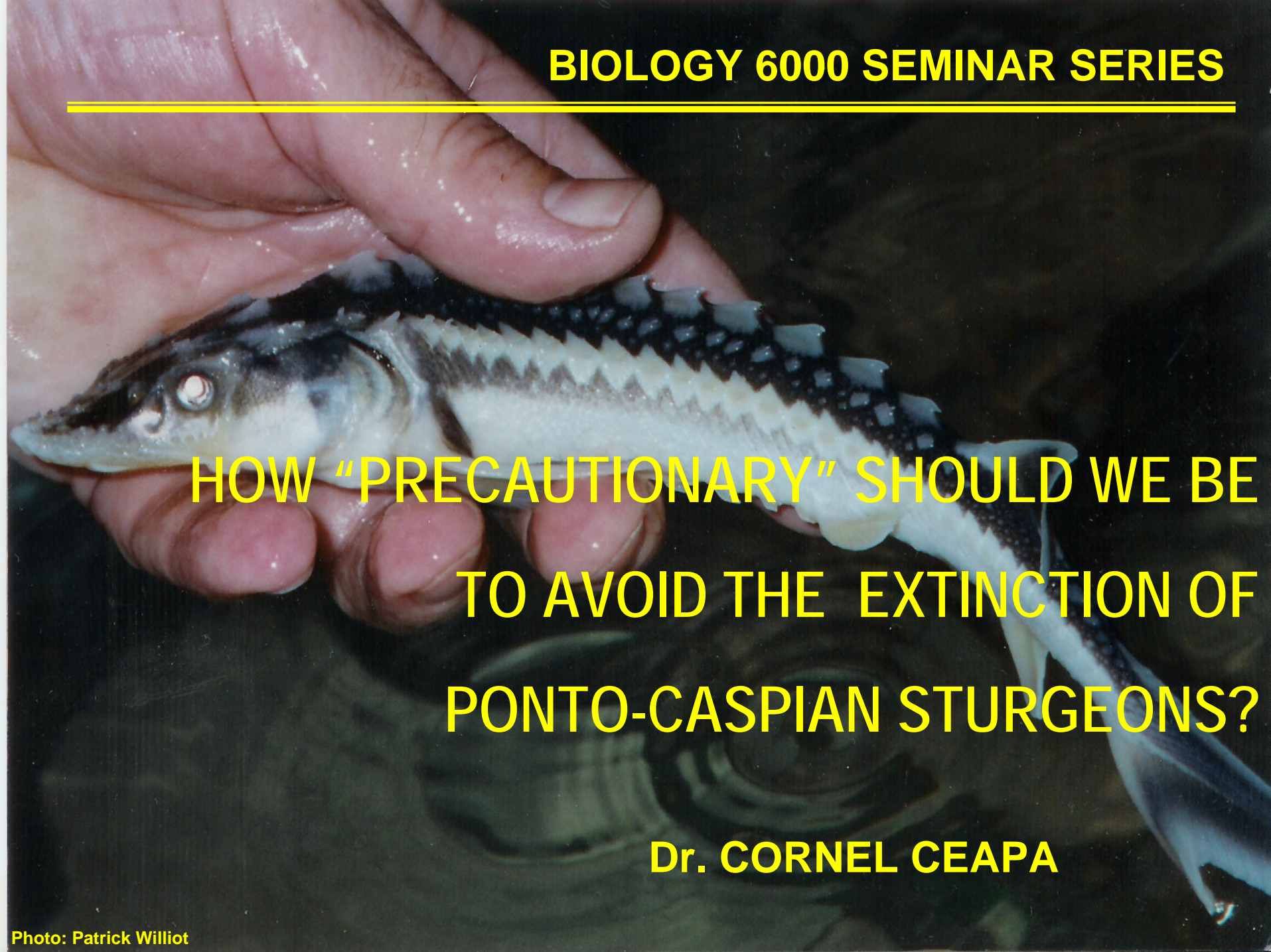


BIOLOGY 6000 SEMINAR SERIES



HOW "PRECAUTIONARY" SHOULD WE BE
TO AVOID THE EXTINCTION OF
PONTO-CASPIAN STURGEONS?

Dr. CORNEL CEAPA

?QUESTIONS?

1. WHAT IS THE STATUS OF PONTO-CASPIAN STURGEON?
2. CAN STURGEON POPULATIONS BE MANAGED SUSTAINABLE?
3. WHAT ARE THE OPTIONS?
4. WHICH ARE THE BEST INDICATORS TO BE USED FOR AN EFFECTIVE ADAPTIVE MANAGEMENT?
5. WHAT ARE THE CRITICAL VALUES ASSOCIATED WITH THOSE INDICATORS
6. WHEN TO STOP?

OUTLINE

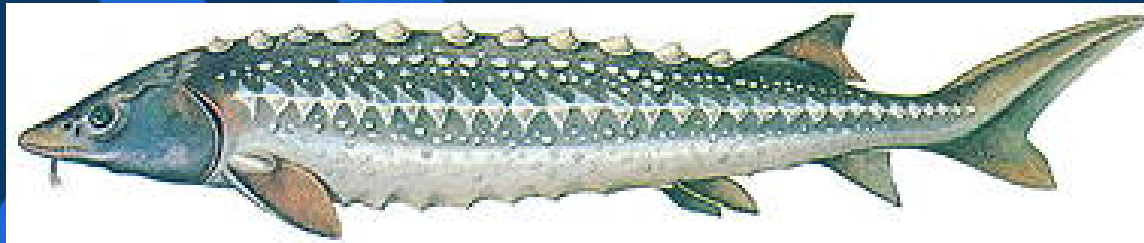
1. SPECIES AND GEOGRAPHY
2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS
3. STRUCTURE OF THE DANUBE POPULATIONS
4. MANAGEMENT OPTIONS
5. INDICATORS FOR THE ADAPTATIVE MANAGEMENT
6. CONCLUSSIONS

1. SPECIES AND GEOGRAPHY



BELUGA

over 100 years old, 6 m and 1,000 kg (Danube – 882 kg)
maturity: 12 – 14 years M and 14 – 16 years F



RUSSIAN STURGEON

max 46 years old, 2.5 m and 115 kg;
maturity: 8 – 12 years M and 13 – 15 years F

1. SPECIES AND GEOGRAPHY



STELLATE STURGEON

max 23 years old, 2.1 m and 68 kg;
maturity: 7 – 10 years M and 10 – 14 years F



SHIP STURGEON

over 30 years old, 2 m and 80 kg (Danube – 68.5 kg)
maturity: 9 – 13 years M and 13 – 16 years F

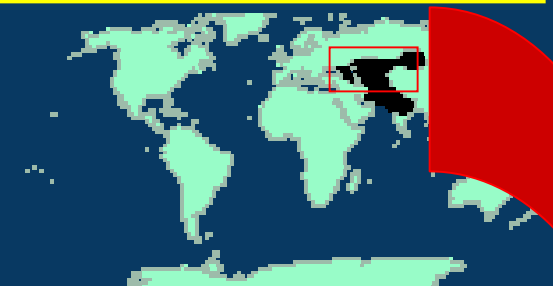


PERSIAN STURGEON

max 36 years old, 2.5 m and 115 kg;
maturity: 7 – 9 years M and 10 – 12 years F

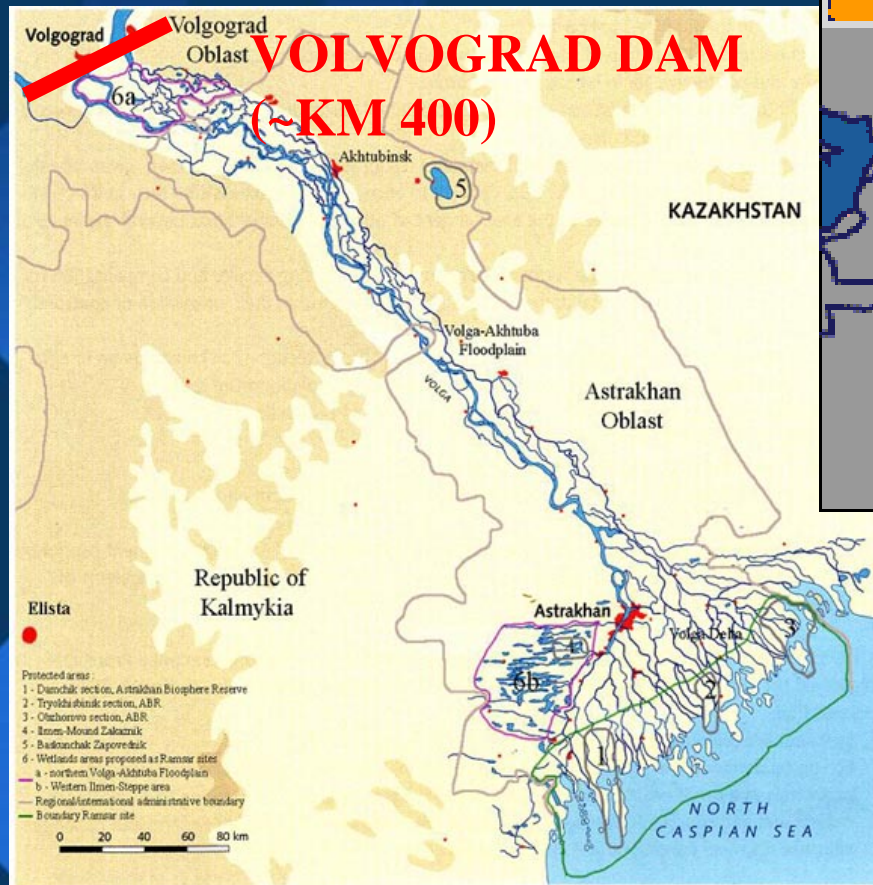
1. SPECIES AND GEOGRAPHY

Ponto-Caspian Region



1. SPECIES AND GEOGRAPHY

Volga River and Caspian Sea

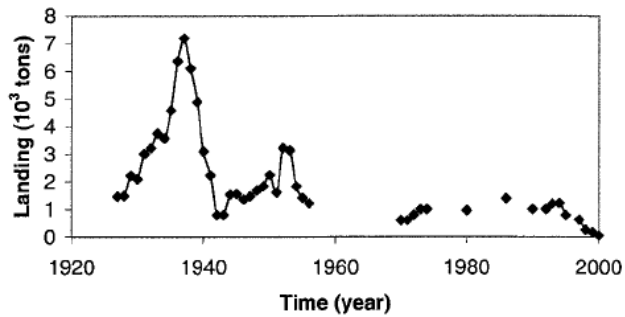


1. SPECIES AND GEOGRAPHY

Danube River and Black Sea

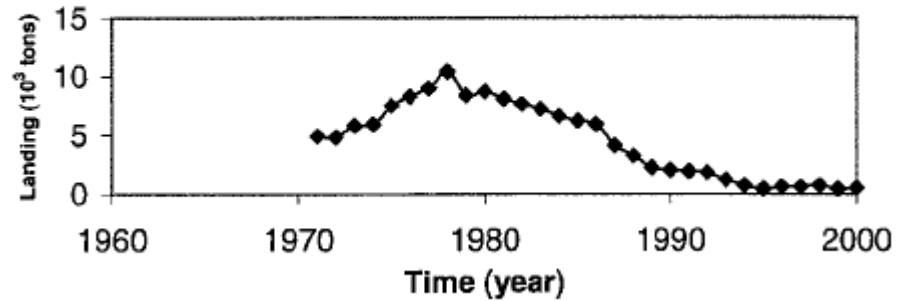


Azov Sea, USSR-Russia All species,
(Kozhin, 1964; FAO & Chebanov)

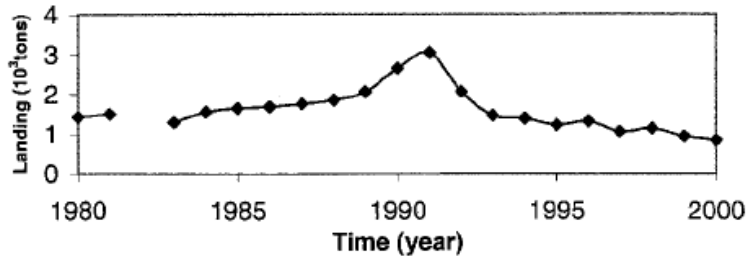


b) Caspian Sea, Ural, Kazakhstan, All species

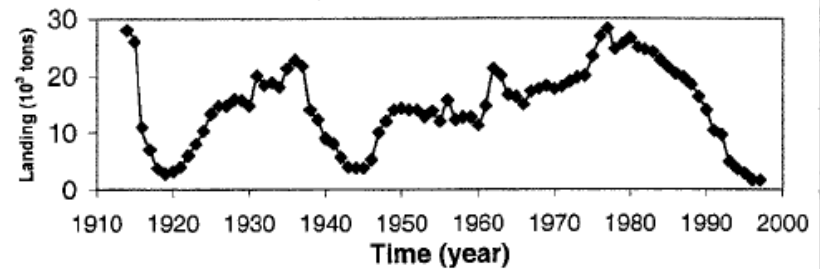
(Kim)



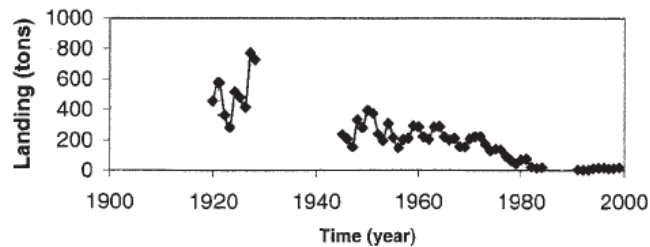
d) Caspian Sea, Iran, All species
(FAO & Pourkazemi)



a) Caspian Sea, USSR-Russia, All species
(Shubina, 1975 & FAO)

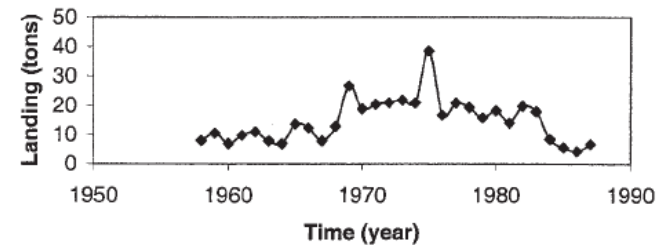


c) Danube, Romania, All species
(Bacalbasa-Dobrovici, 1991 & Patriche)

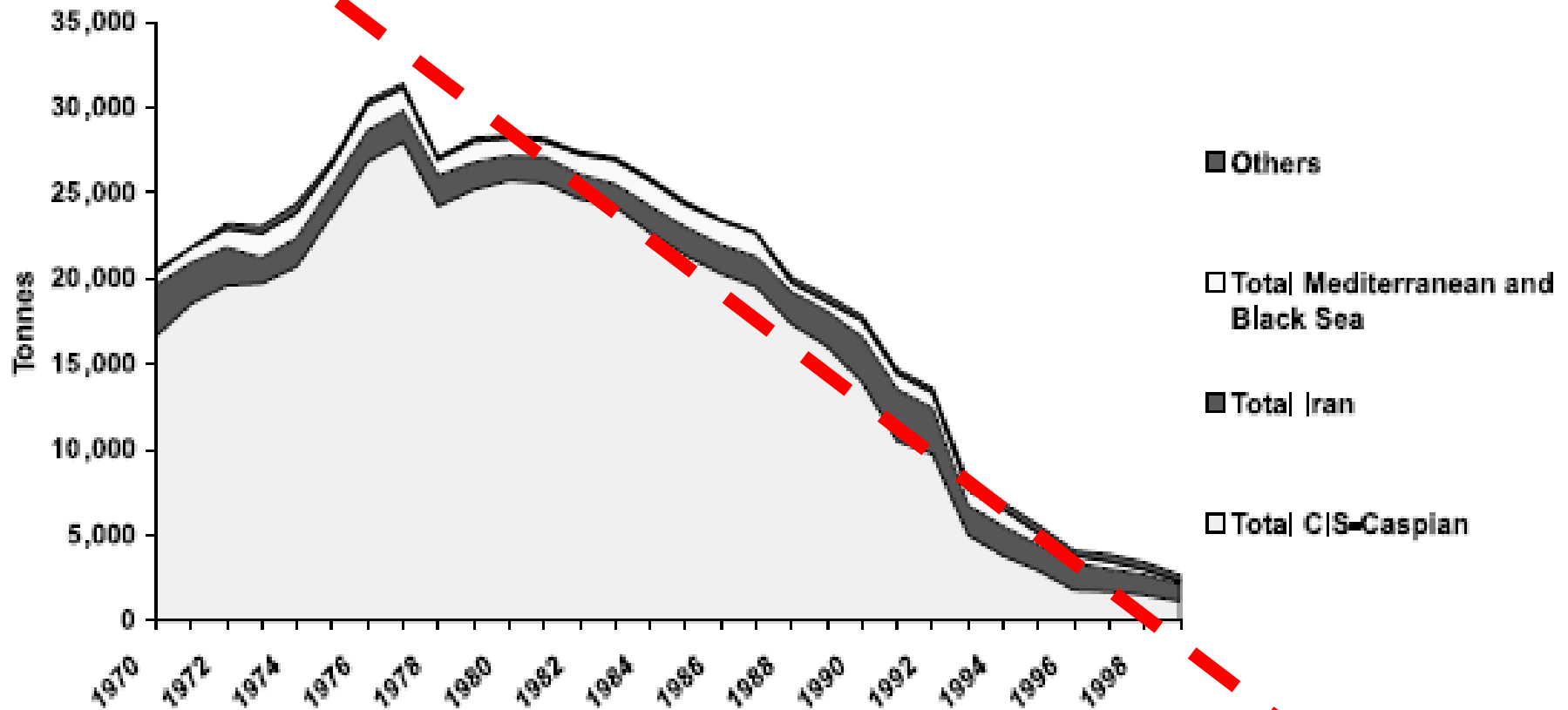


b) Danube, Yougoslavia, All species

(Stamenkovic, 1991)



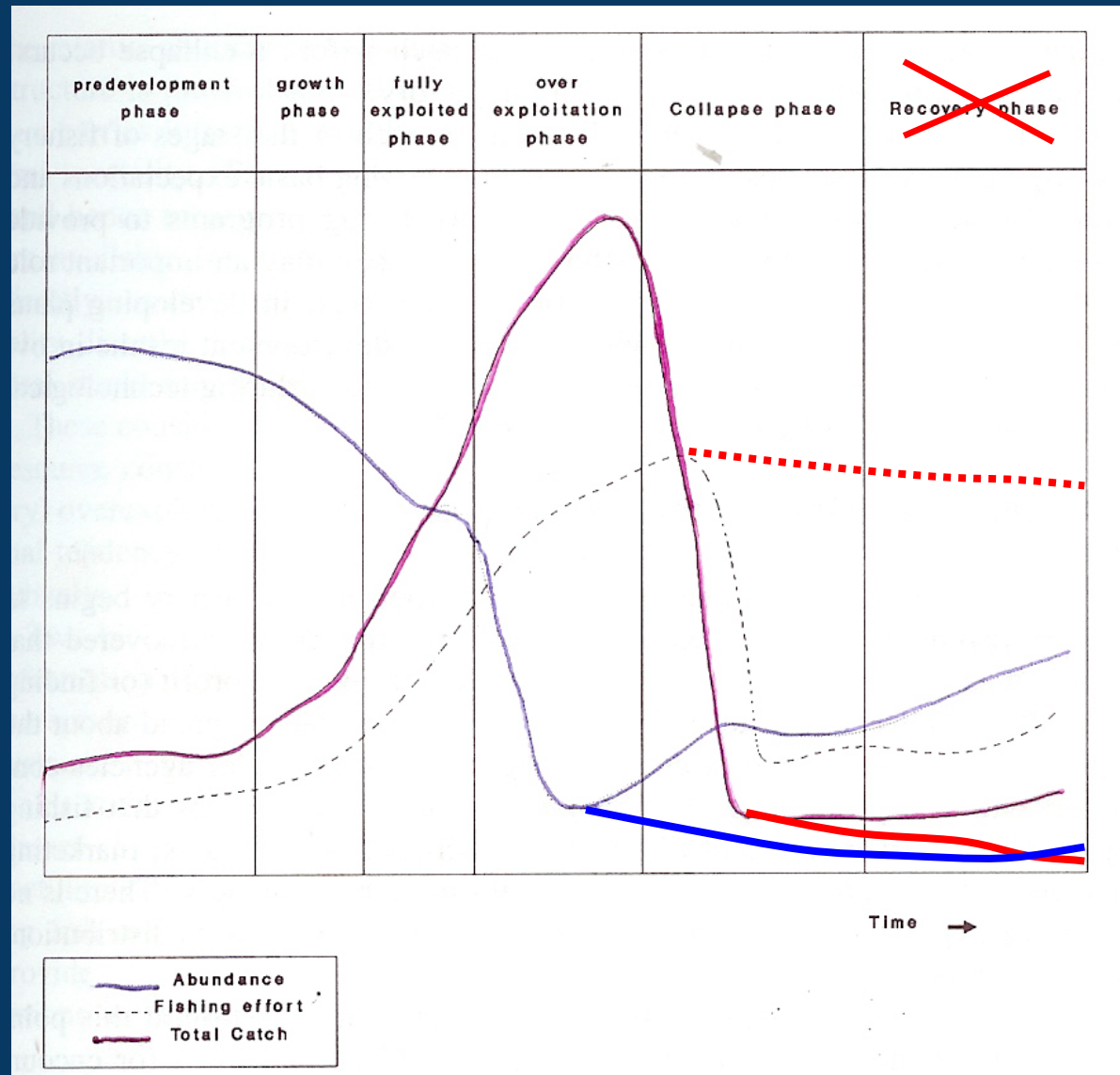
2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS



Prepared by TRAFFIC Europe (WWF/IUCN), November 2001

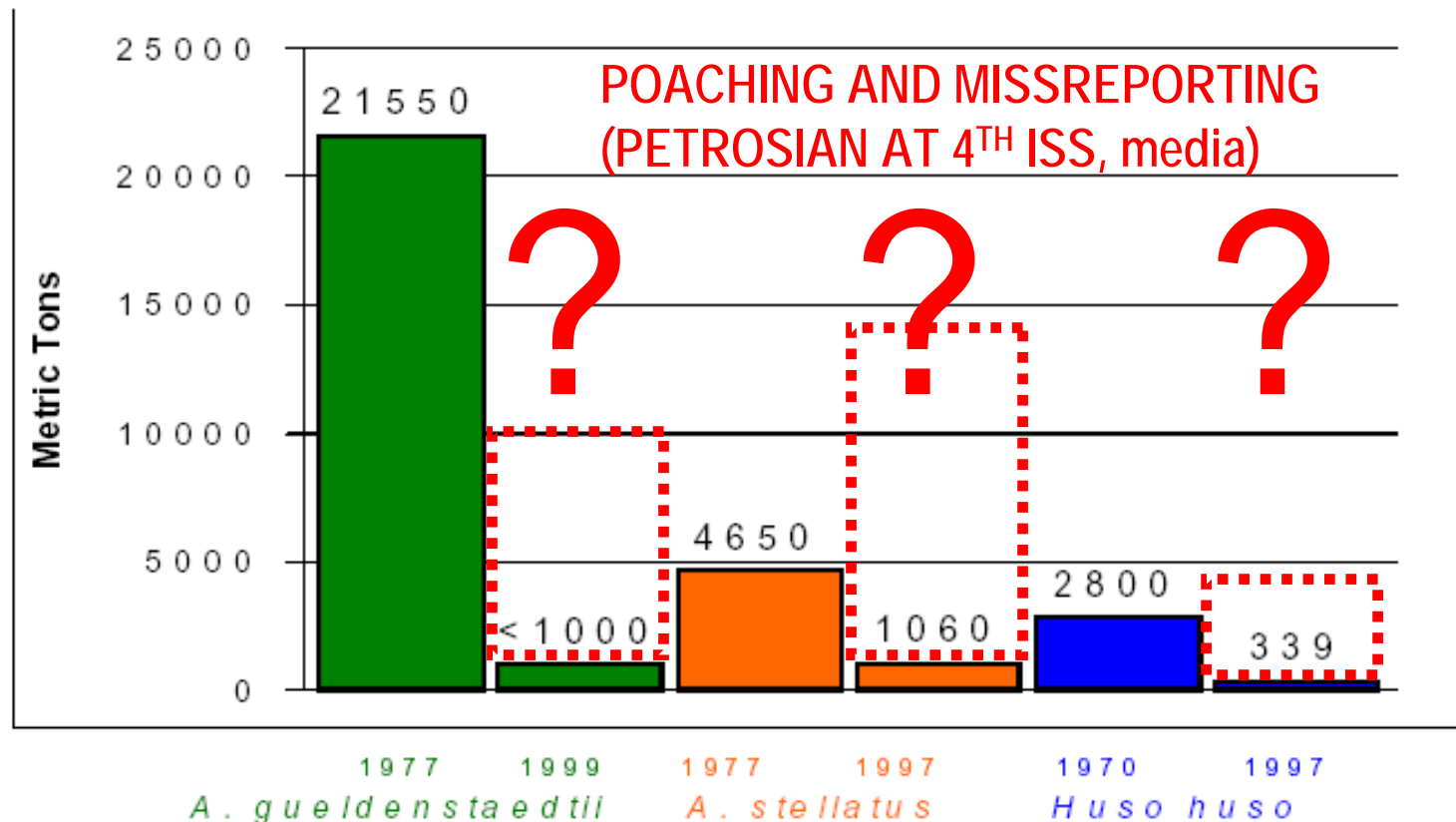
2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS

Relationship
between
abundance,
fishing effort
and capture
for an uncontrolled
fisheries (Hilborn
and Walters, 1992)

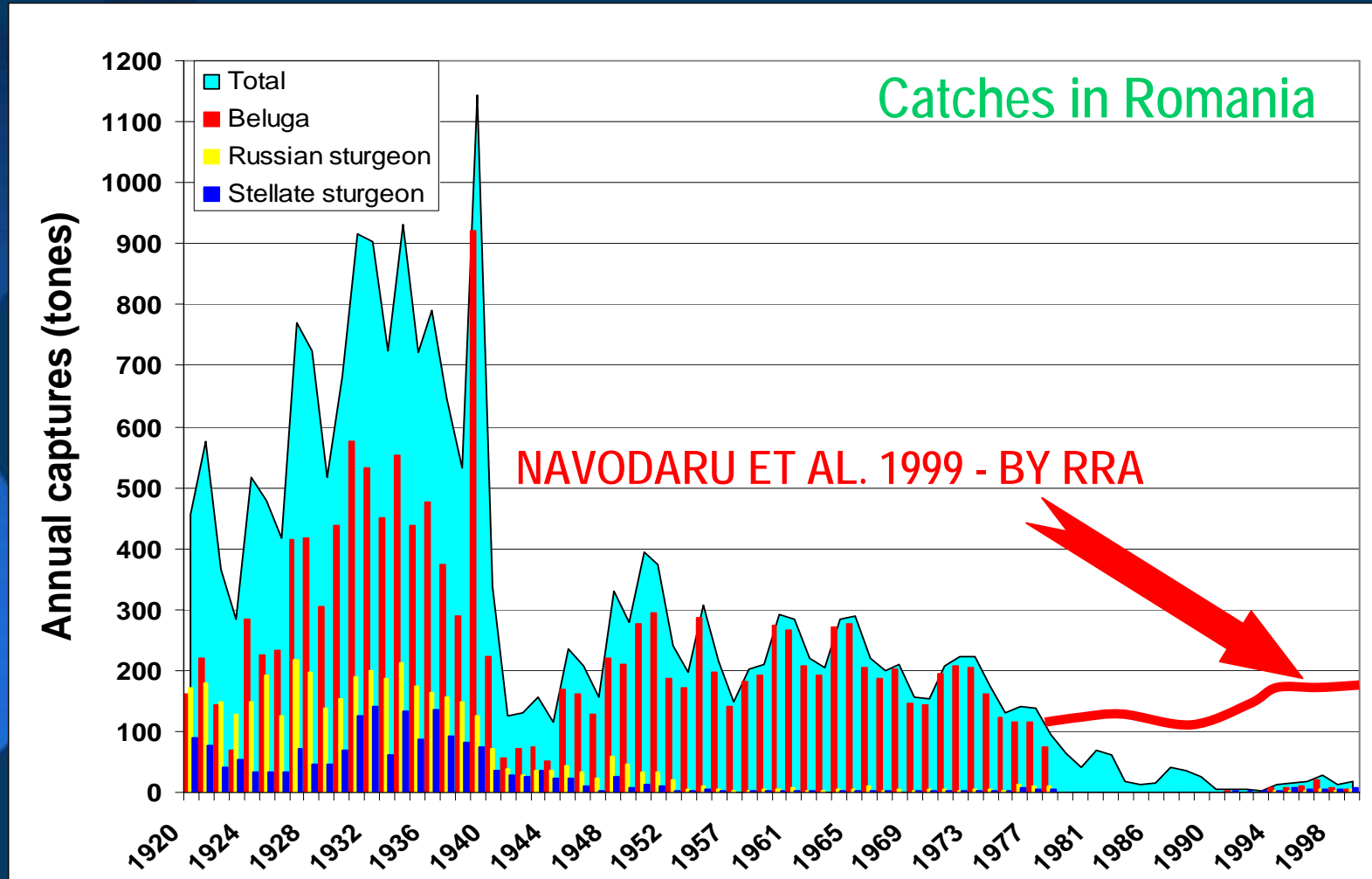


2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS

Catches in the Caspian Sea



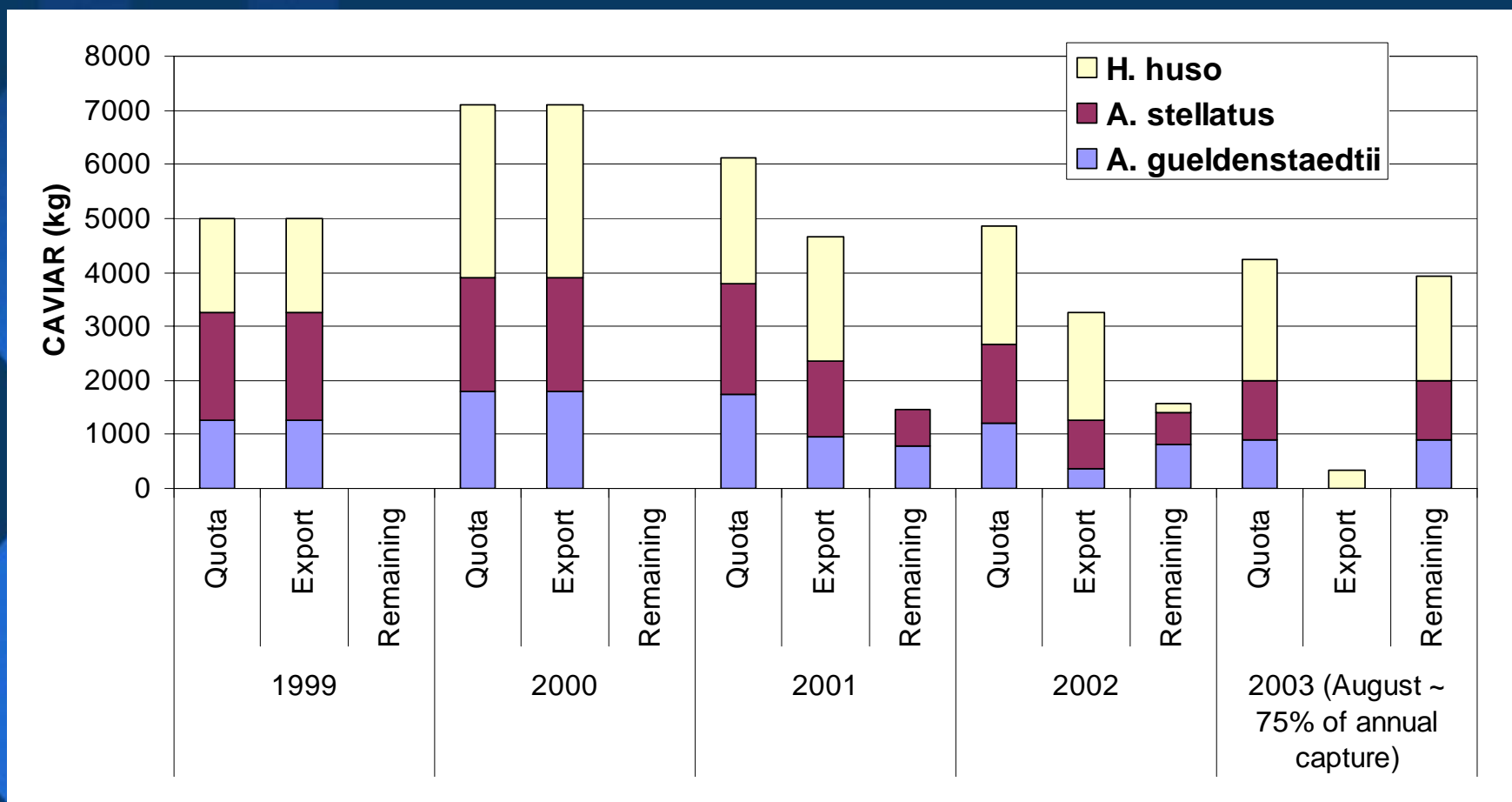
2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS



CEAPA 2001

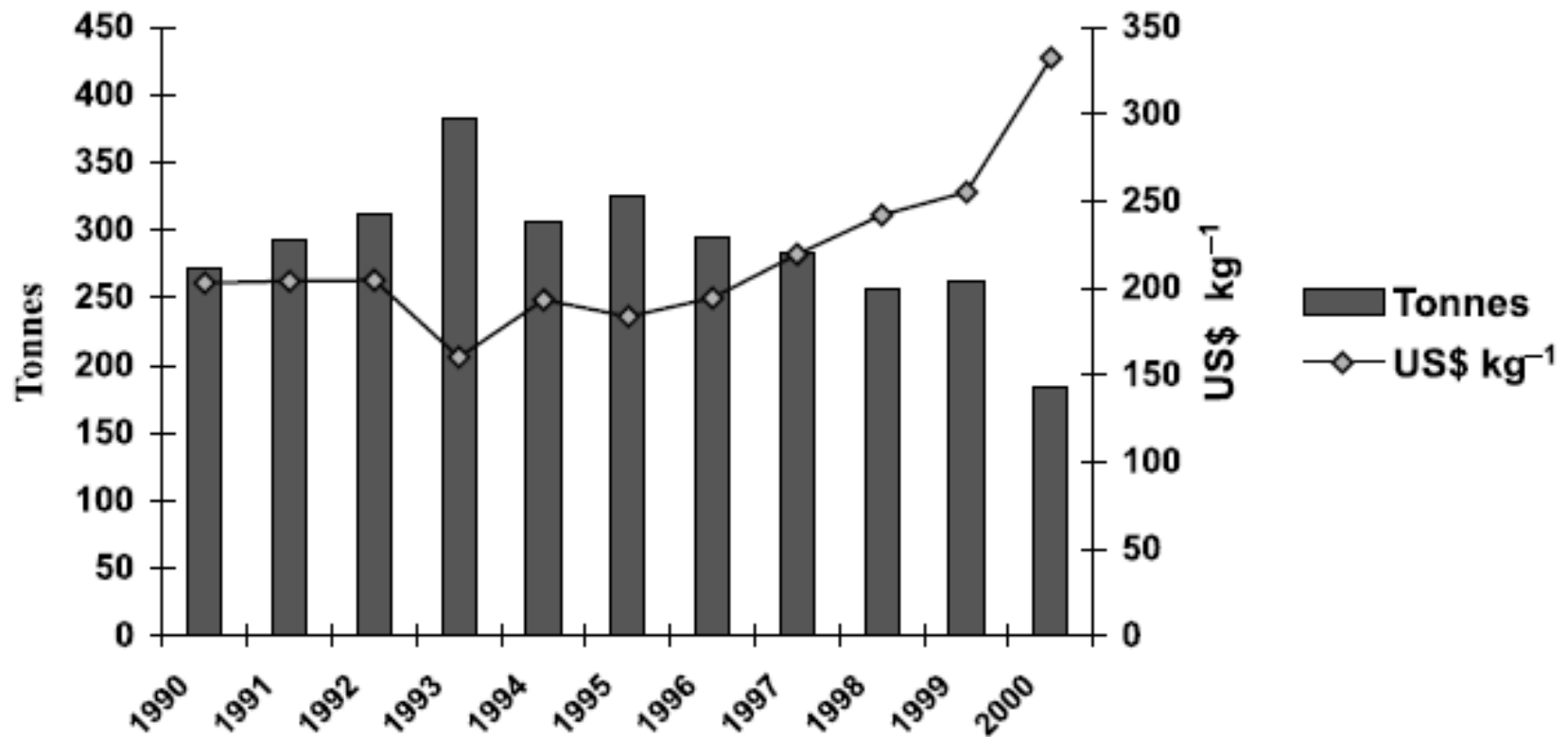
2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS

CITES caviar quotas and exports for Romania (1999-2003)



2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS

Caviar imports by the world major traders the EU, Japan and the USA 1990–2000



Prepared by TRAFFIC Europe (WWF/IUCN) June 2001

2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS

Current "Trends" in the *Huso huso* fishery in the Caspian Sea used for obtaining CITES Export Quotas for 2003

Table 1: Estimated numbers of *Huso huso* in the Caspian Sea and percentage of adults, based on summer trawl surveys*

Year	1998	1999	2000	2001	2002
Numbers	7.6 mil.	9.3 mil.	5 mil. **	9.3 mil.	11.6 mil.
% adults ***	0 - 17.4%	8.7 - 10.0%	5.5% **	14.8 - 22.0%	20.6 - 42.9%

RECOVERY OVER A 5 YEAR PERIOD???

* ... only
t ... stocks,
as during this time the species does not migrate. Summer trawls provide the most reliable estimates of population size and excludes double recording.

**Northern Caspian Sea only

***The first percentage refers to the Northern Caspian Sea; the second percentage to the Middle and Southern Caspian Sea.

Current "Trends" in the *Huso huso* fishery in the Caspian Sea

Table 5: Status of *Huso huso* populations in the Caspian Sea and levels of harvest in the tributary rivers.

Year	Population estimates (mil. specimens)	Number of adults in the sea **	Number of spawners entering rivers	Number of spawners harvested	% of harvested spawners held for the hatcheries
1998	7.6	0	6 090	2 118	41.1
1999	9.3	809 000	5 272	1 454	72.3
2000	5.0*	275 000*	5 355	1 182	48.4
2001	9.3	1 376 400	5 695	1 059	69.1
2002	11.6	2 389 600	5 524	1 121	61.9

*Northern Caspian Sea only

**The number of adults is based on the first percentage of the adult figure range provided in Table 1

2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS

Qualitative evolution of the sturgeon populations

- **Populations status indicators deteriorating**
(Moghim and Nielson 1999, Ceapa et al 2002)
- **Reproductive abnormalities probably due to pollution**
(Moiseeva et al. 1997, Ruban and Akimova 2001)
- **Introductions of non-native species and hybrids**
(Jennikens et al. 2000 contested by Birstein 2002)
- **Allee effect - inability to find mates at low densities leading to apparition of natural hybrids;**

2. STATUS OF THE PONTO-CASPIAN STURGEON STOCKS

CAUSES (Williot et al. 2002):

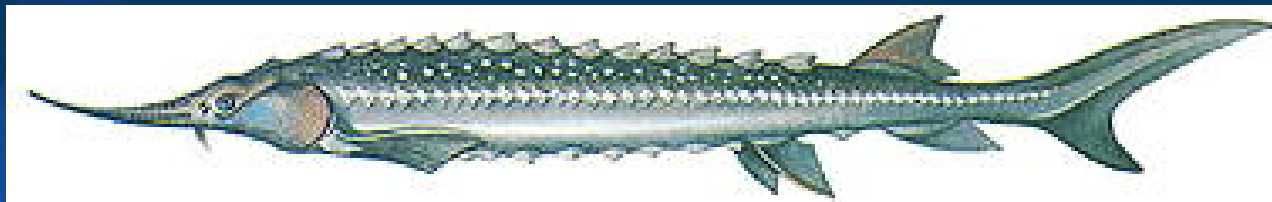
1.Overfishing	18.75%
2.Pollution	18.75%
3.Damming	17.25%
4.Poaching	14.00%
5.Water pumping	9.25%
6.Dredging	7.75%
7.Channelization	3.00%
8.Fisheries organisation	3.00%
9.Sea level	3.00%
10.Quality of marine nurseries	1.50%
11.Industrial development	1.50%
12.Alien species (with parasite)	1.50%
13.Sand bar at river mouth	1.50%
14.Regional management	1.50%

3. STRUCTURE OF THE DANUBE POPULATIONS

Stellate sturgeon – decrease of the total length

Kiriliuk (1965-1968)

LT - 131,16 cm



Ceapa (1997-2000)

LT - 119,73 cm



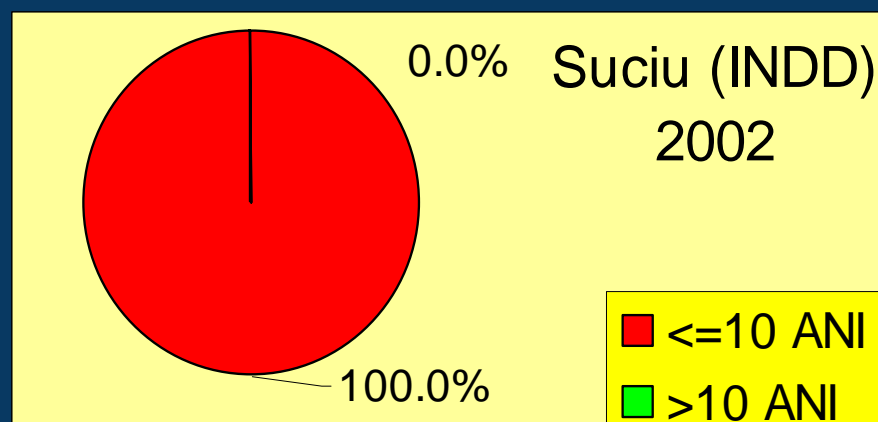
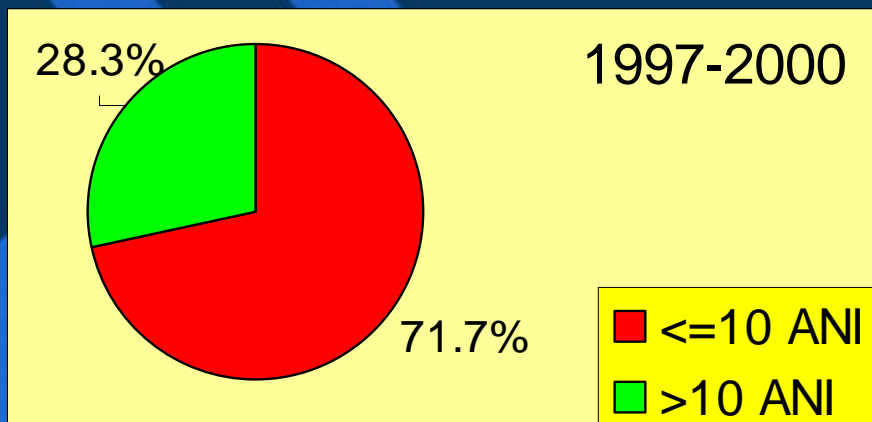
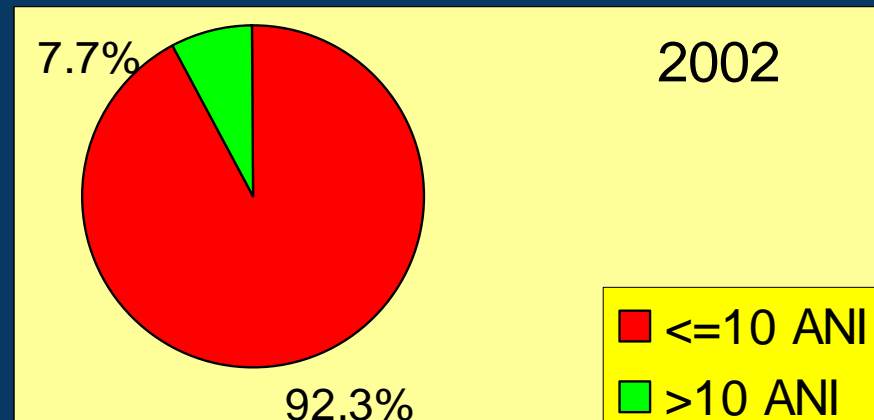
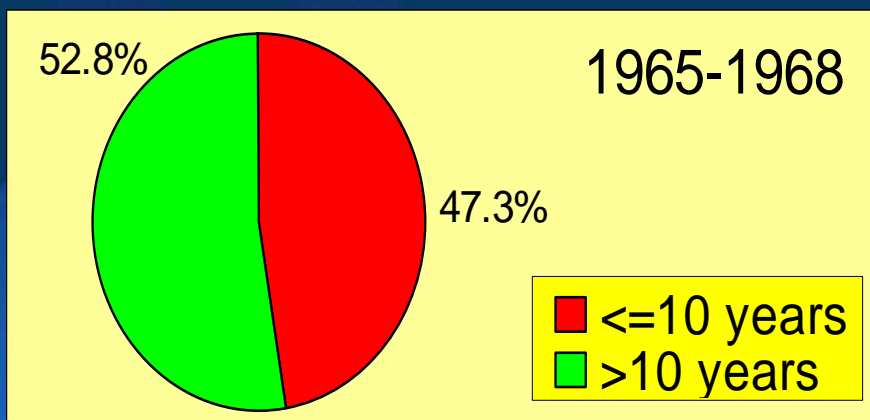
Monitoring 2002

LT - 111 cm



3. STRUCTURE OF THE DANUBE POPULATIONS

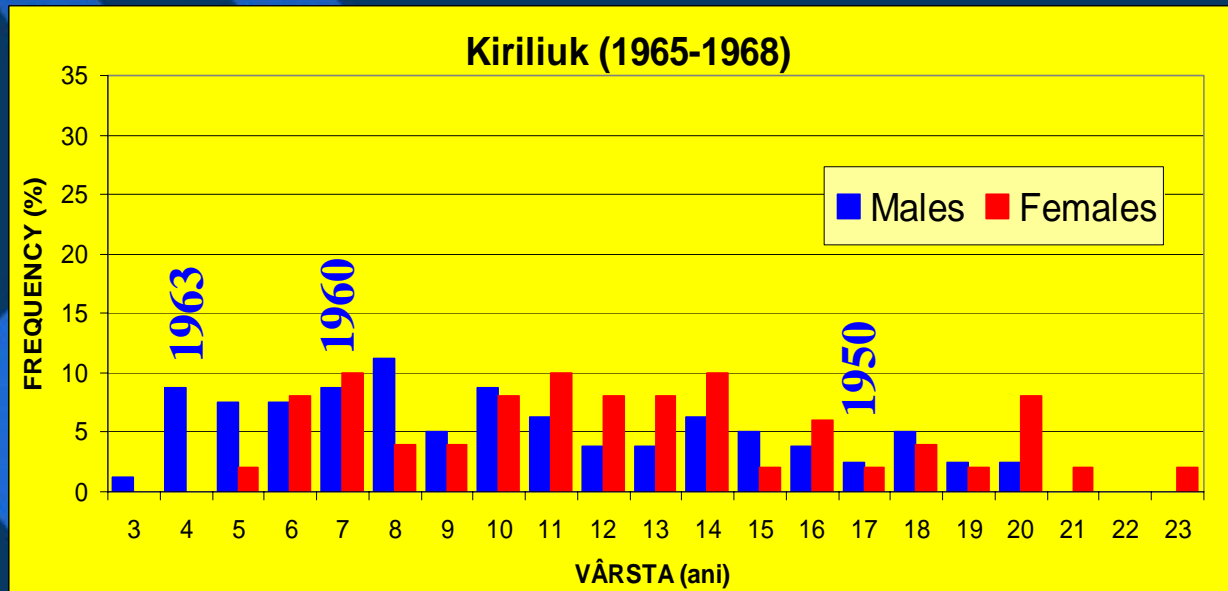
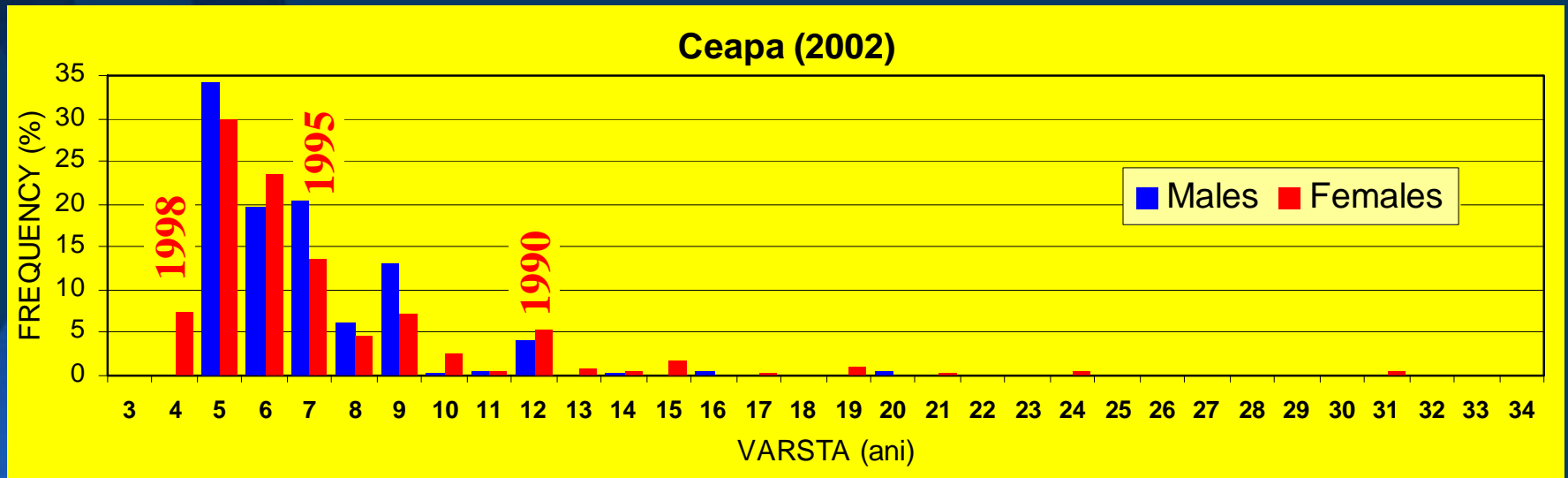
Stellate sturgeon – proportion of first time spawners



Ceapa 2001

3.STRUCTURE OF THE DANUBE POPULATIONS

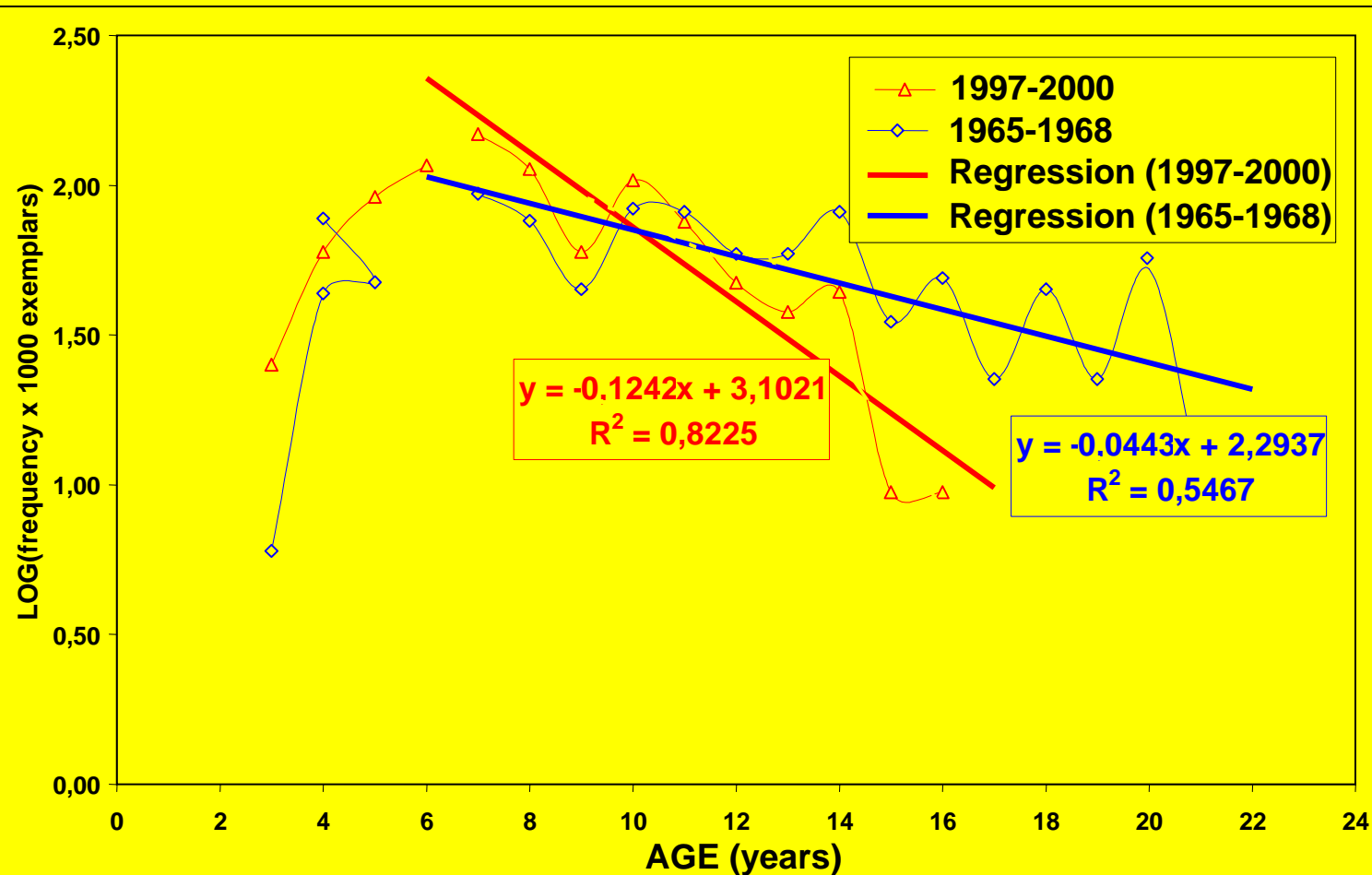
Stellate sturgeon – age structure



Ceapa 2001

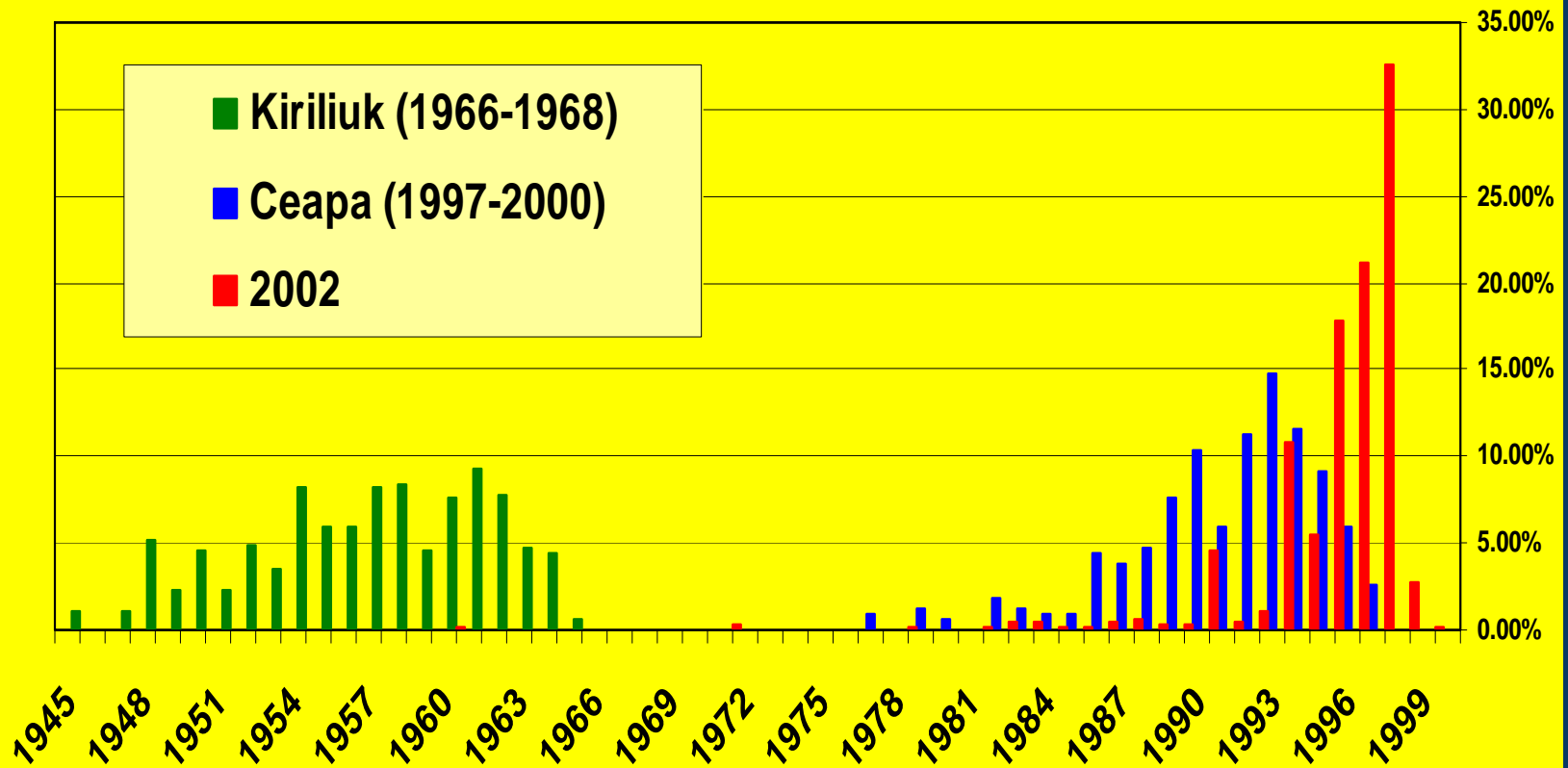
3. STRUCTURE OF THE DANUBE POPULATIONS

Estimated total mortality (A) from capture curves



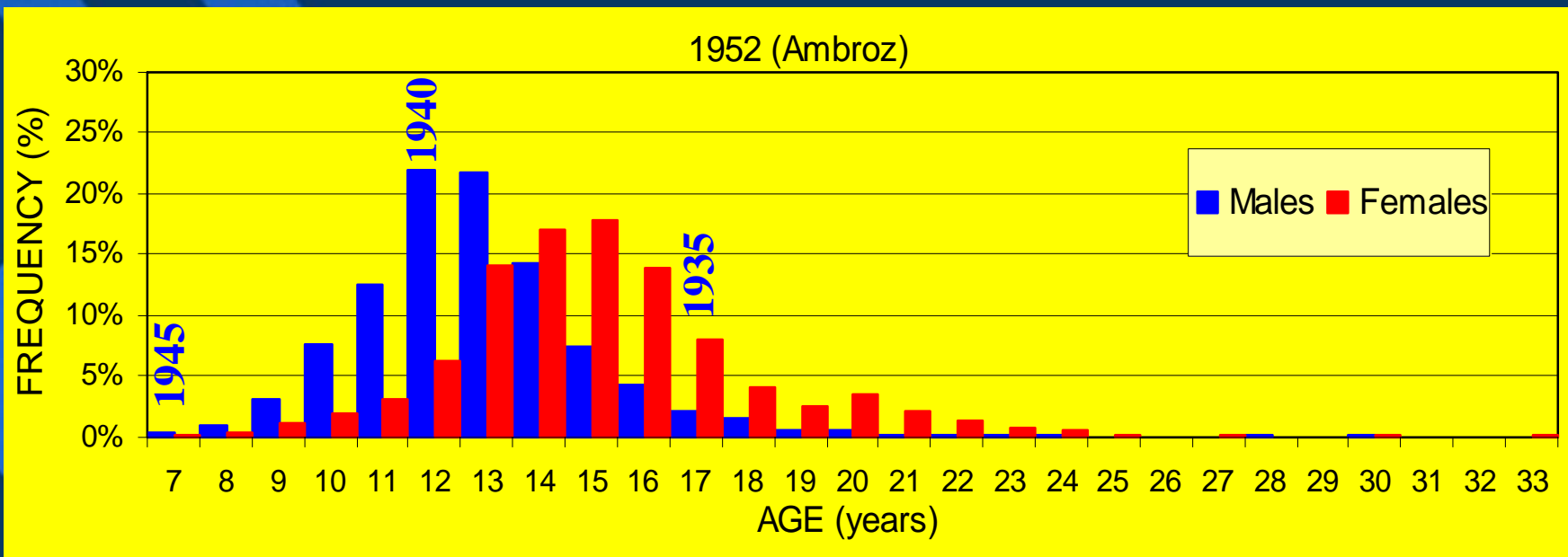
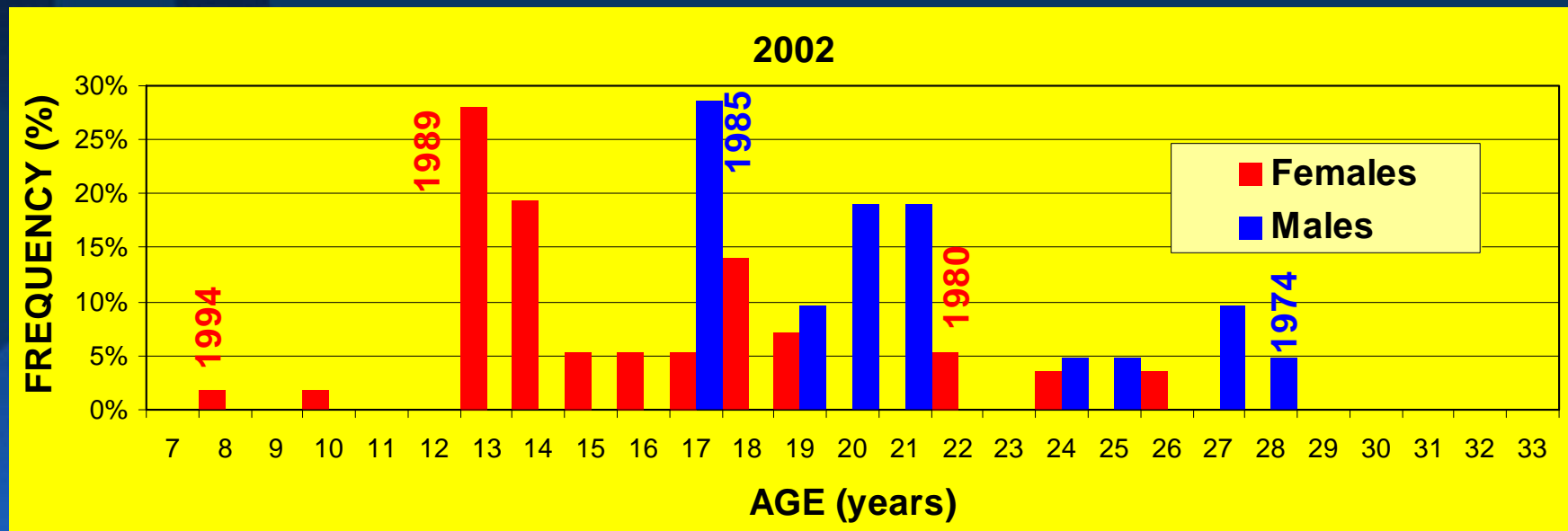
3. STRUCTURE OF THE DANUBE POPULATIONS

Stellate sturgeon – evolution of age structure



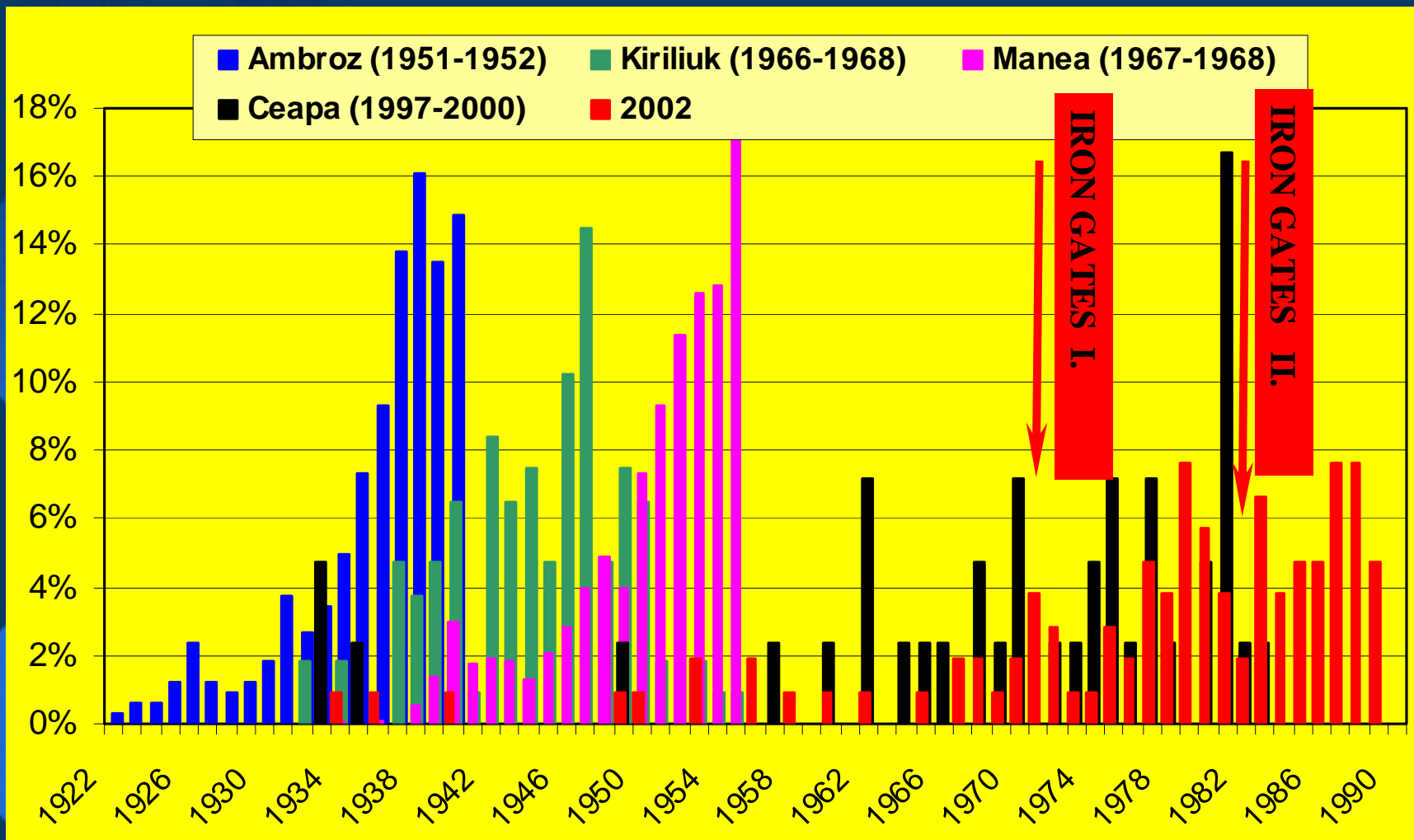
3. STRUCTURE OF THE DANUBE POPULATIONS

Russian sturgeon – age structure



3. STRUCTURE OF THE DANUBE POPULATIONS

Beluga sturgeon – evolution of age structure



4. MANAGEMENT OPTIONS

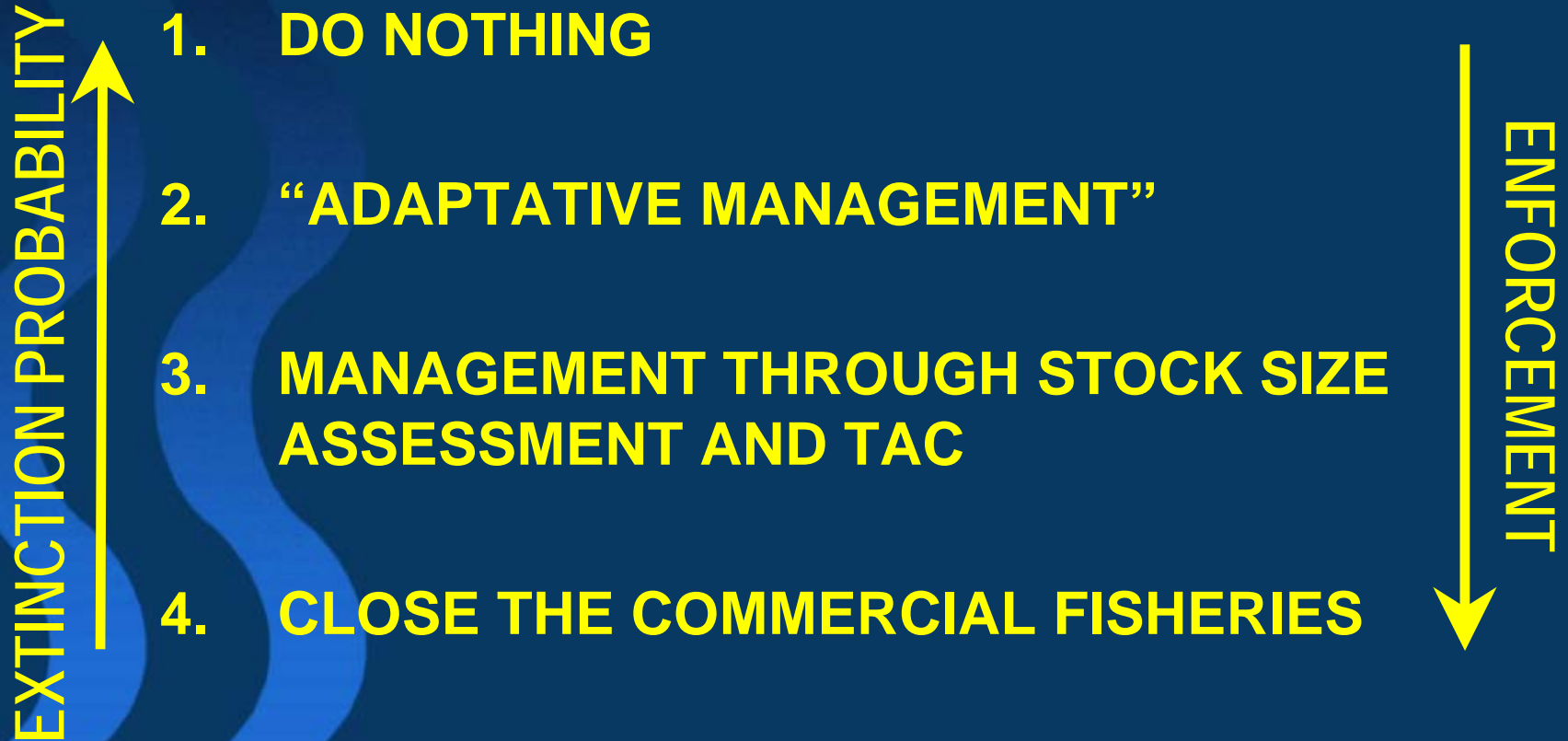
THE PRECAUTIONARY APPROACH TO FISHERIES

"better safe than sorry"

"The principle of the precautionary approach is to conduct fisheries activities in a manner that gives a high level of certainty that the marine ecosystem will not be upset or damaged. These principles should apply at all times, even when the stocks are abundant; to apply it only when stocks are low is a reactive response - the very opposite of precaution."

Michael Earle - The Ecologist 1995: 25 (2/3): 70.

4. MANAGEMENT OPTIONS



4. MANAGEMENT OPTIONS

1. MIMIC CHOICES MADE UNDER SIMILAR CIRCUMSTANCES BY OTHER AUTHORITIES
2. MAKE AN INITIAL CHOICE THAT “LOOKS REASONABLE” AND THEN VARYING IT WHILE MONITORING RESPONSES
3. ENGAGE IN FORMAL STOCK ASSESSMENT TO MAKE THE BEST PREDICTIONS POSSIBLE

A COMBINATION OF 2 AND 3 IS CALLED
ADAPTATIVE MANAGEMENT

(Hilborn and Walters 1992)

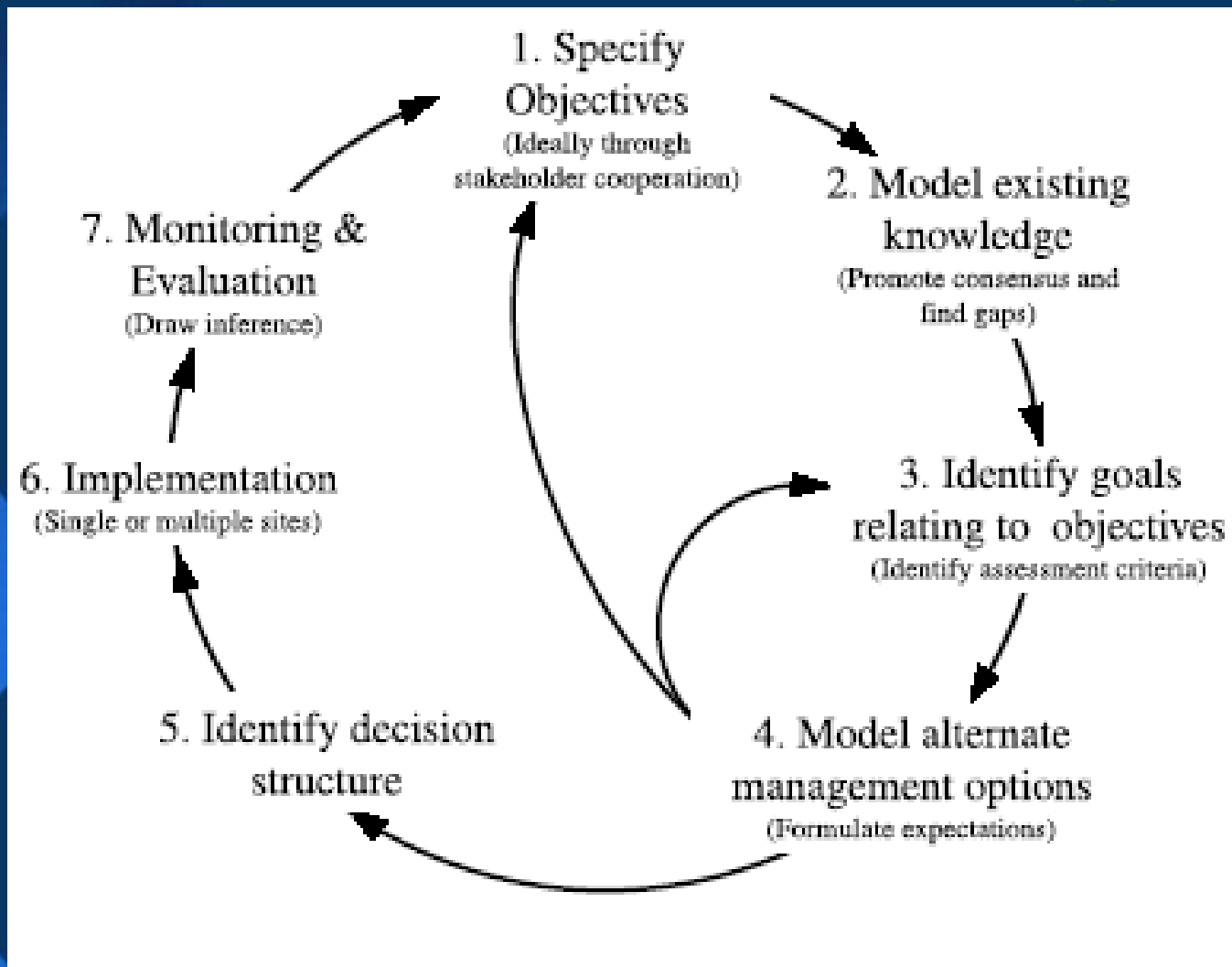
4. MANAGEMENT OPTIONS

CASE STUDY:

CAN THE ADAPTATIVE MANAGEMENT BE
EFFECTIVE FOR MANAGING STURGEON
POPULATIONS IN THE DANUBE RIVER ACTUAL
SITUATION?

4. MANAGEMENT OPTIONS

ADAPTATIVE MANAGEMENT - an ideal approach



5. INDICATORS FOR THE ADAPTATIVE MANAGEMENT

INDICATORS FOR THE REGIONAL DANUBE
POPULATIONS MANAGEMENT
(<http://rosturgeons.danubedelta.org>):

1. Fisheries information (fishing effort, CPUE, capture)
2. Population structure (sex ratio, length and age frequency, individual biometry)
3. Captures by Rapid Rural Assessment (RRA)
4. Number of downstream migrant juveniles [CPUE]

5. INDICATORS FOR THE ADAPTATIVE MANAGEMENT

VALUES OF THE ADAPTATIVE MANAGEMENT

INDICATORS FOR 2000-2002:

1. Fisheries information

- fishing effort, CPUE, capture – unreliable data due of poor enforcement
- CPUE in the experimental fishing still drooping.

2. Population structure

- sex ratio: Russian sturgeon - 73.08% females & 26.92% males;
stellate sturgeon - 37.67% females & 62.33% males;
beluga - 53.33% females & 46.67% males;
- length and age frequency – rejuvenation continues
- individual biometry – more than 20% erroneous data in 2002

3. Captures by Rapid Rural Assessment (RRA): not applied

5. INDICATORS FOR THE ADAPTATIVE MANAGEMENT

VALUES OF THE ADAPTATIVE MANAGEMENT INDICATORS (suite):

4. Number of downstream migrant juveniles [CPUE]

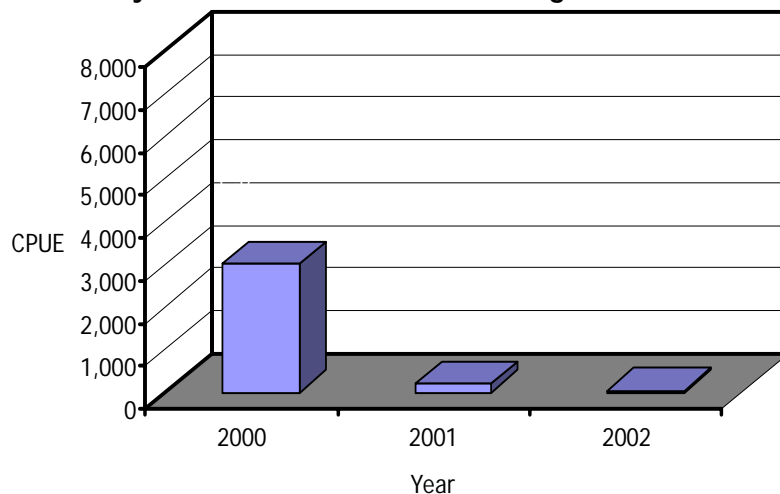
Year	2000		2001		2002		total	
Species	capture	CPUE	capture	CPUE	capture	CPUE	capture	CPUE
<i>Beluga</i>	61	7.625	39	1.625	83	1.93	183	2.44
<i>Stellate sturgeon</i>	24	3	5	0.208	2	0.047	31	0.413
<i>Russian sturgeon</i>	6	0.75	4	0.167	7	0.163	17	0.227
<i>Hybrids</i>	2	0.25	1	0.042	3	0.07	6	0.08
Total	91	11.38	48	2	92	2.14	237	3.16
Fishing effort	8		24		43		75	

5. INDICATORS FOR THE ADAPTATIVE MANAGEMENT

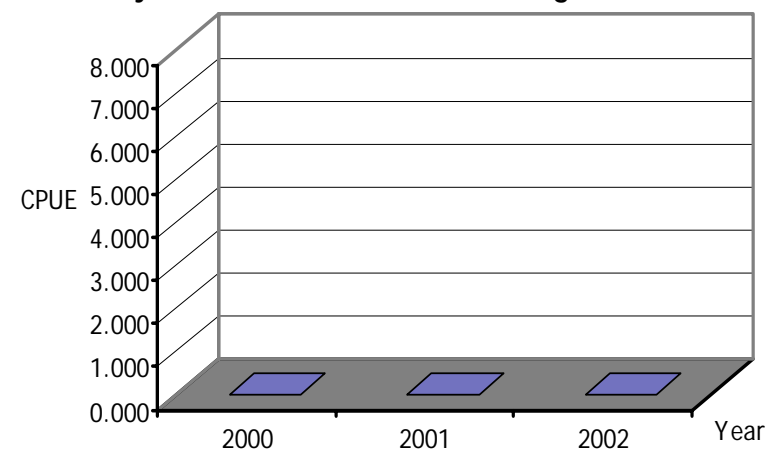
VALUES OF THE ADAPTATIVE MANAGEMENT INDICATORS (suite):

4. Number of downstream migrant juveniles [CPUE]

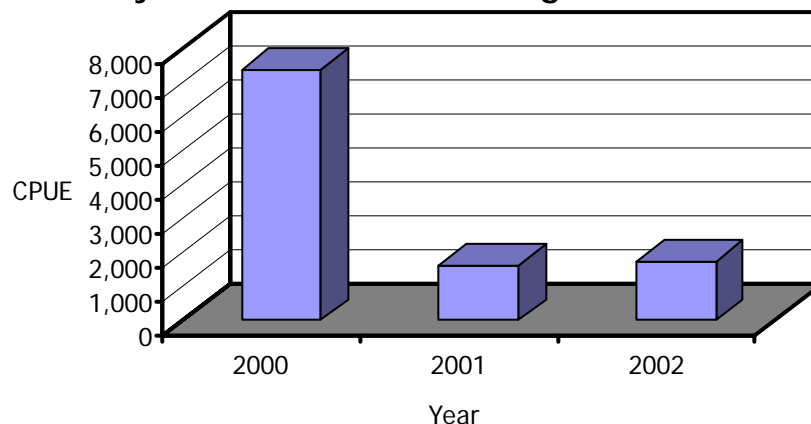
Dynamic of CPUE for stellate sturgeon YOY



Dynamic of CPUE for Russian sturgeon YOY



Dynamics of CPUE for beluga YOY



Suciu, 2002 CITES report

6. CONCLUSIONS

IS THE BIOLOGICAL KNOWLEDGE FOR MANAGING STURGEON POPULATIONS AVAILABLE?

Survey (Williot et al. 2002):

- **most scientists (83%) - biology and ecology known enough to provide suitable recommendations for a sustainable management;**
- **similarly, 89% - biological indicators are available as alarm signals in case of deterioration of the viability of sturgeon stocks.**

6. CONCLUSIONS

ARE WE READY TO TAKE A DECISION?

- **CITES KEEPS GIVING DEADLINES TO THE CASPIAN STATES TO COMPLY TO THE REQUIREMENTS;**
- **DECISION OF U.S. FISH AND WILDLIFE SERVICE FOR LISTING BELUGA UNDER THE US ENDANGERED SPECIES ACT NOT TAKEN YET;**
- **COUNTRIES REPRESENTATIVES INSISTS FOR KEEPING THE FISHERIES OPEN**

6. CONCLUSIONS

DECISSIONS RISKS

- **KEEPING THE FISHERIES OPEN**
 - **EXTINCTION OF THE SPECIES**
 - **LONG TERM SOCIAL PROBLEMS**
 - **STILL DIFFICULT TO CONTROL POACHING AND MISSREPORTING**
 - **INACCESSIBILITY OF SPAWNERS FOR RESTOCKING AND AQUACULTURE**
- **CLOSING THE COMMERCIAL FISHERIES**
 - **SHORT TERM SOCIAL PROBLEMS**
 - **INCREASING OF POACHING (?)**
 - **RESSOURCES FOR ENFORCEMENT FUNDING**

6. CONCLUSIONS

- 1. Ponto-Caspian sturgeon populations are severely disturbed mainly due to overexploitation**
- 2. The CITES and adaptative management failed to improve the situation**
- 3. In order to avoid sturgeons extinction it is recommended to close the commercial fisheries NOW!**

Photo gallery



ACTUAL MINIMAL VALUE =

- FOR FISHERMEN: 7,400 \$
- FOR CAVIAR EXPORTERS: 36,000 \$
- TO CONSUMERS: 72,000 \$



Female beluga (*Huso huso*) (TL = 245 cm: TW ~ 220 kg)
captured on Mai 10, 1997 in the Danube River, Borcea Branch, at Stelnica (R Km 335)
Photo: Cornel Ceapa

Photo gallery



Female stellate sturgeon (TL = 145 cm: TW = 8.3 kg) captured on Mai 15, 1997 in the Danube River, Borcea Branch, at Stelnica (R Km 335) Photo: Cornel Ceapa



Male Russian sturgeon "equipped" with a ultrasonic tag (1999) for migration studies in the Danube River
Photo: Dr. Radu Suciu

Photo gallery



Male ship sturgeon (*Acipenser nudiiventris*) (SL = 176 cm: TW = 56,2 kg)
captured on 31 October 2003 in the Danube River at APATIN (R Km 1390), in SERBIA
Photo: Dr. Predrag SIMONOVIC - Serbia

Photo gallery



Sturgeon capture in Caspian Sea

Russian president Vladimir Putin holding a stellate sturgeon



ABC News online



Beluga sturgeons being sold at auction in Galati, Romania
Photo Antipa ~1930 (Fisheries in Romania, 1933)

