



CWP

Coordinating Working Party on Fishery Statistics

Development of fishing effort
concepts and measures

Prepared for 27th CWP Intersession Meeting

CWP ad-hoc Task Group on
fishing effort concepts (TG-effort)

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Related to: Agenda item 5.3 (document CWP-IS/2022/2)



Content

Review

- Background TG-effort objectives, ToRs, timeframe, and workplan
- CWP historical fishing effort concepts and definitions (ToR 1)
- STATLANT QUESTIONNAIRES
 - CWP use of fishing effort
 - Nominal and effective effort and application
- CWP historical fishing effort concepts and definitions (again)

New since CWP IS/2021 (November 2021)

- Further development of fishing effort concepts (ToR 2)
- Diagrammatic presentation of fishing effort concepts with definitions and relationships
- TG-Effort (ToR 3) revisions and further development of fishing effort measures
- Development of new fishing effort measures in context of emerging technologies

CWP Task Group TG-Effort: Objectives, tasks and timeframe

History: Identified as an activity at CWP 2019 (*Report of the 26th Session of the CWP, Rome, Italy, 15–18 May 2019*. FAO Fisheries and Aquaculture Report No. 1293. Rome, FAO. 51 pp. (also available at [Report of 26th Session CWP](#))

- Five ad-hoc task groups (TGs) established by CWP-26 to progress work during the 2019-2022 intersessional period (CWP, 2019).
 - Membership is open to all CWP parties, and
 - CWP-26 identified a lead organization for each TG to convene and lead that TG with support from the CWP Secretariat.
 - Three of these TGs related to capture fisheries:
- **Fishing effort concepts (TG-effort)**
- Catch concepts (TG-catch)
- Reference harmonization standard (TG-RH2).

Objectives: TG-Effort

- Review, revise and where necessary further develop CWP fishing effort concepts and associated diagram(s) and definitions including measures of nominal and standard effort, and elaborate their use in informing STATLANT questionnaires
- Review, further develop and define standard measures of effort for the categories of fishing gear in ISSCFG, taking account of emerging remote-sensing technologies and opportunities to develop new measures of effort.

TG-Effort work (organization/group roles, work approach)

TG Members

- Conveners: Ms. Nancie Cummings and Mr. David Ramm
- Membership: open to all CWP parties and those interested in this work are encouraged to actively contribute.
- At CWP-26, the following parties indicated initial interest in participating in the TG: GFCM ICCAT, ICES, IOTC, NAFO, SEAFDEC and FAO/WECAFC.

Member roles:

- TG members decide on the detailed work plan and may propose revisions of the ToRs for approval by the Coordinator of the CWP Fisheries Subject Group and the CWP Secretariat.
- Each TG participant is encouraged to engage actively in the work of the TG, including by:
 - Attending all web calls and meetings
 - Sharing knowledge and practical examples to illustrate CWP needs
 - Reviewing working documents co-prepared by the TG and sharing feedback to conveners and all members

Work approach:

Conveners carry out review of historical fishing effort concepts and definitions of fishing effort measures

Share with TG-effort via online google document (Development of CWP fishing effort concepts and measures) ,

Propose revisions and seek inputs from members by email and shared document, **prepare draft reports** for IS review

TG-effort work:

Proposed tasks, Terms of Reference, and Timeframe

ToR	Task	Timeframe	Completed
0.	Develop draft ToRs and work plan in consultation with TG Convener and circulate to members for validation. Call for TG participations and their contact details.	Feb 2021	21 April 2021
1.	Finalize ToRs and establish TG membership	March 2021	July 2021
2.	Review, revise and where necessary further develop the CWP fishing effort concepts and associated diagram(s) and definitions including measures of nominal and standard effort, and elaborate their use in informing STATLANT questionnaires	July/August 2021, 6-July joint meeting catch/effort TGs	Completed
3	Concurrently with 2, review, further develop and define standard measures of effort for the categories of fishing gear in ISSCFG, taking account of opportunities for new measures based on emerging technologies such as AIS, SAR and VIIRS, and artisanal fisheries	July/August 2021	Completed
4.	Circulate first draft of the revised fishing effort concepts and definitions	September 2021	Completed
5.	Consider further development to the fishing effort concepts	Prior to CWP Intersessional meeting (IS)	Ongoing
6.	Concurrently with 5, consider implications of the revised fishing effort concepts and definitions in the work of TG-catch and TG-RH2 and, if needed, convene a virtual joint-TG meeting	Prior to IS	TBD-at 28 th CWP IS Fisheries Subject meeting
7.	Present advanced version of revised fishing effort concepts and definitions at the CWP intersessional meeting (IS)	TBD-at 28 th CWP IS Fisheries Subject meeting	TBD-at 28 th CWP IS Fisheries Subject meeting
8.	Consider further developments including intersessional meeting feedback and enlarging the scope of contributions to other CWP parties	Post IS	
9.	Incorporate relevant outputs of TG-catch and TG-RH2	Post IS	
10.	Present final version of the revised fishing effort concepts, diagram(s) and definitions to CWP-27 for consideration and, if possible, adoption	By mid-2022	

Intersessional progress to CWP-IS-2021 by TG-effort

- **Initiated work** with a review of the development of CWP fishing effort concepts and measures and a joint online meeting with the ad-hoc task group on catch concepts in July 2021
- **Developed fishing effort concepts** (objective 1) and detailed measures of effort (objective 2). Progress was reported at the intersession meeting of CWP (CWP-IS/2021/2) in November 2021.
- **CWP-IS-2021** agreed the following points:
 - Further consider the overall objective of the work
 - Further consider the types and definitions of fishing effort concepts and applications across all fishery sectors (i.e. industrial, small-scale/artisanal, sport/recreational)
 - Further consider the proposals from the t-RFMO workshop (FAO, 2019b)
 - Consider and further develop effort measures in the context of their intended use
 - Identify new efforts measures arising from emerging technologies and which are feasible/practical to implement with available tools
 - Convene another online meeting to progress its work

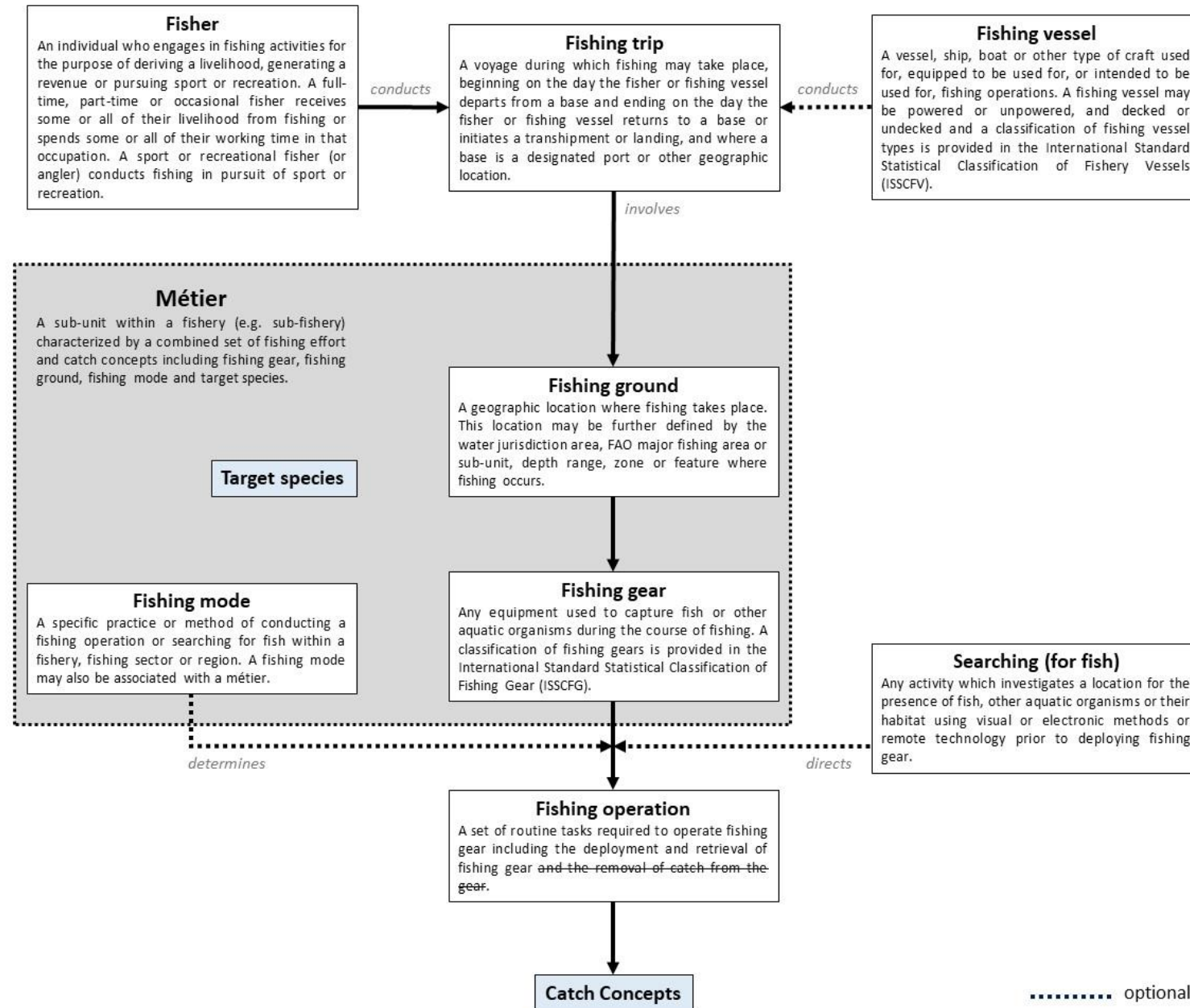
Intersessional progress since CWP-IS-2021 (November 2021)

- Continued work toward TG-effort overall objective, i.e. to develop a comprehensive set of fishing effort concepts and standard measures which can be applied across all capture fishery sectors (i.e. industrial, small-scale/artisanal, sport/recreational) and ISSCFG fishing gears.
- This involved further development of fishing effort concepts and standard measures
- Reporting progress in CWP-IS/2022/2
- Highlights and main points for discussion presented here

Further development of fishing effort concepts

- Current version of the [CWP handbook](#) refers to various statistical concepts associated with fishing effort, including fishing vessel, fishing ground, fishing trip, fishing day, fishing gear and searching (for fish).
- These concepts have been used *inter alia* to develop commonly used measures of fishing effort (refer [CWP-IS/2021/2 Appendix 3](#)).
- TG-effort reviewed these fishing effort concepts and provided additional clarification and development in the following section while recognizing the underlying and inter-related needs to:
 - 1) **maintain continuity and consistency** in the reporting of effort statistics
 - 2) **ensure comprehensive coverage** of fishing effort across all capture fishery sectors (e.g., industrial, small-scale/artisanal), fishing gears and fishing modes

Fishing effort concepts and diagram (Fig.1, CWP-IS/2022/2)



Proposed Standard measures of fishing effort

- **Re-casting** the **STATLANT categories** based on the revised fishing effort concepts and the levels of detail/granularity required and/or capacities (e.g. in small scale fisheries) in reporting statistics
 - **Measures A** primarily associated with a fishing operation
 - **Measures B** primarily associated with a métier
 - **Measures C** primarily associated with a fishing trip.
- **Replacing** the **existing CWP standard** measures of fishing effort **by combined standard measures** using a generic approach (based on the proposal from t-RFMO workshop, 2019)
 - **Combined standard measure of fishing effort =**
 - Measure(s) primarily associated with a fishing operation (**Measures A**)
 - + Measure(s) primarily associated with a métier (**Measures B**)
 - + Measure(s) primarily associated with a fishing trip (**Measures C**)

Proposed Standard measures of fishing effort (Table 1)

Category (granularity)	Standard measure
Category A (primarily associated with fishing operations)	<u>Number of fishing operations</u>
	<u>Number of gear sub-units deployed</u>
	<u>Number of gear.hours fished</u>
	<u>Number of gear.days fished</u>
	<u>Number of hours searching</u>
Category B (primarily associated with métiers)	<u>Number of days on a fishing ground</u>
Category C (primarily associated with fishing trips)	<u>Number of fishing trips</u>
	<u>Number of days absent from base</u>
	<u>Number of days fished</u>
	<u>Number of fishers</u>
	<u>Number of fishing vessels</u>

Combined standard measures of fishing effort by ISSCFG gear categories and fishing modes (Table 2)

Fishing gear category (ISSCFG, 2016)	Fishing mode	Standard measure of fishing effort											
		A1	A2	A3	A4	A5		B1		C1	C2	C3	C4
SURROUNDING NETS													
Purse seines	FREE	X		X		X		X		X	X	X	X
	ASSO	X		X		X		X		X	X	X	X
Surrounding nets without purse lines	ALL	X		X		X		X		X	X	X	X
Surrounding nets (nei)	ALL	X		X		X		X		X	X	X	X
<i>note - all ISSCFG sub-categories are listed above</i>													
SEINE NETS													
All sub-categories	REC	X			X					X			X
	ALL*	X		X		X		X		X	X	X	X
<i>note - ISSCFG sub-categories are: <u>Beach seines</u>, Boat seines, Seine nets (nei)</i>													

Category A

A1: number of fishing operations

A2: number of gear sub-units operated

A3: number of gear.hours fished

A4: number of gear.days fished

A5: number of hours searching

Category B

B1: Number of days on a fishing ground

Category C

C1: number of fishing trips

C2: number of days absent from base

C3: number of days fished

C4: number of fishers **OR** number of fishing vessels*

* depending on the fishery sector and whether or not fishing vessels are used

...continued

Combined standard measures of fishing effort by ISSCFG gear categories and fishing modes (Table 2)

Fishing gear category (ISSCFG, 2016)	Fishing mode	Standard measure of fishing effort											
		A1	A2	A3	A4	A5	B1	C1	C2	C3	C4		
TRAWLS													
All sub-categories	ALL	X		X		X		X		X	X	X	X
<i>note - ISSCFG sub-categories are: Beam trawls, Single boat bottom otter trawls, Twin bottom otter trawls, Multiple bottom otter trawls, Bottom pair trawls, Bottom trawls (nei), Single boat midwater otter trawls, Midwater pair trawls, Midwater trawls (nei), Semi-pelagic trawls, Trawls (nei)</i>													
DREDGES													
All sub-categories	REC	X			X					X			X
	ALL*	X		X		X		X	X	X	X	X	X
<i>note - ISSCFG sub-categories are: Towed dredges, Hand dredges, Mechanized dredges, Dredges (nei)</i>													
LIFT NETS													
All sub-categories	REC	X			X					X			X
	ALL*	X		X				X	X	X	X	X	X
<i>note - ISSCFG sub-categories are: Portable lift nets, Boat-operated lift nets, Shore-operated stationary lift nets, Lift nets (nei)</i>													
FALLING GEAR													
All sub-categories	REC	X			X					X			X
	ALL*	X						X	X	X	X	X	X
<i>note - ISSCFG sub-categories are: Cast nets, Cover pots/Lantern nets, Falling gear (nei)</i>													
GILLNETS AND ENTANGLING NETS													
All sub-categories	REC	X			X					X			X
	ALL*	X	X	X		X		X	X	X	X	X	X
<i>note - ISSCFG sub-categories are: Set gillnets (anchored), Drift gillnets, Encircling gillnets, Fixed gillnets (on stakes), Trammel nets, Combined gillnets-trammel nets, Gillnets and entangling nets (nei)</i>													

Fishing gear category (ISSCFG, 2016)	Fishing mode	Standard measure of fishing effort											
		A1	A2	A3	A4	A5	B1	C1	C2	C3	C4		
TRAPS													
All sub-categories	REC	X			X					X			X
	ALL*	X	X	X		X		X	X	X	X	X	X
<i>note - ISSCFG categories are: Stationary uncovered pound nets, Pots, Fyke nets, Stow nets, Barriers fences weirs etc., Aerial traps, Traps (nei)</i>													
HOOKS AND LINES													
All sub-categories	REC	X			X					X			X
	ALL*	X	X		X	X		X	X	X	X	X	X
<i>note - ISSCFG sub-categories are: Handlines and hand-operated pole-and-lines, Mechanized lines and pole-and-lines, Set longlines, Drifting longlines, Longlines (nei), Vertical lines, Trolling lines, Hooks and lines (nei)</i>													
MISCELLANEOUS Gear													
All sub-categories	REC	X			X					X			X
	DIVE	X			X					X			X
	ALL*	X		X		X		X	X	X	X	X	X
<i>note - ISSCFG categories are: Harpoons, Hand implements, Pumps, Electric fishing, Pushnets Scoopnets, Drive-in nets, Diving, Gear (nei)</i>													

Category A

A1: number of fishing operations

A2: number of gear sub-units operated

A3: number of gear.hours fished

A4: number of gear.days fished

A5: number of hours searching

Category B

B1: Number of days on a fishing ground

Category C

C1: number of fishing trips

C2: number of days absent from base

C3: number of days fished

C4: number of fishers OR number of fishing vessels*

* depending on the fishery sector and whether or not fishing vessels are used

Development of fishing effort measures in context of emerging technologies

Emerging technologies (e.g., satellite-based Automatic Identification System (AIS), Synthetic Aperture Radar Systems (SARS) and Visible Infrared Imaging Radiometer Suite (VIIRS)) may provide opportunities to:

- **Validate** existing measures of effort or provide improved estimates of these measures
- Provide **advanced technologies** for enhanced safety-at-sea including search and rescue and minimizing vessel collisions (AIS, VMS)
- Provide **new technologies** in addition to AIS and VMS, such as **VIIRS for use in monitoring fishing** as well as illegal, unregulated and unreported fishing (**IUU**) activities
- Provide **tools to track compliance** in fishery closures and/or closed areas
- Provide **tools for forecasting** vessel interactions and probability of fatal encounters with at risk marine mammal populations (remotely sensed data and information RSDI)
- **Support the development and application of new measures** of effort which may be integrated with existing measures defined by CWP.

Value added benefits:

Development of fishing effort measures in context of emerging technologies

RECOGNIZING: Emerging technologies may allow further development of measures of fishing effort (e.g.,)

will need to be derived from
readily available, low-cost data

Existing measures

Number of vessels, days and hours fished in an area of interest

- Identification and quantification of the **spatial extent** of fishing modes and fishing operations
- Identification and **quantification of fishing trips**, including departure and arrival locations and transshipments
- Identification and **quantification of loss in fishing grounds and fishery habitats**
- Identification and **quantification of fishery sectors, fishing fleets and sub-units and fleet including vessel behaviors and interactions within or between fleets and sectors.**

New measures

- **Intensity of fishing activities and operations** (e.g. hours fished per km²)
- **Active fleet as a nominal effort measure** of the size of the fleet that is active in a given water area over a given time period
- **Fishing presence as a measure of the presence or absence of fishing vessel** activity or fishing operations in a given area and given time frame.

new measures may require the development
of methodologies and/or capacity building

Items for consideration at CWP-27

CWP-27 is kindly requested to review the work of TG-effort and endorse the following proposals or provide guidance where further consideration may be required:

- Revision and further development of fishing effort concepts
 - Endorse the revised fishing effort concepts and definitions
 - Fisher ([paragraph 9](#))
 - Fishing vessel and fishery-support vessel ([paragraphs 15](#) and [16](#))
 - Fishing ground ([paragraph 22](#))
 - Fishing trip ([paragraph 29](#))
 - Fishing gear ([paragraph 32](#))
 - Searching ([paragraph 35](#))
 - Fishing operation ([paragraph 37](#))
 - Fishing mode ([paragraph 42](#))
 - Métier ([paragraph 45](#))
 - Endorse the fishing effort concept diagram ([Figure 1](#))
 - Endorse subsequent revision and update of the CWP Handbook
- Revision and further development of standard measures of fishing effort
 - Endorse the revised STATLANT categories (A, B, C) based on revised fishing effort concepts and levels of detail/granularity required and/or capacities in reporting statistics ([paragraphs 54](#) and [61](#)).
 - Endorse the revised measures and definitions ([Table 1](#))
 - Endorse the use of combined standard measures A+B+C ([paragraph 56](#))
 - Endorse the implementation of standard measures by ISSCFG gear category and fishing mode ([Table 2](#))
 - Endorse subsequent revision and update of the CWP Handbook
- Development of new or improved fishing effort measures using emerging technologies
 - Acknowledge possible improvements to existing measures and development of new measures ([paragraph 67](#)) noting that possible increases in capacities to implement would likely require increases in resources
- STATLANT questionnaires
 - Endorse the implementation of agreed fishing effort concepts and measures in the STATLANT questionnaires.



Next Steps

- **Request CWP consider progress since IS (November 2021) in context of ToRs**
- **Request CWP endorse revised concepts and effort measures definitions previous slide**
- **Request CWP indicate further work needed and calendar for new work from TG-effort**



Thank you ▪ Merci
Благодарю ▪ ¡Muchas gracias!
謝謝 ▪ شكرا

Dave Ramm and Nancie Cummings