect habitats and species: the Habitats Directive complements the Birds Directive and calls for the creation of a network of sites called Natura 2000. Signatories are to establish Special Protection Areas (SPC) for birds and Special Areas of Conservation (SAC).

Africa	• African Convention on the Conservation of Nature and Natural Resources • Lusaka Agreement on Cooperative Enforcement Operation Directed at Illegal Trade in Wild Fauna and Flora—for Eastern, Central and Southern African countries. • Protocol concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region • African Eurasian Waterbird Agreement (with Europe) • Convention for the Protection, Management, and Development of the Marine and Coastal Environment of the East African Region • Convention on Lake Victoria Fisheries Organization
Asia	• Agreement for the Establishment of the Near East Plant Protection Organization • Convention on the Protection of the Black Sea against Pollution • Plant Protection Agreement for the Asia and Pacific Region • Regional Convention for the Conservation of the Red Sea and of the Gulf of Aden Environment • Framework Convention for the Protection of the Marine Environment of the Caspian Sea • Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin
South Pacific Islands	• Convention for the Protection of the Natural Resources and Environment of the South Pacific Region and Related Protocols (SPREP Convention) • Framework Agreement for the Conservation of

	Living Marine Resources on the High Seas of the South Pacific (The Galapagos Agreement) • ASEAN Agreement on the Conservation of Nature and Natural Resources • Convention on the Conservation of Nature in the South Pacific • Plant Protection Agreement for the Asia and Pacific Region • Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean
South and Central America	• Regional Convention for the Management and Conservation of the Natural Forest Ecosystems and the Development of Forest Plantations • The Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Antigua Convention • Agreements on the Exploitation and Conservation of the Maritime Resources of the South Pacific • Protocol for the Conservation and Management of Protected Marine and Coastal Areas of the South-East Pacific • Convention for the Conservation of the Biodiversity and the Protection of Wilderness Areas in Central America • Convention for the Protection of the Marine Environment and Coastal Area of the South-East Pacific • Protocol Concerning Specially Protected Areas and Coastal areas of the South-East Pacific. • Inter-American Convention for the Protection and Conservation of Sea Turtles • Treaty for Amazonian Cooperation

Caribbean	• 1999 Protocol Concerning Pollution from Land-Based Sources and Activities to the 1983 Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region • Protocol Concerning Specially Protected Areas and Wildlife to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region. • Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention

Appendix 5— List of audits of fisheries conducted by SAIs

Most of the audits listed in this appendix were provided to the authors of this paper, through a questionnaire that was sent to the SAIs. All the case studies in the Chapter 3 are listed in the following table, along with any available Web links to these audits or their summaries.

Please note that the links to these audits are only listed if they are available in English. Other audits may be available, in other languages, on each SAI's individual website.

For a more comprehensive list of audits of biodiversity produced by SAIs, go to the WGEA website at: http://www.environmental-auditing.org/.

1. The Report of the Auditor General of Botswana on Management of Fisheries by Fisheries Division (Department of Wildlife and National Parks). Performance Audit Report No 1, 2005.
2. Performance audit by SAI of New Zealand on the extent to which the Ministry of Fisheries was using information to sustainable manage the fisheries resources (as required by legislation). Follow-up report in 2005.
3. Inquiry in 2002 by the SAI of New Zealand into the administration of the Department of Conservation into a levy payable by the Fishing Industry to offset the environmental impacts of fishing on other species. Follow-up audit in 2005.
4. Performance audit conducted by the SAI of Canada focussing on broad ocean issues, Canada's Oceans Management Strategy (2005). Note: The ICOD report was not a public document as it was only reported to the Board of Directors.
5. Performance audit conducted by the SAI of Canada on fisheries adjustment issues, including the Northern Cod Adjustment Program (1994) and the Atlantic Groundfish Adjustment Program (1997).
6. Special Report of the Auditor-General of South Africa regarding an Environmental Audit of certain aspects of the functions of the Department of Environmental affairs and Tourism in terms of its Budget Programme 3: Sea Fisheries Management and Development (1998).
7. Performance audit conducted by the SAI of South Africa on the findings arising from an audit of marine resource management at the Department of Environmental affairs and Tourism (1996).
8. Performance audits conducted by the SAI of Canada on fisheries management and related issues, including Atlantic GroundFish (1997), Pacific Salmon Habitat (1997) and Pacific Salmon Fishery (1999), Atlantic

Shellfish (1999), The Effects of Salmon Farming in British Columbia on the Management of Wild Salmon Stocks (2000), and Salmon Stocks, Habitat and Aquaculture (2004).

9. The Office of the Auditor General of Norway's study of the management of fish resources.
10. The Office of the Auditor General of Norway's investigation of the management and control of fish resources in the Barents Sea and the Norwegian Sea - a parallel audit conducted by the Office of the Auditor General (Norway) and the Audit Chamber of the Russian Federation (not available in English yet).
11. The Netherlands Court of Audit published a performance audit, entitled 'Sustainable Fisheries", on 30 October 2008.

Appendix 6 — Articles

Biodiversity and Fishery Sustainability in the Lake Victoria Basin: An unexpected Marriage? John S Balinva, Colin A Chapman, Lauren J Chapman, Jan G. Cowx, Kim Geheb, Les Kaufman, Rosemary H Lowe-McConnell, Ole See Hausen, Jan H Wanink, robin L. Welcomme, Frans Witte: BioScience August 2003: Vol.53, Issue 8, pge(s) 703-716. http://www.bioone.org/action/doSearch

Climate Change: Threat or opportunity for Belgium sea fisheries – Els Vanderperren et al IOP conf-Ser:- http://www.iop.org/EJ/article/1755-1315/6/35/352042/ees9_6_352042.pdf?request-id=7782e116-5168-479d-bb3f-2721259ce62f

Continental slope and deap-sea fisheries: implications for a fragile ecosystem, J.A Koslow, G.W.Boehlert, J.D.M Garden, R.L Haedrich, P. Lorance and P. Parin.
http://www.mcbi.org/what/what_pdfs?Koslow_et_al_2000.pdf

Fisheries Management: Status and Challenges, Ichiro Nomura, Assistant-Director-General, Fisheries and Aquaculture Department, Food and Agriculture Organisation (FAO) of the United Nations.
http://www.terrapub.co.jp/onlineproceedings/fs/wfc2008/pdf/wfcbk_001.pdf

GIS in fisheries management, Department of Fisheries and Aquaculture (Malta), in collaboration with University of Plymouth (UK) and COPEMED (FAO), Malta, 12 - 15 March 2001
http://www.faocopemed.org/reports/gis/maltaCourse/day1.pdf

Long-term changes in deep-water fish populations in the Northeast Atlantic: a deeper effect of fisheries. D.M Bailey, M.A Collins, J.D.M Collins, A.F. Zuur and I.G. Priede.
http://rspb.roya(societypublishing.org)/content/early/2009/03/06/rspb.2009.0098.abstract

Lost and abandoned nets in deap-water gillnet fisheries in the Northeast-Atlantic: Retrieval exercises and outcomes. Philip. A. Large, Norman G. Graham, Nils-Roar Hareide, Robert Misund, Dominic J. Rihan, Myles C. Mulligan and Xavier Harlay. ICES Journal of Marine Science, 66: 323-333
http://icesjms.oxfordjournals.org/cgi/content/abstract/66/2/323

Managing Fisheries and Conserving Fishes: A Difficult Balancing Act. Frank J. Rahel. BioScience, April 2008: Vol. 58, Issue 4, pg(s) 354-356. http://www.bioone.org/action/doSearch

Managing Fisheries in Tanzania. Narrinan S.Jiddawi, Marcus C. Ohman, Ambio: A Journal of the Human Environment, December 2002: Vol.31, Issue 7, pg(s) 518-527. http://www.bioone.org/action/doSearch

Overfishing of Inland Waters, J. David Allan, Robin Abell, Zeb Hogan, Carmen Revenga, Brad W. Taylor, Robin. L. Welcomme, Kirk Winemiller, BioScience. December 2005: Vol. 55, Issue 12, pg(s) 1041-1051. http://www.bioone.org/action/doSearch

Overhaul Deep - Sea Fisheries, Sharks in trouble, Good and Bad news for other fish stocks: David Griffith, General Secretary of ICES. www.innovations-report.com/html/reports/environment_sciences/report-50462.html-48k

The economist of 3 January 2009 issue **"Special report on the SEA**; https://www.economist.com/specialreports/displayStory.cfm?story_id=12798458&mode=comment

The Impact of Gold Mining on Women, Communities and Environment in Burma's Kachin State, by Christine Z. Chan, All Kachin Students and Youth Union (AKSYU), *Edited by* Ann Putnum (Earthrights International), September 2004. http://www.aksyu.com/The%20Impact%20of%20Gold%20Mining%20on%20Women,%20Communities%20and%20Environment%20in%20Kachin%20State,%20Burma.pdf

The Marine Environmental Impacts of Artificial Island Construction, Dubai, UAE, by Bayyinah Salahuddin, Masters project submitted in partial fulfillment of the requirements for the Master of Environmental Management degree in the Nicholas School of the Environment and Earth Sciences of Duke University, 2006. http://dukespace.lib.duke.edu/dspace/bitstream/10161/104/1/Salahuddin%20MP%202006.pdf

The North Sea Fisheries Crisis and Good Governance. By Liza Griffin, Governance and Sustainability Programme Centre for the Study of Democracy, Unversity of Westminister (March 2008). http://www.Blackwell -compass.com/subject/geography/article_view?parent=section&last:results…and….-22k

The role of gear technologists in supporting an ecosystem approach to fisheries, ICES Journal of Marine Science, 64: 1525-1534. http://icesjms.oxfordjournals.org/cgi/content/abstract/64/8/1525

Appendix 7 — Open Access Regulations (Rules)

Regulation (Rule)	Intended impact	Strengths/weakness
Gear restrictions- Mesh Size which allows small fish to escape capture.	Control the capture of small fish and to avoid "Growth Overfishing. The FAO defines "growth overfishing as harvesting activities where too many small fish are being harvested too early, through excessive fishing effort and poor selectivity (e.g. too small mesh sizes) and the fish are not given enough time to grow to the size at which the maximum yield-per-recruit from the stock would be obtained. A reduction of fishing mortality on juveniles, or their outright protection, would lead to an increase in yield from the fishery. Growth overfishing, by itself, does not affect the ability of a fish population to replace itself."	▪ Most trawl fisheries take a mixture of species, with an optimum mesh size that is different for the each species captured. ▪ Mesh regulations can in theory increase the total catch, but the economic benefit will be short-lived in an open-access fishery as there is incentive for additional effort.
Minimum Size Limits	▪ Control the capture of small fish in situations where the gear is selective and captured small fish can be returned to the sea with low mortality rates. (shellfish fisheries) ▪ Control of captured small fish by allowing capture by	The weakness in minimum size regulation were noted as early as 1961 by Crutchfield: "In most saltwater fisheries size limits do not, of themselves, afford much protection, since losses of undersize fish returned to the water are normally very heavy. There are, of course, some exceptions

Regulation (Rule)	Intended impact	Strengths/weakness
	unselective gear and allowing an ▪ average count with a minimum size in each count.	(shellfish fisheries); and in addition, size limits provide useful support to other, more effective, regulations designed to allow greater growth before capture"
Closed Areas/Seasons	Long-term or seasonal spatial restrictions on fishing that are intended to protect a stock from overexploitation at a point where it is particularly vulnerable to exploitation, decreasing by-catches of particular components of the resource or minimize the likelihood of conflict between users between different types of gear.	The effectiveness of this regulatory approach in an open access fishery has been the subject of debate and discussion because it is not clear that overall fish stocks will be protected if fishing effort is increased in adjacent areas or moves to harvest the species in another part of the ocean. It is generally agreed that this regulatory tool work best when combined with regulations which limit fishing effort. The ability of national enforcement agencies to monitor and enforce closed areas has improved in recent years with the introduction of GPS and satellite technology. The use of this technology depends on the financial capacity of the national government and the participants in the fishery.
Catch Quotas	Setting the limits on the total annual catch (TAC) to control the amount of fishing and achieve a targeted level of fishing mortality.	▪ Easily understood by the fishing industry. ▪ There can be large variability in population abundance so catch levels have to be adjusted annually. ▪ There have been disagreements between the fishing industry and scientists on the rationale for setting the annual TAC.

Regulation (Rule)	Intended impact	Strengths/weakness
		▪ Managers sometimes set catch levels above the scientifically recommended TAC to satisfy competing user groups. ▪ Erroneous estimates of stock abundance can lead to dramatic changes in TAC from one year to the next. ▪ There are significant time lags in collecting and analyzing data from previous fishing activity to determine the catch levels for the current time period. (Greater risk for short lived species where abundance can very significantly from year to year). ▪ There is increased incentive for fishers to falsify data on the catch to allow the fishery to stay open longer. ▪ Acquiring the scientific knowledge base necessary to permit year-to-year adjustments in catch quotas is costly. Large amounts of data must be collected, costly research surveys conducted and scientists diverted from broader questions of resource assessments and management. ▪ The setting of a global TAC without allocating specific catch levels to individual participants in the fishery results in a race to catch the fish before the TAC is reached and can result in unsafe and uneconomical fishing activity. ▪ Problems setting TAC in a fishery

Regulation (Rule)	Intended impact	Strengths/weakness
		where multiple species are caught at the same time.
Effort Controls	Setting total fishing effort to control the amount of fishing and achieve a targeted level of fishing mortality.	▪ Once the appropriate level of fishing effort is determined, this level may be maintained without year-to-year adjustments dependent on annual stock assessments**.** ▪ The level of fishing effort is related to a quantity of fishing by a standard vessel. Increases in efficiency of fishing vessels are difficult to monitor and detect. Fishing effort per day can change without detection and can result in a change in the fishing power of the standard vessel. ▪ It is difficult to determine if a vessel is fishing while at sea. This may lead other fishers in the area to question compliance with the effort control and this could lead an overall increase in effort.

Limited Access Regulations (Rules)

Regulation (Rules)	**Intended impact**	**Strengths/weakness**
Controlled access to the resource	Reduce the race for the fish by allocating portions of the total available resource to various stakeholders, fleets and gear types.	The allocation process ultimately requires that national governments make decisions to allocate fishery resources to various societal groups. These decisions are driven by the overall societal values of the national government and will ultimately lead to subjective judgements on how the resource should be shared. The

Regulation (Rules)	Intended impact	Strengths/weakness
		allocation of the resource to different groups does not solve the problem of the Tragedy of the Commons." The resource is shared in discrete segments, but then there is competition within each sector for the greatest share of these segments just as there was competition in the open access situation for the greatest share of the global pie. Controlled access is a first step in limiting access to the resource and becomes more effective when combined with other regulations (Rules).
Limited Entry Licences	Any licence that curtails or restricts the addition of fishers, fishing vessels or equipment.	

Appendix 8: Questionnaire

1. **Name of Supreme Audit Institute**
2. **Country**
3. **Year audit was performed**
4. **Title of audit**
5. **Type of Audit**

(__) Performance

(__) Regularity (financial/compliance)

(__) Combined (performance/regularity)

Definitions:

Regularity:

"During an audit of financial statements, environmental issues may include the following:

- *Initiatives to prevent, abate or remedy damage to the environment.*
- *The conservation of renewable and non-renewable resources.*
- *The consequences of violating environmental laws and regulations.*
- *The consequences of vicarious liability imposed by the state.*

Compliance auditing with regard to environmental issues may relate to providing assurance that governmental activities are conducted in accordance with relevant environmental laws, standards and policies, both at national and (where relevant) international levels.

- *Performance auditing:*

- *Performance auditing of environmental activities may include:*
- *Ensuring that indicators of environment-related performance (where contained in public accountability reports) fairly reflect the performance of the audited entity.*
- *Ensuring that environmental programmes are conducted in an economical, efficient and effective manner."*

Source: Guidance on Conducting Audits of Activities with an Environmental Perspective (Intosai, 2001)

6. Audit Form

(__) Individual

(__) Joint

(__) Concurrent

(__) Co-ordinated

Definitions:

Individual audit is an audit conducted by only one SAI.

"Joint audit is an audit conducted by one audit team composed of auditors from two or more SAIs, who prepare a single, joint audit report for publishing in all participating countries.

Concurrent audit is defined as an audit conducted more or less simultaneously by two or more SAIs, but with a separate audit team from each SAI reporting only to its own legislature or its own government and on only the observations and/or conclusions pertaining to its own country.

A third option would be a co-ordinated audit, which is either a joint audit with separate reports (as outlined for concurrent audits) or a concurrent audit with a single, joint report in addition to separate national reports."

Source: How SAIs May Co-operate on the Audit of International Environmental Accords (Intosai, 1998)

7. INTOSAI region

(__) ASOSAI

(__) EUROSAI

(__) OLACEFS

(__) SPASAI

(__) AFROSAI

(__) ARABOSAI

(__) Others

8. Is dissemination of the information on the internet allowed?

(__) Yes**(__)** No

8.1 In which language(s) is report available? (Note 1: only complete this section if you answered "yes" to question 8. Note 2: select as many as apply.)

(__) Arabic

(__) English

(__) German

(__) French

(__) Spanish

(__) Others. Which?

8.2 Please attach report (in PDF format) (Note: only attach the report if you answered "yes" to question 8.)

9. Type of habitat audited

(__) Marine

(__) Freshwater

(__) Mangrove / coral reef

(__) Dryland / desert

(__) Forests

(__) Savannahs

(__) Grasslands

(__) Mountains

(__) Others

(__) None

11. Main environmental risk investigated

(__) Decline and loss of species

(__) Destruction / fragmentation of habitats

(__) Invasive species

(__) Unsustainable use of resources

(__) Effects of climate change

(__) Contamination of ecosystems

(__) Excessive pasture and expansion of agriculture frontier

(__) Urban impact on ecosystems

(__) Genetic diversity / gene banks

(__) Biotechnology / Genetically modified organisms (GMOs)

(__) Others. Which? **(_____)**

12. Characteristics of the audit members

Number of members **(__)**

Area of expertise of members **(__)**

Participation of experts that are not employees of your SAI

(__) No

(__) Yes. Which area(s) of expertise **(_____)**

Details

12. Summarise the audit (maximum 10 lines)

The summary must give the reader instant knowledge of the subject; be related to the central idea of the audit report; and state the type of audit, the topic, the conclusion, and the audited agency or department.

Example:

We conducted a performance audit of the Environment Ministry, which examined the environmental impacts on forests caused by agricultural, livestock, or extraction activities. We looked at the federal government's performance aimed at protecting environment from the expansion of the agriculture/livestock frontier

We found

- an increase in deforestation, fires and extraction of natural resources;
- a lack of good controls; and
- a need to evaluate policies related to agriculture, livestock and extraction activities.

(__)

13. Define the audit objective (maximum 10 lines)

The audit objective describes what the audit team intends to achieve.

Example:

- Evaluate the government's compliance with its duties regarding protection of forest areas that are threatened by the increase in government-stimulated agricultural activities.
- Analyse the government's environmental protection management practices for their effectiveness.

(__)

14. Define the scope (maximum 10 lines)

The scope establishes parameters and limits of an audit. The scope includes the topics, activities, and agencies that have been audited; the period audited; and what the audit covered.

Example:

The scope included

- The activities carried out by the Ministry of the Environment from 2003 to 2005 to put in place legal, economic, organisational, and technical landmarks for protecting the forests.
- The activities carried out by the agencies, from 2003 to 2005, to protect the environment.

(__)

15. Define the criteria (maximum 10 lines)

The criteria are the standards or indicators used to determine whether the program, activity, project, or unit achieves or exceeds the expected performance. The assessment of whether or not criteria are met results in audit observation and in audit findings. The source of criteria could be:

- rules set by laws, regulations, or the administration;
- expert opinions;
- performance of similar national or foreign institutions, and/or generally accepted good practices; and
- international conventions.

Example:

We referred to the following sources

- ISO 14000 (Environment standards);
- expert opinions on genetically modified organisms;

- performance of other environmental agencies that encourage inhabitants in forest regions to act as volunteer inspectors; and
- international trade conventions for wild flora and fauna in danger of extinction.

(__)

16. Define methods used to gather audit evidence (maximum 10 lines)

There are various methods used to gather audit evidence.

Example:

- questionnaires,
- interviews, and
- physical evidence.

(__)

17. Define methods used to analyse evidence (maximum 10 lines)

There are various methods used to analyse evidence.

Example:

- comparisons and flowcharts,
- content analysis,
- cost-benefit analysis,
- interpretation of data distributions,

- modelling and regression analysis, and
- environmental evaluations.

(__)

18. Summarise the main conclusions (maximum 10 lines)

Example:

We found that there has been an increase in deforestation, fires, and the disorganised extraction of natural resources. Up until last year, regions X and Y were the ones most affected but last year region Z was the most affected. The government is responsible for this situation when it fails to prevent activities or when it stimulates economic activities that degrade environment (e.g., agriculture, livestock or extraction of natural resources).

(__)

19. Summarise the main recommendations and decisions (maximum 10 lines)

Example:

- Recommend that the responsible agency clearly establish limits for the environmental protection areas;
- Recommend that the responsible agency study the feasibility of changing the method for setting fines for farmers who do not respect the environment;
- Recommend the responsible agency teach local communities how to avoid contributing to environmental degradation (e.g., by lighting fires or killing endangered species that live in the region).

(__)

20. Summarise the best practices (maximum 10 lines)

Example:

- environmental agencies that stimulate inhabitants in forest regions to act as volunteer inspectors.
- tourism guides created, with the Federal Government's help, to promote ecotourism and ensure the preservation of the protected area.

(__)

21. Summarise the main impacts and results of the audit (Maximum 10 lines)

Impacts and results are the gains or improvements resulting from the audit recommendations and decisions.

Examples:

- Reduction of the indexes of illegal deforestation within the conservation units.
- Implementation of sustainable management programs in the conservation units for the local communities.

(__)

Appendix 9: Summary of survey

Country	Audit Year	Title of audit	Type of Audit	Audit form	Dissemination on the internet	Report language	Type of Fisheries	Main risk investigated
Australia 1	1995-1996 & follow-up 2000-2001	Commonwealth Fisheries Management & Commonwealth Fisheries Management: Follow-up Audit	Performance	Individual	Yes	English	Marine	Unsustainable use of resources; Fisheries impact on ecosystems
Republic of Azerbaijan	2006	A parallel control of the effectiveness of resources allocated to the exploitation of the aquatic resources of the Caspian sea and measures on the protection, preservation, restoration and rational use of sturgeon	Combined	Concurrent	No		Marine	Unsustainable use of resources; Contamination of ecosystems
Republic of Bulgaria	2006-2007	Audit of the activities of the National Agency of Fisheries and Aquaculture (2004-2006)	Performance	Individual	Yes	Bulgarian	Marine, Freshwater, Professional, Recreational, Aquaculture	Unsustainable use of resources

Canada Audit 1	2003–2004	Fisheries and Oceans Canada—Salmon Stocks, Habitat, and Aquaculture	Performance	Concurrent (with two other provincial audit offices)	Yes	English, French	Marine, Freshwater, Professional, Recreational. Aqualculture	The role of aquaculture; Decline and loss of species; Destruction/ fragmentation of marine habitats; Fisheries impact on ecosystems; Biodiversity and ecosystem interactions
Canada Audit 2 (See exhibit 6)	2005	Fisheries and Oceans Canada—Canada's Oceans Management Strategy	Performance	Individual	Yes	English, French	Integrated Management of Oceans Resources (including fisheries)	Conservation and protection, and management of ocean resources
European Union	2006-2007	Special Report on the control, inspection and sanction systems relating to the rules on	Regularity	Individual	Yes	All languages except Arabic	Marine	Unsustainable use of resources; Reliability of the catch data; Inspection

		conservation of Community fisheries resources						effectiveness; Infringement follow-up and sanctions; Overcapacity
Estonia	2008	Audit of Fisheries management and Control in the Baltic Sea	Performance	Co-ordinated	Yes	English, Estonian	Marine, Professional, Fish resources management and control	Unsustainable use of resources; Decline and loss of species
Finland	2007	Developing fisheries	Performance	Individual	Yes	Finnish	Marine, Freshwater, Professional, Recreational, Aquaculture	Unsustainable use of resources; The role of Aquaculture; Underfishing; benefits of recreational salmon fishing compared to professional salmon fishing
Japan	2006	The contribution of subsidies to dispose of unnecessary fishing	Regularity	Individual	Yes	English, Japanese	Marine, Aquaculture	Unsustainable use of resources

		boats/equipments and the calculation of subsidies for a support project to encourage suspension of fishing						
Lithuania	2007	Development of the Fisheries Sector	Performance	Individual	Yes	Lithuanian	Marine, Freshwater, Aquaculture	Unsustainable use of resources; The role of Aquaculture; Quotas policy; Fishing control; Regulation measurements
New Zealand Audit 1 (See exhibit 7)	Follow up 2005	Follow-up report on information requirements for the sustainable management of fisheries	Performance	Individual	Yes	English	Marine, Professional	Unsustainable use of resources
New Zealand Audit 2	2002	Administration of the conservation services programme	Combined	Individual	Yes	English	Marine, Professional	Fisheries impact on ecosystems

Norway Audit 1 (Exhibit 12)	2006	The management and control of fish resources in the Barents Sea and the Norwegian Sea	Performance	Co-ordinated	Yes	English, Norwegian	Marine, Professional, Recreational	Bilateral management of fish resources (including control); Law and sanctions
Norway Audit 2	2003	The Office of the Auditor General's study of the management of fish resources	Performance	Individual	Yes	English, Norwegian	Marine, Professional	Unsustainable use of resources; Decline and loss of species; Capacity of the fishing fleet; Resource control
Poland	2004	Preparation of the Polish sea fishery for the integration with the European Union	Combined	Individual	Yes	Polish	Marine	Governance over whether the rules concerning the conduct of fishery business are followed
Kingdom of Saudi Arabia	2000	Performanc of management, operation and sales and fishing of companies	Performance	Individual	No	Arabic	Fishing operations	
Ukraine	2008	The management of	Combined	Individual	No	Ukrainian	Marine,	Unsustainable use of

		public funds allocated for fisheries development					Freshwater, Aquaculture	resources; Decline and loss of species
United Kingdom	2003	Fisheries Enforcement in England	Combined	Individual	Yes	English	Marine, Professional	Unsustainable use of resources
Netherlands	2008	Sustainable fisheries	Performance	Individual	Yes	English	Marine	Unsustainable use of resources, effectiveness of national and European policy

Glossary

Agenda 21	The 1992 Earth Summit in Rio resulted in "Agenda 21", an action plan adopted by 178 governments, which states that “In order to meet the challenges of environment and development, states decided to establish a new global partnership. This partnership commits all States…that sustainable development should become a priority item on the agenda of the international community.” Agenda 21 is comprehensive, covering many aspects of the sustainable development field.
Audit criteria	Criteria are benchmarks against which the subject matter can be assessed.
Audit objective	A precise statement of what the audit intends to accomplish and/or the question the audit will answer. This may include financial, regularity or performance issues.
Audit scope	The framework or limits and subjects of the audit.
Biodiversity	“The variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.” The definition covers plants, animals, humans and micro-organisms, their genes, and the systems they inhabit.
Concurrent audit	An audit conducted more or less simultaneously by two or more SAIs, but with a separate audit team from each SAI reporting only to its own elected assembly or government, and reporting only the observations and/or conclusions pertaining to its own country.
Compliance audit	With regard to environmental issues, compliance auditing may relate to providing assurance that government activities are conducted in accordance with relevant environmental laws, standards, and policies, both nationally and internationally. (See also regularity audit.)
Comprehensive audit	A combination of two or more of financial, compliance, or performance type audit is often described as a comprehensive audit.
Coordinated audit	Any form of cooperation from joint to concurrent audits. This can be either

	a joint audit with separate reports, or a concurrent audit with a single, international audit report, in addition to separate national reports.
Ecosystem	A dynamic complex of plant, animal, and micro-organism communities and their non-living environment interacting as a functional unit.
Eco system approach	the ecosystem approach to fisheries management involves a consideration of all the physical, chemical and biological variables within an ecosystem, taking account of their complex interactions.
Environmental audit	Audit by a SAI of an environmental subject, for example environmental policies or programs, environmental aspects of other government policies and public money related to environmental measures. Environmental auditing can encompass all types of audit: financial, compliance, and performance audits.
Environmental matters	Environmental matters are becoming significant to an increasing number of governments, entities, and users of financial statements. For example, some organizations operate in sectors where environmental matters may have material impacts on the financial statements. The International Auditing Practices Committee (IPAC) defines environmental matters in a financial audit as: (a) "initiatives to prevent, abate or remedy damage to the environment or to deal with the conservation of renewable and non-renewable resources (such initiatives may be required by environmental laws and regulations or by contract, or they may be undertaken voluntarily); (b) consequences of violating environmental laws and regulations; (c) consequences of environmental damage done to others or to natural resources; and (d)consequences of vicarious liability imposed by law (for example, liability for damages caused by previous owners)."
extinction	Disappearance of a taxonomic group of organisms from existence in all regions.

game animals	Wild animals, birds or fish hunted for food or sport.
habitat	The environment in which an animal or plant lives, generally defined in terms of vegetation and physical features.
Impacts	Are the results of achieving specific outcomes, such as reducing poverty and creating jobs.
Industrial or commercial fisheries	These are capital-intensive fisheries that use large vessels with a high degree of mechanization and employ advanced fish finding and navigational equipment. They have a high production capacity and the catch per unit effort is normally relatively high. They are undertaken for profit with the objective of selling the harvested product on the open market.
invasive species	Organisms that enter an ecosystem in which they are not naturally known to exist—through deliberate or inadvertent actions by humans—and thereby pose a threat to native species. Invasive species are also known as alien or exotic species.
Joint audit	Audit conducted by one audit team composed of auditors from two or more SAIs, who prepare a single audit report for publishing in all participating countries. Audit conducted by one audit team composed of auditors from two or more SAIs, who prepare a single audit report for publishing in all participating countries.
Performance audit	An audit of the economy, efficiency and effectiveness with which the audited entity uses its resources in carrying out its responsibilities.
Performance indicators	Are the aspects of the outputs that need to be reported. Indicators may be identified in relation to inputs, activities, outputs, outcomes and impact. Indicators maybe set considering the unique characteristics of each output, but there are certain minimum characteristics such as cost, quality and timeliness that need to be included for all outputs
Performance targets	Express a specific level of performance that the entity, program or individual is aiming to achieve.
Precautionary principle	The **precautionary principle** is a moral and political principle which states that if an action or policy might cause severe or irreversible harm to the public or to the environment, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would

	advocate taking the action. The principle implies that there is a responsibility to intervene and protect the public from exposure to harm where scientific investigation discovers a plausible risk in the course of having screened for other suspected causes. The protections that mitigate suspected risks can be relaxed only if further scientific findings emerge that more robustly support an alternative explanation. In some legal systems, as in the law of the European Union, the precautionary principle is also a general and compulsory principle of law
Recreational or sport fisheries	These fisheries harvest fish for personal use, leisure, and challenge as opposed to profit. Recreational fishing does not include sale, barter or trade of all or part of the catch. However, recreational fisheries can support significant economic activity.
Regularity audit	Attestation of financial accountability of accountable entities, involving examination and evaluation of financial records and expression of opinions on financial statements; attestation of financial accountability of the government administration as a whole; audit of financial systems and transactions, including an evaluation of compliance with applicable statutes and regulations; audit of internal control and internal audit functions; audit of the probity and propriety of administrative decisions taken within the audited entity; and reporting of any other matters arising from or relating to the audit that the SAI considers should be disclosed
Small Scale or Artisanal fisheries	These are labour-intensive fisheries that use relatively small crafts, if any, and less sophisticated equipment. They are most often family-owned and may be either commercial or for subsistence. Often equated with artisanal fisheries which are defined as small fishing vessels, making short fishing trips, close to shore, mainly for local consumption. Definitions of artisanal fisheries vary between countries. They can be hand-collection on the beach or a one-person canoe in poor developing countries or they can be smaller trawlers, seiners, or long-liners in developed countries.
species	A group of organisms capable of interbreeding freely with each other but not with members of other species.

Sustainable reference value	a scientifically determined and generally accepted limit which if breached implies that progress in the relevant area is unsustainable e.g. the level of fishing above which stocks will fail to recover.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
World Conservation Union	The World Conservation Union (IUCN) is the world's largest conservation network. The Union brings together 82 States, 111 government agencies, more than 800 non-governmental organizations (NGOs), and some 10,000 scientists and experts from 181 countries in a unique worldwide partnership. The Union's mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. The IUCN also publishes a 'Red List' of species threatened with extinction worldwide.
Maximum sustainable yield	the largest yield that can be obtained which does not deplete or damage natural resources irreparably and which leaves the environment in good order for future generations. [GBA] - the maximum amount of a species or group of species that can be taken without diminishing the future take

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