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PROGRESS OF THE ECOCARD WORKPLAN: ESTABLISHING THE PURPOSE AND DEVELOPING A FRAMEWORK

Leanne Fuller, Jon Lopez, Shane Griffiths, Dan Crear, Jean-François Pulvenis and Alexandre Aires-da-Silva

This document is an update and progress report towards the IATTC's Workplan on *EcoCards* presented in EB-02-02 and is produced in response to a 2nd EBWG meeting recommendation, "*for the SAC and the Commission to consider the further development of the proposed Climate Change and EcoCards Workplans, and encourage that this work be done in collaboration with expertise from other tuna RFMOs*" (Meeting WGEB-02 Report).

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SUMMARY

The 1982 United Nations Convention on the Law of the Sea (UNCLOS) established the international legal framework for the conservation and management of living marine resources. The FAO's 1995 Code of Conduct for Responsible Fisheries (CCRF) embodied the principle of an ecosystem approach to fisheries management (EAFM) by stipulating, "*States and users of living aquatic resources should conserve aquatic ecosystems*" and "*fisheries management should not only ensure the conservation of target species, but also of species belonging to the same ecosystem or associated with or dependent on target species.*" This approach was expressly defined and adopted in the 2001 Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem. In line with the CCRF, the 2003 Antigua Convention incorporates in the legal framework of the IATTC the principle of the EAFM, in particular with the inclusion of references to "*non-target or associated or dependent species*" and "*species belonging to the same ecosystem and that are affected by fishing for, or dependent on or associated with, the fish stocks covered by this Convention*." Significantly, in 2003, the same year the Antigua Convention was adopted, the IATTC started to produce

an *Ecosystem Considerations* (EC) report, updated annually, to broadly describe fisheries impacts on the eastern Pacific Ocean (EPO) ecosystems and therefore to promote and strengthen awareness of this topic among its members and other relevant stakeholders.

Due to the increasing length and complexity of this report over the past 20 years, IATTC's staff undertook an evaluation of the ways and means of better communicating the status of the ecosystems as well as advancing and supporting operationalization of the EAFM. To this end, in 2023–2024, the staff collaborated with experts working with other tuna-Regional Fisheries Management Organizations (t-RFMOs) to review and summarize ecosystem research conducted globally, and how this research is delivered to the respective Commissions. The ultimate goal was to propose a workplan for the IATTC to develop useful products for tracking and monitoring the status of EPO ecosystems and effectively inform the decision-making process (EB-02-02). Subsequently, two products were considered. The first consisted of a highly summarized, indicator-based ecosystem report card ("*EcoCard*") used to convey a suite of relevant bycatch, ecosystem, and climate indicators, among others, chosen to 'best' represent ecosystem status. The second consisted of a complementary *Ecosystem Status Assessment* that details the full suite of indicators considered to describe the annual status of marine ecosystems and is used primarily as a reference guide to support the *EcoCard*. The information obtained from the collaborative process with global experts was consequently used to inform an IATTC workplan to develop these products and support operationalization of the EAFM in the EPO (see EB-02-02). The tentative chronology of the proposed workplan extends over five years (2024–2028) and includes four primary phases: (1) Planning, (2) Establishing Criteria, (3) Development, and (4) Management Considerations and Communication.

This document provides an update and progress report towards the IATTC's Workplan on *EcoCards* presented in EB-02-02 and is produced in response to a 2nd EBWG meeting recommendation, "*for the SAC and the Commission to consider the further development of the proposed Climate Change and EcoCards Workplans, and encourage that this work be done in collaboration with expertise from other tuna RFMOs*" (Meeting WGEB-02 Report). The document focuses on accomplishments related to the planning phase. These accomplishments include determining the purpose of an *EcoCard*, which consisted of defining the main goal and objective, and creating a conceptual framework of the *EcoCard* workplan for the EPO tuna fisheries under the IATTC purview.

1. REVIEW OF IATTC'S *ECOCARD* WORKPLAN

In 2024, an *EcoCard* workplan (EB-02-02) to produce two ecosystem-advice products was developed by IATTC staff in collaboration with global experts working with other t-RFMOs. These consisted of (1) an indicator-based *EcoCard* at the ecoregion level (i.e., ecologically meaningful and practical spatial units that can be used to incentivize ecosystem planning, science and development) and (2) a complementary *Ecosystem Status Assessment* used as a reference guide to strengthen the *EcoCard*. The workplan in EB-02-02 was presented to, and supported by, the Working Group on Ecosystem and Bycatch (EBWG) (see WGEB-02 Recommendations, SAC-15 Recommendations). Under the current international legal framework, t-RFMOs share a commitment to incorporate the EAFM in their operation and activities, and as such, collaborations between t-RFMOs facilitate sharing of information on progress and challenges associated with, for example, technical activities and tools considered to address and advance operationalization of the EAFM. The *EcoCard* workplan was created to facilitate, prioritize and track activities to advance elements of the EAFM in the IATTC while considering and adapting experiences by other t-RFMOs. The fundamental goal of this work is to improve IATTC's communication of ecosystem status by restructuring the complex and lengthy *Ecosystem Considerations* (EC; e.g., EB-02-01) report into the *EcoCards* and *Ecosystem Status Assessments* advice products. In the long term, these products would ideally inform the decision-making process in support of operationalizing the EAFM in the EPO. The

workplan includes four primary phases over a tentative five-year plan (2024–2028) (see EB-02-02 for details).

2. PHASE 1 (PLANNING)

2.1. Completed tasks

Several activities were completed during the planning phase. These included collaborations with experts from other t-RFMOs to review and summarize available information on ecosystem research that is used to communicate ecosystem considerations to the respective Commissions. This portion of the work resulted in the development of a proposed IATTC *EcoCard* workplan (EB-02-02) which is harmonized, to the extent possible, with ongoing ecosystem work in other t-RFMOs. The proposed workplan, consisting of a flow diagram and tentative chronology (Figures 1 and 2, respectively), was presented to the 2nd EBWG, and a recommendation was made by the Working Group, stating that, "*the SAC and the Commission consider the further development of the proposed Climate Change and EcoCards Workplans, and encourage that this work be done in collaboration with expertise from other tuna RFMOs*" (Meeting WGEB-02 Report). Subsequent activities in the planning phase included determining the functions (or purpose) of an *EcoCard* (i.e., defining the goal and objective of an EPO *EcoCard*) and creating a conceptual framework of steps to visualize the process (see below). The 3rd Joint Meeting of t-RFMOs on the Implementation of EAFM allowed for further engagement with global experts on the progress of EAFM.

2.2. Establishing the purpose (goal and objective) of an *EcoCard*

IATTC staff's proposed *EcoCard* workplan is based on ICCAT's recommended five main stages (for which the phases in EB-02-02 are adapted from) for indicator development, reporting and use (Figure 3; Juan-Jordá *et al.* 2022a). Juan-Jordá *et al.* (2022a) defined the first stage as establishing the purpose of the *EcoCard*, which includes setting the vision, main goals and objectives and identifying the target audience (in this case the IATTC and its stakeholders). This first stage is important as it helps to focus the work identified in the remaining five main stages (i.e., designing the conceptual framework (stage 2), identifying and calculating indicators (stage 3), interpreting and communicating the indicators (stage 4) and maintaining and refining the indicators (stage 5)). In IATTC's *EcoCard* workplan, phase 1 (Planning) includes "*determining the functions of an EcoCard"* which corresponds to ICCAT's stage 1. The purpose (or function) of an indicator-based *EcoCard*—i.e., the main reason why the IATTC staff developed an *EcoCard* workplan—is to support IATTC's commitment to the principles of the EAFM in the Antigua Convention and advance operationalizaton of the EAFM by developing a user-friendly visual tool for monitoring and communicating ecosystem status to the IATTC in a more efficient way. This visual tool, or *EcoCard*, aims to support the decision-making process. Further following Juan-Jordá *et al.'s* (2022a) first stage of *EcoCard* development, IATTC staff defined the main goal and objective of an indicator-based *EcoCard* to direct future work in the subsequent phases of the *EcoCard* workplan.

2.2.1. Defining the goal

Defining the goal (i.e., a broad, long-term desired outcome) of the *EcoCard* workplan helps to understand the overall vision the IATTC staff proposes to achieve regarding improved ecosystem-science advice and management. As a result of discussions, both internally and with global experts, the IATTC staff recommends that the goal of the *Ecocard* workplan is defined as follows:

To facilitate operationalization of the EAFM by improving ecosystem-science advice for management through the development and application of meaningful and effective tools and communication products.

2.2.2. Defining the objective

As the recommended goal aims to understand the long-term vision (i.e., facilitating operationalization of

the EAFM via appropriate tools and communication products), defining the objective (i.e., a shorter-term step towards achieving the main goal) helps to track progress towards the goal in a more specific and tangible way. Therefore, the IATTC staff's recommendation on defining the objective of the *EcoCard* workplan is as follows:

To transition to an indicator-based EcoCard to support decision making by enhancing awareness, communication and reporting on the status of various ecosystem components enabling the IATTC to prioritize research and potential management intervention.

2.2.3. Designing a conceptual framework

With the main goal and objective of an EPO *EcoCard* at the forefront, IATTC staff created a proposed conceptual framework (Figure 4) following stage 2 of ICCAT's 5 main stages of developing an *EcoCard* (shown in Figure 3) to facilitate visualization of the activities identified within the *EcoCard* workplan. The framework consists of 10 steps (or activities) and is an adaptation of Bianchi et al.'s (2016) generic roadmap of an EAFM implementation and examples of tools and end-user products to support its planning and implementation (shown in Figure 5) and NOAA's Integrated Ecosystem Assessment (IEA) loop (shown in Figure 6). The IEA is an approach designed to engage scientists, stakeholders and managers to integrate ecosystem components into decision making and to balance trade-offs associated with a desired management goal. Like the roadmap and loop examples, the framework developed and proposed by the IATTC staff for the EBWG, the Scientific Advisory Committee (SAC) and the Commission to consider, is also a highly collaborative, progressive, stepwise and iterative approach. Its arrows are color coded (Figure 4): blue arrows primarily highlight scientific activities needed to inform the decision-making process undertaken by the Commission, including receiving input from the subsidiary scientific bodies and working groups of the Commission, and yellow arrows primarily indicate Commission involvement to determine and implement any potential management interventions based on the best available scientific advice and to facilitate revisions of scientific activities and priorities as needed.

The blue or 'scientific-focused' arrows represent steps 1–6 of the *EcoCard* workplan. **Step 1** includes **defining the purpose** (goal and objective – see sections 2.2.1 and 2.2.2 above) aimed at directing the scientific body of work as implied in the Antigua Convention's reference to ecosystem considerations (e.g., Articles IV and VII) and the IATTC's Strategic Science Plan (SSP) (IATTC-93-06a, next iteration planned for 2025). **Step 2** consists of **determining the elements to monitor** (e.g., drivers and pressures, such as fishing and the environment as well as various ecological elements, such as the target and non-target species; Figure 7). **Step 3** involves the bulk of the project concentrated on **developing tools and indicators** that can be used to monitor and track ecosystem components and status. **Steps 4 and 5** are closely related to step 3 and are composed of (step 4) **defining the type of indicator** (e.g., surveillance indicators used for monitoring trends and perhaps eliciting fine-scale analyses or operational indicators that are directly linked to management objectives) and (step 5) **identifying uncertainties** in the chosen indicators to provide an indication of the level of reliability, data coverage and quality. **Step 6** involves a **science-based assessment of ecosystem status** in accordance with the chosen indicators. The results of the analyses or the proposal prepared by the IATTC staff in steps 1–6 will be presented at the subsidiary groups of the Commission for discussion, feedback, and potential endorsement, ensuring active input from all relevant stakeholders in the process at different steps.

The yellow or 'manager-focused' arrows represent steps 7–10. **Step 7** encompasses a review and **consideration of the recommendations** for management actions based on the scientific advice provided by step 6 above. **Step 8** comprises the **implementation of** any potential **management actions** decided by the Commission, as appropriate. **Steps 9 and 10** further emphasize the collaborative and iterative nature of the process with the **manager-focused activities** flowing back into the scientific activities. **Step 9**

involves **monitoring the indicators**—by IATTC scientists and communicating through the appropriate channels (e.g., the EBWG and the SAC)—and revising **communication products** for the Commission's consideration as needed based on the implementation of any potential management actions identified in step 8. Lastly, **step 10** involves **assessing the outcomes** of management actions implemented in step 8 and monitored in step 9. It is important to note that although the blue arrows primarily represent scientific activities and yellow arrows primarily involve potential management decisions, all of these activities require highly collaborative efforts and communication to ensure the scientific activities appropriately align with management objectives and stakeholder concerns. As such, the progress made under all steps (i.e., steps 1–10) is expected to be presented and discussed at the EBWG, SAC and Commission meetings as appropriate.

Based on the above information, the IATTC staff recommends the following:

To consider adopting the proposed conceptual framework described in section 2.2.3 and shown in Figure 4 to support and guide the *EcoCard* workplan (EB-02-02).

2.2.4. Visualizing and categorizing elements to monitor: a proposed visual dashboard

IATTC staff also created a proposed, preliminary, visual dashboard of elements to consider for monitoring—using IOTC's framework for ecosystem assessments and report cards as a guideline—based on three ecosystem-related categories. These included: (1) drivers and pressures (e.g., fishing and environmental conditions), (2) ecological elements to monitor (e.g., Convention species, non-target and vulnerable species, trophic ecology and biodiversity, and habitats) and (3) human dimensions (e.g., socio-economic aspects to balance tradeoffs between the three pillars of EAFM: biological/physical, social and economic) (Figure 7). These categories are aimed at focusing on developing and monitoring indicators that will provide information on perceived or potential impacts of the tuna fisheries on these categories to inform and guide the Commission on potential hazards so that the necessary actions can be taken to ensure the conservation of living marine resources under the Antigua Convention, noting the importance of fishing as a source of food security, employment and economic benefits. Therefore, the IATTC staff recommend the following:

To consider adopting the proposed, preliminary, visual dashboard of elements to consider for monitoring in an indicator-based *EcoCard* (shown in Figure 7).

2.3. Engaging with global experts

During January 2025, FAO and ISSF hosted the 3rd Joint Meeting of tuna RFMOs on the Implementation of EAFM at the FAO headquarters in Rome, Italy under the Common Oceans Tuna Project. This meeting gathered 30 professionals including fisheries managers, scientists, industry and RFMO representatives to discuss progress and challenges associated with advancing the operationalization of the EAFM. Scientists reviewed the ongoing and/or planned indicator-based ecosystem report card approach (SPC-WCPFC, ICCAT, IOTC, and IATTC) as a tool for monitoring trends, evaluating whether a change in the trend may be observed, communicating ecosystem considerations, providing recommendations for potential management actions to the respective Commissions and consequently supporting the implementation and operationalization of the EAFM. Discussions captured the need for clear advice, consideration of indicators as a whole, opposed to individually—noting this is a longer-term endeavor—and the importance of identifying hazards that require management action in an indicator-based ecosystem report card. Participants discussed the need for transparency, guidance and definition of goals by the Commissions, harmonizing the iterative, stepwise process and highlighting synergies among t-RFMOs to the extent possible, while noting a prescriptive plan across t-RFMOs may not be practical due to variability in the provisions of the respective Conventions and mandates of the Commissions.

Another important discussion point included the need to incorporate impacts of climate change and the social and economic consequences to advance progress of the EAFM in t-RFMOs. Socioeconomics is a pillar requiring attention (e.g., under phase 3: tool and indicator development, of IATTC's workplan) although this pillar is likely challenging to address. Additional resources (e.g., consultation with experts in economics and social science) will be essential for determining appropriate means for measuring socioeconomics associated with ecosystem use. An integrated participatory process where all relevant stakeholders are involved in the conversations to address the feasibility of incorporating this pillar to inform t-RFMOs is necessary given different countries may have different socioeconomic objectives as well as data availability and limitations.

3. PHASE 2 (ESTABLISHING CRITERIA FOR ECOREGIONS AND INDICATORS) – NEXT STEPS

Plans for 2025 include both internal discussions and discussions with global experts to establish criteria for delineating ecoregions and developing indicators. The development of the ecoregions and indicators themselves are planned for phase 3 (2026–2027), after the criteria for these have been defined. As a guideline, IATTC can consider screening criteria for indicators developed by other t-RFMOs (Table 1) and ICCAT's framework for delineating ecoregions in future discussions of the use of ecoregions in the EPO (Figure 8). Looking ahead and following direction by other t-RFMOs in the development of indicators, using a data-driven approach, focusing on trends and variance rather than absolute values, rigorously testing indicators and providing advice based on the magnitude of change will facilitate communication of indicators to the Commissions. Model-based indicators (e.g., those from ecosystem models) should also be included in discussions on indicators, as IATTC staff update an ecosystem model and several corresponding indicators in the *Ecosystem Considerations* report (e.g., see EB-02-01) on a near-annual basis.

4. REFERENCES

Bianchi, G., S. Funge-Smith, R. Hermes, C. O'Brien, B. Sambe, and M. Tandstad. 2016. Sustainable fisheries within an LME context. Environmental Development 17: 182-192.

Juan-Jordá, M.J., H. Murua, and E. Andonegi. 2018a. An indicator based ecosystem report card for IOTC - An evolving process. IOTC-2018-WPEB14-20. 17 p.

Juan-Jordá, M.J., H. Murua, H. Arrizabalaga, and A. Hanke. 2018b. A template for an indicator-based ecosystem report card for ICCAT. SCRS/2017/140. Collect. Vol. Sci. Pap. ICCAT 74 (6): 3639-3670.

Juan-Jordá, M.J., H. Murua, P. Apostolaki, C.P. Lynam, A. Rodriguez, J. Barrionuevo, F. Abascal, R. Coelho, S. Todorović, N. Billet, M. Uyarra, E. Andonegi, and J. Lopez. 2019. Selecting ecosystem indicators for fisheries targeting highly migratory species: An EU project to advance the operationalization of the EAFM in ICCAT and IOTC. WCPFC-SC15-2019/EB-WP-12.

Juan-Jordá, M.J., H. Murua, G. Diaz, P. Obregon, L. Kell, D. Alvarez-Berastegui, A. Eider, R. Coelho, T. Sachiko, D. Ochi, A. Domingo, D. Die, O. Yates, I. Tai, J. Bell, P. Tugores, and A. Hanke. 2022a. Report of the 1st Meeting of the Sub-Group on the Ecosystem Report Card. SCRS/2022/104. Collect. Vol. Sci. Pap. ICCAT 79 (5): 152-164.

Juan-Jordá, M.J., A.E. Nieblas, A. Hanke, S. Tsuji, E. Andonegi, A.D. Natale, L. Kell, G. Diaz, D. Alvarez Berastegui, C.A. Brown, D. Die, H. Arrizabalaga, O. Yates, D. Gianuca, F. Niemeyer Fiedler, B. Luckhurst, R. Coelho, S. Zador, M. Dickey-Collas, P. Pepin, and H. Murua. 2022b. Report of the ICCAT Workshop on the identification of regions in the ICCAT Convention Area for supporting the implementation of the ecosystem approach to fisheries management. Collect. Vol. Sci. Pap. ICCAT 79 (5): 178-211.

TABLE 1. Criteria, by tuna-Regional Fisheries Management Organization (t-RFMO), for developing indicators used as the foundation of an ecosystem indicator-based report card. These criteria will be considered in the next phase of IATTC's *EcoCard* workplan (phase 2: EB-02-02 and Figures 1 and 2) during 2025.

TABLA 1. Criterios, por organización regional de ordenación pesquera del atún (OROP atunera), para el desarrollo de indicadores utilizados como base de una ficha informativa sobre ecosistemas basada en indicadores. Estos criterios se considerarán en la siguiente fase del plan de trabajo de la CIAT sobre EcoCards (fase 2: EB-02-02 y Figuras 1 y 2) durante 2025.

Region (t-RFMO)	Criteria	Reference
Western and central Pacific Ocean (WCPFC)	1. science and data based; 2. characterize the states and trends of WCPFC marine ecosystems with respect to fishing activity and/or climate (including reference levels and baselines); 3. reflect well-defined processes underlying fishing activity and fishery responses to climate; 4. responsive to changes attributable to fishing pressure and climate (i.e., minimal time-lags and capability to provide early warning); 5. estimable on a routine basis with a historical data time-series available; 6. cost-effectiveness; 7. scalable across national, sub-regional and regional scales; 8. linked to existing WCPFC models and decision-making processes (for inclusion in MSE scenarios, validation of predictions and testing of model assumptions); 9. can be routinely estimated by members without reliance of the SSP	SC19-EB-WP-01
Atlantic and Indian Ocean (ICCAT and IOTC)	1. Scientific basis 2. Ecosystem relevance 3. Responsiveness to pressure 4. Possibility to set targets 5. Precautionary capacity/early warning 6. Quality of sampling methods 7. Cost effective 8. Existing/ongoing data	(Juan-Jordá *et al.* 2019): see TASK 2: A proposal of ecosystem indicators and their data requirements

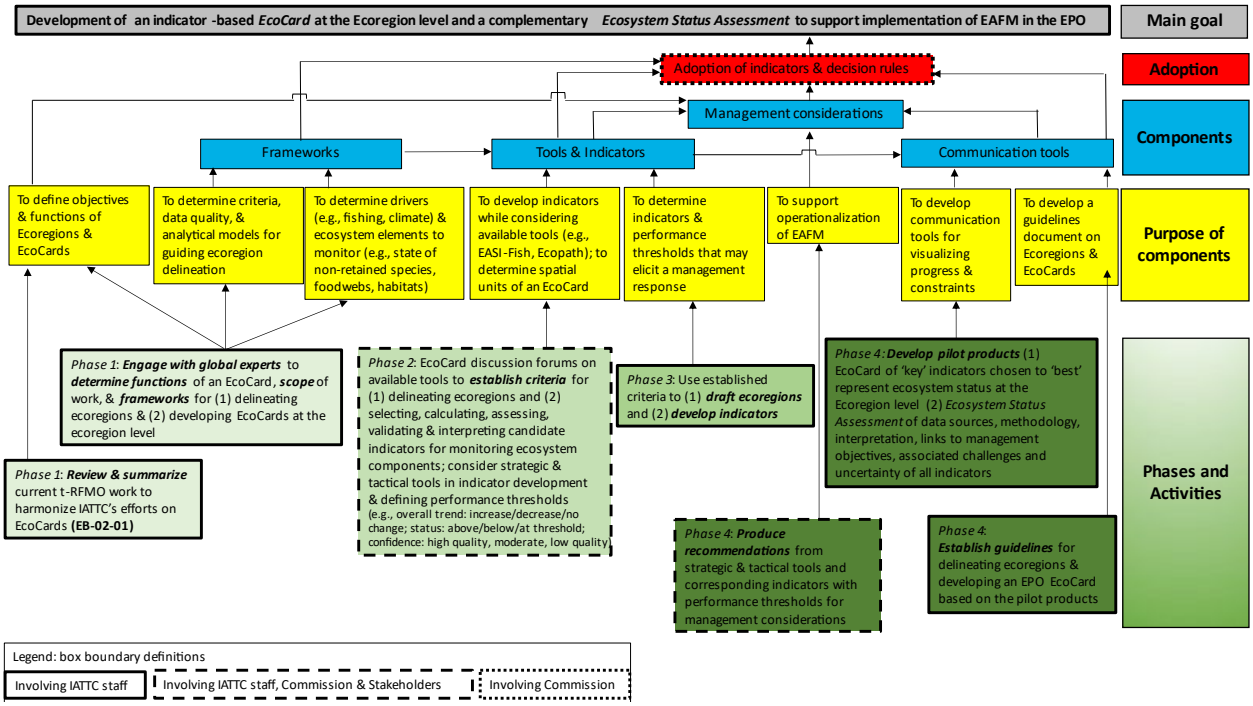


FIGURE 1. A proposed workplan for restructuring IATTC's *Ecosystem Considerations* document into two ecosystem-advice products as described in EB-02-02 (1) an *EcoCard* of 'key' indicators chosen to 'best' represent ecosystem status at the ecoregion level and (2) a complementary *Ecosystem Status Assessment* for the EPO to support implementation of the Ecosystem Approach to Fisheries Management (EAFM). Phase definitions: phase (1) Planning; phase (2) Identifying & Prioritizing Issues for Establishing Criteria; phase (3) Development; phase (4) Management Considerations & Communication.

FIGURA 1. Un plan de trabajo propuesto para reestructurar el documento de *Consideraciones Ecosistémicas* de la CIAT en dos productos de asesoramiento sobre ecosistemas, como se describe en EB-02-02: (1) una *EcoCard* de indicadores "clave" elegidos para representar "mejor" el estado de los ecosistemas a nivel de ecorregión y (2) una *Evaluación del estado de los ecosistemas* complementaria para el OPO para apoyar la implementación del enfoque ecosistémico de la ordenación pesquera (EEOP). Definiciones de las fases: Fase (1) Planificación, Fase (2) Identificación y priorización de cuestiones para establecer criterios, Fase (3) Desarrollo, Fase (4) Consideraciones de ordenación y comunicación.

Phase	Activities	2024				2025				2026				2027				2028			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1) Planning	***Review & summarize*** current t-RFMO work to harmonize IATTC's efforts on developing an EcoCard (EB-02-02)																				
	Draft a proposed workplan to develop EcoCard(s) for the EPO																				
	Present proposed workplan to the EBWG																				
	Engage with global experts to determine functions of an EcoCard, scope of work & frameworks																				
	Create frameworks for (1) delineating ecoregions (2) developing EcoCards at the Ecoregion level																				
2) Identifying & Prioritizing Issues for Establishing Criteria	Discussion forums on tools to ***establish criteria*** for (1) delineating ecoregions, (2) developing indicators																				
	Present progress on EcoCard functions, frameworks and criteria to the EBWG																				
3) Development	Use established criteria from phase 2 to ***draft ecoregions***																				
	Use established criteria from phase 2 to ***draft indicators***																				
	Present progress on draft ecoregions and indicators to the EBWG																				
4) Management Considerations & Communication	***Produce recommendations*** from strategic & tactical & corresponding indicators for management considerations																				
	Develop pilot ecosystem-advice products: (1) EcoCard of 'key' indicators (2) detailed Ecosystem Status Assessment of all indicators																				
	Present progress on the pilot products to the EBWG																				
	Present recommendations for decision rules to the Commission																				
	Establish guideliines for delineating ecoregions & developing EPO EcoCards at the Ecoregion level, based on the pilot products																				
Timeline is flexible and subject to change Process is iterative Maintain, review, refine Ecoregions and EcoCards on an annual basis to support EAFM																				

FIGURE 2. Proposed timeline of phases and proposed activities for restructuring IATTC's *Ecosystem Considerations* document into an indicator-based *EcoCard* at the ecoregion level and corresponding *Ecosystem Status Assessment* for EPO fisheries in support of operationalization of the Ecosystem Approach to Fisheries Management (EAFM), as described in the *EcoCard* workplan EB-02-02. Q=Quarter; EBWG=Ecosystem & Bycatch Working Group.

FIGURA 2. Cronograma propuesto de fases y actividades propuestas para reestructurar el documento *Consideraciones Ecosistémicas* de la CIAT en una *EcoCard* basada en indicadores a nivel de ecorregión y la *Evaluación del estado de los ecosistemas* correspondiente para las pesquerías del OPO en apoyo de la puesta en marcha del enfoque ecosistémico de la ordenación pesquera (EEOP), como se describe en EB-02-02. T=Trimestre; GTECI=Grupo de Trabajo sobre Ecosistema y Captura Incidental.

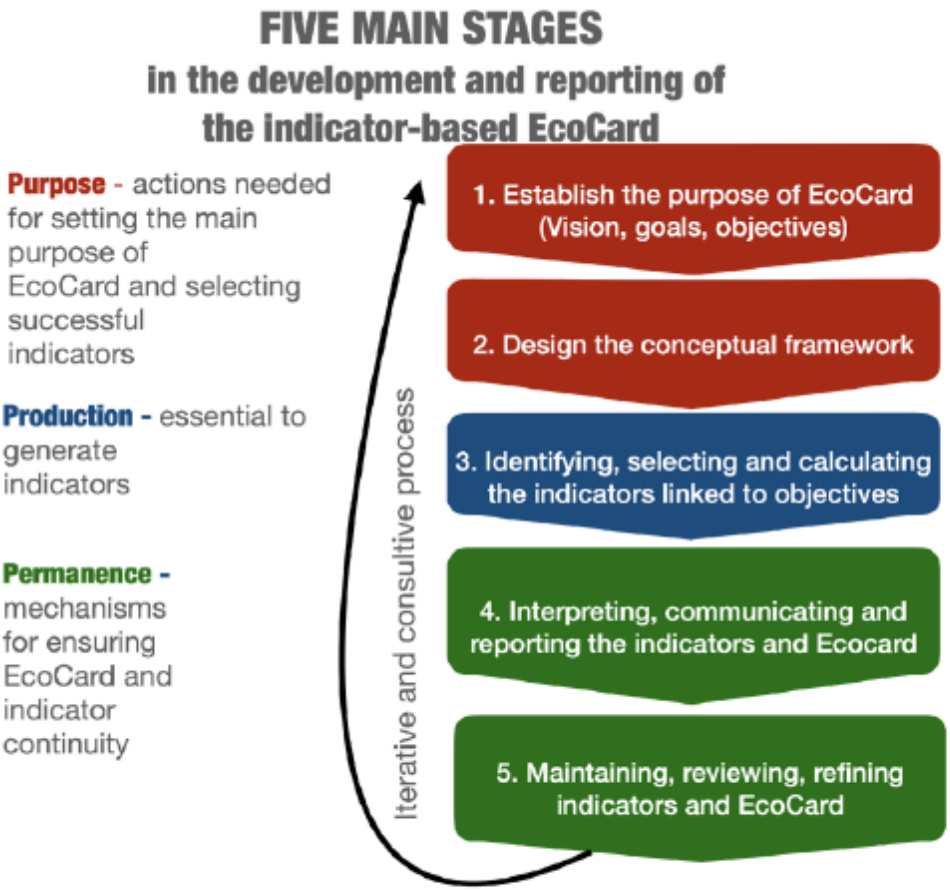


FIGURE 3. Five main stages for developing an indicator-based *EcoCard* from Juan-Jorda *et al.* (2022a). Stages 1 and 2 were addressed herein as part of phase 1 of IATTC's *EcoCard* workplan (EB-02-02 and Figures 1 and 2).

FIGURA 3. Cinco etapas principales de la elaboración de una *EcoCard* basada en indicadores, tomada de de Juan-Jordá *et al.* (2022a). Las etapas 1 y 2 se abordaron aquí como parte de la fase 1 del plan de trabajo de la CIAT sobre *EcoCards* (EB-02-02 y Figuras 1 y 2).

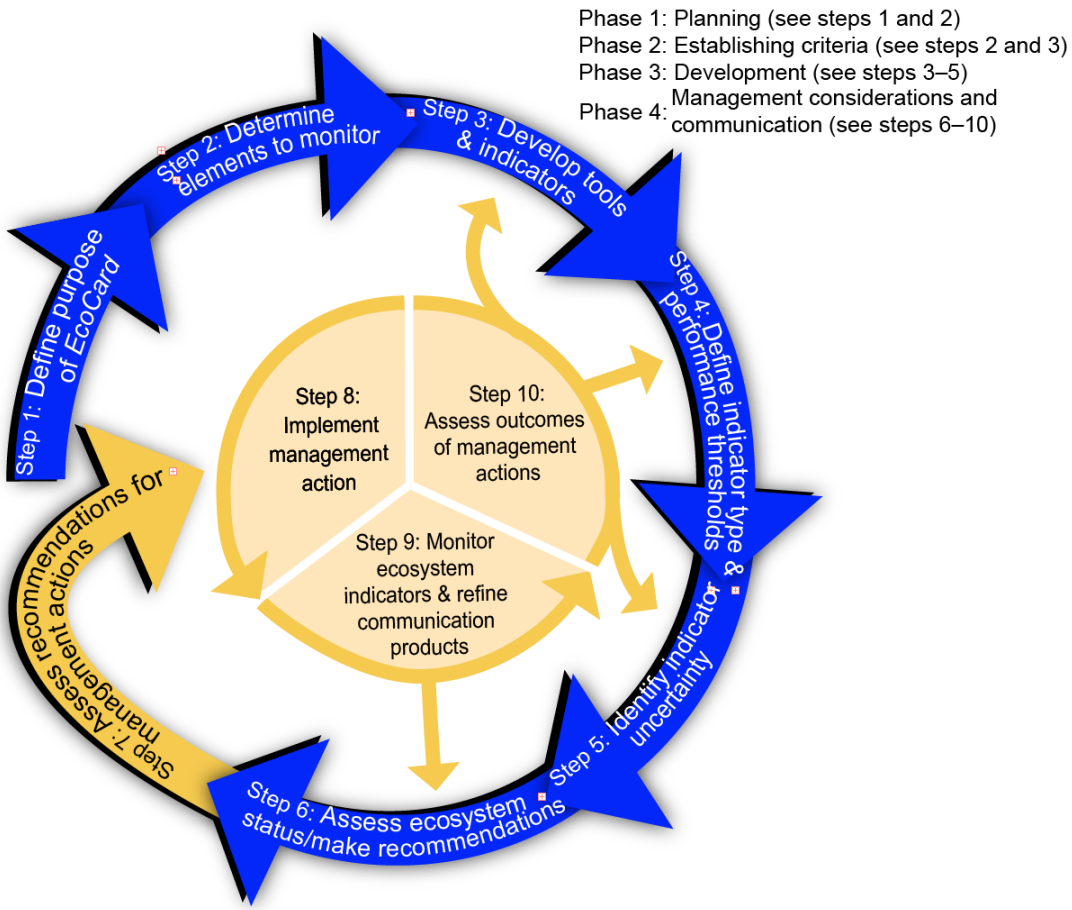
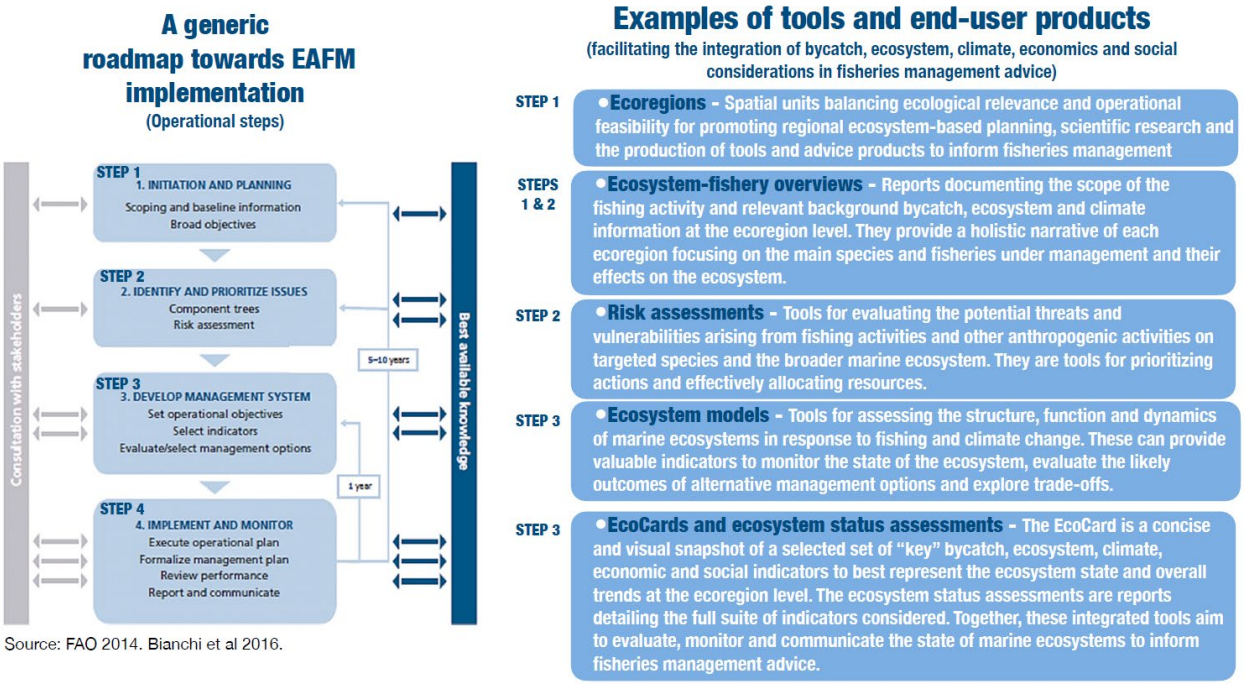


FIGURE 4. IATTC staff's proposed conceptual framework of the *EcoCard* workplan to facilitate implementation of EAFM through the development of communication products (i.e., indicator-based *EcoCards* and complementary *Ecosystem Status Assessments*) used to prioritize research and potential management intervention. Blue arrows primarily represent scientific steps (1–6) required to provide ecosystem advice to the Commission. Yellow arrows primarily represent steps (7–10) needed by the Commission to determine any potential management action(s), implementation of actions and assessment of management actions based on scientific recommendations. The process is iterative and requires consistent communication between scientists, managers and other relevant stakeholders to refine ecosystem-advice communication products. The framework follows the four phases identified in IATTC's *EcoCard* workplan (EB-02-02 and Figures 1 and 2).

FIGURA 4. Marco conceptual propuesto por el personal de la CIAT para el plan de trabajo sobre *EcoCards* con el fin de facilitar la implementación del EEOP mediante el desarrollo de productos de comunicación (es decir, *EcoCards* basadas en indicadores y la *Evaluación del estado de los ecosistemas* complementaria) utilizados para priorizar las investigaciones y posibles intervenciones de ordenación. Las flechas azules representan principalmente los pasos científicos (1-6) necesarios para proporcionar asesoramiento a la Comisión en materia de ecosistemas. Las flechas amarillas representan principalmente los pasos (7-10) que necesita la Comisión para determinar cualquier posible acción de ordenación, la implementación de acciones y la evaluación de acciones de ordenación basadas en recomendaciones científicas. El proceso es iterativo y requiere una comunicación constante entre científicos, gestores y otras partes interesadas pertinentes para perfeccionar los productos de comunicación de asesoramiento sobre ecosistemas. El marco sigue las cuatro fases identificadas en el plan de trabajo de la CIAT sobre *EcoCards* (EB-02-02 y Figuras 1 y 2).



Source: FAO 2014. Bianchi et al 2016.

FIGURE 5. A generic roadmap of Ecosystem Approach to Fisheries Management (EAFM) implementation and examples of tools and end-user products to support its planning and implementation (adapted from Bianchi et al. 2016) and used to inform a conceptual framework of IATTC's *EcoCard* workplan (see Figure 4).

FIGURA 5. Hoja de ruta genérica para la implementación del enfoque ecosistémico de la ordenación pesquera (EEOP) y ejemplos de herramientas y productos de usuario final para apoyar su planificación e implementación (adaptada de Bianchi *et al*. 2016) y utilizada para informar un marco conceptual del plan de trabajo de la CIAT sobre *EcoCards* (ver Figura 4).

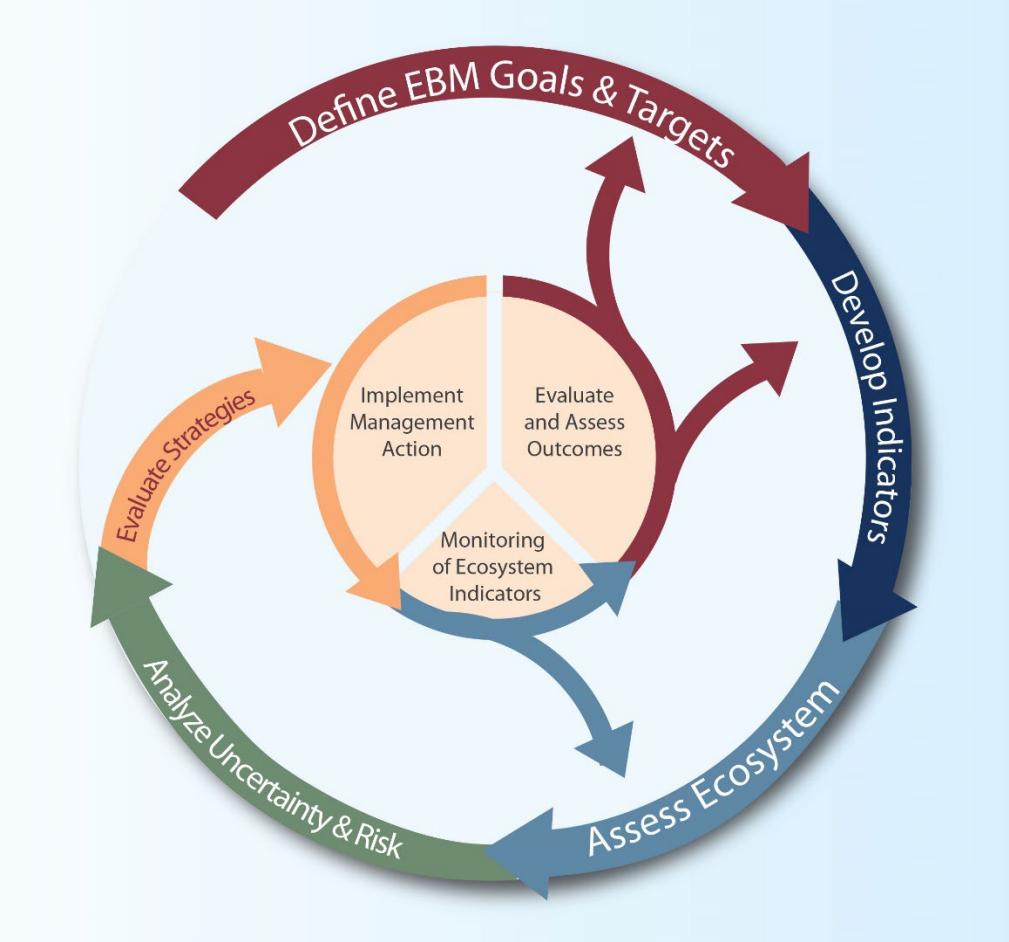


FIGURE 6. NOAA's Integrated Ecosystem Assessment loop used to inform a conceptual framework of IATTC's *EcoCard* workplan (see Figure 4).
FIGURA 6. El bucle de Evaluación Integrada de Ecosistemas de la NOAA utilizado para informar un marco conceptual del plan de trabajo de la CIAT sobre *EcoCards* (ver Figura 4).

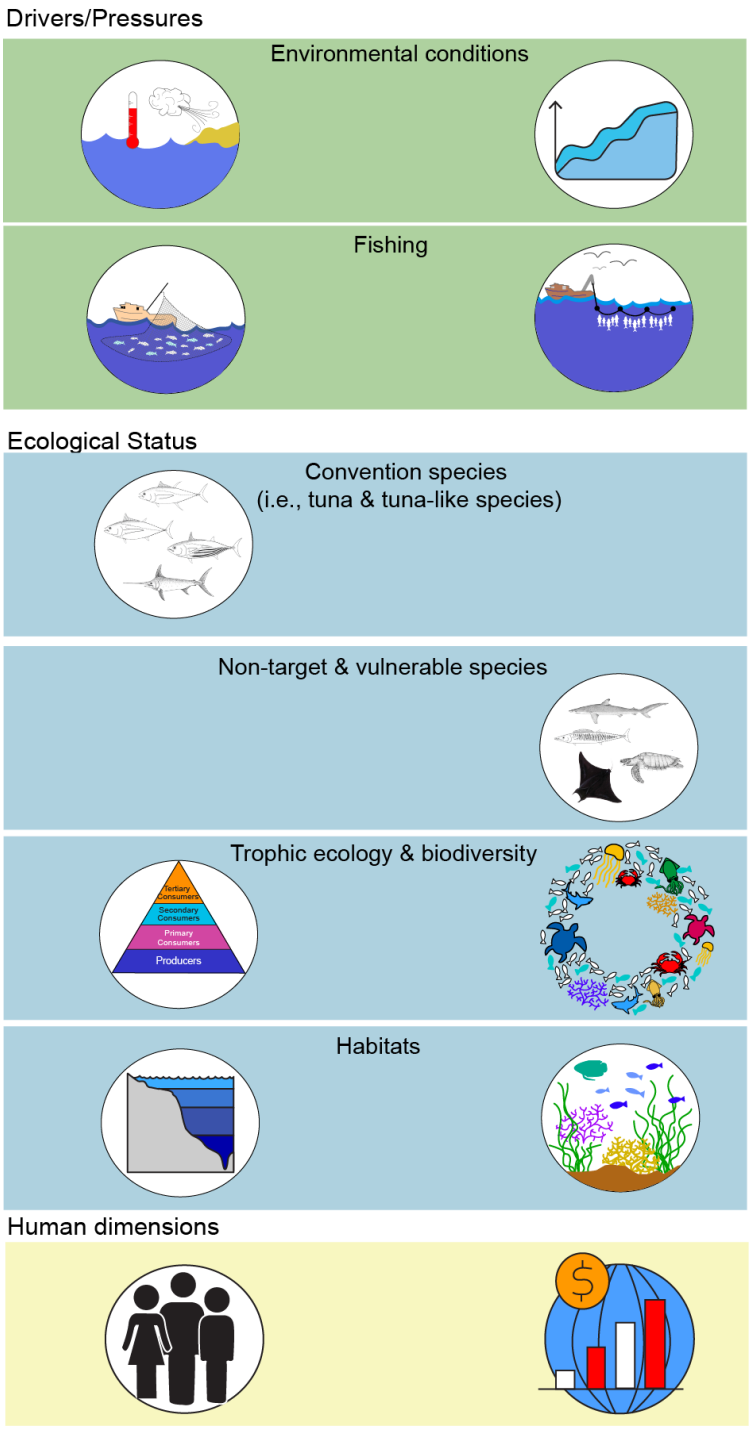


FIGURE 7. Categories of elements included in IATTC staff's proposed visual dashboard to develop an *EcoCard* for the IATTC. The IATTC team adapted the terms used in the drivers, pressures and ecological elements to monitor identified by Juan-Jordá, *et al.* (2019), Juan-Jordá *et al.* (2018b), and Juan-Jordá *et al*. (2018a).

FIGURA 7. Categorías de los elementos incluidos en el panel visual propuesto por el personal de la CIAT para desarrollar una *EcoCard* para la CIAT. El personal de la CIAT adaptó los términos utilizados en los impulsores, presiones y elementos ecológicos para el monitoreo identificados por Juan-Jordá, *et al.* (2019), Juan-Jordá *et al.* (2018b) y Juan-Jordá *et al*. (2018a).

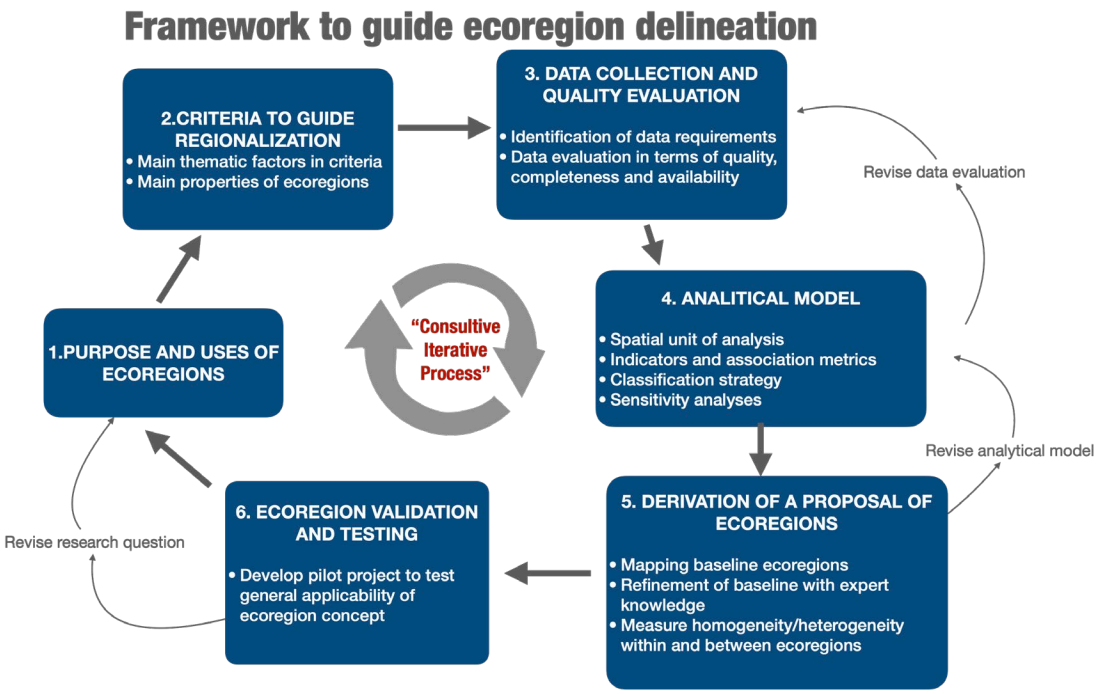


FIGURE 8. The general framework undertaken by ICCAT in delineation of ecoregions reproduced here from Juan-Jordá *et al.* (2022b) to guide future IATTC discussions on the use of ecoregions and establishment of criteria to delineate potential ecoregions in the EPO (phase 2 of the *EcoCard* workplan: see Figures 1 and 2).

FIGURA 8. Marco general adoptado por la CICAA para la delimitación de las ecorregiones, reproducido aquí a partir de Juan-Jordá *et al.* (2022b), para guiar las futuras discusiones de la CIAT sobre el uso de ecorregiones y el establecimiento de criterios para delimitar posibles ecorregiones en el OPO (fase 2 del plan de trabajo sobre *EcoCards*: ver Figuras 1 y 2).