CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Eighteenth meeting of the Animals Committee
San Jose (Costa Rica), 8-12 April 2002

CONSERVATION OF ACIPENSERIFORMES (DECISIONS 11.59 AND 11.152)

This document has been prepared by the Secretariat.

1. Decision 11.59 states that "All Parties engaged in trade in sturgeon and paddlefish specimens should report to the Secretariat on the progress made to implement the measures agreed upon in Resolution Conf. 10.12 (Rev.)[1] and on their national management strategies for Acipenseriformes prior to the 18th meeting of the Animals Committee." With Notification to the Parties No. 2001/085 of 19 December 2001, the Secretariat reminded the Parties of this Decision and invited the submission of information by 23 January 2002. Decision 11.152 states that "The Secretariat shall prepare a report with recommendations regarding implementation by Parties of the measures agreed upon in Resolution Conf. 10.12 (Rev.) and, after review by the Parties concerned, submit it for consideration at the 18th meeting of the Animals Committee." A draft of this report was submitted to the Parties through Notification to the Parties No. 2002/012 of 6 March 2002, and all comments received will be forwarded to the Committee prior to its meeting in April 2002. The present document is the report required by Decision 11.59.

2. Decision 11.96 directs the Animals Committee to "review the Secretariat's report resulting from implementation of Decision 11.152 and, at its 18th meeting, decide upon actions to be taken by Parties on the implementation of CITES and regarding regional management strategies, and report at the 12th meeting of the Conference of the Parties". The Committee is therefore invited to consider this report and to determine whether it wishes to make recommendations concerning further actions that need to be taken, for consideration at the 12th meeting of the Conference of the Parties.

3. The Secretariat is of the opinion that actions taken pursuant to the review of the commercially exploited species of Acipenseriformes in terms of Resolution Conf. 8.9 (Rev.)[2] on the Review of Significant Trade have largely superseded the recommendations contained in Resolution Conf. 10.12 (Rev.), in that the recommendations of the Committee have already set processes

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[1] Conservation of sturgeons

[2] Trade in specimens of Appendix-II species taken from the wild

under way to address a wide range of issues that will benefit the conservation of the Acipenseriformes. The Committee might nevertheless consider whether it should make recommendations concerning the species that have not yet been reviewed in the context of Resolution Conf. 8.9 (Rev.), or possibly suggest amendments to Resolution Conf. 10.12 (Rev.) if deemed necessary.

4. Information provided in response to Notification to the Parties No. 2001/085 is reflected in this document, along with information obtained through other activities related to the implementation of Resolution Conf. 10.12 (Rev.). It is not possible, however, to provide detailed information on the implementation of this Resolution for all 27 species recognized in the Order Acipenseriformes. The majority of species (15) are not economically important and/or relatively poorly known compared to the species that account for most specimens in trade such as *Acipenser gueldenstaedtii, A. persicus, A. stellatus, Huso huso* and *Polyodon spathula*. It is noteworthy that species of the Order Acipenseriformes until recently occurred in virtually all the major river systems and seas of the northern hemisphere, and that approximately 50 countries are or were range States. *Acipenser sturio* has possibly become extinct in 26 countries, mostly in western and central Europe. Eight countries in the Eurasian region and North America have lost one or more species other than *Acipenser sturio.* For the majority of countries, little or no information is readily available concerning the conservation of Acipenseriformes species.

Implementation of Resolution Conf. 10.12 (Rev.)

5. Aspects of the implementation of Resolution Conf. 10.12 (Rev.) on the conservation of sturgeons have received much attention in the past two years, notably in the Review of Significant Trade in Acipenseriformes and in agreements reached at the 45th meeting of the Standing Committee (Paris, June 2001) on further actions by some range States and the verification of their implementation by the Secretariat; and in the development of a universal caviar labelling system and various activities aimed at combating illegal trade. The Secretariat has obtained through these processes much information from the Parties concerning their conservation efforts and management of Acipenseriformes species and concerning the control of trade in Acipenseriformes specimens. The results have been summarized in several documents and reported to the Animals Committee, the Standing Committee and the Parties (see for instance documents Doc. AC16.7.2, SC45 Doc. 12, AC17 Doc. 7.1, Notifications to the Parties Nos. 2001/041, 2001/042, 2001/045, 2001/056, 2001/065, 2001/075, 2001/087 and 2001/088, all available on the CITES website, and CITES Alerts to enforcement agencies). Further information has been collected through the Secretariat's ongoing liaison with range States, participation in meetings such as the meeting of the Black Sea States on sturgeon conservation and management in October 2001, Sofia, Bulgaria, the verification and enforcement-related missions that the Secretariat conducted in the Caspian States and the United Arab Emirates pursuant to decisions of the Standing Committee at its 45th meeting, and participation in a regional environmental law workshop in December 2001 in Baku, Azerbaijan.

6. The operative part of the Resolution contains the following provisions and recommendations (in italics). Further information concerning the implementation of these provisions and recommendations is provided below:

   URGES the range States of species in the Order Acipenseriformes to:

   a) encourage scientific research particularly in the Eurasian region to promote the sustainability of sturgeon fisheries through management programmes;

      Range States of the Amur River, Black Sea and Caspian Sea have made strong commitments to support cooperative research on a number of important issues such as stock assessment, monitoring, the genetic structure of stocks, and other issues highlighted in the recommendations

of the Animals Committee concerning these basins. In the Black Sea region, agreement has been reached to form a cooperative sturgeon management body, the Black Sea Sturgeon Management Group, which has agreed to identify additional research priorities and initiatives.

b) *curtail the actual illegal fishing and export of sturgeon specimens by improving the enforcement of existing laws regulating fisheries and export in close contact with the CITES Secretariat, ICPO-Interpol and the World Customs Organization;*

This provision has also been addressed in the recommendations of the Animals Committee for range States of the Amur River, Black Sea and Caspian Sea basins. An agreement was reached by the Caspian States to request Interpol to conduct an analysis of illegal trade, and for the Secretariat, in collaboration with Interpol and the World Customs Organization, to conduct a study of enforcement needs for implementing CITES and measures in national legislation aimed at combating illegal harvest of sturgeons and trade in their products [see Notification to the Parties No. 2001/056, Annex 1, paragraph d) iii)]. The first of such assessments has been completed, and recommendations have been made to the country concerned. The data currently available on illegal harvesting, trade and enforcement are too limited for analysis by Interpol. It also appears that existing legislation itself does not necessarily facilitate enforcement. The Secretariat will, as resources allow, continue to engage with all the countries in support of this recommendation. ICPO-Interpol and the World Customs Organization have discussed illegal trade in caviar at several of their meetings and have brought the Secretariat's Alerts on this subject to the attention of their member countries. The Secretariat has also noted an increased communication between exporting and importing countries to identify illicit shipments but believes more could be done. Environment Canada (with the assistance of the Secretariat) has recently published an identification guide for sturgeon and paddlefish, which may further assist with enforcement of trade regulations.

c) *explore ways of enhancing the participation of representatives of all agencies responsible for sturgeon fisheries in conservation and sustainable-use programmes for these species;*

The recommendations of the Animals Committee concerning those species that have been reviewed by the Committee pursuant to Resolution Conf. 8.9 (Rev.) have in general resulted in involvement by various government sectors in sturgeon conservation and management issues, particularly in the Caspian region (but liaison between Management Authorities for Acipenseriformes and other CITES Management Authorities in the same country, or other fisheries management agencies could still be improved). The degree of participation by agencies referred to in this recommendation is not currently considered to be problematic by the Secretariat.

d) *promote regional agreements between range States of sturgeon species aiming at proper management and sustainable utilization of sturgeons;*

All littoral countries of the Amur River, Black Sea and Caspian Sea have confirmed their commitment to develop regional agreements and conservation strategies, partly in response to Decision 11.58 (which specifies that intergovernmentally coordinated quotas have to be declared for each basin), and partly in response to the recommendations of the Animals Committee for species reviewed pursuant to Resolution Conf. 8.9 (Rev.), which specifically addressed this issue. Intergovernmental commissions for the management of sturgeons in the Amur River and Azov Sea have already been established.

RECOMMENDS:

a) *that Parties provide the Secretariat with copies of applicable legislation on CITES, including legislation on sturgeon species, particularly referring to the export of personal effects;*

Although several range States have provided details of their fishing regulations, many such Parties still do not have adequate legislation to implement the Convention. Full translations of relevant text in one of the working languages of the Convention is lacking in some cases, and it is not clear whether the effectiveness of legislation has been assessed by all range States.

b) *that range States inform the Secretariat about legal exporters of sturgeon parts and derivatives;*

Some range States have provided the information to the Secretariat, but the Secretariat is of the opinion that the principal obligation remains with Management Authorities to monitor the operations of exporters. The Animals Committee has also recommended pursuant to Resolution Conf. 8.9 (Rev.) that the relevant countries should register exporters in future. It may be equally important for re-exporting countries to register and regulate the activities of re-exporters. The Secretariat is aware that the details of exporters and labelling systems that it has distributed to the Parties are welcomed by importing countries, which see such information as beneficial to their efforts to identify illegal shipments, and encourages range States to continue to supply such details.

c) *that importing countries be particularly vigilant in controlling the unloading of sturgeon specimens;*

Several importing countries have made significant seizures of illegally traded caviar and some have conducted intensive investigations into illicit trade that have resulted in successful prosecutions. The Secretariat has provided advice to assist importing countries in identifying fraudulent and forged permits and certificates and this has resulted in a number of seizures and confiscations. The Secretariat's own investigation in 2001 of re-exports of caviar from the United Arab Emirates revealed that substantial quantities were of questionable origin. The Management Authority of the United Arab Emirates and the Secretariat are cooperating to close off a route that has been exploited by unscrupulous dealers. The Secretariat has also taken steps to identify new routes or traders as they emerge. The Secretariat believes, however, that there remains considerable scope for improvement in the exchange of information between exporting, re-exporting and importing countries regarding illicit trade and traders.

d) *that Parties ensure that all their relevant agencies cooperate in establishing the necessary organization, scientific and control mechanisms needed to implement the provisions of the Convention with respect to the sturgeon, and in any projects designed to conserve sturgeon species;*

This issue has also been emphasized in the recommendations by the Animals Committee concerning species that have already been reviewed, and should also be an essential element in the development of regional conservation strategies. In at least two instances, mechanisms have been established to facilitate future cooperation between Management and Scientific Authorities, and with fisheries management bodies, where applicable. Most countries can do more to improve cooperation between Management and Scientific Authorities and enforcement agencies.

e) *that Parties consider the harmonization of their national legislation related to personal exemptions for caviar, to allow for the personal effects exemption under Article VII, paragraph 3, and consider limiting this exemption to no more than 250 g per person;*

The Secretariat is aware that some Parties have still to amend their legislation to put this recommendation into effect. It is not aware, however, of any significant problems regarding international movements of caviar, of quantities less than 250 g, for personal effects. It believes, however, that some Parties (including range States) could do more to make the public aware of the 250 g limit.

f) *that range States of sturgeon species included in Appendix II in accordance with Article II, paragraph 2 (a), consider the feasibility of establishing annual export quotas for sturgeon specimens and, if they are established, communicate such quotas to the Secretariat;*

Decision 11.58 was adopted at the 11th meeting of the Conference of the Parties concerning the establishment of catch and export quotas for shared stocks of Acipenseriformes. This Decision has already resulted in much improved consultation amongst range States concerning quotas and provides a powerful incentive for future collaboration.

g) *that Parties monitor the storage, processing and re-packaging of sturgeon specimens in Customs free zones and free ports, and for airline and cruise line catering;*

The Secretariat is aware of several seizures that have been conducted by Parties whilst monitoring Customs free zones and free ports. It has no information to indicate that this is a major area for concern, however. Neither is it aware of significant problems relating to airline and cruise line catering. It has, however, brought to the attention of relevant Parties the fact that airlines appear to have been targeted as potential customers by some illicit traders and has asked Management Authorities to raise awareness among airlines of illegal trade.

h) *that the Secretariat, in consultation with the Animals Committee, explore the development of a uniform marking system for sturgeon parts and derivatives and aquaculture stocks to assist in subsequent identification of the species while consulting with appropriate experts in fisheries, aquaculture and industry, and particularly in collaboration with range States;*

Resolution Conf. 11.13[3] on a universal labelling system for the identification of caviar was adopted at the 11th meeting of the Conference of the Parties, and the Animals Committee has been closely involved in subsequent consultations on the implementation of a universal labelling system, and possible refinements to the Resolution. The Secretariat believes that labelling should be applied to all containers, regardless of size, and should be used in both domestic and international markets. The Secretariat recommends that the CITES logo be used on labels. Re-packaged and re-exported caviar should also be labelled. The Animals Committee may wish to consider proposing an amendment to Resolution Conf. 11.13 to expand the use of labels accordingly. The Secretariat is aware of increasingly widespread use of DNA profiling to assist in determining the species from which caviar is derived. It recognizes that several Parties are in favour of an internationally approved system for DNA profiling and is conscious that there has been some criticism of some current systems. Whilst acknowledging that a standardized system would be preferable, the Secretariat wishes to point out that it is a matter for each country's judiciary to decide what is acceptable or not and, thus, the adoption of a universal system may not be possible. The Secretariat continues, however, to encourage range States to make samples available for research and DNA profiling purposes and it believes there is greater scope for such exchanges of material than is the case at present.

[3] Universal labelling system for the identification of caviar

i) that the Animals Committee consider the trade in sturgeon specimens in the context of the review of significant trade, pursuant to Resolution Conf. 8.9 (Rev.);

All internationally traded species of Acipenseriformes have been reviewed or are in the process of being reviewed (see Notification No. 2001/056 and document AC18 Doc. 7.1).

DIRECTS the Secretariat:

a) in collaboration with range States and international organizations from both industry and the conservation community, to assist with the development of a strategy including action plans for the conservation of Acipenseriformes;

The development of conservation strategies and action plans have been incorporated in the recommendations of the Animals Committee concerning the Amur River, Black Sea and Caspian Sea, and the Secretariat remains at the Parties' disposal to assist with this task.

b) for that purpose, to seek financial assistance from Parties, international organizations, United Nations Specialized Agencies, intergovernmental and non-governmental organizations and industry.

The Secretariat will continue to seek financial assistance for the development of conservation strategies and action plans. t has already been able to secure funding for the first meeting towards the development of a regional conservation strategy in the Black Sea, which also involved FAO and the IUCN/SSC Sturgeon Specialist Group. The Secretariat has also provided assistance with the drafting of a major funding proposal for further development in this regard in the Black Sea region, but wishes to note, however, that it may be difficult to raise substantial funding for this type of activity.

General summary and recommendations

7. It may appear from paragraph 6 that considerable progress has been made to implement Resolution Conf. 10. 2 (Rev.). The Secretariat nevertheless wishes to emphasize that serious problems remain to be addressed concerning the conservation and sustainable management of Acipenseriformes stocks. Some of the major problems are presented in the following summary and further recommendations are made for consideration by the Committee. The summary and recommendations are based on the information available to the Secretariat and its perspectives on what has proved to be a highly complex and challenging conservation and management issue, and may need refinement through inputs from specialists in sturgeon fisheries and conservation. In general, little or no information is available about the biology, conservation requirements and management of the majority of stocks of sturgeons and paddlefish and their habitats. It has not been possible to do an exhaustive literature review for a comprehensive overview of the many conservation problems that face this group of species, or to reflect site- and stock-specific problems, and the conclusions and recommendations are therefore of a general nature, and perhaps more applicable to the commercially exploited stocks of the Eurasian region than to stocks elsewhere.

Protection of sturgeon habitats and the genetic integrity of stocks

8. All species of Acipenseriformes in virtually all range States have been seriously affected by a massive loss and degradation of habitat in the 20th century. Very few major river systems in the distribution range of the Acipenseriformes have not yet been subjected to the construction of dams, reservoirs, channels or water abstraction for agriculture. The principal effects of barriers and other alterations to flow regimes are to change the characteristics of streambeds, the salinity, temperature, depth and turbidity of water, and the sedimentation regimes in estuaries and lakes. These changes

result in the physical obstruction of migration routes and the alteration of spawning grounds. Although most Acipenseriformes species typically spend a relatively small proportion of their lives in freshwater systems, all species are completely dependent on freshwater systems to spawn (sturgeon fry have a very low tolerance to saline water). Dramatic declines in recruitment have been recorded after access to spawning sites was lost or when spawning sites were modified through sedimentation or scouring. Spawning in the majority of species is currently restricted to a small fraction of the original spawning grounds, often in sub-optimal spawning habitat. In some cases, the ecological separation between species during spawning has been lost, resulting in interspecific competition for spawning sites and hybridization in extreme cases.

9. Access to spawning sites is frequently compromised or completely impossible in some systems as the result of reduced flow rates, reduced water depths and the formation of sand bars across river mouths. These effects are most pronounced in smaller rivers, many of which have been entirely lost to sturgeons. Significant spawning, and major stocks of sturgeons, currently occur primarily in only the largest river systems, and only in those where a considerable length of river can still be accessed from the relevant marine basin where sturgeons spend most of their lives. Some stocks have persisted primarily because of large-scale introductions over a long period of time rather than natural spawning, or have been reduced to relict status, persisting largely as non-breeding adults with little or no recruitment. It is nevertheless encouraging that some countries have indeed made attempts to mitigate the effects of habitat alteration by for example dredging of river mouths. Experiments are under way in the Azov Sea basin to create artificial spawning runs in blocked rivers, based on work in North America, which may result in improved spawning, but concerted action is needed to protect remaining spawning habitat. It is not known to what extent countries, especially in the Eurasian region, are actively protecting the remaining freshwater habitat of sturgeons and paddlefish, but the protection of spawning habitat and the maintenance of access to such habitat have to be priorities for conservation if further losses are to be avoided. The restoration of spawning habitat and migratory access to such sites would come a close second.

10. Serious habitat degradation has also occurred as the result of industrial and agricultural pollution and eutrophication, affecting both the freshwater and marine components of drainage basins. Some stocks show evidence of reproductive inhibition and teratogenesis, and it can be assumed that reproductive success and recruitment have been compromised to a varying degree in many more stocks. Other serious changes occurring in marine waters can not be ruled out, and the potential consequences of oil and gas extraction as well as the introduction of alien species remain to be explored in full. Sturgeon species differ in their tolerance to disturbance, and the community structure or species composition may accordingly change significantly in some basins.

11. Insufficient information is available on the population structure of almost all Acipenseriformes species, but there are several indications that considerable genetic differentiation has occurred at drainage basin and species level and that most populations may therefore be far more complex than is currently known. Many species exhibit a high degree of fidelity to natal rivers. Little genetic exchange seems to occur between different spawning stocks of the same species, despite the mixing of non-reproductive individuals of different stocks in the marine environment for the greater part of the year. Individual stocks are therefore highly vulnerable to disruptions in migration and spawning within particular rivers. It is a common feature of large Eurasian basins that spawning rivers are currently restricted to a fraction of the total number of tributaries that previously served as spawning grounds, and it is likely that a considerable degree of genetic diversity has already been lost. It appears in these systems that, once spawning has ceased in a tributary for a considerable period, it is unlikely to be reinstated (but attempts are under way in some countries to create new spawning stocks through re-introduction).

12. The conservation status of some stocks and components of stocks is therefore likely to be considerably more complex than currently understood, and may be compromised further by the

inability of fisheries management systems to deal appropriately with different sub-stocks. Fishing pressure may lead to the disappearance of less abundant genetic forms within a larger population if fishing pressure cannot be controlled to a level appropriate to the conservation needs of each genetic variant.

13. The introduction of specimens from aquaculture operations into spawning systems may have considerable impacts on the genetic diversity within a basin. Most aquaculture operations in the Eurasian region, producing tens of millions of fingerlings per year for stocking in support of commercial fisheries, base their operations on very limited numbers of parents, in some cases on fewer than 10 adult females per species per year. The release of large numbers of closely related offspring may swamp smaller numbers of offspring produced through natural spawning and may therefore reduce the genetic fitness of the population as a whole and of each successive spawning cohort. The maintenance of as diverse a genetic pool as possible is pivotal given the increasing uncertainty concerning spawning opportunities and the generally reduced size of sturgeon stocks.

14. Interbasin transfer of subspecies or genetically distinct stocks (possibly even species) has occurred through introduction in support of commercial fisheries. It can be expected that increasing demand for fertilized live oocytes and cryo-preserved spermatocytes for artificial reproduction may lead to further mixing of genetic stocks, and some precautionary measures should be developed.

15. Some countries have established freshwater populations of some species of sturgeons in river sections isolated from marine bodies through the construction of dams etc. These populations, e.g. in the Volga and Kuban Rivers, surprisingly, have managed to spawn and persist despite the lack of access to the marine system, but are nevertheless reproductively isolated from their parental stocks. A decision will be required in future to manage such stocks separately from parental stocks and to allow the inevitable genetic drifting that will occur, or to manage them as part of a metapopulation. Currently vacant sturgeon habitat in such isolated parts of rivers may hold considerable potential for the recovery of populations and spawning, but will require human intervention indefinitely to be of any conservation value.

Recommendations

16. A global inventory of Acipenseriformes spawning habitats and sites and their conservation status, ranked according to importance, should be conducted urgently by all range States, as the basis for further conservation planning and action.

17. Regional conservation strategies for Acipenseriformes, as recommended in Resolution Conf. 10.12 (Rev.) and also recommended by the Committee in terms of Resolution Conf. 8.9 (Rev.) should include provisions to maintain and improve the conservation status of Acipenseriformes habitat in fresh water in particular. The protection of such habitat should be integrated as much as possible by range States into their national conservation priorities, also those relating to other international agreements such as the Convention on Biological Diversity (CBD), the Convention on Wetlands of International Importance (Ramsar) and the Convention on Migratory Species of Animals (CMS). It should become a common goal to protect all remaining unprotected spawning habitats and migratory routes in the short term; to improve the level of protection of currently protected spawning habitats and migratory routes in the medium term; and to attempt the restoration of spawning habitats and migratory routes of all critically endangered and endangered (or the equivalent classifications that countries may use nationally to rank the conservation status of species) species of Acipenseriformes in as many range States as possible. Former range States should be encouraged to re-introduce nationally extinct species.

18. Further work aimed at improving the understanding of the population structure and genetic variation of stocks subject to large scale economic exploitation is urgently needed.

19. Guidelines based on genetic considerations need to be developed concerning large-scale stocking of basins with fingerlings produced through aquaculture. The principal objective of such guidelines should be that the genetic composition of offspring produced for release in a functional spawning river should not compromise the genetic variation of that spawning stock.

Management of Acipenseriformes fisheries

20. Most sturgeon species of economic importance are anadromous, i.e. migrating from marine water bodies to spawn in freshwater systems. Planned sturgeon fisheries target reproductively mature individuals, typically from the time when reproductively active individuals leave the marine system to start their spawning migration until they return to marine water. Most fisheries that are aimed at producing caviar as the principal product are conducted in spawning rivers, i.e. to maximize the caviar yield by targeting females with oocytes in an advanced stage of development. Catches from river fisheries are not entirely limited to pre-spawning females, as the harvesting methods are not selective and will still result in the capture of males, immature individuals (which have been reported to accompany spawning migrants for reasons that are still unclear) and post-spawning females. This type of fishery typically involves multiple catching stations along a river, affecting individuals moving both upstream and downstream. Unless catching effort is extremely well regulated, mortality is likely to be very high. A high proportion of sturgeons from typical catches appears to be landed alive, but little seems to have been done so far to release non-target individuals (probably because the meat from such individuals is also of commercial or subsistence value).

21. The age structure of stocks seems to be highly uneven in many cases, which is consistent with a pattern of episodic recruitment (i.e. successful mass recruitment takes place in some years only), possibly exacerbated by anthropogenic influences on, for example, water discharge into spawning rivers. The sizes of most stocks of economically important species have strongly declined historically, but are still large in absolute terms (in the order of 10^5 or 10^6 individuals or more), with a strong bias towards juveniles. For long-living, slow-maturing but highly fecund species, this bias is partly explained by the relatively low natural mortality rates of juveniles older than about one year, the massive stocking of juveniles from hatcheries in some areas, but also by the high mortality rates of adults due to fishing. A large proportion of catches seems to consist of first-time spawners, indicating low adult survival rates. Minimum size limits, but no maximum size limits in the Eurasian region, have been established for all commercial catches.

22. Catch quotas have traditionally been based on stock assessments in the marine environment, but stock assessments have seldom been satisfactory in terms of basin-wide coverage and sampling intensity. While it may be possible to infer an estimated total stock size from stock assessments based on sampling trawls, a number of complications have to be considered. In some cases, sampling trawls have produced such limited catches of sturgeons, probably because of the currently reduced densities of most sturgeon stocks, that little can be inferred about the age structure and recruitment of stocks, and statistical variation in most demographic and biological parameters remains unknown. Additionally, stock assessments based on trawling in marine bodies seem to have little direct relevance to the setting of catch quotas for the spawning component in any given year, because not enough information is collected through such assessments on the component of the population likely to spawn in the next year. Some countries have attempted to adjust offtakes on the basis of the size and structure of the spawning component (mostly known from the fraction caught), but because an entirely different cohort (and a minor number of repeat spawners from older age classes) will enter rivers to spawn in the next year, the characteristics of spawning fish landed in any particular year have little predictive value for future years. The actual limit on catches of the spawning stock entering rivers therefore seems to be largely arbitrary. In some cases, it seems as if the bulk of the spawning component is harvested every year, as reflected in the low incidence of repeat spawners in catches. In this scenario, the only feasible option is to adjust catch quotas based on general stock trajectories derived from stock assessment surveys outside the spawning rivers.

This option may therefore not be specific enough to take account of temporal variation in recruitment, and thus to ensure that offtakes of specific year classes which dominate in spawning components are sustainable in terms of the survivorship of those year classes. Harvesting therefore seems, in general, to result in the elimination of entire cohorts or large fractions of cohorts.

23. Increasingly large numbers of sturgeons are also caught to obtain reproductive stock for aquaculture operations. The preferred specimens for aquaculture seem to the largest reproductively active specimens available, which may result in an additional targeted pressure on the relatively small fraction of stocks that have managed to spawn (or escape being caught) repeatedly. Increasing demand for stocking aquaculture operations may see an increasing targeting of juvenile or reproductively inactive sturgeon for rearing and breeding in captivity. The vast majority of specimens derived from aquaculture (fingerlings or fertilized oocytes) are indeed derived from wild specimens, from which gametes are obtained for *in vitro* fertilization, and the offtake of specimens for this purpose should also be considered in the context of sustainability of harvesting and making non-detriment findings.

24. Significant volumes of sturgeons are also caught as part of stock assessments, research and monitoring. Commercial trade in specimens derived from such catches seem to play an important role in the maintenance of research, scientific institutions and sturgeon hatchery production, but could also lead to abuse. Greater transparency in large-scale non-commercial or research-related fisheries is required to avoid concerns that such fisheries are merely a subterfuge for commercial fisheries and trade.

25. Unplanned sturgeon fisheries, namely as incidental catch or bycatch from other fisheries are, by definition, not targeted at any specific segment of the population. Large-scale industrial fishing for sardine-type fishes in, for example, the Black and Caspian Seas in areas where sturgeon juveniles accumulate have resulted in considerable bycatch of sturgeon, but the scale of impact is not known. In some countries, a high proportion of the total number of sturgeons landed was caught as bycatch from other fisheries, but there are grounds for concern that other fisheries may be used as a subterfuge by fishermen in order to catch the more valuable sturgeons.

26. Illegal fisheries in many instances amount to a major additional offtake. Although difficult to quantify (but recognizing considerable progress in, for example, the Danube system to do so), illegal fishing seems to amount to between four and ten times the volumes legally authorized to be caught, possibly more according to some estimates. Some countries have attempted to adjust offtakes to compensate for illegal catches (and catch limits derived from stock assessments in marine bodies implicitly take the impact of illegal catches in previous years into account), and have presented data that the declines in most stocks have been halted, but there are also cases where such compensation has not been effective or has not lead to the recovery of stocks. It is therefore imperative that the process of establishing commercial catch quotas should take better account of all sources of sturgeon mortality. Some countries have taken measures to provide strong incentives to reduce illegal catches and illegal trade, e.g. by a combination of offering price advantages for legally caught specimens and strict enforcement, which hopefully will result in a reduction in illegal catches over time.

Recommendations

27. The process of establishing catch and export quotas for shared stocks established through Decision 11.58 should be maintained and improved. The Secretariat intends to propose amendments to this Decision at the 12th meeting of the Conference of the Parties to eliminate several confusing elements contained in the Decision and to provide for clearer guidance concerning the process that

needs to be followed by both range States and the Secretariat. It also intends to propose the incorporation of the substance of this Decision, along with other related Decisions, in a revised Resolution on the conservation of sturgeons.

28. Research is urgently needed to quantify the effects of current fishing practices in spawning rivers, with the aim of revising such practices to allow a significant fraction of the spawning component to return to marine water after spawning.

29. Alternative approaches to stock assessment and monitoring of sturgeons should be considered, to improve the basis for catch quotas in spawning rivers and to take better account of all sources of fishing mortality. New resources have to be identified to support more comprehensive, more regular and more intensive stock assessments. So-called fishery-independent assessment techniques need to be developed to complement trawl-based data collection.

30. Urgent research is needed into the impact and scale of illegal fishing of sturgeons, so that illegal fishing can be adequately taken into account in the establishment of offtake limits (and to provide a benchmark for enforcement success).

31. Alternative approaches to providing stock for aquaculture operations and stock enhancement programmes should be developed to reduce the impact of targeted harvesting of large sturgeons for this purpose (and to increase the genetic base for releases). Approaches to be considered could include the expansion of facilities for the cryopreservation of spermatozoa, and the hormonal manipulation of non-reproductive females.

32. Agreed protocols should be developed for scientific research involving large-scale catches and landings of sturgeons, to maximize the information that can be gained from such catches whilst minimizing the ecological impacts of such catches. Alternative mechanisms for the funding of stock assessments and research should be considered.

33. Regulation of fisheries with a significant bycatch of sturgeon should be revised, to reduce the impact of bycatches on sturgeon stocks. Regional conservation strategies should endeavour to incorporate such provisions.

<u>Regulation of fisheries and enforcement</u>

34. The catching and landing of Acipenseriformes species appears to be extensively regulated in almost all range States, but it is not apparent that the enforcement of such regulations is adequate in all cases, nor that the regulations themselves are always the most appropriate. There seems to be a general need to modernize the traditional hunting and fishing legislation used by most countries to include controls on domestic and international trade and to provide for economic incentives or other means to promote compliance. Regulations concerning river fishing may not be effective to reduce fishing effort unless compatible with the spawning and migratory behaviour of sturgeons, aspects which may not have been taken into account in all cases. Some regulations also appear not to be conducive to enforcement, e.g. it is easier to verify that no fishing takes place on some days than to verify that no more than a specified number of nets are set on any one day. Few countries have implemented tagging schemes to enable law enforcers to determine that a specimen has been legally acquired at any stage from landing to processing. In many range States national legislation, and the penalties available to the courts, do not reflect the conservation importance of sturgeon species and the penalties currently imposed often do not act as a sufficient deterrent to poachers or illegal traders. Although the Secretariat is satisfied, to a considerable extent, that the regulation of legal harvesting, processing and export appears to be effective, it is convinced that the regulation of domestic trade requires much greater attention in several range States. Domestic markets offer too great an opportunity for the laundering of illegally obtained and processed sturgeon parts and

derivatives. Domestic demand has often not been adequately assessed and has often not been taken into account in determining catch quotas.

35. Regulations concerning other fisheries may not have accommodated sturgeon management objectives in some cases, and serious impacts on the survival of fingerlings can be expected if, for example, fisheries using nets with small mesh sizes are conducted in the mouths of spawning rivers. Allowing sturgeon caught as bycatch to be sold commercially can arguably open a huge loophole for illegal targeting of sturgeons in fisheries ostensibly targeting other species.

36. Considerable awareness has been raised in all important range States of the importance of regulations and their enforcement, but further work and resources are still necessary in most cases. Fisheries regulations should be improved in several situations, e.g. to harmonize fisheries practices on both sides of the same river forming the boundary between countries, to limit the taking of spawning migrants, to establish a maximum size limit to allow the survival of some repeat spawners and older adults, and the release of non-target specimens.

37. Much more vigorous enforcement is needed, in parts of the Eurasian region in particular, in order to combat illegal fishing and illegal trade.

Recommendations

38. Range States engaged in sturgeon fisheries should, in order to provide a sound legal basis for conservation and management of sturgeon resources, assess the effectiveness of their fishing regulations and review them to promote regional harmonization of regulation of sturgeon fisheries in shared basins, prevent other fisheries from undermining sturgeon conservation, and prevent trade in specimens resulting from sturgeon bycatch and scientific fisheries from becoming a subterfuge for commercial fishing and trade.

39. All range States should review regulations, or establish new regulations where appropriate, in order to bring strict control over domestic trade in sturgeon products.

40. Further efforts should be made by range States to maintain and improve enforcement, and to extend enforcement from fisheries to trade.

Economic considerations in Acipenseriformes conservation

41. Most of the important sturgeon range States, in terms of the number of species or the amount of habitat, have economies in transition, and in some cases, large human communities without alternative sources of income depend on fisheries, including legal and illegal fisheries of sturgeons. Rural economies in such instances face severe consequences from further measures to restrict trade that may emerge through the processes under way in CITES, but in the longer term, even worse consequences if stocks decline further. Larger fishing companies and exporters will also be affected, but the consequences for small fishermen (legal and illegal) will be particularly severe. It is noteworthy that some economically important stocks of other fish species are also depressed or in a state of decline, at least in the Black Sea and the Caspian Sea, and other fisheries therefore do not offer much of an alternative source of income. It is important to recognize that managing a high-value open-access resource, particularly for countries with economies in transition, is not an easy task. States need to have the institutional and financial resources (and political will) to improve management of the stocks, regulate access, reorganize the domestic catch and markets and ensure a fair standard of living for the local community. The lack of resources and capacity to manage the species provides an opportunity for illegal trade. An important question in the context of CITES is therefore to determine how greater investments in sturgeon conservation and management can be

made, how the role of sturgeon resources in sustainable development can be maintained, and how the role of international trade in sturgeon products can be enhanced in this regard.

42. Illegal fishing of sturgeon and illegal trade in caviar is poorly understood in terms of economic costs and benefits. While illegal harvesting and trade undoubtedly support the livelihoods of thousands of people in the Eurasian region, such activities probably also amount to a net loss in value that can be derived from the resource. From all accounts, illegal products achieve much lower prices than their legal equivalents, although this price differential is likely to be less prominent further up in the chain of trade and consumption. Illegal fishing, and probably also illegal trade, has nevertheless been remarkably efficient in economic terms. Small-scale illegal operators seem to recover several times more sturgeon and caviar compared to legal operations, and at much lower investment costs. Consideration should therefore be given to alternative ways of distributing access to sturgeon resources and providing a legal framework for the bulk of fishing activity that currently falls outside the legal realm. It may be possible to use greater revenue returns per unit caught through legal trade to reduce the overall number of sturgeons caught illegally. Early indications from some countries suggest that such alternatives are effective.

43. Domestic markets should be regulated regardless of international trade regulation, because they may drive the overexploitation of a biological resource on their own. Inadequate control of domestic markets is also leading to substantial loss of potential revenue for States and the financing of conservation and enforcement. Taxation on trade in caviar is often focused solely on the major legal exporters. Customs and other revenue-gathering agencies could be encouraged to focus on all aspects of the trade in sturgeons, especially domestic markets. Enforcement efforts should not be restricted to fishery-protection issues.

44. Differences in revenues received by different range States for their sturgeon resources are striking. Some countries have achieved highly sophisticated marketing of their exports, whilst others appear to be far less efficient. Quality control and packaging are obvious areas requiring improvement, but other aspects of trade could also be improved. Various systems of trading sturgeon products internationally are used, ranging from a single State-controlled corporation conducting processing and exports, to competitive auctions of catch quotas, independent processors and multiple exporters. Too little is known about the relative merits of each system, but range States involved in sturgeon fisheries and trade should consider alternative models, learn from their competitors and conduct much more market research than is evidently done at present. A more comprehensive system of labelling caviar and other sturgeon products is required to facilitate enforcement (see document AC18 Doc. 15.2), and can contribute to customer awareness if the labelling system is marketed as a certification tool to discriminate between legally and illegally acquired specimens.

45. The potential impact of sturgeon aquaculture on sturgeon conservation is unclear. All indications are that *ex situ* production of sturgeons will increase considerably if the output from *in situ* production cannot meet the international demand for caviar in particular. Such a shift in production may reduce fishing pressure on wild sturgeons, but may also pose a risk concerning the positive relationship that countries may wish to develop between international trade and the conservation and management of sturgeons and their habitat. Further consideration is needed amongst range States of current policies on the export of fertilized oocytes and fingerlings to commercial *ex situ* operations. Aquaculture may also play an important role in range States, and may be one of the most viable alternatives to illegal harvesting and trade. So far few range States have actively promoted the development of such operations in their territories and using their own species, and this option should be given serious consideration.

Recommendations

46. Range States should, as part of the process of developing regional conservation strategies for sturgeons, identify mechanisms that will enhance the funding of conservation and management of sturgeon stocks, possibly including mechanisms that will allow reinvestment of trade revenues into conservation and management. The feasibility of economic instruments such as tradeable catch and export quotas, export taxes, access fees (payment for the right to exploit the resources) and user charges should be explored in order to create incentives for proper management (i.e. to generate enough income through exports and economic instruments to finance and make investments in management activities, monitoring and enforcement). The Secretariat is available to assist in this regard.

47. Range States should investigate alternative options concerning the distribution of access to sturgeon resources, and seek the assistance of international development and conservation organizations to do so, particularly to address the issue of large-scale illegal fishing by people with low incomes.

48. Range States should review current policies on the export of fertilized oocytes and live fish for aquaculture, in order to develop a harmonized approach that will support their conservation and habitat protection efforts, prevent genetic pollution, and secure long-term market access (but sacrificing short-term gains through trade in these high value items). Support for the establishment of aquaculture operations involving local communities and local species should be actively considered, to provide alternative income and reduce harvesting pressure.

49. Range States should, in order to maximize the economic value of trade in sturgeons and thus the potential benefits to sturgeon management and conservation, consider alternative marketing models. Assistance should be sought from appropriate international bodies in this regard, including the Secretariat. Consideration should be given to using the universal labelling system as a certification tool at retail level in order to promote customer confidence. Some tools from the intellectual property regime could possibly be used to add value to exports by establishing rules concerning the origin and trade names for caviar, similar to the European wine industry amongst other industries. Preference and price advantages for sustainably produced caviar could serve as a powerful incentive measure in producer States. The Secretariat is available to assist with the investigation of such options.

Conclusion

50. The Secretariat wishes to note that the problems summarized above are not insurmountable, and that processes of liaison and coordination created through the implementation of the Review of Significant Trade, as well as the implementation of Decision 11.58, have already achieved much to raise awareness of sturgeon conservation needs, to improve regional cooperation, to improve access to information, to improve accountability in the use of sturgeon resources and to serve as useful frameworks for further action. Considerable commitment to improved management has been demonstrated by virtually all countries engaged in large-scale commercial use of sturgeons.

51. Decision 11.58, the scope of the recommendations of the Animals Committee pursuant to Resolution Conf. 8.9 (Rev.), and subsequent agreements of the Standing Committee have provided a new level of intervention in the management of CITES-listed species and trade in their specimens which may become a benchmark in CITES. The Secretariat has been able to engage with the major producers to an unprecedented level, also involving new Parties, non-Parties, new Management Authorities, Scientific Authorities and regional scientific institutions, new regional bodies and consultative processes, and it believes that the outcome has been very positive.

52. The Secretariat wishes to thank all Acipenseriformes range States for the information that they have provided and their willingness to address complex issues related to the conservation and management of species in this order. It is hoped that the processes that have been established and

the cooperation that has been achieved will continue. The Secretariat remains willing to provide whatever assistance may be needed by any of the range States, or to help obtain such assistance from other sources.