

A PROPOSED QUALITY CONTROL SYSTEM FOR ICCAT TASK I, TASK II CATCH/EFFORT, AND TASK II SIZE DATA

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SUMMARY

The ICCAT Secretariat currently receives information on catches for about 200 country-gear combinations, on catch/effort for about 100 country-gear combinations and on size sampling for about 80 country-gear combinations. The data are of generally high quality, but inevitably contain a small percentage of errors. This report describes the first steps in the design of a computer-based system to discover the majority of errors before the data are entered in the ICCAT data bank.

RESUME

Le Secrétariat de l'ICCAT reçoit actuellement des informations sur les prises pour deux cents combinaisons pays-engin, prise/effort pour une centaine de combinaisons pays-engin, ainsi que sur l'échantillonnage de taille pour environ quatre-vingt combinaisons. Les données sont en général de très bonne qualité, mais contiennent inévitablement un léger pourcentage d'erreurs. Le présent rapport décrit les premières mesures prises pour l'élaboration d'un système informatisé visant à déceler la plus grande partie des erreurs avant que les données ne soient implantées dans la banque ICCAT de données.

RESUMEN

La Secretaría de ICCAT recibe información sobre capturas para alrededor de 200 combinaciones país-arte, datos de captura/esfuerzo respecto a unas 100 combinaciones país-arte, y para unas 80 combinaciones país-arte sobre muestreo de tallas. Por lo general, los datos son de gran calidad, aunque, inevitablemente, contienen un pequeño porcentaje de errores. Este informe describe los primeros pasos dados para el diseño de un sistema informatizado que permita descubrir la mayor parte de esos errores antes de incorporar dichos datos en el banco de datos de ICCAT.

The ICCAT Secretariat currently receives and enters in its data banks Task I catch information for about 200 country-gear combinations, Task II information on catch/effort for about 100 country-gear combinations, and Task III information on size sampling for about 80 country-gear combinations. The data received are of generally high quality. Secretariat staff scan the data for obvious errors as they are entered, but the large and increasing volume of material makes it inevitable that some errors find their way into the data banks and are not discovered until the data are used.

While the basic responsibility for the submission of precise and accurate data must remain with the national offices, it would be useful to submit all incoming data to a system of quality control by computer at the Secretariat. A system of this sort could easily detect apparent anomalies such as data on catch or catch/effort reported from dry land or outside the Atlantic and Mediterranean, samples from inappropriate areas such as for southern bluefin tuna north of the Equator, catches per unit effort that exceed the bounds of credibility, etc. Many routine checks are in fact better performed by computers than by even the best-trained and -intentioned human staff. The lack of imagination of the machines means that they never suffer from boredom, distraction, wandering attention, or the effects of temporary physical indisposition while scanning very large files.

Until the present, only some coding of the incoming data has been verified by computer checking.

No system of computer programs can detect all of the errors, but an appropriately designed one could call attention to an appreciable number. Inquiries could be made of the appropriate national offices early enough to assure a reasonable chance of making corrections. (All who work with data well know that the chance of finding the source of errors and making appropriate corrections tends to decrease exponentially with time.) Such a system could render a valuable service to statistical offices in member and non-member countries that do not presently have sophisticated computer systems.

Computer programs to perform this function would be relatively simple, consisting primarily of a series of "if" statements. For instance, if a large catch of bigeye tuna is shown as being made in the Mediterranean, then "flag" (print out in a list) the record for further examination. Similarly, if the catch per day of a purse seiner is shown as 3,000 tons, flag the record. The first example is qualitative, the second quantitative. When the checks to be made are quantitative, the limits of the tests must be "tuned" to levels that will flag perhaps two to five percent of the data for a second look and verification.

If the limits are set too low, they will flag a larger part of the data than can be reasonably looked at. If they are set too high, they will not flag any. An important factor to consider is changes with time. Fishermen frequently modify gears or techniques and change catch per unit effort in the process, for example. Obviously, the values suggested for quantitative tests will have to be tuned continuously as the tests are performed. The

upper and lower limits for size sampling data, at present crude first approximations, are particularly susceptible to refinement. As they stand, they are only for fishing gears. It may later be desirable to refine the tests to examine different fisheries and areas separately.

Eventually as the quality control system becomes more sophisticated, it will be possible to develop tests not only to test against pre-selected norms, but also to compare such items as:

1. This year's catch, catch/effort and size data with last year's from the same sources for reasonable correspondence.
2. Catch/effort and size data between sources that could be expected to show similar relations-- two countries' purse seine fleets fishing the same species in the same area at the same time, for example.
3. The shape of length frequency curves derived from size sampling with known reasonable length frequency curves, etc., and with length frequency curves that should be similar-- from identical gear-area-time strata for example.

What follows is a proposed initial series of tests to be applied to catch, catch/effort and size data as they are received and before they are entered into the data banks. When they have been appropriately tuned, they also should be applied in a retrospective look at data now in the banks.

TASK I CATCH AND TASK II CATCH AND EFFORT QUALITY CONTROL TESTS

*** BAITBOAT ***
(Includes BB, BBI, BBF)

*** ALL GEARS ***

General area test:

Flag if catch was outside Atlantic and Mediterranean (other oceans or land) (Atlantic map needed-- has been requested from U.S. National Marine Fisheries Service Southeast Fisheries Center)

Species-area tests:

Flag if -

BFT south of 30 degrees S
SEF north of 30 degrees S
YFT north of 40 degrees N
SKJ north of 50 degrees N
BLF east of 20 degrees W
MAW west of 30 degrees W
YFT, BET, BUM in Mediterranean

Code tests:

Flag if -

Data have unknown species code
Data have unknown gear code
Data have unknown area code

Atlantic quadrants to be used for area tests:

AtQuads:

A = 0 - 70W	40W - 40E
B = 0 - 60S	30W - 20E
C = 0 - 60S	30W - 65W
D = 0 - 50N	40W - 100W

(It may prove practical after the system has been tested and used for a while to change 0 latitude (Equator) to 5 degrees N.)

If area is given as ICCAT Area, the following rough equivalents should be applied (some ICCAT Areas include large parts of more than one AtQuad)-

- A - SYB 3, 4; SJ 71-73, 75-77; LLYF 10, 11, 14, 19; LLBE 40, 42, 44; AL 31, 32; BF 53, 54, 57-59, 62, 64; BIL 94, 95
- B - SYB 1, 2, 5; SJ 74, 78, 79; LLYF 14, 17, 19; LLBE 45, 47; AL 33, 34; BF 65, 66; BIL 97
- C - SYB 23; SJ 84; LLYF 18; LLBE 46, 48; AL 33, 34; BF 66; BIL 96
- D - SYB 20-22, 24-26; SJ 80-83; LLYF 10-13, 15, 16; LLBE 41, 43, 44, 49, 50; AL 31, 32; BF 51, 52, 55, 56, 60, 61, 63, 64, 67; BIL 91-94

Species test:

Flag if catch contains species other than:

BFT	Exceptions:			
YFT				
SKJ				
BET	Brazil	BLF	KGM	SWO
ALB	C. Verde	MAW		
LTA	Portugal	BON	SWO	BUM
FRI	S. Africa	SEF		
BIL				
YOU				
OTH				

Area test:

Flag if fishing area is outside Atquad:

Angola	B	Exceptions:	
Brazil	C		
Brazil-for.	C		
Cape Verde	A		
FIS-FISM	A		
France	A or B		
Gabon-based	A or B		
Ghana	A or B	1973-75 Japan	D
Japan	A or B	1963-65 Spain	B
Jpn.ICAT	A or B		
Korea	A or B		
Kor+Pan	A or B		
Portugal	A		
Senegal	A		
S. Africa	B		
Spain	A		
Venezuela	D		
Venez.-for.	D		

Flag if a country other than those listed

CPUE test for Task II catch/effort data,
(principal species only):

Effort unit is day (fished, at sea, etc.)

Flag if effort unit is other than day

Flag if cpue is greater than:

BFT	- 2.0 tons or 350 fish
YFT	- 2.0 tons
SKJ	- 10.0 tons
BET	- 0.5 ton
ALB	- 0.5 ton
LTA	- 1.0 ton
FRI	- 1.0 ton

Note: These values are first approximations and will require tuning.

*** PURSE SEINE ***
 (Includes PS, PSG, PSS, PSM, PSD, PSLB, PSFB, PSFS)

Species test:

Flag if catch contains species other than:

BFT	LTA
YFT	FRI
SKJ	BIL
BET	YOU
ALB	OTH
BON	

Area test

Flag if fishing area is outside Atquad:

Argentina	C	Norway	A
Brazil-for.	C	Senegal	A
Canada	B or D	S. Africa	B
Congo	A or B	Spain	A or B
FIS-FISM	A or B	USSR	A or B
France	A	USA	B or D
Ghana	A or B	Venezuela	D
Italy	A	Venezuela-for.	D
Japan	B	Yugoslavia	A
Morocco	A or B		

Flag if a country other than those listed

CPUE test for Task II catch/effort data,
 (principal species only):

Effort unit is day (fished, at sea, etc., except
 Yugoslavia)

Flag if effort unit is other than day

Flag if cpue is greater than:

BFT	- 20.0 tons or 1500 fish
YFT	- 11.0 tons
SKJ	- 11.0 tons
BET	- 0.4 ton
ALB	- 0.5 ton
BON	- 5.0 tons
LTA	- 10.0 tons
FRI	- 10.0 tons

Note: These values are first approximations and
 will require tuning.

*** LONGLINE ***
 (Includes LL, LLMB, LLFB, LLHB)

Species test:

Flag if catch contains species other than:

BFT	BUM
SBF	WHM
SKJ	SAI
BET	BIL
ALB	YOU
SWO	OTH
BLM	

Area test:

Flag if fishing area is outside Atquad:

Argentina	C
Brazil	C
Brazil-for.	B or C
Canada	D
Cape Verde	A
Cuba	A or D
Norway	A
S. Africa	B
Spain	A
USSR	A or B
USA	D
Uruguay	C
Venezuela	D
Venez.-for.	D

Flag if a country other than those listed

CPUE test for Task II catch/effort data,
 (principal species only):

Effort unit is 1000 hooks

Flag if effort unit is other than number of
 hooks

Flag if cpue is greater than:

BFT	- 0.10 ton or 1.5 fish
YFT	- 0.20 ton or 3.5 fish
SKJ	- 0.01 ton or 0.1 fish
BET	- 0.50 ton or 12.0 fish
ALB	- 0.60 ton or 35.0 fish
SWO	- 0.10 ton or 1.5 fish
BUM	- 0.05 ton or 1.0 fish
WHM	- 0.01 ton or 0.1 fish
SAI	- 0.01 ton or 0.5 fish

Note: These values are first approximations and
 will require tuning.

*** GILL ***Species test:

Flag if catch contains species other than:

BFT
SKJ
BET
SWO

Area test:

Flag if fishing area is outside Atquad:

Benin	B
Norway	A
Venezuela	D

Flag if a country other than those listed

No CPUE test*** HAND ***Species test:

Flag if catch contains species other than:

BFT	BON
YFT	LTA
SKJ	MAH
BET	WAH

Area test:

Flag if fishing area is outside Atquad:

C. Verde	A
Portugal	A
Senegal	A
S. Africa	B
USA	D

Flag if a country other than those listed

No CPUE test*** HARPOON ***Species test:

Flag if catch contains species other than:

BFT
SWO

Area test:

Flag if fishing area is outside Atquad:

Canada	D
Italy	A
Turkey	A
USA	D

Flag if a country other than those listed

No CPUE test*** HAUL SEINE ***Species test:

Flag if catch contains species other than:

YFT
SKJ
SWO

Area test:

Flag if fishing area is outside Atquad:

Benin	B
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Flag if a country other than those listed.

No CPUE test

*** SPORT ***
 (Includes SPOR, R R, RRFB, RRFS, SPHL)

Species test:

Flag if catch contains species other than:

BFT	Exceptions:				
SWO	S. Africa	SRF	YFT	SKJ	
BUM		ALB	BON		
WHM	Senegal	SAI			

Area test:

Flag if fishing area is outside Atquad:

Canada	D
Senegal	A
S. Africa	B
Spain	A
USA	D

Flag if a country other than those listed

CPUE test for Task II catch/effort data,
 (principal species only):

Canada effort unit is day fished
 USA effort unit is hours

Flag if effort unit is other than day or hour

Flag if cpue is greater than:

BFT - 0.01 ton	0.0 fish
SWO - 0.05 fish	
BUM - 0.03 fish	
WHM - 0.05 fish	

Note: These values are first approximations and
 will require tuning.

*** TRAP ***

Species test:

Flag if catch contains species other than:

BFT	Exceptions:				
	Morocco	BON	LTA	FRI	SWO
	Spain	BON	LTA	FRI	

Area test:

Flag if fishing area is outside Atquad:

Canada	D
Italy	A
Morocco	A
Spain	A
Tunisia	A

Flag if a country other than those listed

CPUE test for Task II catch/effort data,
 (principal species only):

Effort unit is trap day

Flag if effort unit is other than day

Flag if cpue is greater than:

BFT - 1.0 ton

Note: These values are first approximations and
 will require tuning.

*** TRAWL ***

Flag if gear is TRAW

*** TROLL ***

Species test:

Flag if catch contains species other than:

ALB	Exceptions:				
BFT		Brazil	KGM	SSM	
		Senegal	BON	LTA	MAW

Area test:

Flag if fishing area is outside Atquad:

Brazil	C
France	A
Senegal	A
Spain	A
S. Africa	B

Flag if a country other than those listed

CPUE test for Task II catch/effort data,
(principal species only):

Effort unit is day (fished, at sea, etc.)

Flag if effort unit is other than day

Flag if cpue is greater than:

ALB - 1.0 ton

Note: These values are first approximations and will require tuning.

*** SURFACE ***

No species test

Area test:

Flag if fishing area is outside Atquad:

Argentina	C	Morocco	A
Benin	B	Norway	A
Brazil	C	Portugal	A
C. Verde	A	Senegal	A
France	A	USSR	A or B

Flag if a country other than those listed

No CPUE test

*** UNCLASSIFIED ***

No species test

Area test:

Flag if fishing area is outside Atquad:

Morocco	A
Portugal	A
USA	D
USSR	A or B

Flag if a country other than those listed

No CPUE test

TASK II SIZE QUALITY CONTROL TESTS

Species and area tests as listed above for Task I and Task II catch/effort, plus the following tests for minimum and maximum sizes. Note that all values are first approximations and will require tuning. Gears include variations as shown above--BB includes BB, BBI, BBF, etc.

	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
<u>BFT</u> (Fork Length)		
BB	40	180
PS	40	300
LL	40	300
HAND	150	300
SPOR	100	300
TRAP	100	300
OTHER	40	300

	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
<u>SBF</u> (Fork Length)		
ALL GEARS	50	190

	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
<u>YFT</u> (Fork Length)		
BB	30	150
PS	30	180
LL	100	200
OTHER	30	180

	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
<u>SKJ</u> (Fork Length)		
ALL GEARS	30	90

	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
<u>BET</u> (Fork Length)		
BB	30	170
PS	30	170
LL	70	200
OTHER	30	170

<u>ALB</u> (Fork Length)	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
BB	50	120
LL	40	130
TROL	40	110
OTHER	40	120

<u>BLF, LTA, BON, FFI, SSM,</u> <u>KGM, CER, KGX (Fork Length)</u>	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
ALL GEARS	20	80

<u>SWO</u> (Eye-fork)	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
ALL GEARS	40	300
(Lower jaw-fork)		
ALL GEARS	50	300

<u>BUM</u> (Eye-fork)	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
ALL GEARS	100	300
(Lower jaw-fork)		
ALL GEARS	150	300

<u>WHM</u> (Eye-fork)	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
ALL GEARS	100	180

<u>SAI</u> (Eye-fork)	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
ALL GEARS	100	180

<u>SFF</u> (Eye-fork)	<u>MIN (Cm)</u>	<u>MAX (Cm)</u>
ALL GEARS	100	170