

Robust Conservation Anarchy:
Comparing Treaty Institutional Design for Evidence of Ostrom's Design Principles,
Fit, and Polycentricity

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ABSTRACT

Institutions (rules, norms, and shared strategies) are social feedback systems that structure actors' decision-making context. It is important to investigate institutional design to understand how rules interact and generate feedbacks that affect robustness, i.e., the ability to respond to change. This is particularly important when assessing sustainable use/conservation trade-offs that affect species' long-term survival. My research utilized the institutional grammar (IG) and robust institutional design to investigate these linkages in the context of four international conservation treaties.

First, the IG was used to code the regulatory formal treaty rules. The coded statements were then assessed to determine the rule linkages and dynamic interactions with a focus on monitoring and related reporting and enforcement mechanisms. Treaties with a regulatory structure included a greater number and more tightly linked rules related to these mechanisms than less regulatory instruments. A higher number of actors involved in these activities at multiple levels also seemed critical to a well-functioning monitoring system.

Then, drawing on existing research, I built a set of constitutive rule typologies to supplement the IG and code the treaties' constitutive rules. I determined the level of fit between the constitutive and regulatory rules by examining the monitoring mechanisms, as well as treaty opt-out processes. Treaties that relied on constitutive rules to guide actor decision-making generally exhibited gaps and poorer rule fit. Regimes which used constitutive rules to provide actors with information related to the aims, values, and

context under which regulatory rules were being advanced tended to exhibit better fit, rule consistency, and completeness.

The information generated in the prior studies, as well as expert interviews, and the analytical frameworks of Ostrom's design principles, fit, and polycentricity, then aided the analysis of treaty robustness. While all four treaties were polycentric, regulatory regimes exhibited strong information processing feedbacks as evidenced by the presence of all design principles (in form and as perceived by experts) making them theoretically more robust to change than non-regulatory ones. Interestingly, treaties with contested decision-making seemed more robust to change indicating contestation facilitates robust decision-making or its effects are ameliorated by rule design.

DEDICATION

I dedicate this dissertation to my Oma whose strength and courage has always been an inspiration to me, and to my husband, Mike, for his steadfast love and encouragement. You are my rock. I would not be where I am today without you. Finally, to all things wild and wonderful; may you continue to exist.

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CHAPTER 1

INTRODUCTION

Wildlife and biodiversity conservation depends on the ability of policymakers to resolve social dilemmas, including the tension between human development and species/nature protection. This is particularly true at the global level where international coordination is necessary to ensure the efforts of countries working on conservation issues in one region are not wiped out by development projects in another. Legal, political science, and international relations' scholarship over the past two decades has confirmed that institutions (i.e., rules, norms, shared strategies), institutional structure, and policy processes matter to policy outcomes, particularly in the international governance of coupled social-ecological systems (SES) (Haas et al., 1994; Bernauer, 1995; Mitchell, 2006). Much of that research has focused on measuring governance effectiveness through implementation, compliance, and other factors (Brown Weiss & Jacobson, 1998; Miles et al., 2002; Bodansky, 2010; Young, 2010b, 2010a; Sand, 2019).

What is often overlooked is that policies are socially constructed feedback systems that interact with each other and the other elements in an SES in often unpredictable ways which can never be fully understood (Anderies & Janssen, 2013). Scholars are just beginning to discern institutional configurations and their effect on governance robustness to change (Baggio et al., 2016; Barnett et al., 2016), but there is still much to learn. This research is an empirical and theoretical contribution towards articulating the relationship between institutional structure and robust institutional design. It is based on the premise that the key to overcoming the challenge of incomplete

knowledge, unpredictability, and change in governance systems is to acknowledge these limitations, gain a good understanding of the system's fundamental features and decision-making feedbacks, and then use that information wisely to nudge the system in directions where core conservation objectives can be maintained (Anderies & Janssen, 2013). While there are a few studies that have dissected institutional arrangements (Basurto et al., 2010; Siddiki, Weible, et al., 2011; Carter et al., 2016) or analyzed policy robustness (Therville et al., 2018; Guerbois et al., 2019; Naylor et al., 2019), none have done both. This study aims to address that gap by comparatively examining the institutional arrangements of four international conservation treaties¹ for their robust design features.

Before outlining the structure of this dissertation, I will provide a brief overview on each treaty. Readers are referred to Appendix A for more details.

Treaty overview

The International Convention on the Regulation of Whaling (ICRW) was signed in Washington, D.C., on December 2, 1946, and entered into force in November of 1948 (IWC, 2020e). It is not only the oldest international conservation agreement in the group of treaties subject to this analysis, but also the oldest conservation agreement that is currently still active. The ICRW's entry into force predates the creation of the United Nations (U.N.) and, as such, the Convention is not organized, nor supported by the U.N. or the U.N. Environment Programme (UNEP). As of May 27, 2020 the International Whaling Commission (IWC), which is the governing body of the ICRW, had 88 member states, including whaling and nonwhaling countries (IWC, 2020h). An

¹ International Convention on the Regulation of Whaling (ICRW); Convention on International Trade in Endangered Species (CITES); Convention on Migratory Species (CMS); and the Convention on Biological Diversity (CBD).

indication of the contentiousness among member governments in this forum was evident when Japan withdrew from the Convention in order to pursue coastal whaling outside the treaty scope effective July 1, 2019 (Normile, 2019).

Aside from having the smallest membership of the four treaties examined in this research project, the IWC² has membership gaps that include whaling countries and former members, such as Japan and Canada, as well as Denmark, Norway, and Iceland who have established a fractured relationship with the convention by maintaining membership or non-Party participation status while continuing to actively engage in whaling activities under objections or through withdrawal, thereby, circumventing the whaling moratorium that's been in place since the mid-1980s. The ICRW's core objective is two-fold: (1) "the proper conservation of whale stocks" in order to (2) "make possible the orderly development of the whaling industry" (ICRW, 1946).

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was signed in Washington, D.C., on March 3, 1973 (CITES, 2020c). The Convention entered into force on July 1, 1975, after the mandatory ten state ratifications had been deposited (Huxley, 2000; Brown & Swails, 2005; Gillespie, 2011). As of April 2020, CITES' membership is at 183 Parties (CITES, 2020c). In contrast to the CMS and the ICRW, CITES member governments include most of the countries engaged in high volumes of wildlife trade, including major wildlife importers such as the United States, China, and Russia; and wildlife exporting countries such as Tanzania and South Africa (African Wildlife Foundation, 2017).

² This Convention is commonly referred to by its governing body, the International Whaling Commission or IWC which is in contrast to the other three treaties which are colloquially referenced by treaty name.

CITES' core objective is the regulation of international trade in wild plants and animals through a system of import/export permits and certificates that are managed at the national level within member countries. Each member country is required to establish one or more Management Authorities to administer the licensing system, and one or more Scientific Authorities which provide scientific input to the Management Authority on the potential impact of trade on species (CITES, 2020b).

The **Convention on the Conservation of Migratory Species of Wild Animals (CMS)**, which is also sometimes known as the Bonn Convention, was signed in Bonn, Germany, on June 23, 1979 by twenty-eight states. The treaty entered into force on November 1, 1983, three months after the treaty Depository government received the fifteenth instrument of ratification (Lyster, 1989). As of November 2019, the CMS had 130 member states with notable coverage gaps in North America, Asia, and Russia (CMS, 2020c).

The treaty's core objective is the conservation of migratory species of wild animals. It currently covers under its auspices a wide variety of mammals, birds, reptiles, fish, and one insect (the Monarch butterfly) (CMS, 2020e). Like in CITES, species are organized in Appendices based on the threats to their long-term survival. However, unlike CITES which regulates trade in all species regardless of threat level, CMS applies a "framework convention" approach (CMS, 2020a) to the conservation of its Appendix II-listed species by requesting that its Parties enter into separate AGREEMENTS (capitalization follows CMS form) with each other, non-Party states, or other entities.

The **Convention on Biological Diversity (CBD)** is one of the three Rio Earth Summit Conventions that were advanced by the United Nations Conference on Environment and Development (UNCED) in response to a growing recognition that “traditional conservation” measures were ineffective in halting the decline of biological diversity, and that the Earth system had to be viewed as a single complex system (CBD, 2007). The convention text was adopted in May 1992 in Nairobi and opened for signature later that month in Rio de Janeiro (CBD, 2007). The CBD Convention entered into force 19 months later in December of 1993 after being ratified by 30 countries (Herkenrath, 2002). With 196 Parties, the CBD has near universal membership with only two recognized nation states not being a Party: the Holy See and the United States of America (CBD, 2020).

The CBD has three core objectives: (1) “the conservation of biological diversity”; (2) “the sustainable use of its components”; and (3) “the fair and equitable sharing of the benefits arising out of the utilization of genetic resources” (CBD, 1992 Article I). These are very broad and reinforcing goals which “bring nearly all topics within the scope of the CBD” (Wold, 1998, p. 4). However, these goals also acknowledge the different economic conditions and moral responsibilities of the world’s nations with regard to conservation and sustainable use of biological diversity (Wold, 1998).

Research design and organization

This research was set up to take a macro and micro perspective of rules. At the micro level, treaty rules contain information that is relevant to the decision-making context, such as information on permitted, required, and prohibited actor behavior, as

well as the goals, aspirations, and contextual parameters of the instrument. Here, the institutional grammar (IG) (Crawford & Ostrom, 1995) and social theory (Searle, 1995, 2010) helped increase my understanding of the core components of treaty rules and, in so doing, allowed me to further probe the connection between decision-making and institutional design. At the macro level, conceptualizing rules as part of the software in a process model controller enabled visualizing rules as processes that emerge based on the configurations that are activated, and their interaction with actors in the decision-making arena. Here, robustness in SES (Anderies et al., 2007; Anderies & Janssen, 2013), Ostrom's institutional design principles (Ostrom, 1990), institutional fit (Young, 2002), and polycentricity (Ostrom, 2005; Aligica & Tarko, 2012) were useful analytical frameworks to the analysis.

In **Chapter 2**, I utilized the IG to code the *regulatory* institutional statements in the formal treaty documents for each of the four regimes at the micro level. At the macro level, I assessed the coded institutional statements by their rule typologies to determine their connections and dynamic interactions horizontally and vertically within the context of treaty monitoring and related enforcement and reporting/information sharing mechanisms. This analysis allowed me to answer the following related questions: (1) “What are the elements and configurations of the *regulatory* treaty rules?”; and (2) “based on these institutional arrangements, what general policy processes are generated, and how may that theoretically affect robustness (sensitivity to shocks and disturbances)?”

In **Chapter 3**, I build on the work of Chapter 2 by exploring the treaties' *constitutive* rules from a micro and macro perspective in order to better understand the relationship between these two linguistic forms, their internal fit, and likely feedbacks generated. I addressed the interrelated questions: (1) "What are the elements and configurations of constitutive rules?"; "how do the constitutive and regulatory rule structures connect (fit)?"; and (3) based on these coupled institutional arrangements, what policy processes are generated and how might that affect governance robustness?" I expanded an existing list of five constitutive rule typologies to thirteen typologies which I then used to code the constitutive institutional statements in all treaty formal documents. This expanded set of typologies may be generalizable and useful to other policy instruments and will be tested accordingly in the future. I then qualitatively examined the connections between the constitutive and regulatory rules horizontally and vertically by expanding the Chapter 1 treaty monitoring mechanism analysis, as well as by assessing opt out processes outlined in the treaty rules.

Chapter 4 represents the culmination of the analyses conducted in the prior two chapters. Here, I relied on several analytical frameworks of robust institutional design, including Ostrom's institutional design principles, polycentricity, and fit, to answer the questions: (1) "What key institutional characteristics are present in each regime?"; and (2) based on those characteristics, theoretically how robust to disturbance/shock are these governance systems? Content analysis was used to identify and assign a value to individual components of robust institutional design tagged in the coded formal treaty documents and expert interview transcripts. These values were then analyzed to

determine each treaty regime's degree of theoretical robustness. My findings contributed to theories of robust institutional design and will be shared as practical insights with participants in each of the treaty forums. Finally, my research findings and their theoretical and practical implications are synthesized and discussed in **Chapter 5**.

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CHAPTER 2
THE STRUCTURE OF CONSERVATION ANARCHY: A COMPARATIVE
INSTITUTIONAL ANALYSIS OF REGULATORY RULES IN FOUR
CONSERVATION TREATIES

Introduction

Institutions³ are social feedback systems that structure the decision-making context of the actors who are being governed (Kiser & Ostrom, 1982 Article III(4)(b); Ostrom, 2005; March & Olsen, 2006). They consist of a mix of regulatory⁴ and constitutive⁵ rules which link together to create a policy web of institutional arrangements. Good governance demands understanding these institutional linkages to determine the feedbacks generated, their impact on actor behavior, and institutional robustness to change. There are few scholarly analyses that explore these connections in detail; a gap that this research aims to address by analyzing the *regulatory* governance design of four international conservation instruments (ICRW, CITES, CMS, and CBD⁶) from a macro and micro perspective.

At the macro level, a complex social-ecological system (SES) perspective is taken in which a treaty represents the Controller (K_t) embedded within the system it aims to govern (Anderies et al., 2007; Anderies & Janssen, 2013) (Fig. 2.1). Like software, the

³ Institutions are defined as the regulatory rules, norms, and shared strategies, as well as the underlying aspirations and contextual parameters outlined in constitutive rules that govern human interactions with each other and their environment.

⁴ Regulatory rules outline required, permitted, and prohibited behavior/actions (Ostrom, 2005)

⁵ Constitutive rules describe the aspirations and foundational context of a legal instrument (Searle, 1995, 2010)

⁶ International Whaling Commission (ICRW); Convention on the International Trade in Endangered Species of Fauna and Flora (CITES); Convention on Migratory Species of Wild Animals (CMS); and the Convention on Biological Diversity (CBD).

Controller provides the “code” (or rules) that generates change in the SES (J.M. Anderies, personal communication June 4, 2020). While we can never fully understand these complex systems, by determining the underlying governance software components, we can learn how information processing, conflict resolution, and action processes are configured. That knowledge can then be used to determine the likely policy feedbacks generated by the Controller in order to use them wisely to cope with the inherent SES complexity and uncertainty (Anderies & Janssen, 2013).

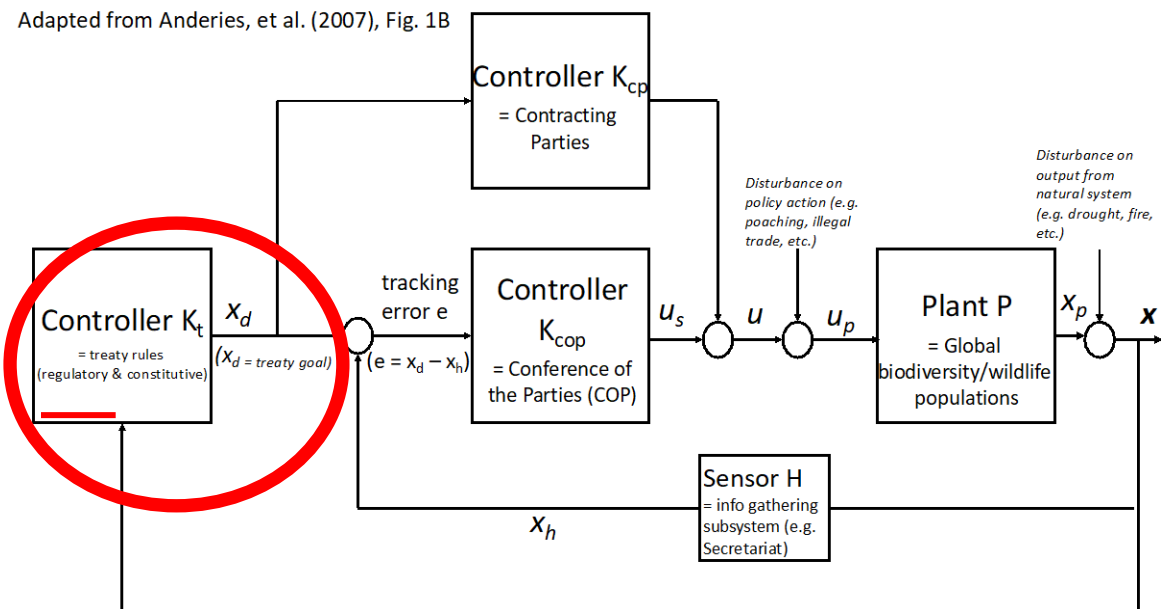
Conceptualizing treaties as software also reinforces the notion of a dynamic system. For example in Fig. 2.1, sensor H (an information gathering system, such as a treaty Secretariat) receives an output signal (x) from the Plant P (the resource, i.e., biodiversity status, wildlife conditions) indicating overexploitation of glass frogs in the international pet trade. The sensor (H) then assesses the data, generates a report, and feeds it back into the system where it triggers a tracking error (e)—measured as the difference between the treaty goal/core objective (x_d) and the measurement (x_h)—which is then received by the Conference of the Parties (COP) (K_{cop}). Based on the Controller K_t 's rule structure, K_{cop} (the treaty governing body) will take action, and a feedback (u_s) in the form of a policy response is generated to restrict or shut-down the international glass frog pet trade. This example reflects how the “software” configuration of Controller K_t dynamically affects system performance (output x) and robustness (sensitivity to shocks and disturbances).

At the micro level, this report uses the institutional grammar (IG) (Crawford & Ostrom, 1995; Ostrom, 2005; Siddiki, Christopher, et al., 2011) to parse the regulatory

institutional structure of K_t in each treaty forum into their core elements and rule configurations. This information then provides the data to animate and comprehend the macro level feedback system just described. It also contributes to the measurement of the internal (match between constitutive and regulatory rules) and external fit of K_t (match between K_t 's rule structure and the way it is perceived by actors in K_{cop}) which will be reported on in subsequent papers.

Figure 2.1

Treaty-as-controller process model adapted from Anderies, et al., Fig. 1B (2007). The model depicts a treaty governance system embedded in a hypothetical social-ecological system. Controller K_t (circled in red) consists of regulatory and constitutive rules. This paper focuses on the regulatory institutional configurations (underlined in red) in order to determine their syntactic components, rule configurations, and potential feedbacks.



There are, of course, no policy panaceas and increases to the controller's ability to respond to change, i.e., robustness, leads to fragilities elsewhere. Accordingly, the goal of robust policy design is to construct a fail-safe, nimble governance system that

continuously monitors the SES, assesses vulnerability-robustness trade-offs, and tweaks policy processes so the system remains within acceptable performance parameters (Anderies & Janssen, 2013; Anderies, 2015). Here, again, understanding the underlying rule structure and its likely feedbacks is key to such an undertaking.

In combination, this research contributes an empirical application of the IG to advance a theoretical understanding of the link between institutional (software) design, potential policy feedbacks, and institutional robustness. It also helps answer the following research questions: (1) What are the elements and configurations of the treaty Controller K_t's software?; and (2) based on these institutional arrangements, how is the software designed to run, i.e., what general policy processes are generated and how may that theoretically affect robustness (sensitivity to shocks and disturbances)?

Key takeaways from the IG analysis include evidence of consistent syntactic similarities across all four treaty regimes. Key differences arise out of treaty DEONTIC structures which separate the regimes into those that impose a higher degree of legally binding commitments on their Parties, and those that do not. The main feedbacks explored were coupled aggregation and choice rules outlining monitoring mechanisms which combined with information rules to create reporting/information sharing feedbacks which were not always well-linked across analysis levels. Enforcement mechanisms exist in all treaties, but the CBD. The CBD also exhibited a rudimentary monitoring/reporting mechanism feedback which grants limited authority to its governing body to do anything other than review reports. These factors compounded by a weakly regulatory DEONTIC

structure that places few obligations on its Parties exposes the CBD as the treaty least likely to be able to cope with change.

Sections 2.1 through 2.3 describe the findings of the micro level analysis of the regulatory treaty rules using the IG. Sections 2.4 and 2.5 outline the rule configuration feedbacks horizontally by their rule classes (Ostrom, 2005) and vertically by level of decision-making authority. Section 3 draws on these findings to assess the monitoring mechanisms created in the Convention texts, to discuss the presence or absence of design principles (Ostrom, 1990), and theoretical treaty governance robustness before coming to a conclusion.

1 Methods

Accelerating species/biodiversity declines (Ceballos et al., 2015; Ceballos et al., 2017; IPBES, 2019), and the concomitant need for researchers to contribute to improved international conservation governance, provided the impetus to focus on conservation treaties as illustrative examples of the connection between institutional “software” design and its feedback mechanisms. While the treaties included in this analysis (Table 2.1) pursue similar conservation objectives (conservation for sustainable use), they differ in age, focus, and organization. The oldest treaty (ICRW) is over 70 years old, while the youngest (CBD) went into effect 28 years ago. CITES and CMS focus on wildlife, the ICRW is a quasi fisheries agreement, and the CBD is broadly concerned with biodiversity. All treaties are organized under the United Nations, except the ICRW. See Appendix A for more details on the treaties’ historical and decision-making context, membership status, objectives, and organizational structure.

Table 2.1

Details on treaties included in the analysis. Table columns are organized with the oldest treaty, the ICRW, in the second left column and the youngest, the CBD, in the far right column. The “Signed/entry into force” row distinguishes when the Convention text was first agreed upon by member states (signed date) and when it entered into force (once the required number of States ratified the agreement). The “Member states” row outlines the number of member states as of June 1, 2020. All treaties, but the ICRW, are organized under the United Nations (U.N.). Treaty governing bodies are the Conference of the Parties (COP) in the U.N. treaties and the International Whaling Commission (ICRW or “Commission”) in the ICRW. Voting procedures are taken from the treaty formal rules. It should be noted that within each treaty, consensus agreement is generally sought but infrequently achieved in CITES and the ICRW.

	ICRW	CITES	CMS	CBD
Signed/Entry into force	Dec.1946 / Nov. 1948	March 1973 / July 1975	June 1979 / Nov. 1983	June 1992 / Dec. 1993
Member states	88	183	130	196
Core objective	Conservation of whale stocks and development of the whaling industry	Regulation of wildlife trade	Conservation of migratory species of wild animals	Conservation and sustainable use of biological diversity; fair and equitable sharing of the benefits arising out of the utilization of genetic resources
Species covered	Cetaceans	Wild animals and plants subject to international trade	Migratory species (Mammals, birds, reptiles, fish, and one insect)	Biodiversity in general – not species focused
Scope	Global	Global	Global	Global
Organization	Non-U.N. treaty	U.N. treaty	U.N. treaty	U.N. treaty
Frequency and duration of governing body meetings	Commission meeting every 2 years Duration: 3-10 days	COP meetings every 2-3 years Duration: >10 days	COP meetings every 3 years Duration: 5-7 days	COP meetings every 2 years Duration: >10 days
Voting procedure	Simple majority vote. Schedule amendments require three-fourths majority vote.	Simple majority vote on procedural matters. All other decisions two-thirds majority vote.	Every effort should be made to reach consensus. Two-thirds majority unless otherwise specified.	De facto consensus (no agreement on voting mechanism).

Treaty and document selection was based on a purposive, non-probability sampling method which is appropriate for intensive case studies attempting to research a particular phenomenon (Bernard et al., 2017), such as the one pursued here. Accordingly, the treaties and documents included in the analysis represent “the population of relevant [treaties and] texts” to answer the research questions (Krippendorff, 2013, p. 120). The resulting selection and endogeneity bias is mitigated by the IG coding which generates a variety of predictor variables (IG elements and rule classes), thereby increasing variation in the outcome variable (degree of robustness). The comparative research design which assesses formal rules against informal rule perceptions mitigates the endogeneity and potential omitted variable bias (King et al., 1994).

The total number of treaty texts included in the analysis was $n = 60$. Documents were selected based on five categories: (1) Foundational (convention texts and rules of procedure); (2) maintenance and amendment of core treaty governance features (e.g., changing species listings and the Convention texts); (3) financial and administrative; (4) organizational (governance of scientific and intersessional bodies); and (5) interpretation, implementation, and compliance. Appendix B provides details on treaty and document selection processes, including theories used to determine document categories, a treaty output comparison, and bias mitigation strategies.

1.1 Institutional grammar coding: Regulatory rules

This inquiry focuses on the regulatory rule structure of Controller K_t (Fig. 2.1) which outlines the actions that are permitted, required, or prohibited (Crawford & Ostrom, 1995; Ostrom, 2005). Coding formal regulatory documents with the institutional

grammar followed a multi-step process which is detailed in the updated IG coding manual (Basurto et al., 2018) (see also Appendix C).

In the IG, the unit of analysis is an institutional statement which in written texts equates to individual sentences. Depending on the structure of the grammar components—in particular, evidence of multiple DEONTICs or AIMs—a sentence may be further broken down into smaller statements before being parsed into their ABDICO syntax components:

- (1) ATTRIBUTE (the actor of the statement),
- (2) OBJECT (the entity that is the receiver of the action outlined in the AIM and executed by the ATTRIBUTE);
- (3) DEONTIC (an indicator as to the enforceability of a statement);
- (4) AIM (the verb of the sentence indicating the specific action an actor is to take);
- (5) CONDITIONS (WHAT, WHERE, HOW, AND WHEN the institutional statement is to occur); and
- (6) OR ELSE (outlines the consequence of noncompliance with the institutional statement)

(Ostrom, 2005; Siddiki, Christopher, et al., 2011).

Regulatory statements that include all six ABDICO components are considered true rules. Without the “OR ELSE” component, the statement is considered a norm; and if both the “OR ELSE” and the “DEONTIC” are missing, the statement is considered a shared strategy (Ostrom, 2005).

1.2 Coding strategy

1.2.1 Shared strategies

Since exploring the structure of Controller K_i is important to understanding decision-making feedbacks and robustness, the overarching coding strategy was to maintain the original statement with a minimum of modifications. This was, however, not

always feasible. The linguistic structure of treaty resolutions and decisions was a particularly vexing issue in which a desire to reflect the “true” rule structure conflicted with the need to facilitate the effective analysis of the coded data.

Treaty resolutions/decisions⁷ are designed as guidance/recommendations from the Conference of the Parties (COP) to the Parties and other entities within the treaty forum (Rajamani, 2016). They are adopted through voting mechanisms during regularly scheduled meetings. The linguistic structure of these resolutions/decisions sometimes followed the format: “Conference of the Parties urges Parties or other entities to do something”; or “Conference of the Parties directs the Secretariat/Scientific Council to do something”. In documents which included many of these statements, coding them “as is” would have resulted in a large number of shared strategies with identical ATTRIBUTES (e.g., “Conference of the Parties) and little variation in the AIMS, e.g., “encourages”, “recommends”, “urges”, “directs” would be the dominating. From a purist perspective, this might tell us something about the treaties’ syntax structure. This syntactic information would, however, be outweighed by a coding strategy that obscures the actual activities and interactions outlined in the statement. Illustrative examples of this phenomenon include:

13. INSTRUCTS the Secretariat to remind affected Parties explicitly of the reservations that will be rendered invalid, in time for the Parties to renew their reservations if they so desire;
(CITES, 2019 (1983) Res. Conf. 4.25).

⁷ Parties in the CBD record their decision-making as Decisions, not Resolutions. These Decisions meet the long-term guidance criteria outlined in the Resolutions of the other three treaties making it possible to cross-compare. For more information on treaty decision-making contexts, see Appendices A and B.

Coding option 1: From a purist perspective, this statement could be coded as a shared strategy:

[Conference of the Parties] [implied ATTRIBUTE] instructs [AIM] the Secretariat [OBJECT] to remind affected Parties of the reservations that will be rendered invalid [WHAT CONDITION] explicitly [HOW CONDITION] in time for the Parties to renew their reservations if they so desire [WHEN CONDITION].

Coding option 2: Applying the assumption that all resolutions represent COP guidance to various forum entities, one could also modify this shared strategy as a norm in order to code it as a more direct interaction:

Secretariat [ATTRIBUTE] [shall] [“INSTRUCTS” translates into the implied DEONTIC “shall” which legal scholars define as a legally binding obligation] remind [AIM] affected Parties [OBJECT] of the reservations that will be rendered invalid [WHAT CONDITION] explicitly [HOW CONDITION] in time for the Parties to renew their reservations if they so desire [WHEN CONDITION].

As the coding example outlines, the benefits of option 2 are three-fold. First, the modified norm retains the intent of the shared strategy but by moving the OBJECT “Secretariat” in the shared strategy (option 1) into the ATTRIBUTE position (option 2), the coded statement provides more detail on who should be taking action. Second, in the modified statement (option 2), the AIM more accurately reflects the type of action that is to be taken, e.g., “instruct” versus “remind”. Based on the AIM alone—without considering the context of the entire statement—option 1 would be coded as a choice rule typology, instead of an information rule which based on the described action is the more appropriate typology. Third, by restructuring the institutional statement, the coding

avoids “burying” key ATTRIBUTE actors, like the Secretariat, in the OBJECT field, and key OBJECT actors, like the Parties, in the WHAT condition. This is an important factor that will influence the ability to assess the decision-making structure of the coded data in any subsequent network analysis.

Based on the aforementioned, the adopted coding strategy in this research was *option 2*. The implied DEONTIC that was added to the modified norm was driven by the AIM of the original shared strategy. AIMS which asserted a legally-binding mandatory action (e.g. COP “directs”) were coded as implied DEONTIC “shall”. AIMS outlining a recommended action (e.g., COP “invites”) were coded as implied DEONTIC “should”. This AIM-DEONTIC translation followed legal scholars’ guidance on the legal obligation of the DEONTIC in an international treaty context (Bodansky, 2016; Rajamani, 2016).

1.2.2 Other coding modifications

Most other coding modifications were common features of the IG and followed the guidelines of the updated IG codebook (Basurto et al., 2018) (Appendix C), e.g., converting statements from passive to active voice, and coding statements that include multiple DEONTICs or AIMS. Appendix D provides details on the coding strategies used.

1.2.3 Rule typologies

Each institutional statement was only assigned one rule typology. In instances where more than one could have been coded, the rule typology order outlined in the

updated coding manual (Basurto et al., 2018, p. 7) (Appendix C) was consulted, and the highest-ranking rule typology was applied to the institutional statement. For example:

*...where the recommendations have been met, the Secretariat shall, **following consultation with the Chair of the Standing Committee**, notify the range States concerned that the species/country combination was removed from the review process...*

(CITES, 2002 (Rev. 2018) Resolution 12.8(1)(i) 2002)

The AIM “notify” signifies an information rule, and the WHEN condition “following consultation with the Chair of the Standing Committee” indicates a joint action, i.e., an aggregation rule. Since an aggregation rule has a higher ranking than an information rule (Basurto et al., 2018, p. 7) (Appendix C), this institutional statement was coded as an aggregation rule.

1.2.4 Intercoder reliability testing

Coding was tested under “test-retest” conditions in which the same texts were subjected to repeat coding reviews. Such “stability” testing represents a first step of establishing data reliability (Krippendorff, 2013, pp. 270-271). Subsequent intercoder reliability testing to establish higher data reliability and replicability of research findings was attempted but abandoned due to time constraints and difficulties finding/training a second coder familiar with the IG. As such, the reported research findings are useful to draw preliminary conclusions about the processes generated by the treaty regimes. However, further testing is warranted (and will be conducted at a later time) to ensure a higher degree of replicability and data validity.

2 Coding Results

Ideally, the regulatory rule structure of Controller K_t (Fig. 2.1) is designed to generate policy processes that modify existing behavior so that core policy objectives are maintained under varying conditions. The IG is perfect to explore these connections as it was developed to examine “the potentially cumulative manner in which institutional statements can affect individual expectations, [decision-making, and action]” (Ostrom, 2005, pp. 173-174). Parsing institutional statements can aid in determining (1) the regulatory rule design; (2) the likely policy feedbacks that are generated; and (3) the theoretical robustness of those feedbacks to complexity, disturbance, and stress (Anderies & Janssen, 2013).

Future research will expand this IG analysis to assess informal rule perceptions and treaties’ constitutive rule composition in order to provide a more holistic perspective of the policy processes generated by Controller K_t . The remainder of this section, however, will review the static rule syntax elements and its dynamic components *horizontally* via the IG rule classes, and *vertically* via the authoritative analysis levels. Section 4 will animate the identified design features to determine the feedbacks and theoretical robustness of the regulatory monitoring processes in the treaty texts before coming to a conclusion.

2.1 General syntactic composition

Raw counts of the coded institutional statements, as well as their percentage values, are outlined in the Data Table (Appendix E). The table is organized by treaty with the oldest treaty (ICRW) listed first, and the newest (CBD) listed last. Each column

represents an element of the IG syntax. There are two summary sections at the end of the Table (“Total institutional statement counts (All)” and “Percentage of totals (All)”) which restate treaty column totals for an at-a-glance comparison across regimes.

While the number of coded institutional statements varied, the percent distribution of constitutive and regulatory rules within each regime was consistent, reflecting a mix of about 75% regulatory to about 25% constitutive institutional statements (Figure 2.2). This means that on average three-quarters of the rule structure is needed to create and maintain the aspirations and objectives of the regimes that are outlined in the remaining one-quarter of the rules. Figure 2.3 confirms an overall governance-by-norms regulatory rule structure⁸ in all four treaties with none of the over 3,000 coded institutional statements including an OR ELSE. The absence of true rules is, however, not unique to the supra-national context, as few policy documents, regardless of governance scale, include true rules (Schlüter & Theesfeld, 2010; Siddiki, Christopher, et al., 2011; Carter et al., 2016). Shared strategies made up about 2% of the institutional statements, except in the CBD where they were around 1% (Appendix E; Fig. 2.3D). The occurrence of shared strategies (Data Table, Appendix E) (Fig. 2.3A-D) was influenced by the coding strategy, particularly in the CBD where Decisions often included statements that required restructuring into a norm with an implied DEONTIC. While this potentially inflated the occurrence of norms, even after removing all modified statements, norms prevailed, including in the CBD.

⁸For the remainder of this paper, any references to “rules” implies *regulatory* rules which are the subject of this analysis.

Figure 2.2

Pie charts visualizing the rounded percent distribution of coded institutional statements by treaty regime and syntax based on the coded data outlined in Data Table (Appendix E). Regulatory rules reflect about 75% of all coded institutional statements in each treaty, while 25% are dedicated to the constitutive rules that envision how the treaties ought to operate.

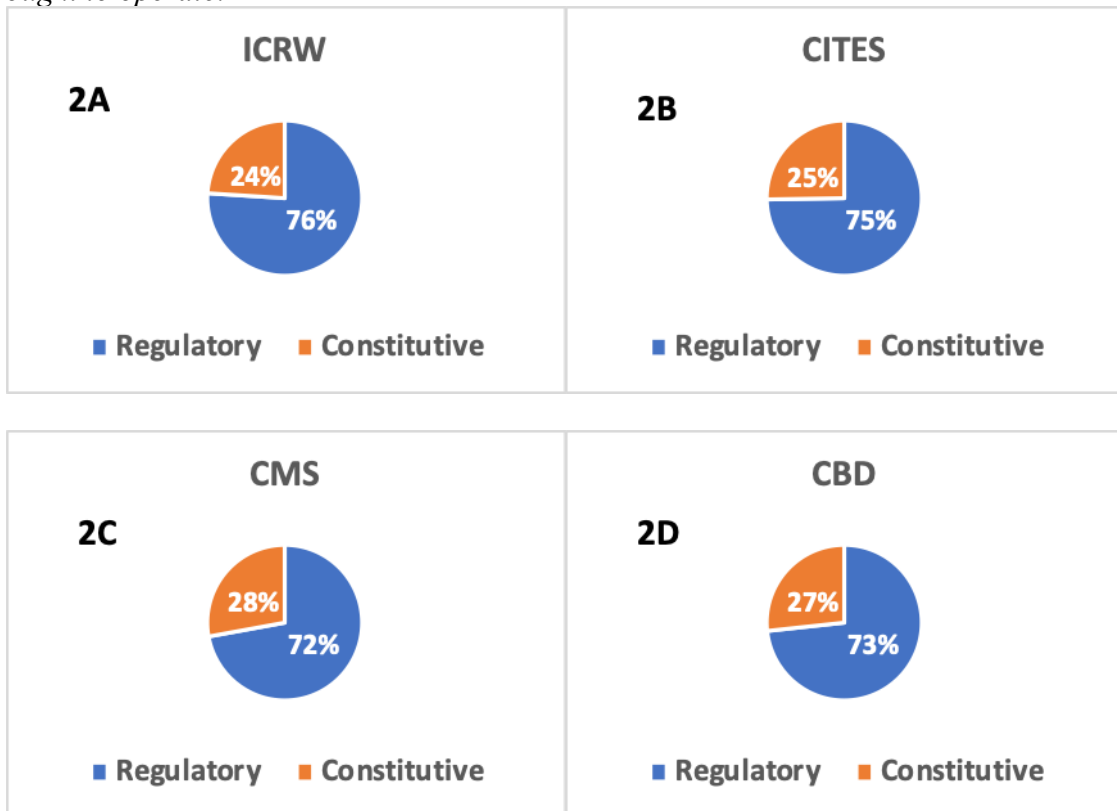
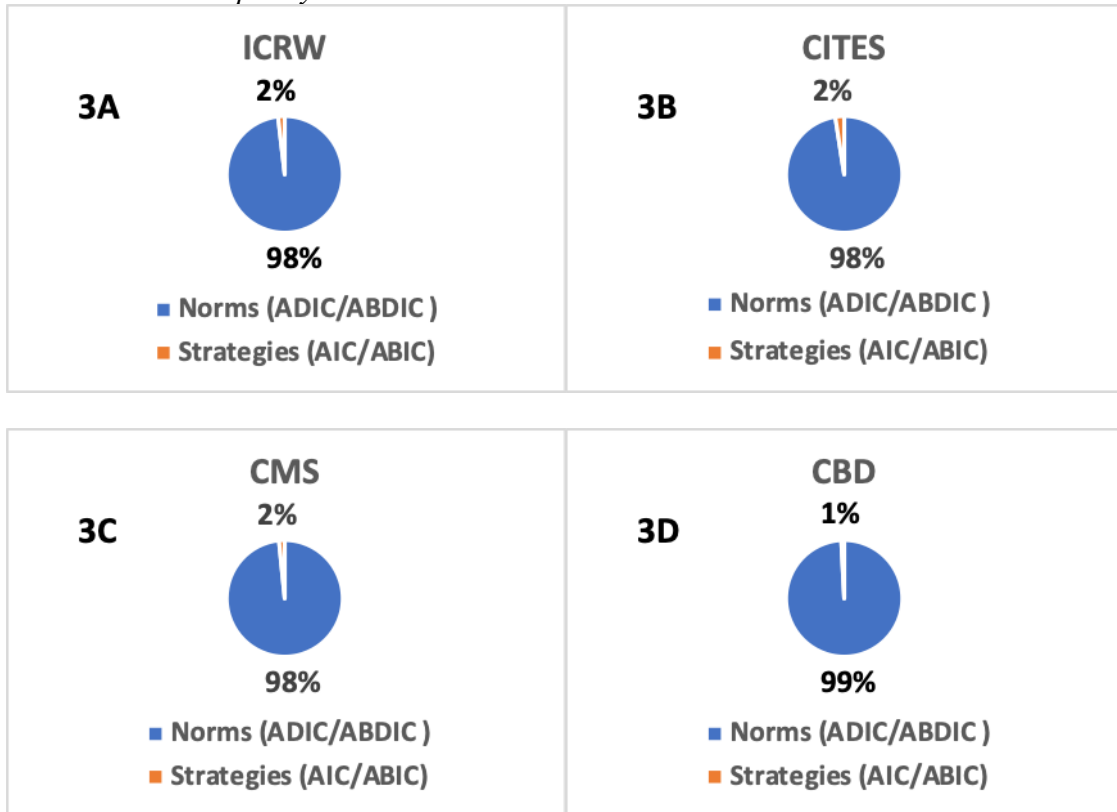


Figure 2.3

Pie charts visualizing the rounded percent distribution of norms and shared strategies by treaty regime based on coded institutional statements and coding strategy. The coded data reveal treaty governance by norms which is not unexpected and follows patterns observed in other policy documents.



The treaties were similarly structured across nearly all IG syntax elements, typologies and analysis levels. These were unexpected findings indicative of a general linguistic pattern utilized in treaty documents. However, due to a paucity of data for comparison, this cannot currently be verified. Exceptions were found in the coding of the DEONTIC structure, payoff, choice, and scope rules, as well as the levels of analysis where the ICRW rule syntax deviated from that of the U.N. treaties. These differences will be addressed in Section 4.

2.2 Deontic structure

Deontic operators outline the permissibility of a prescribed action as either permitted, prohibited, or required (Ostrom, 2005). The linkage between deontic operators used in treaty texts and their permissibility was determined by the language aspect of a treaty’s “legal character” (Rajamani, 2016, p. 343). DEONTICs “shall” and “must” create mandatory rights and obligations, “will” implies a promise or expectation, and “should” a recommendation (Bodansky, 2016; Rajamani, 2016) (D. Bodansky email communication March 8, 2017) (Table 2.2).

Table 2.2

Deontic operators and their legal obligation. (Adapted from Bodansky 2016; Rajamani 2016, D. Bodansky email communication March 8, 2017).

Deontic operator	Legal obligation
shall/shall not	mandatory (legally binding)
must/must not	mandatory (legally binding)
may/may not	permissive (legally binding)
will/will not	normative expectation (not a legal obligation - somewhere between shall and should)
should/should not	recommendation (not legally binding)

Institutional statements with “shall” or “must” DEONTIC operators impose a greater commitment on the target actor than statements containing a “should”. Since foundational documents (Convention texts, rules of procedure) are deemed to be legally binding, they should include a higher percentage of mandatory, legally-binding DEONTICs than the recommendations/guidelines outlined in resolutions/decisions (Bodansky, 2016; Rajamani, 2016; Mitchell, 2020). The coded data (Appendix E, columns I-M) appears to follow that logic with all treaties exhibiting the greatest percentage of institutional statements in the mandatory legally-binding category (DEONTICs “shall” and “must”) (Figs. 4A-7A). However, this was based on an analysis

of all documents lumped together (foundational and resolutions/decisions) requiring a split analysis by document type to distinguish their respective DEONTIC structures. Doing so, indeed, revealed a majority of the statements in the foundational documents imposed legally-binding obligations on the Parties, whereas resolutions/decisions predominantly utilized recommendations (Figs 4B-7B; 4C-7C). This was true across all treaties but, in particular, in the CBD which exhibited a textbook version of that pattern (Figs. 7B-C).

Split-coding the DEONTICs by document type also revealed resolutions with a DEONTIC structure that conflicts with their reported/perceived intent as legislative guidance. Resolutions/decisions dealing with crucial governance aspects, like compliance and financial commitments, hold Parties to a higher obligation than generally is assumed, thus, demonstrating that underneath the simplified division between foundational texts and resolutions lies a greater complexity in which some guidance is more mandatory than others (see Appendix F for further details on syntactic structure and deontic split-coding details).

Figure 2.4

Pie charts depicting the lumped DEONTIC structure of the ICRW, including institutional statements in **all** documents (Fig. 2.4A). Fig. 2.4B reflects the ICRW DEONTIC structure isolated in the foundational documents; and Fig. 2.4C reflects the distribution of the DEONTIC in the ICRW resolutions only.

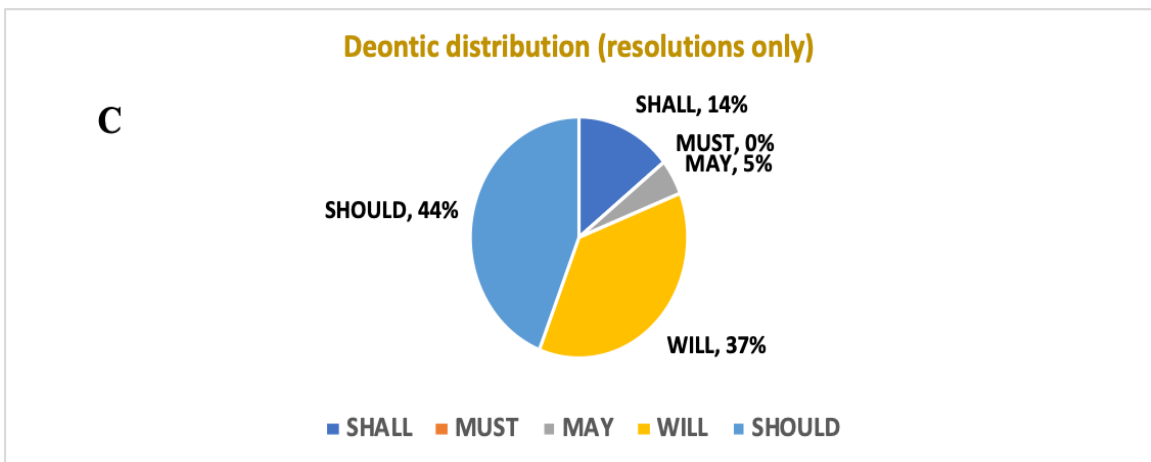
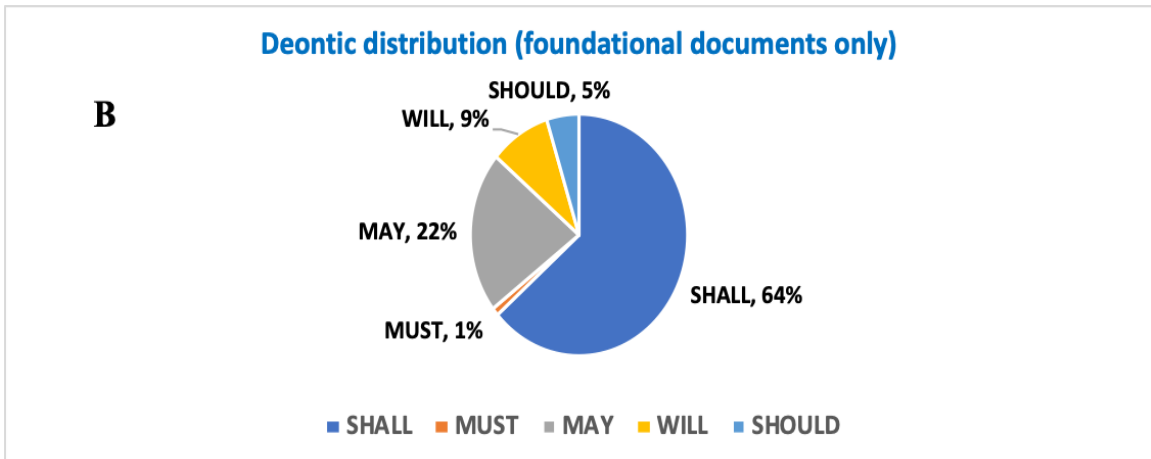
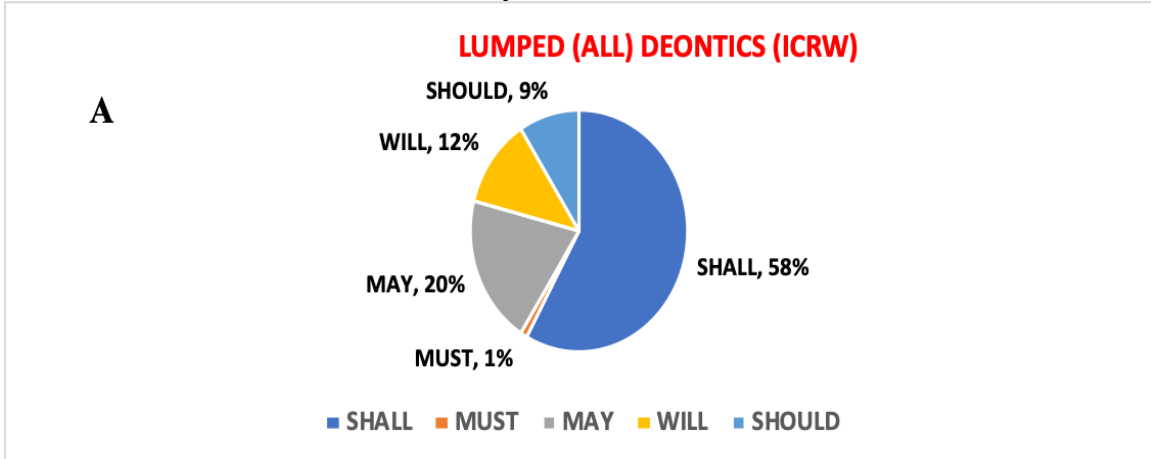


Figure 2.5

Pie charts depicting the lumped DEONTIC structure of the CITES, including institutional statements in **all** documents (Fig. 2.5A). Fig. 2.5B reflects the CITES DEONTIC structure isolated in the foundational documents; and Fig. 2.5C reflects the distribution of the DEONTIC in the CITES resolutions only.

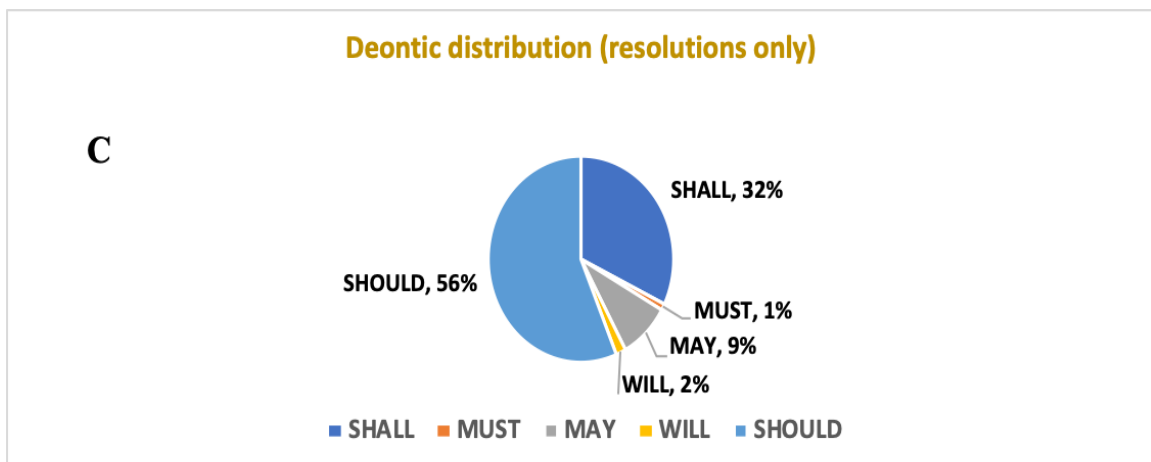
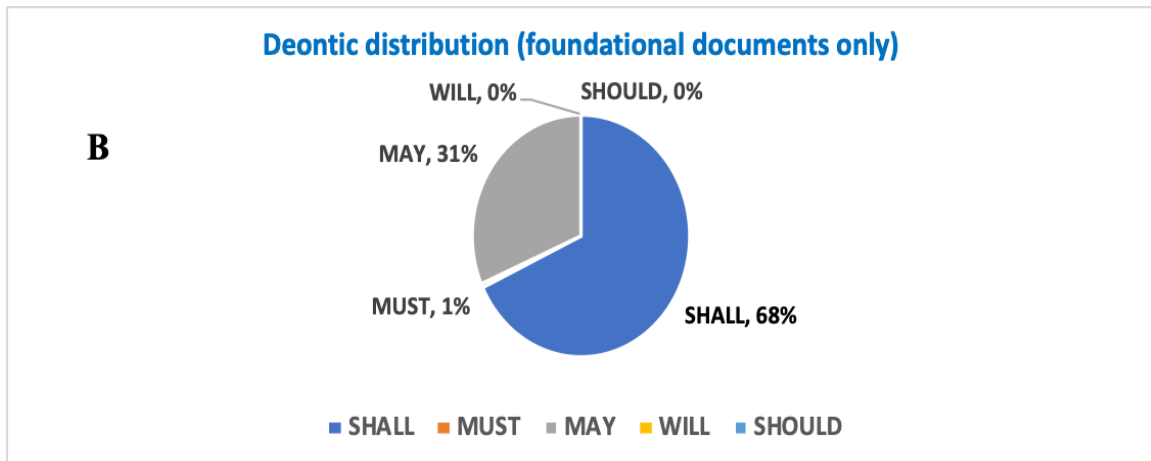
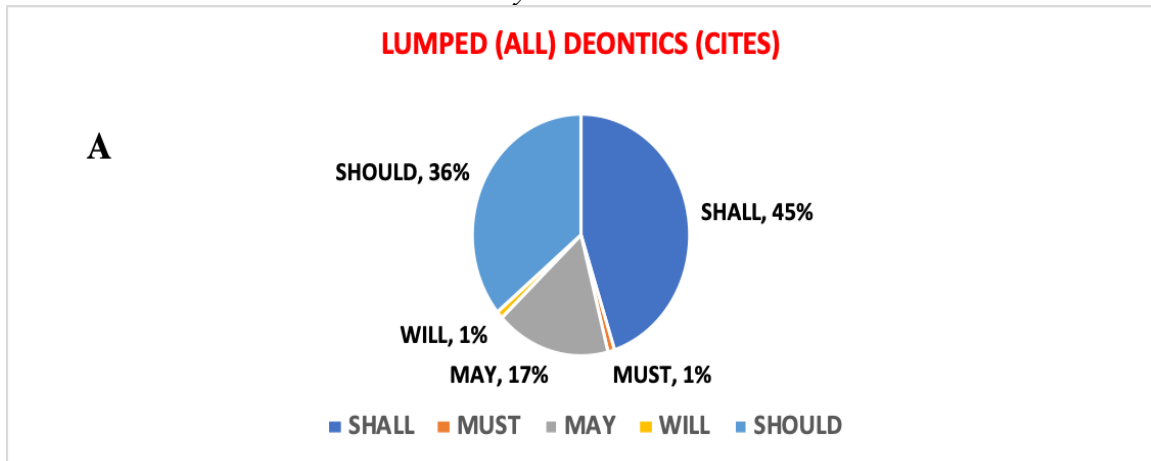


Figure 2.6

Pie charts depicting the lumped DEONTIC structure of the CMS, including institutional statements in **all** documents (Fig. 2.6A). Fig. 2.6B reflects the CMS DEONTIC structure isolated in the foundational documents; and Fig. 2.6C reflects the distribution of the DEONTIC in the CMS resolutions only.

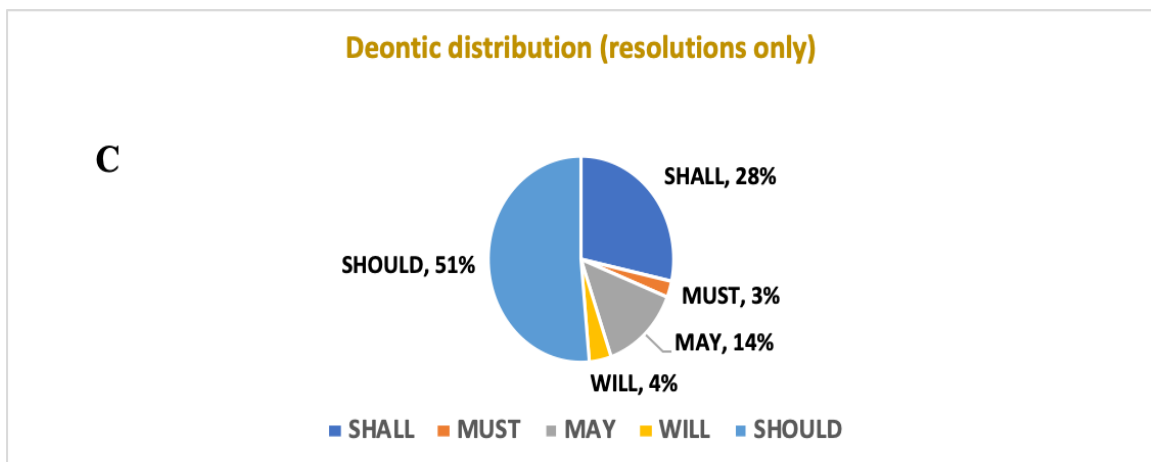
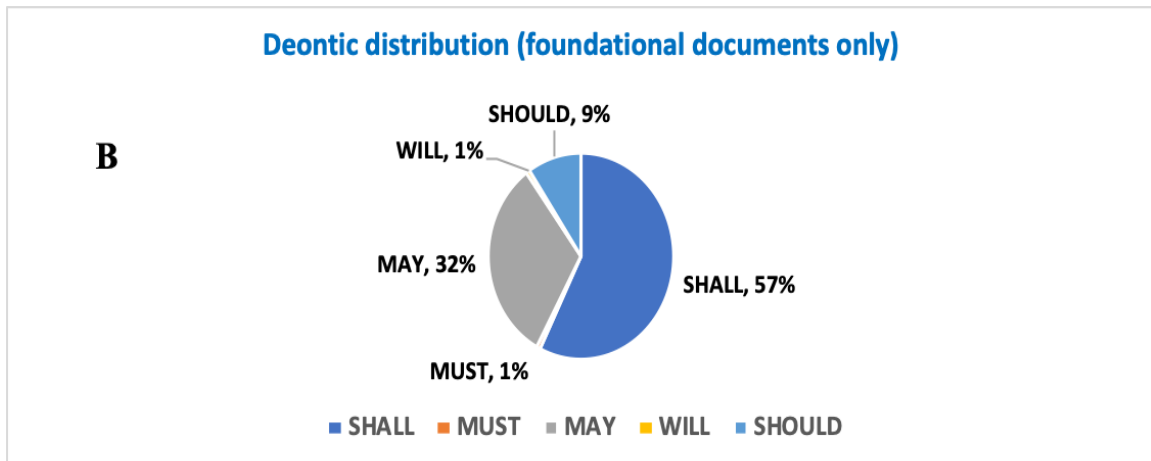
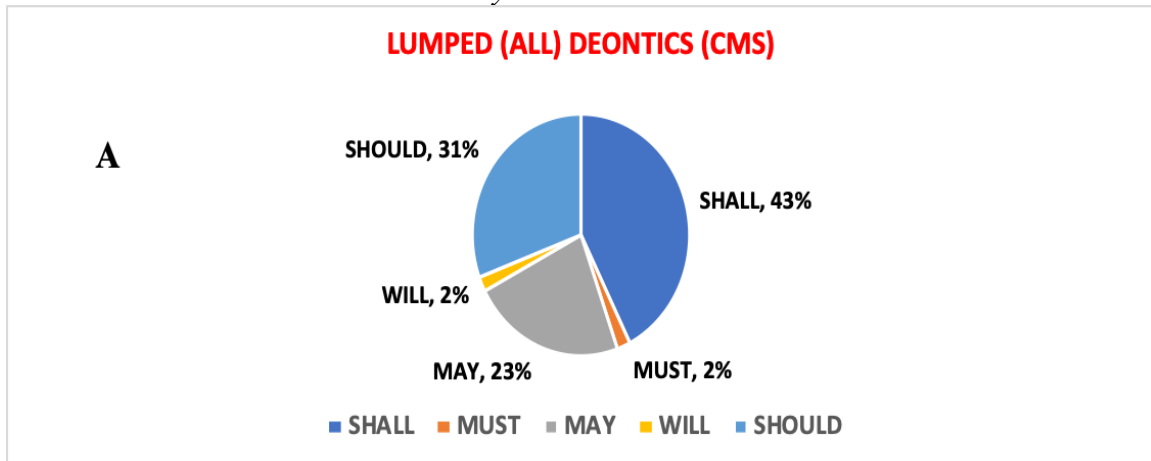
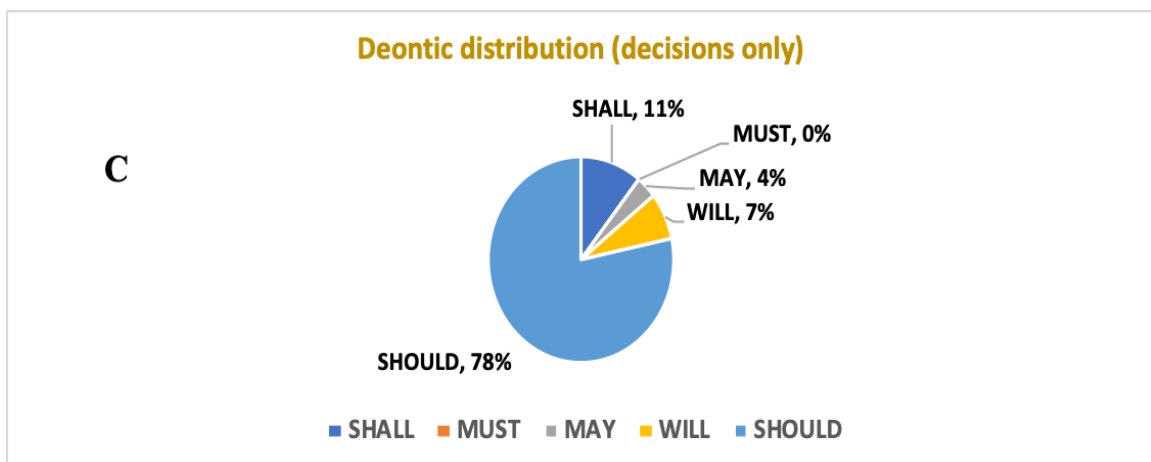
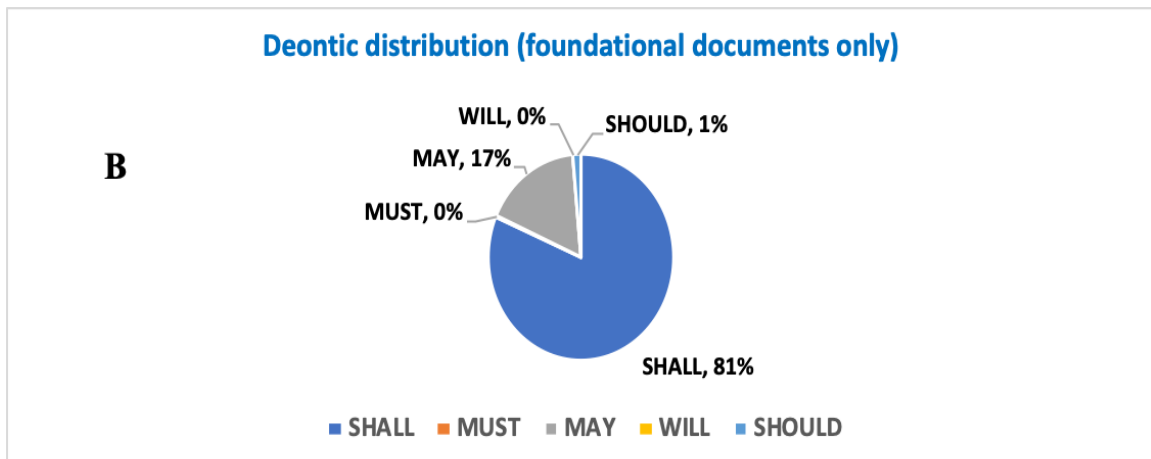
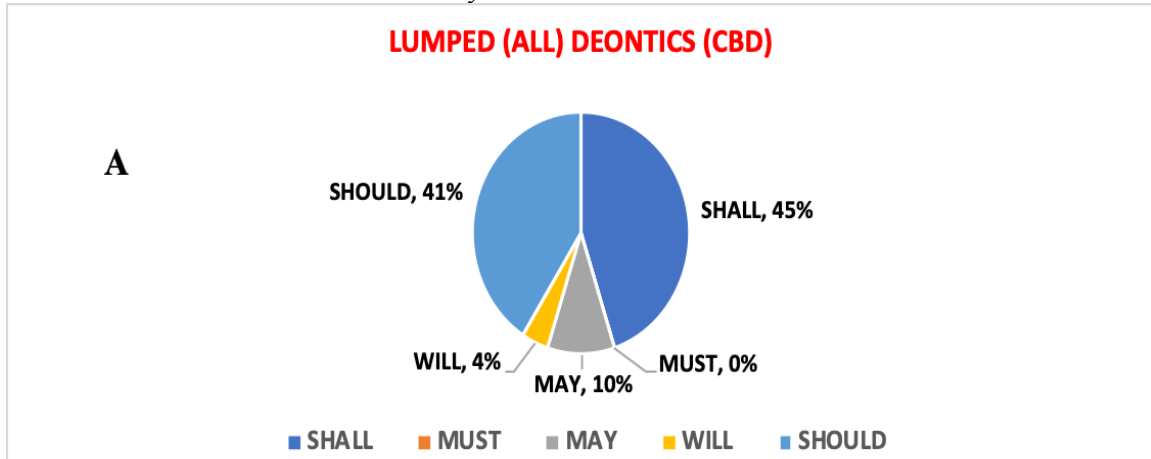


Figure 2.7

Pie charts depicting the lumped DEONTIC structure of the CBD, including institutional statements in all documents (Fig. 2.7A). Fig. 2.7B reflects the CBD DEONTIC structure isolated in the foundational documents; and Fig. 2.7C reflects the distribution of the DEONTIC in the CBD decisions only.



While the split-coding confirmed the distinction in DEONTIC obligations by document type, it did not account for the influence of “watered-down” AIMS and WHEN conditions, such as “endeavor to” and “as far as possible and as appropriate”, which tend to reduce a legally binding “shall” action to a recommended/desired “should” outcome (see Appendix F for details). Analyzing the co-occurrence of watered-down AIMS and WHEN conditions with mandatory, legally-binding DEONTIC operators (“shall” and “must”) helped clarify remaining syntactic inconsistencies, like the textbook performance of CBD. It also revealed CITES and the ICRW as more regulatory treaties with a high degree of mandatory, legally binding commitments on their Parties (Nagtzaam, 2009; Bowman et al., 2010), CMS with a medium degree (Baldwin, 2011), and CBD as the treaty with a weak degree of mandatory legally binding commitments (Harrop & Pritchard, 2011) (Table 2.3) (see Appendix F for further details).

Table 2.3

Effect of watered-down DEONTICS on the degree of legal commitment of a treaty structure. The occurrence of DEONTICS “shall” and “must” in the coded formal documents (number and percentages of coded statements) is coupled with the occurrence of “watering-down” AIMS and WHEN conditions to determine their theoretical effect on the mandatory, legally-binding nature of affected treaty commitments. The highest occurrence of watered-down DEONTICS was in CBD, the lowest in CITES. Using these two percentage values as high and low cut-offs, the scale of strong to weakly regulatory was set from 0 (no occurrence of watered-down DEONTICS = strongly regulatory) to 7 (high occurrence of watered-down DEONTICS = weakly regulatory). Dividing 7 through 3, the cut-off for the strong, medium, weak regulatory range was set at approx. 2.3%, thus providing the ranking scheme outlined above. 0% to 2.3% = strong degree of legal commitment; 2.4% to 4.6% = medium degree of legal commitment; and 4.7% to 7% = weak degree of legal commitment.

	ICRW	CITES	CMS	CBD
Shall/must statements (number of coded institutional statements)	442	488	276	390
Percentage shall/must (total coded institutional statements)	59%	46%	45%	45%
Number of watered-down Deontics affecting shall/must statements	6	3	10	26
Percentage watered-down	1.36%	0.61%	3.62%	6.67%
Regulatory ranking strong (0-2.3%); medium (2.4-4.6%); weak (4.7-7.0%)	strong	strong	medium	weak

2.3 Condition structure

The CONDITION portion of an institutional statement outlines the constraints on the action that is to be taken by the ATTRIBUTE/actor. In the past, the CONDITION was coded as one element in which all constraints were lumped together (Crawford &

Ostrom, 1995; Ostrom, 2005). The parsing of CONDITIONS into WHAT, WHERE, HOW, and WHEN components is a new contribution to the IG with little practical application thus far, although it is outlined in the updated IG coding manual (Basurto et al., 2018) (Appendix C).

The key takeaways from the CONDITION coding were that **WHAT** conditions (43-47% occurrence) (Appendix E) were useful to dissect densely packed institutional statements with multiple CONDITIONS. **HOW** conditions (18-23% occurrence) identified how particular joint actions are to be achieved (e.g., voting by consensus) and/or how other actors are connected to the ATTRIBUTE and OBJECT in the decision-making process; issues relevant to future network analysis. **WHEN** conditions (31-38% occurrence) are indicators of rule consistency and compliance, as they indicate next steps that are required to be taken once a particular temporal or trigger event is reached. Despite arguments that some of the institutional design principles (DPs) are not useful in anarchy (Stern, 2011; Araral, 2014), the **WHERE** condition (1-2% occurrence) proved to be an indicator of the boundary DP (DP1) by identifying specific whaling and in-situ/ex-situ conservation sites, as well as areas designated for delegations and observers at CITES meetings. Further details on the CONDITION coding, including relevant coding examples, are outlined in Appendix F.

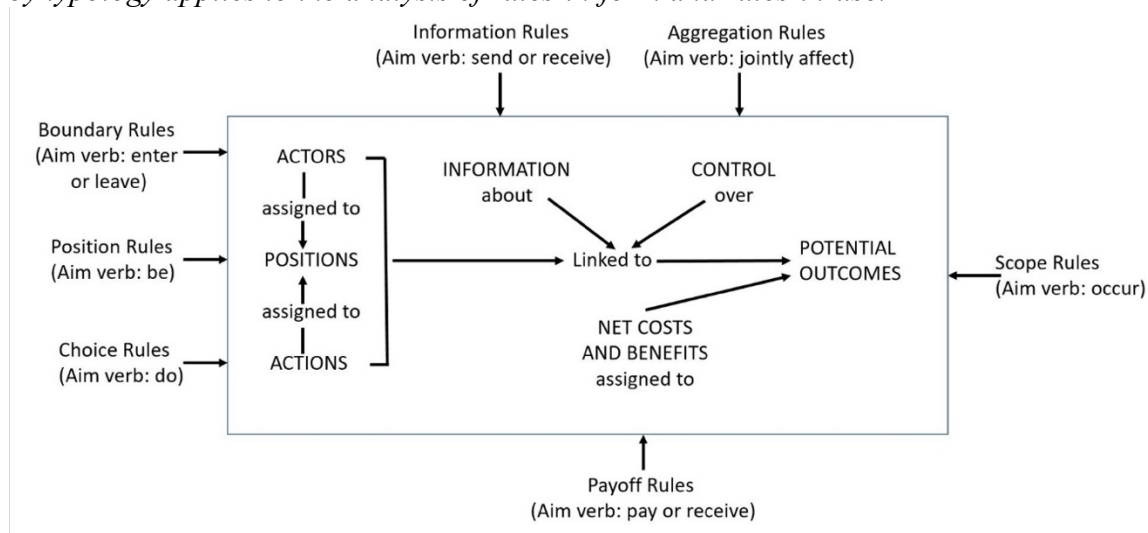
2.4 Rule typology (horizontal rule structure)

By dissecting the syntax of the selected treaty rules, we have learned that their static components are similarly structured across regimes but for the degree of legally-

binding commitments imposed on member States which separates the treaties into strong, medium, and weakly regulatory regimes. The next step is to determine how these static components combine/interact to generate policy processes. This is done by linking the AIM of institutional statements to the logic of the Institutional Analysis and Development (IAD) framework (Ostrom, 2005) in order to identify one of the seven rule classes that affect elements within an action situation *horizontally*. Fig. 2.8 illustrates this connection based on a generic action situation in which the general AIM verb “enter” would indicate, e.g., a boundary rule that assesses the eligibility of actors to become monitors.

Figure 2.8

Analyzing rule structures horizontally by rule typology in an action situation, including matching AIM verbs (adapted from (Ostrom, 2005, p. 189). Horizontal rule classification by typology applies to the analysis of rules-in-form and rules-in-use.



The Data Table (Appendix E) (columns X-AD) outlines the number of coded institutional statements by rule typology (or class), treaty regime, and document. Again, the distribution of rule typologies across treaty regimes was very consistent (Figs 9A-D).

The main outlier was the ICRW which exhibited an unusually high percentage of payoff rules, and utilized choice and scope rules less frequently than the U.N. treaties. The remainder of this section will briefly review each rule typology, and its potential contribution to the treaty policy process (see Appendices G and H for supplemental coding guidelines, typology coding details and examples).

2.4.1 Position rules (*Basic AIM verb: “be” | Regulated component: positions*)

Although rare (1-2% occurrence in the treaty texts), position rules are foundational to the structure of an action situation since they establish the set of positions/entities “that are to be filled with participants...” (Ostrom, 2005, p. 193), and the “number of individuals that can occupy [that] position” (Basurto et al., 2018, p. 19) (Appendix C). Once established, positions can be assigned rights and duties which link them to specific action situations. For example, the position rule establishing a whaling inspector is linked to boundary and information rules outlining inspector qualifications and their reporting duties (IWC, 2018).

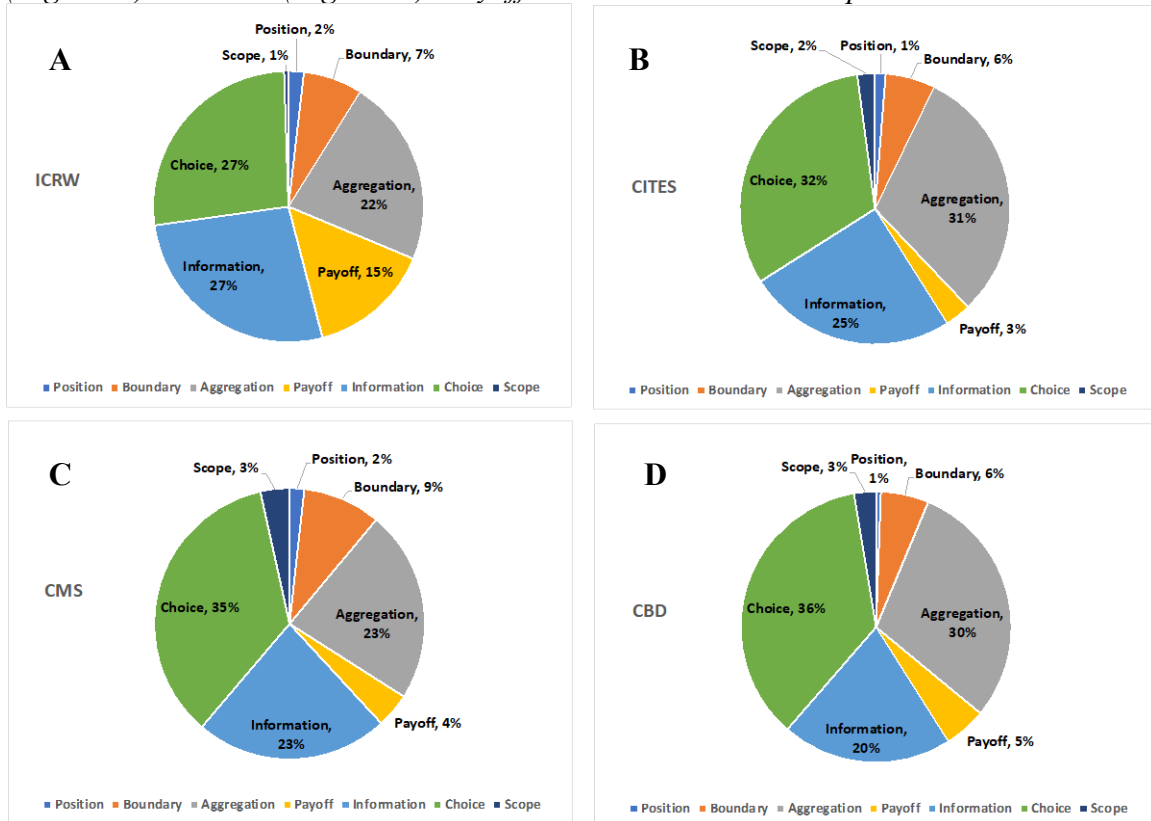
2.4.2 Boundary rules (*Basic AIM verbs: “enter” or “leave” | Regulated component: participant*)

Boundary rules (6-9% occurrence) detail the eligibility requirements, constraints, and specific processes to enter and exit positions (Ostrom, 2005, p. 194; Basurto et al., 2018). They fulfill a gatekeeper function in which carefully crafted entry requirements ensure equal access by qualified individuals to certain positions. Exit requirements should prevent power grabs and facilitate the removal of corrupt or incompetent individuals.

Opt-out clauses represent treaty-specific boundary rules as they allow Parties to change their status to a non-Party with regard to the species under reservation/objection, thus, effectively “delineat[ing] the requirement for [partial exit]” (Basurto et al., 2018, p. 19). Boundary rules link with position and information rules that outline, e.g., opt-out notification requirements.

Figure 2.9

Pie charts depicting the rounded percentage distribution of the regulatory rule typology by treaty regime. Rule typology distribution is again very similar with the ICRW (Fig. 2.9A) and CMS (Fig. 2.9C) rule structures focusing less on aggregation rules than CITES (Fig. 2.9B) and CBD (Fig. 2.9D). Payoff rules however are more prevalent in the ICRW.



2.4.3 Aggregation rules (Basic AIM verb: “jointly affect” | Regulated component: actions)

Aggregation rules (22-31% occurrence) describe how participants are related in decision-making processes. They also outline the diversity of agents and connections in a system and, therefore, represent indicators of robust institutional design. Since most Commission/COP decision-making is conducted collectively, voting and review mechanisms were coded as aggregation rules and often connected to information and choice rules that share voting results and outline further actions that can be taken, e.g., opt-outs.

2.4.4 Payoff rules (Basic AIM verbs: “pay” or “receive” | Regulated component: costs/benefits)

Payoff rules “assign external rewards or sanctions to particular actions... or outcomes” (Ostrom, 2005, p. 207). Sanctioning measures related to implementation issues at the operational level and, less frequently, for Party noncompliance at the collective choice level represent treaty payoff rules, as well as processes related to financial contributions, e.g., Parties’ mandatory and voluntary contributions to the Conventions. They can be linked with information rules outlining reporting requirements of domestic prosecutions or choice rules that describe additional actions to be taken when paying financial contributions. The occurrence rate of payoff rules was about 3-5% in the U.N. treaties, and 15% in the ICRW.

2.4.5 Information rules (Basic AIM verbs: “send” or “receive” | Regulated component: information)

Information rules (20-27% occurrence) outline monitoring, information sharing, and reporting mechanisms which give the actors insights into the “overall structure of the [action] situation”, the status of the resource that is being governed, and the past and present moves or decision-making context of other actors in the system (Ostrom, 2005, p. 206). This not only creates the basis for informed collective decision-making, but it also facilitates knowledge as to who is trustworthy and who is not (Ostrom, 2005). In the treaty context, information rules that require CITES’ Parties to transmit annual species trade data are often coupled with aggregation rules providing the COP with review/oversight authority (CITES, 1973).

2.4.6 Choice rules (Basic AIM verb: “do” | Regulated component: control)

Choice rules (27-36% occurrence) take on a catch-all category in which institutional statements that involve actions and cannot otherwise be assigned to a rule class are coded as choice rules (Ostrom, 2005; Basurto et al., 2018). By defining the range of actions that actors can take, choice rules also affect and distribute the “basic rights, duties, liberties and exposures of [participants]”, thus influencing equitable decision-making mechanisms (Ostrom, 2005). For example, the CBD choice rule that Parties shall “support local populations to develop... remedial action in degraded areas” (CBD, 1992) which would be well-matched with aggregation rules that assign control for distributing such support to an appropriate entity/actor.

2.4.7 Scope rules (Basic AIM verb: “occur” | Regulated component: outcome)

In contrast to the other eight rule classes which are action focused, scope rules identify desired, prohibited, or required outcome measures (Basurto, et al. 2018, p. 21) (Appendix C) (1-3% occurrence). Scope rules affect behavior change by directing actors to meet a specific target (Ostrom, 2005) and by identifying policy process outcomes, e.g., at the national level, CITES requires Parties to ensure “living specimens are properly cared for during any period of transit... to minimize risk of injury, damage to health, or cruel treatment” (CITES, 1973). While scope rules do not dictate how Parties go about ensuring that goal, paired choice/aggregation rules often recommend actions and assign authority, e.g., to the Management Authority for the handling of wildlife specimens.

2.5 Levels of analysis (vertical rule structure)

Analyzing rule structures *vertically* means determining whether the hierarchical relationships that institutional statements create are authoritative (constitutional or collective choice levels) or govern day-to-day activities (operational level). At the *operational* level rules outline proscriptive or prescriptive choices, decisions result in actions, and the output is an action (Carter, 2017). In the treaty context, operational rules outline, e.g., reporting and notification activities.

The *collective choice* level of analysis outlines rule making, rule changing, monitoring, and enforcement behavior. Here authoritative decisions are made (usually collectively) that influence the choices of others at the operational level by generating constraints in the form of a rule or process (Carter, 2017) (S. Siddiki, personal

communication March 31, 2020), e.g., the adoption of resolutions by the Commission/COP.

Constitutional choice rules represent the supra-authority that sets the rules for the managers/policymakers at the collective choice level. In the treaty context, constitutional choice rules establish the Convention itself, e.g., “[h]aving decided to conclude a convention to provide for the proper conservation of whale stocks” (ICRW, 1946). They can also express the ethical values of the framers of Convention texts. Constitutional choice rules are rare, and there were no regulatory rules at this analysis levels (only constitutive rules which will be discussed in a separate publication).

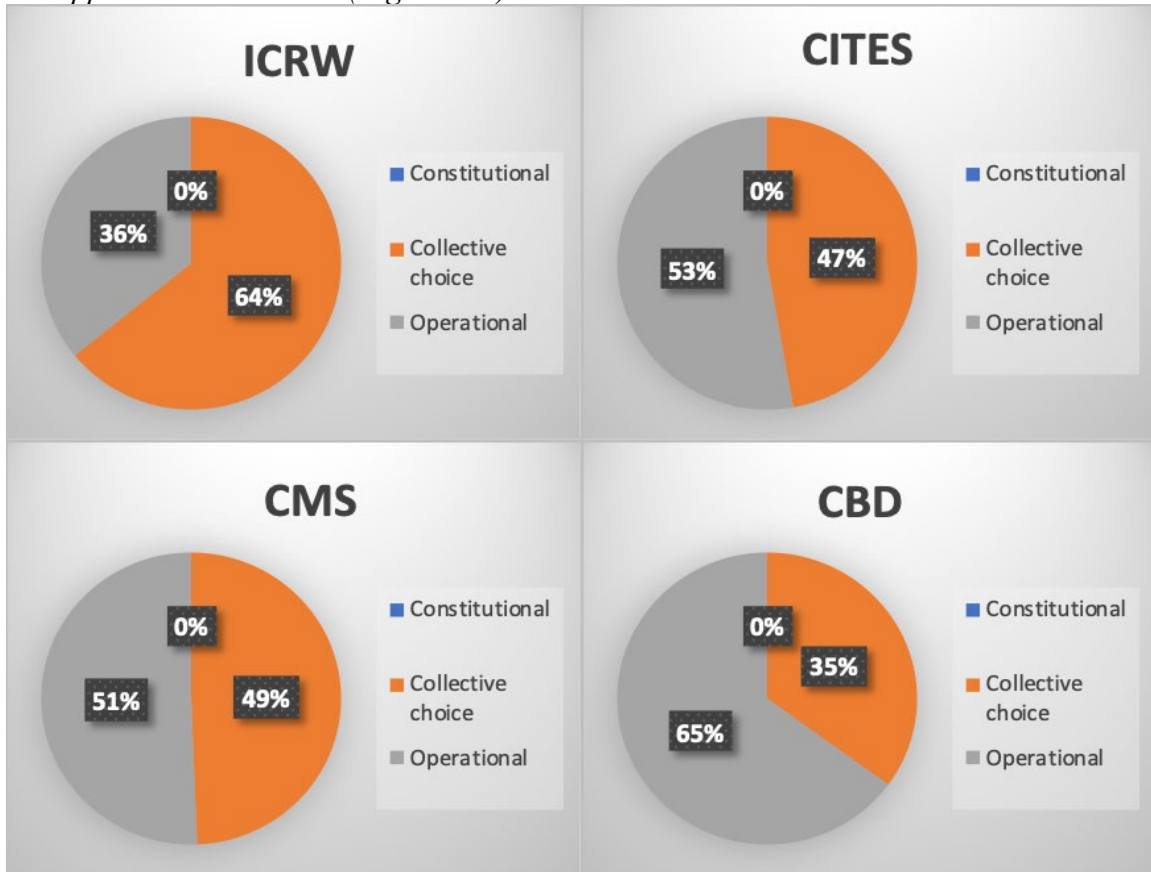
An overview of the hierarchical decision-making by treaty regime (Fig. 2.10) reflects that the ICRW consolidates its decision-making mainly at the collective choice level (64% of coded institutional statements). This sets it apart from the U.N. treaties, in particular the CBD where the levels are mirror opposite (65% coded at the operational level).

Coding rules vertically facilitates an in-depth analysis of the hierarchical decision-making processes generated by Controller K_t's “software”. It complements the horizontal one by analyzing how the rule classes generated in individual institutional statements connect and interact across levels of authority. Using the example of monitoring, a horizontal rule analysis examines how, e.g., aggregation and choice rules configure at one analysis level to create a monitoring mechanism. A vertical analysis reviews how these monitoring mechanisms couple with payoff and information rules across authority levels.

This information is useful to determine how policy processes flow and how that may affect governance robustness.

Figure 2.10

Pie charts depicting the rounded percentage distribution of coded regulatory institutional statements by levels of analysis for each treaty regime. Note: The ICRW levels of analysis are opposite to the CBD's (Fig. 2.10D).



3 Discussion

3.1 Static components of the IG syntax

One of the original intentions of the IG was to rigorously examine the difference between true rules and “attributes of the community”, i.e., their norms and shared

strategies (Ostrom, 2005, p. 138). Ostrom hypothesized that the IG would aid in determining “when strategies or norms evolve into rules and why” (2005, p. 138). Shared strategies are also thought to aid cooperation among actors by establishing expectations about the behavior and actions of others, whereas norms ascribe legal commitment and information on right/wrong actions (Siddiki et al., 2019). The norms and shared strategies in the treaty texts neither indicated an underlying process of evolution to “true rules”, nor did the distinction between norms and shared strategies seem to be anything other than a linguistic choice and/or perhaps based on administrative procedures (in the case of the CBD). Expectations and coordination activities in all four treaties were established both through the DEONTIC operator as part of a norm and, to a lesser extent, via shared strategies. It is also difficult to determine whether norms and shared strategies outlined in the treaties represent what Ostrom defines as “attributes of the [global conservation] community (Ostrom, 2005, p. 138). A determination of the fit between the internal (formal constitutive and regulatory) rules and how they are perceived would provide a better indicator of any shared understanding and will be addressed in a subsequent paper.

Although the DEONTIC structure at first seemed to indicate a similar distribution of legally-binding mandatory statements in all four regimes, the watering down effect of AIMS and WHEN conditions made the degree of legal commitment on the Parties to the CBD and CMS much weaker than in CITES and the ICRW. Although further research is needed, this pattern seems to indicate an evolution away from treaties that are more

“regulatory” to regimes with more amorphously defined recommendations, like the CMS and CBD.

Split-coding the DEONTICs by document type revealed resolutions with a DEONTIC structure that seems counter-intuitive to their reported/perceived intent as legislative guidance indicating that underneath the simplified division between foundational texts and resolutions lies a greater complexity in which some guidance is more mandatory than others.

Parsing the IG CONDITION into sub-conditions: WHAT, WHERE, HOW, and WHEN provided information on the linguistic complexity of the formal treaty documents (WHAT condition), an indication of the presence of design principle 1 (user and resource boundaries) (WHERE condition), and information on the joint decision-making processes and activities (HOW condition). The trigger events and temporal qualifiers described in WHEN conditions were useful indicators of rule consistency and compliance.

3.2 Monitoring mechanisms by rule typology configurations

The remainder of this paper will utilize the information gleaned from the coding of the foundational Convention⁹ texts to determine the likely policy processes that the regulatory “software” might generate, and its potential impact on the governance system’s sensitivity to shocks and disturbance. The focus was on the monitoring mechanisms outlined in the Convention, including related enforcement (sanctioning) and

⁹ Convention references the foundational document that established each treaty regime.

reporting/information sharing requirements. The review will assess these coupled mechanisms by rule typology configurations and across analysis levels.

Treaty monitoring mechanisms were defined based on the reformulated institutional design principles DP4 monitoring which included related reporting and information sharing requirements and DP 5 enforcement; (Ostrom, 1990; Cox et al., 2010). DP4 (monitoring) was expanded to include three aspects: (1) monitoring the resource (DP4A); (2) monitoring appropriation (i.e., the direct killing or taking of animals, as well as habitat destruction) (DP4B); and (3) monitoring the monitors (DP4C) (Ostrom, 1990; Cox et al., 2010 Table 3). Given the global reach of the regimes, all three aspects of DP4 should be conducted at multiple levels by multiple actors in the respective regimes.

Common-pool resource (CPR) scholars have found that when DP4C (monitoring the monitors), graduated sanctions (DP5) and congruence between costs and benefits (DP2), are missing, CPR systems are more likely to be unsuccessful (Baggio et al., 2016). Legal and international relations experts also find monitoring mechanisms key to the effectiveness of international conservation agreements by ensuring that (1) legal commitments are upheld; and (2) treaty objectives are met (Vogel & Kessler, 1998). Collecting and sharing data on Party compliance and conservation efforts also increases transparency, trust, and reciprocity in action, if monitoring data can easily be verified and “policed” by others (Young, 1994). Monitoring should also provide information on the level of cooperation by other countries. This provides assurance to the Parties that

noncompliance will be detected (Bodansky, 2010), thereby, increasing the risk of exposure to Parties not abiding by their commitments and making state commitment more credible and valuable (Keohane et al., 1994). In essence, monitoring makes the “Faustian bargain” of giving an international regime the authority to coerce standardized behavior and action more palatable to policymakers (Ostrom, 2005, p. 21).

Fig. 2.11 compares the general structure of monitoring mechanisms across treaty regimes as outlined in the Conventions. The number of actors tasked with monitoring, enforcement, and reporting/information sharing responsibilities varies among treaties (dark blue bar), with the ICRW and CBD each utilizing three entities in such activities versus six in CITES. The ICRW utilizes the highest number of rule classes to organize its activities (4 classes; gray bar); while the design principle configurations are the same across treaties (4 configurations; yellow bar), except in the CBD which utilizes only 3 DPs. Monitoring mechanisms in CITES and CMS, the two wildlife conservation treaties, are structured similarly. Although the ICRW and CBD utilize the same number of statements to organize their respective monitoring mechanisms (13 statements), in the CBD that number represents a much small fraction of the Convention’s overall institutional statements (5.3%) compared to the ICRW (22.41%).

Figure 2.11

Monitoring mechanism comparison across treaty regimes based on the analysis of the treaty Conventions only. Graph outlines the number of actors involved in monitoring; the number of coded statements; number of rule classes involved; design principle configurations; and levels of analysis. Note: the total number of regulatory institutional statements in each Convention are: 58 (ICRW); 158 (CITES); 134 (CMS); and 246 (CBD) (Appendix E).

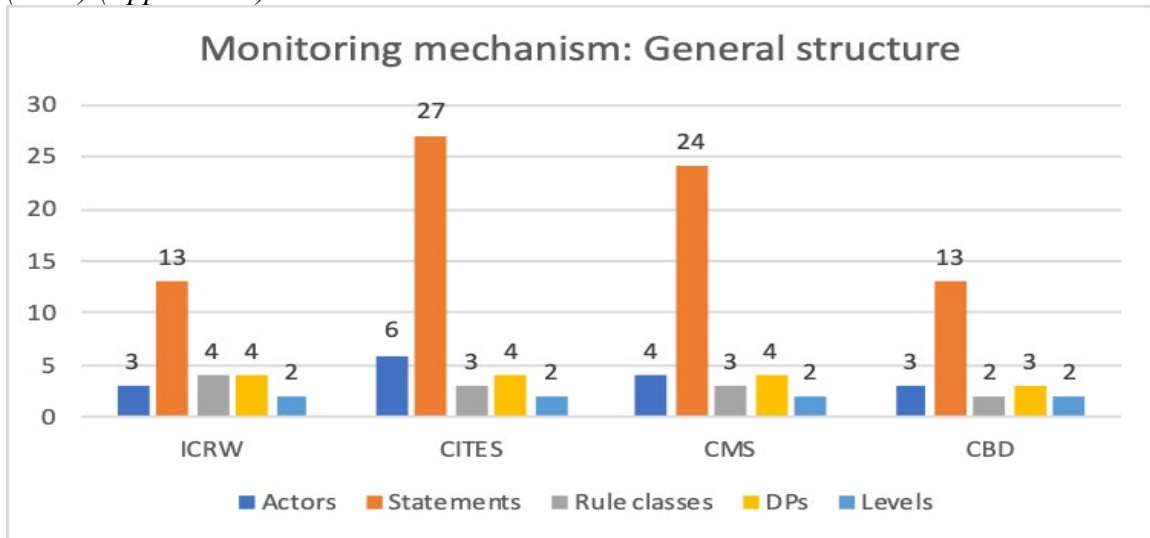


Figure 2.12

Comparison of monitoring mechanisms across treaty regimes based on rule typologies involved in structuring monitoring, enforcement, and reporting responsibilities within the Convention texts.

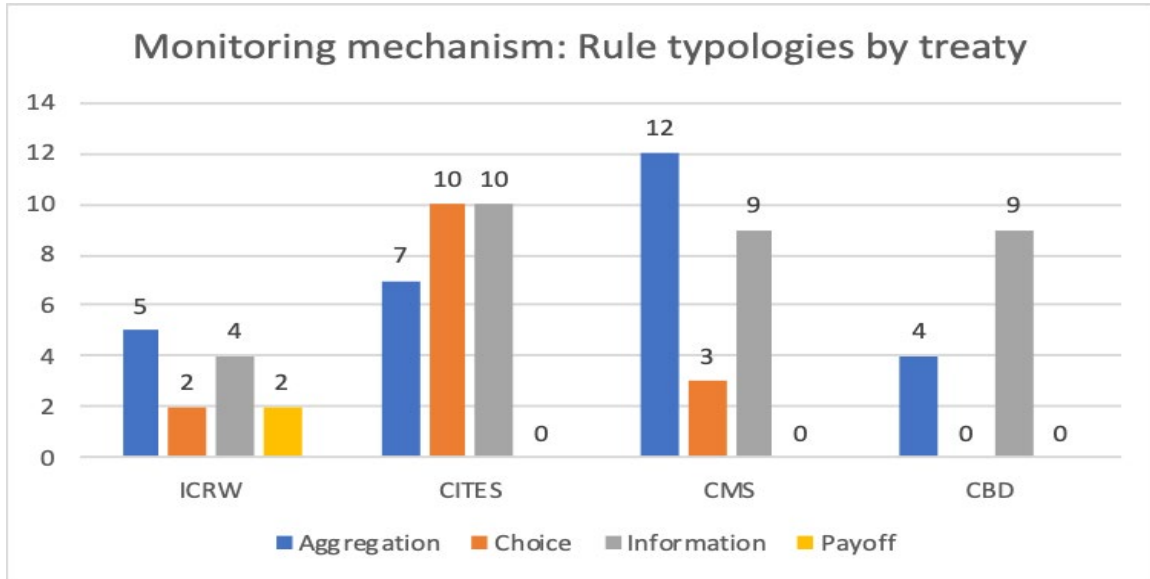


Figure 2.12 outlines the monitoring mechanism rule typology configuration by treaty. In general, the treaties rely on a mix of aggregation, choice, and information rules to organize monitoring, sanctioning, and reporting/information sharing activities. Outliers are the ICRW which also utilizes payoff rules, and the CBD which relies only on aggregation and information rules. CMS reflects a high number of aggregation rules indicating a focus on joint decision-making in its monitoring, while CITES includes a more balanced mix of aggregation, choice, and information rules to do so.

3.2.1 Monitoring mechanisms in the ICRW

Table 2.4 outlines the general monitoring mechanism as it is setup in the ICRW. There is a mix of aggregation, choice, and payoff rules at the collective choice and

operational level. Aggregation rules outline the Commission’s authority to “make recommendations” to the Contracting Governments on “any matters related to whales or whaling” and the implementation of the Convention (ICRW, 1946). Choice rules outline the Contracting Governments’ duty to take measures to ensure application of the Convention and punishment for infractions of the same. Payoff rules assign sanctioning authority to the Contracting Government at the collective choice analysis level, as well as to the owners of whale catchers at the operational level who are ordered to not pay gunners or crews for any whales taken in violation of treaty rules (Table 2.4). The Commission is also tasked with investigating the status of whale populations (DP4A) and the effects that whaling may have on the same (DP4B).

This reflects a straightforward organization of the ICRW’s monitoring mechanism that utilizes all three features of the monitoring DP (DP4A, 4B, and 4C) in combination with DP5 (sanctioning) to assess and enforce treaty implementation. The enforcement DP, in particular, is well-organized across levels of analysis (see yellow-highlighted cells in Tables 2.4 & 2.5). At the collective choice level the Commission monitors Governments, and the Governments monitor whalers. And at the operational level the Government prosecutes whaling operators, and whaling operators punish gunners and crews engaging in illegal activities. In contrast, monitoring activities are limited to the collective choice level and conducted only by one entity; the Commission.

Table 2.4

Rule typology configuration for general monitoring in the ICRW outlining implementation (green highlights) and enforcement mechanisms (yellow highlights).

RULE TYPOLOGY	ACTOR	STATEMENT	LEVEL	DP
Aggregation	Commission	Make recommendations to any or all Contracting Governments on any matters related to whales or whaling and to the objectives and purposes of the convention	Collective choice	DP4C
	Commission	Encourage, recommend, organize studies/investigations relating to whales and whaling	Collective choice	DP4A DP4B
	Commission	Collect and analyze statistical information re current condition/trend of whale stocks and effects on whaling on them	Collective choice	DP4A DP4B
	Commission	Study, appraise, disseminate information concerning methods of maintaining and increasing whale populations	Collective choice	DP4A
	Commission	Publish independently or in collaboration with... other organizations and agencies such reports as it deems appropriate, as well as statistical, scientific, and other pertinent information relating to whales and whaling	Operational	DP4C
Choice	Contracting Government	Take appropriate measures to ensure application of provisions of Convention	Collective choice	DP4C
	Contracting Government	Take appropriate measures to ensure the punishment of infractions against provisions of Convention	Collective choice	DP5
Payoff	Contracting Government	Institute prosecution for infractions against or in contravention of the Convention	Collective choice	DP5
	Nationals/ owners of whale catchers	No bonus or remuneration for whales taken in violation of the Convention	Operational	DP5

The Table 2.4 monitoring mechanism configuration is complemented by the information rules outlined in Table 2.5 which assign reporting responsibilities to the Contracting Governments. However, while there are information rules that contribute further to the monitoring of monitors (DP4C) by mandating that Governments report on domestic activities related to whales, whaling, and infractions (Table 2.5), aggregation rules providing the Commission with authority to review or act on such information are

missing (Table 2.4). Instead the rules refer back to the general aggregation rule outlined in Table 2.4 which allows the Commission to make recommendations; nothing more. As such, the information/reporting rule configuration (and related feedback) appears incomplete and weakly connected across analysis levels (see green-highlighted cells in Tables 2.4 & 2.5).

Table 2.5

ICRW rule typology configuration for reporting back on implementation (green highlights) and enforcement (yellow highlights) mechanisms.

RULE TYPOLOGY	ACTOR	STATEMENT	LEVEL	DP
Information	Commission	Arrange for the publication of reports of its activities	Operational	DP4C
	Contracting Government	Transmit (annually) scientific information available with respect to whales and whaling, including results of research conducted under special permit scientific whaling	Operational	DP4C
	Contracting Government	Transmit to the Commission full details of each infraction	Operational	DP4C
	Contracting Government	Information on infractions shall include statement of measures taken for dealing with the infraction and penalties imposed	Operational	DP4C

3.2.2 *Monitoring mechanisms in the CITES*

The CITES general monitoring mechanism utilizes aggregation and choice rules like the ICRW. However, these are more elaborate both in number of statements, actors involved, and connectedness (Table 2.6). There were no payoff rules. Instead, choice rules require CITES' Parties to prohibit trade and include measures to penalize illegal behavior making them functionally equivalent, but for their AIM, to payoff rules, thereby, meeting the DP5 enforcement criteria.

It should be noted that CITES distinguishes Party actions based on whether they are conducted collectively at the collective choice level (aggregation rules) where they outline review/oversight mechanisms that the Parties agree upon as members of the governing body (the COP), or as choice rules at the operational level where they outline Parties' individual implementation and reporting requirements. The Convention text also assigns monitoring and oversight responsibility to the Secretariat, e.g., studying the reports provided by the Parties (choice rule), making implementation recommendations and, with the approval of the COP, engaging in studies that contribute to treaty implementation (Table 2.6). Providing an additional entity with the responsibility to monitor the resource, appropriation, and monitors enables a richer and more complete perspective than can be found in the other treaties.

The highlighted sections in Table 2.6 illustrate areas where aggregation and choice rules are well-matched across actors and levels of analysis. For example, at the operational level, choice rules require the Parties to prepare periodic reports on the implementation of the Convention. These reports are reviewed at the operational and collective choice level by both the Secretariat and the Parties collectively with both being given the authority to make recommendations related to treaty implementation issues. The information rules outlined in Table 2.7 connect the preparation of the periodic reports with their submission to the Secretariat/collective Parties. Overall, much like the ICRW, CITES aggregation and choice rules create monitoring mechanisms that address all three monitoring criteria (DP4A, B, and C). However, in contrast to the ICRW, this

data is collected by the Parties *and* independently by the Secretariat. This makes CITES' monitoring mechanisms stronger than those of the ICRW. Enforcement mechanisms are outlined as choice rules that more generally require the Parties to prohibit and penalize illegal trade at the national level with no separate rules specifying punishment of actors engaged in illegal wildlife trade. This makes CITES' enforcement provisions weaker than those in the ICRW.

Table 2.6

Rule typology configuration for general monitoring in the CITES outlining implementation (yellow highlights) and monitoring (green highlights) mechanisms related to trade overexploitation. The highlighted cells reflect well-matched mechanisms.

RULE TYPOLOGY	ACTOR	STATEMENT	LEVEL	DP
Aggregation	Parties [collectively]	Make recommendations for improving the effectiveness of the Convention	Collective choice	DP4C
	Parties [collectively]	Review progress made towards restoration and conservation of species included in Appendices	Collective choice	DP4A DP4B
	Parties [collectively]	Receive and consider any reports presented by the Secretariat or by any Party	Collective choice	DP4C
	COP 8	Make whatever recommendation it deems appropriate to Party in response to inquiry related to trade overexploitation and/or ineffective implementation.	Collective choice	DP4C
	COP 7	Review information provided by Party resulting from an inquiry by authorized person related to trade overexploitation and/or ineffective implementation of the Convention	Collective choice	DP4C
	Secretariat	Make recommendations for the implementation of the aims and provisions of the Convention, including the exchange of scientific and technical information	Collective choice	DP4C
	Secretariat	Undertake scientific and technical studies in accordance with programs authorized by the COP as will contribute to the implementation of the present Convention...	Operational	DP4A DP4B DP4C
Choice	Parties	Take appropriate measures to enforce the provisions of the Convention	Operational	DP4C
	Parties	Prohibit trade in specimens in violation of provisions of Convention	Operational	DP5
	Parties	Include measures to penalize trade in, or possession of, such specimens (traded in violation) and provide for confiscation or return to the State of export of such specimens	Operational	DP5
	Parties	Prepare periodic reports on implementation of Convention	Operational	DP4C
	Parties 5	Propose remedial action to Secretariat [in instances of trade overexploitation and/or ineffective implementation of Convention]	Operational	DP4C
	Secretariat 2	Study the reports of the Parties	Operational	DP4C
	Person authorized by Party 6	Carry out inquiry into trade overexploitation and/or ineffective implementation of the Convention when Party considers inquiry desirable	Operational	DP4C
Payoff		NONE		

Table 2.7 reveals the information feedbacks created in the CITES Convention text which are, again, much more detailed and draw on more actors than the ICRW does. However, unlike the ICRW, there is no specific infraction reporting requirement. Text boxes numbered 1-8 in Tables 2.6 and 2.7 illustrate how information related to infractions flows within CITES. The Parties transmit annual reports containing trade data to the Secretariat (information rule, Table 2.7, step #1) which is then reviewed (choice rule, Table 2.6, step #2). Next the Secretariat reports the species trade overexploitation issue to the Management Authority (information rule, Table 2.7, step #3). The Management Authority (through Party representatives) is then required to inform the Secretariat of any relevant facts (information rule, Table 2.7, step #4) and propose remedial action (choice rule, Table 2.6, step #5). The Party also has the option to engage an authorized third person to investigate the issue, if it so desires (choice rule, Table 2.6, step #6). The COP will then review the information provided by the Party and make whatever recommendation it deems appropriate at its next meeting (aggregation rules, Table 2.6, steps #7-8).

While this process seems fairly well-connected, there is an assumption that either the Management Authority is the CITES party representative, or that the Management Authority will communicate the infraction to the party representative. Second, and more concerning, the rules seem to imply that the COP only reviews “information provided by the Party resulting from an inquiry by authorized person” (CITES, 1973 Article XIII). It is unclear, whether the COP will review the matter if a Party deems an investigation by

an authorized person undesirable, and there is no step #6 in the process. These gaps notwithstanding, information, choice, and aggregation rules outlining monitoring mechanisms are generally well-developed and organized across levels of analysis.

Table 2.7

CITES rule typology configuration for reporting back on implementation and enforcement mechanisms.

RULE TYPOLOGY	ACTOR	STATEMENT	LEVEL	DP
Information	Parties	Maintain records of trade in specimens included in Appendices	Operational	DP4B
	Parties 1	Transmit to Secretariat annual report containing summary of information on trade records (number and types of permits/certificates granted, etc.); and biennial report on legislative, regulatory and administrative measures taken to enforce the provisions of the present Convention	Operational	DP4C DP5
	Parties 4	Inform Secretariat of any relevant facts related to trade overexploitation of species or ineffective implementation of Convention	Operational	DP4C
	Secretariat	Prepare annual reports to the Parties on its work and the implementation of the Convention	Operational	DP4C
	Secretariat 3	Communicate information related to Appendix I or II species overexploitation by trade or on ineffective implementation of the Convention to the authorized Management Authority	Operational	DP4C
	Secretariat	Invite the attention of the Parties to any matter pertaining to the aims of the present Convention	Operational	DP4C
	Secretariat	Request from Parties further information with respect to the studies they provided as is necessary to ensure implementation of the Convention	Operational	DP4C
	Secretariat	Make available to the public Party's periodic reports on implementation and legislative, regulatory and administrative measures taken to enforce provisions of the Convention	Operational	DP4C
	Scientific Authority	Monitor export permits granted for specimens included in Appendix II AND actual exports of such specimens	Operational	DP4B
	Scientific Authority	Advise Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of species in order to ensure population is maintained throughout its range...	Operational	DP4B

3.2.3 Monitoring mechanisms in the CMS

The rule typology structure in CMS, at first, appears well-connected and on par in its configuration with the two regulatory regimes, the ICRW and CITES. However, on closer examination, there are differences that may affect the policy processes generated and resulting sensitivity to shocks and disturbances.

Like the ICRW and CITES, CMS utilizes aggregation and choice rule configurations to organize its general monitoring scheme (Table 2.8). Four actors are addressed in these rule configurations, the same number as in CITES (one less than in the ICRW). Choice and aggregation rules relating to monitoring the implementation of treaty provisions appear well-connected (see green-highlighted cells, Table 2.8). For example, choice rules mandate that the Secretariat prepare reports for the COP on treaty implementation at the operational level. Aggregation rules then provide the Scientific Council and the COP with the decision-making authority to review implementation, decide on additional measures that should be taken, and recommend solutions both to the COP (by the Scientific Council) and to the Parties by the COP. These rules link well with the reporting mechanisms outlined in Table 2.9 where the Parties are required to inform the COP through the Secretariat on measures they have taken to implement the Convention. Independent oversight is provided by an information rule that mandates the Secretariat obtain information from any appropriate sources that will further the objectives and implementation of the Convention.

Table 2.8

Rule typology configuration for general monitoring in the CMS outlining implementation and (a rudimentary) enforcement mechanisms (DP5). Highlighted cells reflect well-matched mechanisms.

RULE TYPOLOGY	ACTOR	STATEMENT	LEVEL	DP
Aggregation	COP	Review implementation of Convention at each meeting of the COP	Collective choice	DP4C
	COP	Decide on any additional measure that should be taken to implement objectives of Convention	Collective choice	DP4C
	COP	Review and assess conservation status of migratory species	Collective choice	DP4A DP4B
	COP	Review progress made towards conservation of migratory species, especially those listed in Appendices I and II	Collective choice	DP4A DP4B
	COP	Review progress made under AGREEMENTS	Collective choice	DP4C
	COP	Make recommendations to the Parties for improving the effectiveness of the Convention	Collective choice	DP4C
	COP	Make recommendations to the Parties for improving the conservation status of migratory species	Collective choice	DP4C
	Scientific Council	Evaluate the results of research on migratory species in order to ascertain their conservation status	Operational	DP4A DP4B
	Scientific Council	Recommend to the COP solutions to problems relating to scientific aspects of implementation of the Convention	Operational	DP4C
	Scientific Council	Recommend research and the coordination of research on migratory species	Operational	DP4A DP4B
Choice	Parties	Promote, cooperate in and support research relating to migratory species	Operational	DP4A
	Parties	Prohibit taking of Appendix I migratory species	Operational	DP5
	Secretariat	Prepare reports for the COP... on the implementation of the Convention	Operational	DP4C
Payoff		NONE		

Choice and aggregation rules in CMS address all three monitoring criteria (DP4A, B, and C), but there are no payoff rules outlining provisions to deal with infractions and non-implementation of treaty rules. Neither CITES nor the ICRW include enforcement (DP5) provisions related to Party non-compliance. Their rule configurations, however, do address issues related to core species conservation mandates, either with payoff rules or

choice rules that substitute as enforcement provisions. In contrast, CMS has only one rule that mandates the Parties prohibit the taking of Appendix I migratory species within their jurisdiction. There is no requirement to penalize such illegal takings. There is no provision prohibiting the illegal taking of Appendix II migratory species (presumably this is “outsourced” to the AGREEMENTS, see Appendix A), and there is no appropriator level enforcement, like there is in the ICRW. As Table 2.9 outlines, there is also no information rule requiring the reporting of infractions. Overall, the monitoring/enforcement policy processes that are generated in the CMS treaty text seem to be less rigorous than in the two regulatory regimes.

Table 2.9

CMS rule typology configuration for reporting back on implementation mechanisms. Highlighted cells reflect well-matched mechanisms.

RULE TYPOLOGY	ACTOR	STATEMENT	LEVEL	DP
Information	COP	Receive and consider any reports presented by Scientific Council, Secretariat, any Party, or any standing body established pursuant to an AGREEMENT	Collective choice	DP4A DP4B DP4C
	Parties	Inform COP through Secretariat on measures taken to implement the Convention provisions	Operational	DP4C
	Parties	Keep Secretariat informed with regard to migratory species listed in Appendices that they consider themselves to be range states of, including provision of information on flag vessels engaged in taking migratory species	Operational	DP4A DP4B
	Scientific Council	Report to the COP on conservation status of migratory species and measures for improvement	Operational	DP4C
	Secretariat	Obtain from any appropriate source reports and other information which will further the objectives and implementation of this Convention	Operational	DP4C
	Secretariat	Invite the attention of the COP to any matter pertaining to the objectives of the Convention	Operational	DP4C
	Secretariat	Arrange for dissemination of reports and information that will further the objectives and implementation of the Convention	Operational	DP4C
	Secretariat	Maintain and publish list of recommendations made by the Convention	Operational	DP4C
	Secretariat	Provide information for the general public re Convention and its objectives	Operational	DP4C

3.2.4 Monitoring mechanisms in the CBD

The CBD treaty text includes a total of 246 institutional statements (Data Table, Appendix E), of which only 13 statements (around 5%) were devoted to monitoring mechanisms. There is no enforcement mechanism in the form of payoff rules or other evidence of DP5. The general monitoring mechanism portion of the rules utilizes aggregation rules only (Table 2.10). Like in the ICRW, the treaty text does not envision any involvement by the Secretariat in monitoring activities. Basically, Tables 2.10 and

2.11 outline a barebones monitoring/reporting structure that relies on two rule typologies (aggregation and information rules) and three entities (COP, SBSTTA, and the Parties).

Table 2.10

Rule typology configuration for general monitoring in the CBD outlining implementation mechanisms. The highlighted cells reflect well-matched mechanisms.

RULE TYPOLOGY	ACTOR	STATEMENT	LEVEL	DP
Aggregation	COP	Keep under review the implementation of the Convention	Collective choice	DP4C
	COP	Review scientific, technical and technological advice on biological diversity provided [by SBSTTA]	Collective choice	DP4C
	COP	Consider such information [reports submitted by the Parties] as well as reports submitted by any subsidiary body	Collective choice	DP4C
	SBSTTA	Provide scientific and technical assessments of the status of biological diversity (under the authority of and in accordance with the guidelines laid down by the COP)	Operational	DP4A
Choice		NONE		
Payoff		NONE		

At the collective choice level, the COP is authorized to jointly “keep under review the implementation of the Convention”, review advice related to biological diversity received from its scientific and technical body (SBSTTA), as well as to consider information received through reports from the Parties and other subsidiary bodies. What is conspicuously absent, is the lack of authority for the CBD COP to make recommendations and/or decisions related to core conservation or implementation issues. This lack of authority undermines the rudimentary reporting structure in place. Tables 2.10 and 2.11 highlight in green the monitoring mechanism for treaty implementation which requires the Parties to inform the COP on the measures they have taken to implement the Convention and their effectiveness in meeting CBD objectives

(information rule, operational level). The SBSTTA’s role is to provide advice to the COP with regard to implementation of the Convention, and assessment of the effects of measures taken (operational level, information rules). The COP is jointly authorized at the collective choice level to review and “consider” that information, but the authority ends there (Table 2.10).

Table 2.11

CBD rule typology configuration for reporting back on implementation mechanisms. The highlighted cells reflect well-matched mechanisms.

RULE TYPOLOGY	ACTOR	STATEMENT	LEVEL	DP
Information	Parties	Identify components of biological diversity important for the conservation and sustainable having regard to the indicative list of categories set down in Annex I	Operational	DP4A
	Parties	Monitor through sampling and other techniques the components of biological diversity identified... paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use.	Operational	DP4A
	Parties	Identify processes and categories of activities which have or are likely to have significant adverse impacts on the conservation and sustainable use of biological diversity	Operational	DP4B
	Parties	Monitor these [adverse] effects [on biological diversity] through sampling and other techniques	Operational	DP4B
	Parties	Maintain and organize by any mechanism data derived from identification and monitoring activities	Operational	DP4A DP4B
	Parties	Facilitate the exchange of information from all publicly available sources relevant to the conservation and sustainable use of biological diversity...	Operational	DP4A DP4B
	Parties	Present to the COP reports on measures which it has taken for the implementation of the provisions of the Convention and their effectiveness in meeting the objectives of the Convention	Operational	DP4C
	SBSTTA	Provide COP and other subsidiary bodies with advice relating to the implementation of the Convention	Operational	DP4C
	SBSTTA	Prepare scientific and technical assessments of the effects of types of measures taken in accordance with the provisions of the Convention	Operational	DP4B

The CBD monitoring mechanism meets the three elements of the monitoring DP, and there is also somewhat of a match between information rules at the operational level and the authority provided to the COP at the collective choice level (green highlighted cells in Tables 2.10 and 2.11). However, the CBD monitoring processes generated by this configuration end in the review process. No further follow up action in the form of recommendations or decisions is outlined or authorized. There is also no reporting of infractions and no enforcement mechanism. In combination, the CBD's monitoring and reporting/information sharing mechanism appears challenged in comparison to the other treaties.

3.2.5 Summary

Reviewing the monitoring processes generated in the Convention texts, we can learn that these mechanisms are most developed and most clearly linked across levels of analysis in CITES. While authority in all four forums is vested in the governing body¹⁰, monitoring activities are distributed among various actors ranging from six in CITES to three in the ICRW and CBD (Fig. 11).

While CITES exhibits a strongly connected monitoring process, its enforcement mechanism is weaker than the ICRW. The ICRW has a well-developed enforcement mechanism that utilizes payoff rules to affect entities at the national and appropriation

¹⁰ The reference in CITES to Parties at the collective choice level appears to be linguistic diplomacy. It acknowledges that individual Parties review the monitoring information received, however, decision-making authority occurs when these individual State representatives vote collectively on any action to be taken.

level. In contrast to CITES, its reporting mechanisms on infractions and other monitoring aspects are only weakly matched at the collective choice level where the COP does not have the authority to review and take action. CMS' monitoring mechanism is generally well-connected. However, it lacks enforcement mechanisms (DP5) and monitoring/reporting of infractions. It also does not mandate any conservation or taking limits on its Appendix II-listed species; presumably outsourcing such responsibility to its daughter AGREEMENTS. Finally, the CBD reflects the weakest monitoring mechanism beginning with devoting only a small fraction of its institutional statements to monitoring. CBD does not have any enforcement mechanism, and it only utilizes aggregation and information rules to structure its monitoring/reporting configurations. The Secretariat has no involvement in monitoring, and the COP's authority is limited to a review with no recommendations or decision-making authority outlined in the treaty text. None of the four treaties address enforcement of treaty implementation by their Parties.

Overall, the mechanism structure analysis revealed the treaties aligning with their DEONTIC structure assessment. Both strongly regulatory treaties emerged as the ones with the strongest monitoring/enforcement mechanisms, with CITES, again, higher performing than the ICRW. CMS reflected a moderately useful monitoring structure, while the weakly regulatory CBD demonstrated a rudimentary monitoring mechanism.

3.3 Linking rule typologies to the design principles

The IAD rule typology represents “causal variables of a process” (Ostrom, 2009, p. 38), the presence of which can lead to certain decision-making processes and actions

that make a robust governance system theoretically more likely. As shown in Section 4.2, the causal variables of the general monitoring process in the four treaty regimes were aggregation and choice rules. Payoff and choice rules were linked to the enforcement process; and information rules represented causal variables of the information sharing/reporting process that linked them to the monitoring/enforcement mechanism.

In contrast, the design principles (DPs) “are an effort to understand why the results of these processes are robust in some cases and fail in others” (Ostrom, 2009, p. 37). They describe characteristics or necessary conditions of the governance infrastructure that, when present in certain configurations, can decrease sensitivity to change (Anderies et al., 2016; Baggio et al., 2016). They help address governance puzzles, such as why the ICRW’s governance system—which seems to assert a greater degree of legal commitment on its Contracting Governments and contains a good mix of rule typologies—seems to operate less effectively as CITES which is structured similarly. Although individual institutional statements cannot represent evidence of the presence or absence of a particular DP, when viewed in the manner in which they configure based on their rule typology facilitates linkage to a particular DP. For example, aggregation and choice rules were standard staples of the general monitoring mechanisms for each treaty, except the CBD. The ICRW, which emphasizes enforcement the most, complemented its aggregation/choice rule configuration with payoff rules. The CBD’s rudimentary monitoring mechanism makes do with only aggregation rules. The reporting/information

sharing mechanism linked to the monitoring schemes in all treaties was governed by information rules only.

These rule typology configurations linked their associated institutional statements with elements of the monitoring DP (DP4A resource; DP4B appropriation; and DP4C monitors), except in the case of payoff and certain choice rules which linked them to the enforcement DP5. Evidence of the presence/absence of these design principles aided in the analysis of the likely monitoring/enforcement/reporting processes generated within each treaty. CPR research has shown that DP4 & DP5 when coupled with DP2 (the congruence DP) are often indicators of more robust governance systems. Future analysis, in particular assessing the external fit between rule configurations, and how they are perceived will utilize the information generated here to determine the theoretical robustness of each treaty regime.

4 Conclusion

Coding the regulatory institutional statements of the four treaty regimes revealed static rule structures that made the treaties look very similar. The first differences began to emerge in the analysis of the DEONTIC structures which distinguished the treaties between strongly regulatory regimes that impose a greater degree of legally binding commitments on their Parties (ICRW and the CITES), and those that were medium and weakly regulatory (CMS and CBD, respectively). Once these static structures were animated by assessing the coupled monitoring, enforcement, and reporting/information

processes generated based on the treaty rule typologies, levels of analysis, and design principles, these early distinctions manifested themselves with greater certainty.

The most interesting comparison is that of the ICRW and CITES which in their static DEONTIC structures both impose a large degree of legal commitments on their member states with few watered-down AIMS and WHEN conditions. In its treaty text, the ICRW also exhibits a strongly connected enforcement mechanism that utilizes payoff rules to address whaling infractions through several entities across levels of analysis, including appropriators at the operational level. In contrast, CITES enforcement mechanism appears weaker in its reliance on choice rules that target fewer actors and only reach to the national level. However, its monitoring mechanism is strongly interconnected with its information sharing/reporting mechanism. Additionally, it imbues several actors with monitoring responsibilities, and dedicates a higher number of institutional statements to create the monitoring mechanism. These are areas where the ICRW is weaker. The theoretical policy process trade-offs created through strong enforcement/weak monitoring and reporting versus weak enforcement/strong monitoring and reporting may cancel each other out. However, it is also likely that CITES may emerge as less sensitive to change, since a well-connected monitoring and reporting system might be more nimble and better able to cope with shocks and disturbances than a strong enforcement system with a weaker monitoring and reporting system.

The true outlier among the treaties is the CBD. The coupling of a weakly regulatory instrument that imposes little obligations on its Parties with a rudimentary

monitoring and reporting structure that hinders assessing the few obligations the regime does impose appears to be a recipe for a non-robust governance system. Subsequent papers will further explore these connections by embedding the regulatory with the constitutive rule structures to assess their internal fit, and by measuring the treaties' theoretical robustness through a comparison of the formal rule structures to the way they are perceived by actors in the system.

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CHAPTER 3

FROM ASPIRATION TO REGULATION IN ANARCHY: COMPARING CONSTITUTIVE INSTITUTIONAL ARRANGEMENTS IN FOUR CONSERVATION TREATY REGIMES

Introduction

This publication builds on prior work assessing the *regulatory* institutional arrangements of four international conservation treaties: the International Convention for the Regulation of Whaling (ICRW); the Convention on the International Trade in Endangered Species (CITES); the Convention on Migratory Species (CMS); and the Convention on Biological Diversity (CBD). Here, the focus is on examining the treaties' *constitutive* rules from a macro and micro perspective in order to better understand the interaction between the two linguistic forms (i.e., their internal fit), the likely feedbacks generated, and how those feedbacks may affect governance robustness (i.e., sensitivity to shocks and disturbances).

At the macro level, a complex social-ecological system (SES) perspective is taken in which institutions¹¹ are conceptualized as the software of Controller (K_t) (Fig. 3.1) which provides the code (rules) for processes to occur that influence/change in the SES (Anderies et al., 2007). Controller K_t 's software consists of a mix of regulatory and

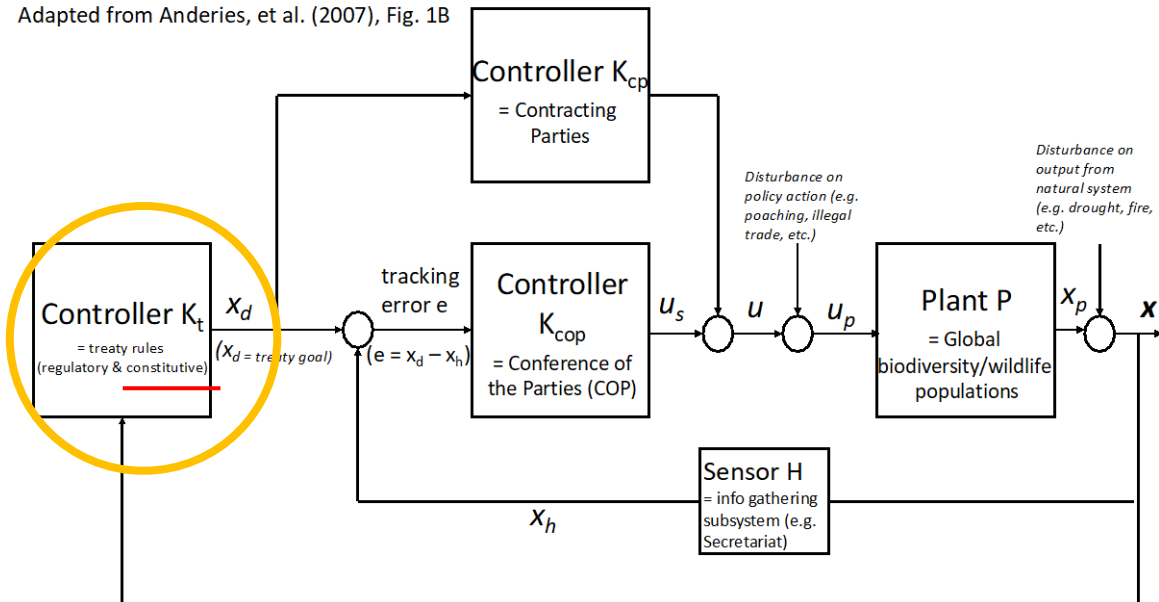
¹¹ The term institutions is used interchangeably with “rules” and is defined as the rules, norms, shared strategies, aspirations, aims, contextual factors, and parameters that guide human interaction and decision-making with themselves and their environment.

constitutive rules which intertwine and interact with each other to generate policy processes (or feedbacks) within the system. For example, Alaskan bowhead whales (Plant P) may have suffered a population crash due to declines in zooplankton, their main dietary staple; a disturbance on Plant output (x_p) resulting in fewer animals (output x) (Fig. 3.1). The data from output x is received by the International Whaling Commission's (IWC) Scientific Committee (depicted as Sensor H in the process model) (Fig. 3.1). The Scientific Committee (Sensor H) processes the data, consults with experts, and prepares a report which is submitted to the Commission (the IWC equivalent of the Conference of the Parties (K_{cop}) in the process model). Submission of the report generates a tracking error (e) because the reported bowhead population crash (x_h) conflicts with the ICRW's aspirational goal (x_d) of managing whale harvests at levels that can be sustained (a constitutive rule). Guided by the rules outlined in Controller K_t , the Commission (K_{cop}) will agree on a policy response—e.g., an adjustment of bowhead whaling quotas for the Alaskan Inuit who hunt the species under IWC's auspices (regulatory rules). This generates a system feedback (u_s) reducing human exploitation of the species and allowing it to recover.

Figure 3.1

Process model adapted from Anderies, et al. (2007). Here, the constitutive treaty rules (underlined in red) are part of the software design of Controller K_t (circled in orange) and embedded in the complex social-ecological system they aim to govern.

Adapted from Anderies, et al. (2007), Fig. 1B



Although this example represents an oversimplified account of the policy process, it does illustrate the connection between constitutive and regulatory rules. It also illustrates the importance of Controller K_t 's position as a "benevolent social planner" seeking maximization of a social welfare function (Anderies et al., 2007, p. 15194) which, in the instance of the ICRW Convention, means the dual objective of conserving whale stocks *and* the development of the whaling industry (ICRW, 1946); i.e., a sustainable use objective. Figure 3.1 also illustrates the dynamic nature of coupled SESs and is a reminder that the feedbacks generated in such systems can never be fully known. Instead, improving our knowledge of the underlying software design of Controller K_t can

help identify general feedback patterns which, in turn, can be utilized to navigate the inevitable robustness-vulnerability tradeoffs of such complex systems. That knowledge allows informed decisions as to what feedbacks and/or vulnerabilities can be targeted to keep the governance system operating within acceptable parameters so that agreed-upon objectives are met.

At the micro level, this research draws on social theory and the logic of the Institutional Analysis and Development (IAD) framework to extend the institutional grammar's applicability to the analysis of constitutive rules (Kiser & Ostrom, 1982; Searle, 1995; Ostrom, 2005; Searle, 2010). In practice, it utilized existing research on constitutive rule typologies (Ceci et al., 2018) to create a set of 13 rule classes which were used to parse Controller Kt's constitutive rule design in order to identify the likely rule configurations generated with regard to the ideals, aspirations, and contextual parameters upon which the treaty regimes are founded. The information that was extracted from the micro analysis contributed to the comparative macro examination of the treaties' policy processes and potential sensitivity to change. It also aided in answering the following questions: (1) what are the elements and configurations of Controller Kt's constitutive software design?; (2) how do constitutive and regulatory rule structures connect (what is their fit)?; and (3) based on these coupled institutional arrangements, what policy processes are generated, and how might that affect governance robustness?

Study findings revealed carefully crafted and linked constitutive and regulatory rules can enhance the horizontal fit and vertical feedback mechanisms of treaty governance structures. While all four treaties included procedural aspirations in their rule structures, CITES effectively utilized its procedural aspirations as policy guidance rule markers to which specific regulatory rules were linked. Reporting feedback mechanisms related to monitoring activities were generated in all four forums. However, in most treaties vertical linkages could be made more explicit. In terms of robustness, as measured by internal horizontal fit and the existence of vertical reporting feedbacks, CITES took the lead. CMS and CBD rely heavily on constitutive rules related to monitoring and opt out mechanisms without the proper regulatory rule support. This likely makes these regimes more sensitive to disturbance or shock because they lack proscriptive and prescriptive action to operationalize the aspirations and generate the requisite vertical feedbacks necessary to cope with change.

This paper is organized to first provide an overview of the methods used, including the development of the constitutive rule typologies (Section 1), before discussing the coding results in Section 2. Section 3 draws on the information generated in Section 2 to explore the regulatory and constitutive rule feedbacks with a focus on monitoring and opt out mechanisms before coming to a conclusion.

1 Methods

International treaties have long been deemed instrumental to coordinating global action related to environmental problems, including conservation declines (Brown Weiss

& Jacobson, 1998). However, accelerating global species and biodiversity losses (Ceballos et al., 2015; Ceballos et al., 2017; IPBES, 2019) necessitate the need to apply a different scholarly lens to the analysis of international conservation instruments in order to gain a better understanding of the relationship between rule types and the decision-making feedbacks they generate.

The treaties selected for analysis (Table 3.1) pursue similar conservation objectives (conservation for sustainable use), but differ in age, focus, and organization. Except for the oldest treaty (ICRW), all treaties are organized under the United Nations (U.N.). Their respective entries into force spans over 70 years with the oldest treaty (ICRW) becoming legally effective in 1946 and the youngest (CBD) in 1992. Treaty mandates include a focus on wildlife (CITES and CMS), cetaceans (ICRW), and overall biodiversity (CBD). (Appendix A outlines details on the treaties' historical and decision-making context, membership status, objectives, and organizational structure).

Table 3.1

Treaty details. Table columns are organized with the oldest treaty, the ICRW, in the second left column and the youngest, the CBD, in the far right column. The “Signed/entry into force” row distinguishes when the Convention text was first agreed upon by member states (signed date) and when it entered into force (once the required number of States ratified the agreement). The “Member states” row outlines the number of member states as of June 1, 2020. All treaties, but the ICRW, are organized under the United Nations (U.N.). Treaty governing bodies are the Conference of the Parties (COP) in the U.N. treaties and the International Whaling Commission (ICRW or “Commission”) in the ICRW. Voting procedures are taken from the treaty formal rules. An explanation of the ethical values is provided in Section 3.3.1.1. It should be noted that within each treaty, consensus agreement is generally sought but infrequently achieved in CITES and the ICRW.

	ICRW	CITES	CMS	CBD
Signed/Entry into force	Dec.1946 / Nov. 1948	March 1973 / July 1975	June 1979 / Nov. 1983	June 1992 / Dec. 1993
Member states	88	183	130	196
Core objective	Conservation of whale stocks and development of the whaling industry	Regulation of wildlife trade	Conservation of migratory species of wild animals	Conservation and sustainable use of biological diversity; fair and equitable sharing of the benefits arising out of the utilization of genetic resources
Species covered	Cetaceans	Wild animals and plants subject to international trade	Migratory species (Mammals, birds, reptiles, fish, and one insect)	Biodiversity in general – not species focused
Scope	Global	Global	Global	Global
Organization	Non-U.N. treaty	U.N. treaty	U.N. treaty	U.N. treaty
Environmental ethic	Two-thirds anthro/non-anthro	Two-thirds anthro/non-anthro	Balanced (anthropocentric/non-anthropocentric)	Highly anthropocentric

	ICRW	CITES	CMS	CBD
Voting procedure	Simple majority vote. Schedule amendments require three-fourths majority vote.	Simple majority vote on procedural matters. All other decisions two-thirds majority vote.	Every effort should be made to reach consensus. Two-thirds majority unless otherwise specified.	De facto consensus (no agreement on voting mechanism).

A purposive, non-probability sampling method was utilized to select “the population of relevant [treaties and] texts” to answer the research questions (Krippendorff, 2013, p. 120). This is an appropriate strategy given the focus on uncovering a particular phenomenon, such as institutional design (Bernard et al., 2017), and could not have been accomplished through random selection. The endogeneity and selection bias associated with such purposive sampling is mitigated by the rule typology coding which generates a variety of predictor variables (rule classes), thereby increasing variation in the outcome variable (degree of robustness). The comparative research design which assesses formal rules against informal rule perceptions further reduces the endogeneity and potential omitted variable bias (King et al., 1994). (See Appendix B for details on treaty and document selection processes, including theories used, a treaty output comparison, and bias mitigation strategies).

1.1 Institutional grammar: Constitutive rules

While regulatory rules follow deontic logic and regulate existing forms of behavior, constitutive rules follow modal logic (Grossi et al., 2006) and describe the quality or state of something as possible, impossible, or necessary (Garson, 2018). In the treaty context,

constitutive rules fulfill four functions; two of which were outlined in the literature and two identified in the treaty texts. First, constitutive rules set out (or qualify) how the world ought to be by outlining the aspirations, aims, and objectives of the legal regime (Searle, 1995, 2010), e.g., it is necessary to conserve wildlife for the benefit of future generations. Second, they define new forms of behavior (Grossi et al., 2006); e.g., it is necessary for the CITES Parties to agree to implement wildlife trade regulation measures domestically. Third, they highlight the contextual factors/issues that necessitated the development of the rules, regime, or resolution in the first place, e.g., consistent illegal trade in species has necessitated adopting this resolution. Finally, they describe the generic parameters or boundaries under which decisions are to be made (Siddiki personal communication, March 31, 2020), e.g., it is necessary that the provisions of this Article shall not apply to specimens purchased as personal effects.

Constitutive rules have remained a theoretical concept within the realm of social ontology and linguistics where scholars have been debating whether they really exist (Warnock, 1971; Giddens, 1984), or whether they represent a subset of regulatory or rules-in-equilibrium (Hindriks & Guala, 2014); assertions which have been opposed (Searle, 2015). Others have attempted to define constitutive rules based on their “counts as” features (Jones & Sergot, 1996; Grossi et al., 2006, 2008), their connotation and import (Hindriks, 2009), or on the X or Y type features of the syntax (Conte 1991 qtd. in Sileno et al., 2018). Sileno et al. (2018) distinguish constitutive rules based on their

meaning, i.e., whether they are “characteristic of regulative drivers” within the system or “part of an interpretative system” (p. 45).

Institutional analysts have preferred to focus their efforts on regulatory rules; excluding constitutive rules from their analyses (Siddiki et al., 2019), until recently when their political and cultural significance even for individuals and groups not directly affected by them came to the fore (Carter, 2017, p. 1). Subsequent calls for studies that explore the connection between regulatory and constitutive rules and their influence on human behavior are heeded in this study (Siddiki et al., 2019, p. 18) which, by necessity, also involved developing a rule typology to do so.

1.2 Development of the constitutive rule typology

When assessing institutional statements¹² for their linguistic characteristics, constitutive rules can often be identified by the absence of, or difficulty in identifying an ATTRIBUTE/actor and/or the absence of an AIM (verb) that indicates an action. DEONTIC operators can be present in constitutive statements where they are often paired with passive verbs, e.g., “shall mean/define” (Basurto et al., 2018). There are two syntactic types of constitutive rules. The general syntax for institutional facts is “Token X counts as Type Y in Context C” in which Context C provides some form of context or constraint that specifies X or Y (Searle, 2010). The rarer syntax is the declaratory speech act “[t]here shall be X” (Searle, 1995, 2010).

¹² Institutional statements are the unit of analysis in IG coding. In its simplest form, an institutional statement is a sentence. However, the presence of multiple AIMs (verbs) or DEONTIC operators in a sentence may necessitate breaking sentences into more than one statement. For more details, see paper 1 on regulatory rules.

The elements of the constitutive rule syntax do not have universally agreed-upon definitions, although scholars interested in legal informatics, artificial intelligence, and machine learning have made promising advances in that direction (Grossi et al., 2006, 2008; Ceci et al., 2018). The constitutive rule typology developed as part of this research builds on Ceci, et al.'s (2018) work on financial regulations. The application of the typology to international conservation regimes suggests these rule classes may be generalizable to other policy documents, although further research is necessary to confirm that.

Coding the constitutive institutional statements in the four treaty regimes began with the set of five constitutive legal concept patterns developed by Ceci, et al (2018): Legal definitions, commencement rules, amendments, relative necessities, and party-to-the-law statements (pp. 105, 116 Table 3). These five concept patterns were insufficient to classify all forms of constitutive rules encountered in the treaty documents, and three more were derived from Biagioli's (2009) constitutive metarules: Application, power, and status (Biagioli, 2009; qtd in Ceci et al., 2018 Table 2). A modified version of the regulatory position rule was also added, as were four new rule typologies¹³: Constitutive-regulatory (Con-Reg); ethical value; procedural (aspirational); and statement of fact (see Appendix I for table with syntax and coding examples for each rule typology).

¹³ The terms "typology" or "rule class" are used interchangeably and denote a constitutive rule classification.

1.3 Coding strategy

An attempt was made to code the original institutional statements as they were expressed in the formal documents so as to best approximate the “true” structure of the Controller K_t , but that was not always possible. Unlike in the regulatory rule coding process, the four elements of the constitutive syntax are not universally defined and, as a result, were not analyzed separately. For example, in the regulatory syntax, an ATTRIBUTE is always an “animate actor that carries out an AIM” and the rule typology identification is driven by the AIM (verb) of the coded statement (Basurto et al., 2018, p. 14). In the constitutive syntax, Token X and Type Y take on different characteristics depending on the rule typology (Ceci et al., 2018, p. 117), and the rule typology is driven by the “counts as” element of the syntax plus a careful review of the statement in its entirety to determine the message that is being communicated. Table 3.2 provides a comparison of the constitutive rule syntax elements, their broad definition in the literature, and their values in the context of this research.

Table 3.2

Representation of the elements of the constitutive rule syntax (column 1) as defined in the literature (column 2); and based on the rule typology developed for this research (Appendix I).

Constitutive rule syntax	As defined in the literature¹⁴	As defined in the treaty rule typology
TOKEN X:	A material (or previously identified) phenomenon	Rule (or set of rules/laws); new text; legal regime; Object/Attribute; word/phrase, symbol; or a position
COUNTS AS:	Representative of a form of collective agreement (Searle 1995, 2010)	Verb; phrase; deontic/verb combination
TYPE Y:	Abstract concept created by the constitutive rule itself	Old text; action/mechanism; legal entity; governance tool; specific date or description of a date; statement of meaning; expression of an ethical world view; a function; addressee/position; number of individuals; responsibility/benefit; procedural governance aspect; status/condition; 1 .98976890-report/ action/recommendation
CONTEXT C:	Limited area of application (or form of constraint)	Legal effect/state of affairs; legal entity; within treaty rule/regime/regulation; norm/legal text; specified governance context; another target object/entity; guidance for creation of legal document

As Table 3.2 outlines, Context C identifies a limit or constraint on the applicability of the constitutive rule (Ceci et al., 2018). In instances where Context C was not explicitly mentioned in the statement, the IG procedure for missing regulatory CONDITIONS (Crawford & Ostrom, 1995, p. 585) was adapted to conform to the

¹⁴ Unless otherwise indicated, the definitions provided in this column are gleaned from Ceci, et al. (2018).

constitutive rule context. Specifically, the regulatory default conditions “[at all times]” and/or “[in all places]” (Crawford & Ostrom, 1995, p. 585; Ostrom, 2005, p. 149; Basurto et al., 2018, p. 5(2)(b)) were substituted with “[within the treaty context]” or “[within the treaty regime]” as the Context C default condition.

1.4 Intercoder reliability testing

The full complement of constitutive rule typologies were tested by coding all constitutive institutional statements within the CMS treaty documents (n = 244), making adjustments, and then recoding until coding descriptions were sufficient to reliably code all institutional statements. All coding then underwent repeated trials to ensure similar coding results for each rule typology across all documents. Such “test-retest” coding resulted in stable data reliability sufficient to draw preliminary conclusions (Krippendorff, 2013, pp. 270-271). Further intercoder reliability testing is necessary and will be conducted at a later time to establish higher data reliability and replicability of research findings.

2 Coding Results

Constitutive rules enumerate treaty aspirational goals, contextual factors, and policy parameters. As such, they describe the treaty blueprint; its aims and the necessary qualifications to reach a desired state, e.g., the conservation of wildlife for future generations. One would, therefore, expect Controller K_t's software to contain a blend of constitutive rules which are matched with regulatory rules crafted to ensure those

aspirations and criteria are translated into appropriate actions and decision-making processes.

Parsing the constitutive institutional statements provided a better understanding of the (1) constitutive rule design (blueprint code) and (2) its fit with the regulatory rules; which enabled an examination of (3) the likely policy feedbacks that these coupled rule configurations generate; and (4) the theoretical robustness of those feedbacks to complexity, disturbance, and stress (Anderies & Janssen, 2013). The remainder of this section will provide an overview of the static constitutive rule design across treaty regimes based on their syntax, levels of analysis, rule typology and links with regulatory rules (addressing items (1) and (2)). Section 4 will animate these design features *horizontally* via their rule typologies and *vertically* across the authoritative analysis levels to determine their feedbacks, fit, and theoretical robustness with a focus on monitoring and opt out processes (addressing items (3) and (4)), before coming to a conclusion.

2.1 Syntactic composition

A total of 1,173 constitutive institutional statements were coded across the four treaty regimes which represents 25.85% of all coded statements (total regulatory and constitutive institutional statements = 4,537) (Data Table, Appendix J). Only 1% of the total constitutive statements per treaty were declaratory speech acts, except in CITES which had none (Fig. 3.2). This mirrors the distribution of shared strategies/norms in the regulatory rules (2% shared strategies to 98% norms, except in the CBD where it was 1% to 99%) indicating treaty design favors communicating its instructions as norms instead

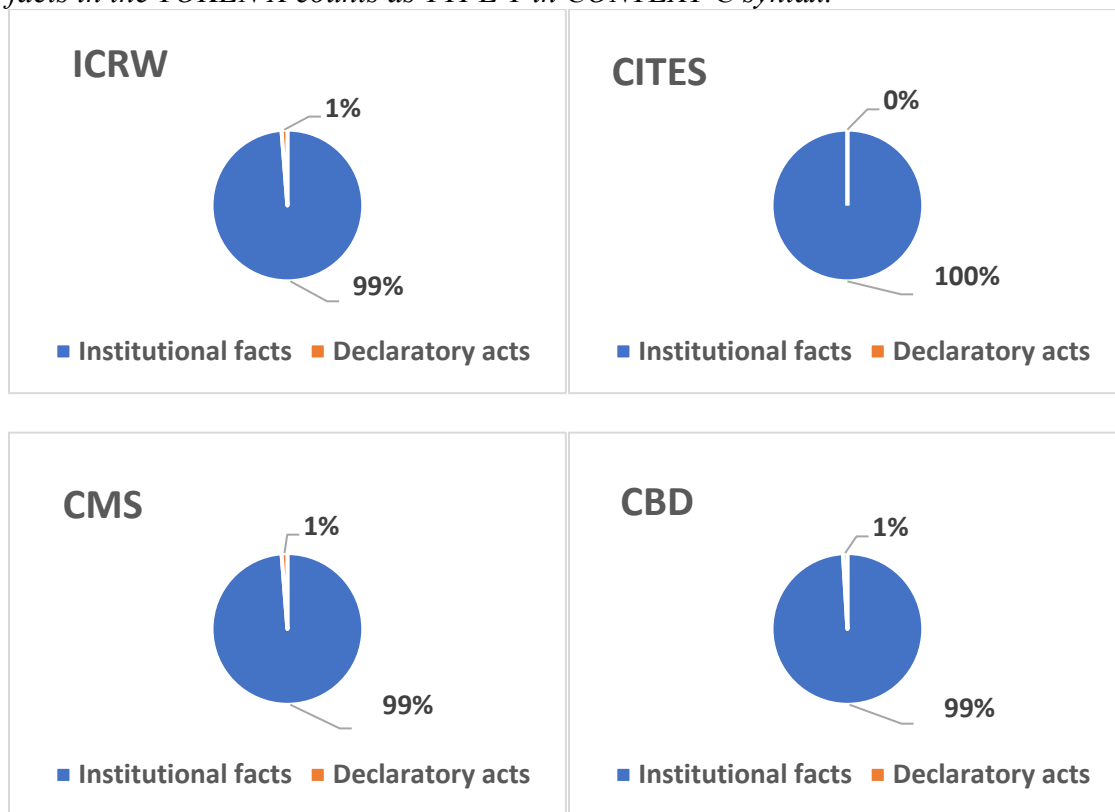
of rules, and its policy aims/foundations as institutional facts instead of declarations.

Whether this is a meaningful finding or simply a linguistic reality of policy design is

difficult to ascertain until other policy documents have been analyzed similarly.

Figure 3.2

Pie charts reflecting distribution of constitutive rule syntax across the four treaty regimes. Declaratory speech acts (“there shall be X”) make up only one percent of the coded constitutive statements in the ICRW, CMS, and CBD. There were no declaratory speech acts in the CITES. The majority of constitutive rules are expressed as institutional facts in the TOKEN X counts as TYPE Y in CONTEXT C syntax.



2.2 Ethical value structure

All treaties analyzed in this research are considered anthropocentric *conservation* instruments designed to exploit nature and wildlife in a manner that maximizes human

benefit without undermining the long-term viability of nonhumans (Minteer, 2009; Gillespie, 2014). Yet, some of the institutional statements in the texts indicated less “human chauvinistic” expressions that seemed to extend sympathy and consideration to other species (Gillespie, 2014, p. 4). Parsing the ethical statements into degrees of anthropocentric value provided a richer understanding of the aspirations that led to rule creation while, at the same time, still acknowledging the instruments’ roots in anthropocentrism. The ethical value typology statements were coded as anthropocentric if they focused on human interests (including economic and development); as biocentric if they acknowledged that individual nonhumans have some intrinsic value (Taylor, 1981); and if the statement recognized the value of nonhuman nature holistically to include populations of nonhuman species and the abiotic components of nature (Kopnina, 2012; Washington et al., 2017), it was coded as ecocentric.

Table 3.3 outlines the total number of statements coded as ethical value per treaty and their distribution among the three worldviews. *Figure 3.3* expresses the percentage totals of those values in a pie chart comparison (see Appendix K for coding guidelines, list of coded statements, and how they were assigned).

Table 3.3

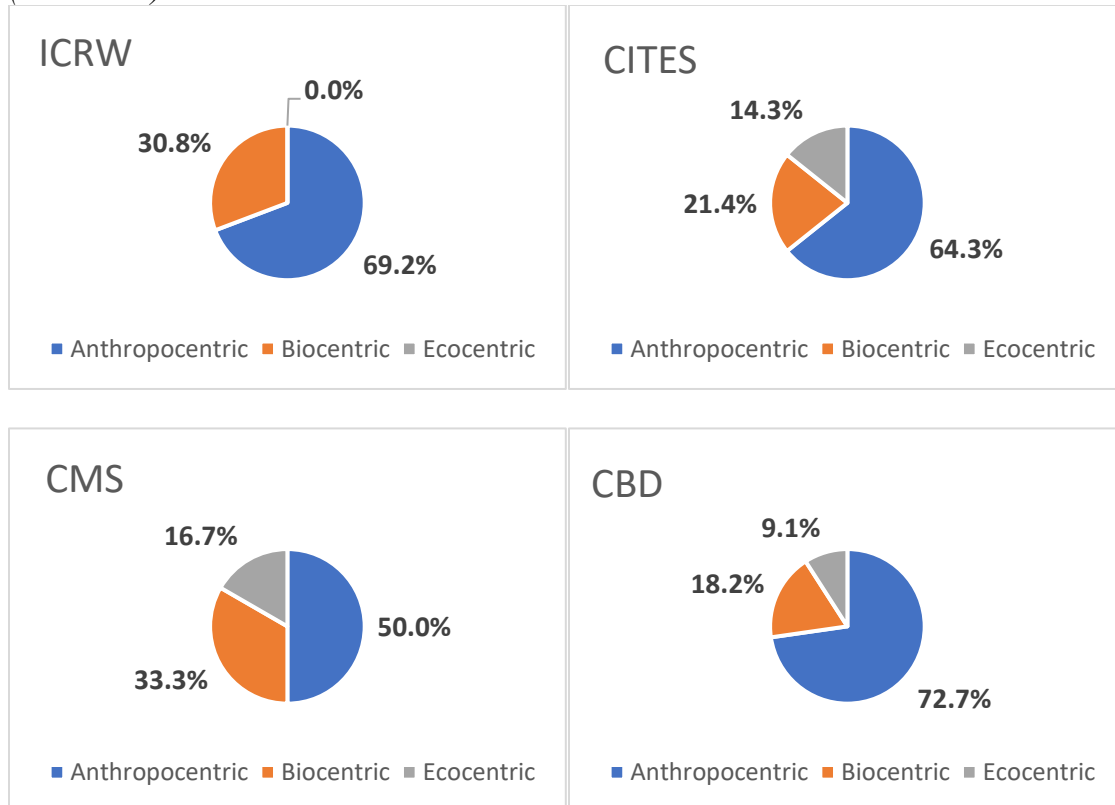
Distribution of ethical value institutional statements among the four treaty regimes by number of statements coded in each of the three environmental worldview/ethical value categories). The degree of anthropocentrism was calculated by taking the difference between the high and low percentage occurrence of anthro values and dividing it by three [(73-50)/3 = 7.5).

Environmental worldview/ethical value	ICRW {Number of coded statements coded as ethical value}	CITES {Number of coded statements coded as ethical value}	CMS {Number of coded statements coded as ethical value}	CBD {Number of coded statements coded as ethical value}
Anthropocentric/utilitarian	9	9	9	8
Biocentric/preservationist	4	3	6	2
Ecocentric/nature-centered	0	2	3	1
Total institutional statements expressing ethical value	13	14	18	11
Total constitutive statements in texts (documents containing ethical statements)	67	192	92	103
Percentage anthro (anthro ./ total institutional statements expressing ethical value)	69.2%	64.3%	50.0%	72.7%
Degree of anthropocentrism	High (65.6 - 73.3%)	Medium (57.8 - 65.5)	Low (50.0 - 57.7%)	High (65.6 - 73.3%)

CMS reflected a low degree of anthropocentrism with 50% of all coded ethical statements expressing a human-centered worldview, and the remaining half acknowledging the intrinsic value of nonhumans (biocentric, 33.3%) and nature (ecocentric, 16.7%) followed by CITES with around 35% non-anthropocentric values; a medium degree of anthropocentrism (Fig. 3.3). Both the ICRW and the CBD were ranked as having a high degree of anthropocentrism. The ICRW included about 30% biocentric values only, and with more than 70% of all ethical value statements coded as anthropocentric, the CBD emerged as the most human-centered instrument (Table 3.3, Fig. 3.3).

Figure 3.3

Pie charts depicting the percentages of ethical values expressed in the selected formal documents coded for each treaty. Anthropocentric values (blue color) dominate in all four forums, followed by biocentric (orange color) and to a lesser extent ecocentric value (gray color). The CMS forum takes the most balanced ethical perspective with 50% of all coded ethical statements expressing a human-centered worldview, while the remaining half acknowledge the intrinsic value of nonhumans (biocentric value) and nature (ecocentric).



2.3 Rule typology (horizontal rule structure)

Classifying rules *horizontally* links institutional statements to action situations via the rule typology they represent and is based on the logic of the IAD framework (Kiser & Ostrom, 1982; Ostrom, 2005, 2011). Here, the AIM of the regulatory rule syntax sorts institutional statements into one of seven rule classes which then affect elements within

the action situation (e.g. positions, participants). Sorting by AIM was thought to be applicable for most, if not all, relevant rules (including constitutive ones) and also allowed linkage across levels of analysis (Ostrom, 2005).

The “COUNTS AS” element of the constitutive rule syntax was substituted for the AIM and facilitated indirect links of constitutive rule typologies to the elements in, and rule classes affecting, an action situation (see Figs. 4-7). However, these linkages do not directly correspond to the basic regulatory AIM verbs or rule classes, partly because of the indirect relationship between constitutive and regulatory rules (Hindriks, 2009, p. 265). The only exception were position rules which appeared in the treaty texts both in regulatory and constitutive form, but with different AIMs/COUNTS AS features. Hence, the need to utilize the rule typologies introduced in this paper. Table 4 lists the 13 constitutive rule typologies, their associated “COUNTS AS” features, and linkages by functional group. The remainder of this section will briefly review the constitutive rule typologies (Table 4) and their configuration/interaction with the other elements of an action situation (see Appendices L and I for more details on these typologies and the typology syntax) before discussing the structure of constitutive treaty rules across levels of analysis. Section 4 will describe design feature feedbacks and their theoretical robustness with a focus on monitoring and opt out features.

Table 3.4

Using “Counts As” to classify constitutive rules (following Ostrom (2005) by functional grouping, and IAD regulatory and constitutive rule typology linkage.

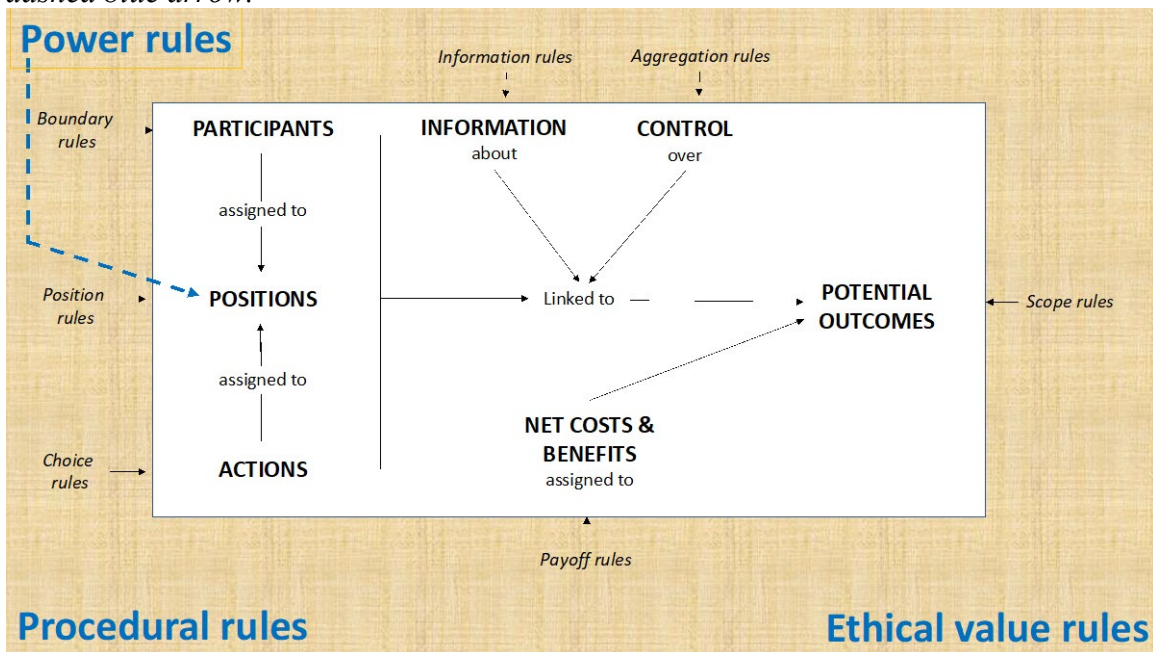
Functional grouping	Constitutive rule typology	Counts as	IAD linkage (regulatory; elements)	IAD linkage (constitutive)
Aspirational	Ethical value	recognizes acknowledges is aware/conscious/concerned shall aim (to do something related to conservation)	Action situation background - indirect influence on all rule classes Position (constitutive)	
	Procedural	desires to do something recognizes or acknowledges a need	Action situation background - indirect influence on all rule classes	
	Power	shall have the right (responsibility)/shall be relieved (of a responsibility) shall (shall not) affect shall not prejudice assumes (power) serves (another entity)	Action situation background; Indirect influence on positions in action situation	
New contextual criteria	Definition	means/will be taken to mean shall be construed is defined is considered	Boundary, information, aggregation	None
	Position	agree to or shall establish is composed	Boundary, position, choice, information, aggregation, scope	Ethical value
	Party-to-the-Law	shall be represents has the mandate	Choice, information, aggregation	Application
Existing contextual criteria	Statement of Fact	has reported/prepared/worked/received/made is aware/concerned directs	Action situation background (good to know information)	None
	Status	is recognized/recalled as providing sets out represents	Choice, information, aggregation, payoff	Party-to-the-Law, definition, procedural, ethical value
	Con-Reg	shall be deposited shall be (some language provision)	Choice, information	None
Constitutive boundary conditions	Commencement	shall enter (into force)/shall cease (to be in force) shall remain (open for signature/accession) shall take effect is adopted	Boundary, information	None
	Amendment	shall (shall not) become (effective) repeals	Information	Application
	Application	includes/does not include applies/does not apply	Choice, information	Amendment, Party-to-the-Law
	Relative necessity	shall be deemed is regarded as is understood as	Boundary, choice	None

2.3.1 Aspirational group

Constitutive rule typologies in the aspirational group outline the aspirations and aims of the treaty drafters—the way they envisioned the world ought to be (Searle, 1995, 2010). These are institutional statements that express ethical values, outline desirable authority structures, and procedural goals. Figure 3.4 visualizes how aspirational rules provide the contextual backdrop to a given action situation where procedural and ethical value rules indirectly influence all seven regulatory rule classes, while power rules also indirectly influence positions within the action situation.

Figure 3.4

Action situation adapted from Ostrom (2005, p. 189) depicting the aspirational constitutive rule group providing the contextual background within which the action situation is embedded. The influence generated through ethical value and procedural rules is indirect and can affect a variety of rules. This indirect connection is expressed by representing these constitutive rules in the background tapestry of the action situation. The power rule also operates in the background but additionally can be connected to the Positions in the action situation box. This additional connection is indicated with a dashed blue arrow.



2.3.1.1 Ethical value rules | Counts As: Recognizes, acknowledges, shall aim, is aware/conscious/concerned

Ethical value rules (3-7% occurrence rate; Data Table, Appendix J) outline the ethical considerations that led to the development of the regime. They express the idealized goals, hopes, and aims of the treaty drafters and, in the case of resolutions, of the States that were Parties at the time a resolution was adopted. Once accepted/adopted,

they become a part of the background tapestry of an action situation from which they indirectly influence the other regulatory rule classes (Fig. 3.4). As outlined earlier, the treaty texts expressed degrees of anthropocentric values which should guide decision-making in the forums.

2.3.1.2 Power rules | Counts As: shall/shall not have the responsibility); shall/shall not affect; shall not prejudice, assumes (power); serves (another entity)

Power rules (2-5% occurrence rate) perform two functions. First, they convey or cede power and authority to specific actors within the forums with regard to their responsibilities/duties as individuals or as state actors in relation to other international instruments and domestic activities. Second, they attempt to provide equity within the treaty power structure by providing technical or financial assistance to member states. As such, they are implicitly connected to positions within the action situation and also indirectly influence the decision-making/actions of certain actors by providing them with power or funding through various regulatory rule classes (Fig. 3.4).

2.3.1.3 Procedural (aspirational) rules | Counts As: desires to do something/recognizes or acknowledges a need

Procedural (aspirational) constitutive rules are the practical cousin of ethical value rules. They describe the conditional background context that necessitated the need to create/modify the rules without directly connecting to any of the rule classes or elements in the action situation (Fig. 3.4). Because they outline procedural aspirations, procedural rules can be traced to regulatory rules designed to address the desired procedures, thus,

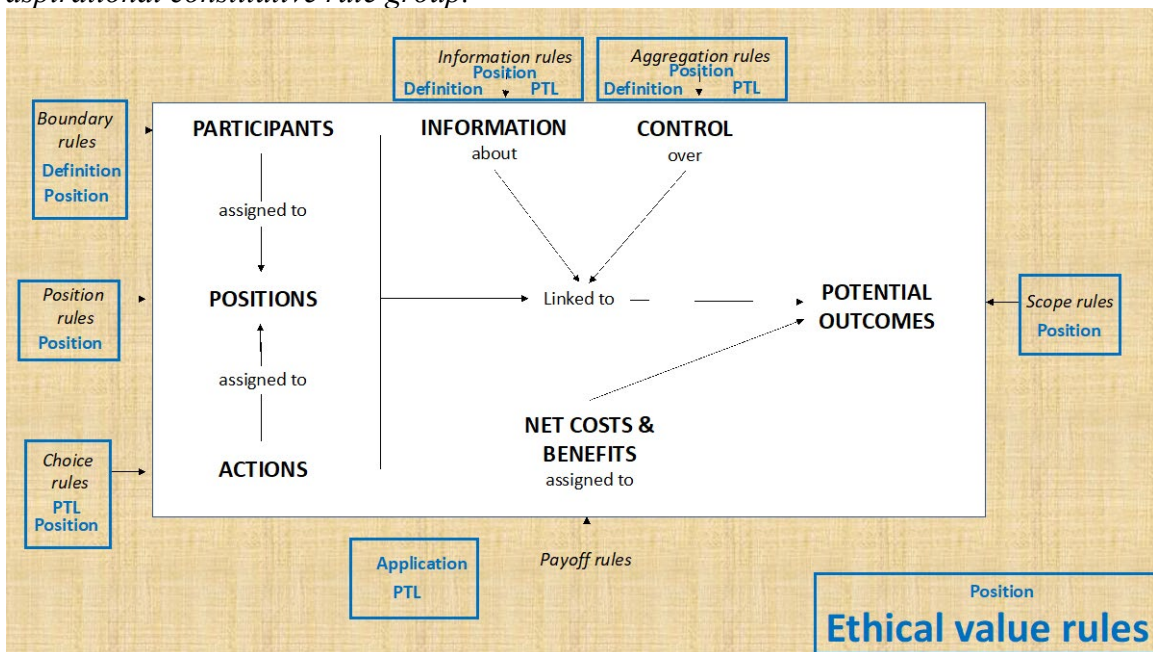
providing an indicator of rule completeness and internal fit. Procedural rules occurred quite frequently in nearly all treaty formal documents with the ICRW containing less (9%) than the U.N. treaties (14-21%).

2.3.2 New contextual criteria group

Constitutive rules can create and specify new forms of behavior (Grossi et al., 2006) by establishing and defining the foundational context from which to build the treaty regime. Constitutive rules in the new contextual criteria group outline core definitions, create new positions, and assign new functions to existing positions/processes within the treaty regimes. In doing so, these constitutive rules link with all but the payoff regulatory rules. They also couple with constitutive application and ethical value rules. Figure 3.5 visualizes these linkages.

Figure 3.5

Action situation adapted from Ostrom (2005, p. 189) depicting the constitutive new contextual criteria constitutive rule group and their linkages to the regulatory and constitutive rules in the treaty texts. Constitutive rules are depicted in blue letters. Black letters outside the action situation box represent regulatory rules and their impact on components within the action situation are depicted through black arrows. Blue boxes outline the indirect interactions between constitutive rules of the new contextual group and the regulatory rules that they are connected to. In addition to interacting with regulatory rules, PTL (Party-to-the-Law) and constitutive application rules interact with each other, as do position and ethical value rules; the latter of which is from the aspirational constitutive rule group.



2.3.2.1 Definition rules | Counts As: means/will be taken to mean/shall be construed/is defined/is considered

Definition rules define abstract concepts of objects, thereby making a particular legal effect or state of affairs within a certain context possible (Ceci, et al. 2018). This includes defining, e.g., what it means to be a Party within a particular treaty regime. The

coding of definition rules revealed a gap between the two regulatory instruments with a 23% occurrence rate in the ICRW versus only 9% in CITES (Data Table, Appendix J). CMS and CBD were similar at 12% and 11%, respectively. In the treaty texts, definition rules link to regulatory boundary, information, and aggregation rules (Fig. 3.5).

2.3.2.2 Position rules | Counts As: agree to or shall establish/is composed

Much like their regulatory cousin, constitutive position rules (3-7% occurrence rate) identify/establish new roles to be filled by actors/entities and outline the number of individuals who can occupy these positions (Basurto et al., 2018). They represent core contextual criteria within a regime and are associated with new forms of behavior. For example, the establishment of the Standing Committee in CITES not only creates a new entity within the forum but also transfers some of the power of the Conference of the Parties (COP) to this entity so that it may handle conservation matters intersessionally (i.e., between meetings). Position rules link with constitutive ethical rules, as well as all regulatory rule classes, except payoff rules (Fig. 3.5).

2.3.2.3 Party-to-the-Law rules | Counts As: shall be/represents/has the mandate

Party-to-the-Law (PTL) rules (1-2% occurrence rate) assign new functions, authority, and responsibilities to existing entities or processes within the treaty regimes (Ceci et al., 2018). These assignments outline new decision-making parameters that give the existing position/actor the ability to affect and be affected by regulatory rules previously not under their purview. For example, making the COP the decision-making organ in a Convention assigns new functions to the previously existing entity, thus

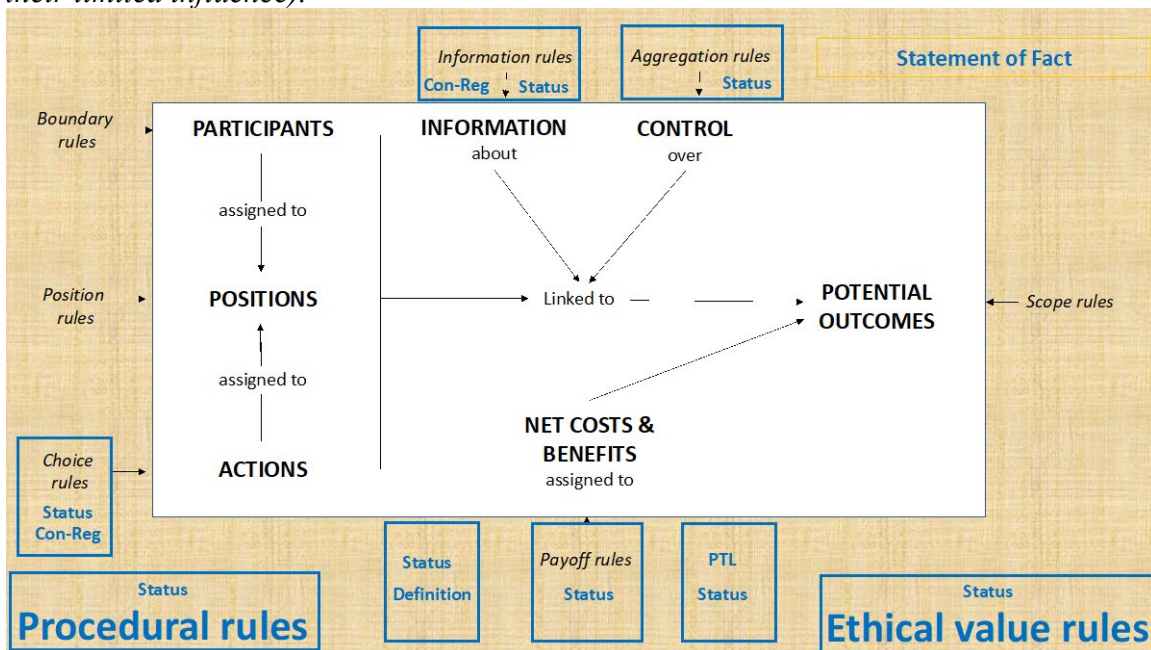
imbuing it with new authority and the ability to affect and be affected by regulatory rules differently than before. By identifying ATTRIBUTES/actors and assigning new values to these positions/entities, PTL rules serve as key node identifiers in governance structures. This information can be usefully explored in network analyses of forum participant interactions. PTL rules link with choice, information, and aggregation rule classes, as well as with constitutive application rules (Fig. 3.5).

2.3.3 Existing contextual criteria group

Constitutive rules can also provide information on the existing contextual criteria or precedents under which a legal regime is operating (S. Siddiki, personal communication). Constitutive rules in this group report on work performed, represent how particular aspects of treaty governance are provided, and outline language and deposit requirements. These rules link with choice, information, aggregation and payoff rules. Additionally, status rules connect with several constitutive rules. Statement of fact rules do not link with any rules and operate in the background of an action situation similarly to aspirational constitutive rules but their influence is more limited. Figure 3.6 visualizes these linkages.

Figure 3.6

Action situation adapted from Ostrom (2005, p. 189) depicting the existing contextual criteria constitutive rule group and their linkages to regulatory and constitutive rules in the treaty texts. Constitutive rules are depicted in blue letters. Black letters outside the action situation box represent regulatory rules and their impact on components within the action situation are depicted through black arrows. Blue boxes outline the indirect interactions between constitutive rules of the new contextual group and the regulatory rules that they are connected to. In addition to interacting with regulatory rules, status constitutive rules also interact with PTL (Party-to-the-Law), procedural, ethical value, and definition constitutive rules. Statement of fact rules do not have any linkages with constitutive or regulatory rules, as they provide background/”good to know” information. Accordingly, they are represented as operating in the background similarly to aspirational rules but with a more limited influence (and smaller font size to represent their limited influence).



2.3.3.1 Statement of Fact rules | Counts As: has

reported/prepared/worked/received/made/is aware/concerned/directs

Statement of fact (SOF) rules (15-21% occurrence rate) represent generic operational treaty governance parameters which outline the completion of some work or

project by one entity for or on behalf of another entity, or the reporting of future work that will soon be done. These “report back” statements often occur at the beginning of Resolutions/Decisions where they explain the reasons for certain decision-making. They do not directly link with regulatory rules, instead providing background information that is useful to know but not as critical as, e.g., definition rules (Fig. 3.6).

2.3.3.2 Status rules | Counts As: is recognized/recalled as providing/sets out/represents

Status rules represent contextual criteria that can serve two functions. First, they can reveal particular aspects of treaty governance that might not be captured elsewhere. For example: “it is the understanding and practice of a majority of CITES Parties that the establishment of quotas [for Appendix I species] satisfies the [requirement] that the export of a specimen will not be detrimental to that species’ survival” (CITES, 1994 (Rev. 2019)).

Second, status rules can also serve as reminders of existing decisions (precedents) that the proposed resolution either aims to modify or build upon. For example, status rules advising Parties that although the Convention provisions do not require prior support from range states for listing proposals, doing so was recommended in prior resolutions. Status rules link with a variety of regulatory and constitutive rules (Fig. 3.6). Their occurrence rate is different in the ICRW than in the U.N. treaties; 16% versus 20-26%, respectively (Data Table, Appendix J).

2.3.3.3 Constitutive-Regulatory (Con-Reg) rules | Counts As: shall be deposited/some language requirement

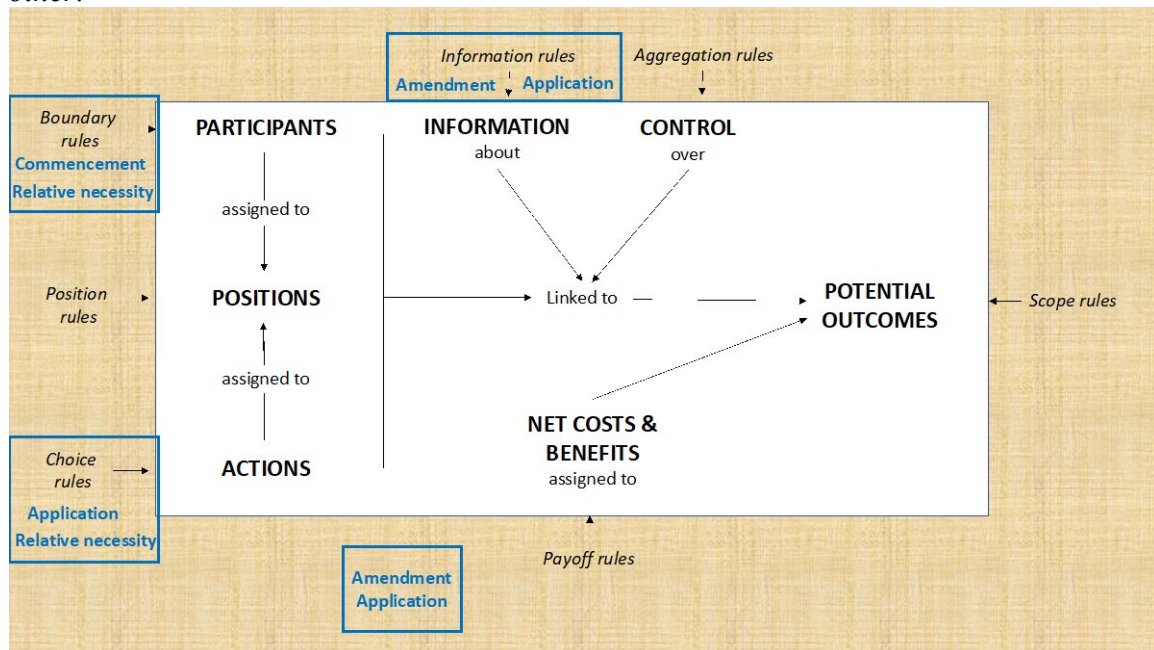
Con-Reg rules (1-3% occurrence rate) represent *hybrid* constitutive rules that operate in a space that is neither fully constitutive nor regulatory. Although they include DEONTIC operators, their linguistic structure (passive voice, no specific actor performing an action) makes coding them as regulatory challenging. Official language and/or deposit requirements for the original treaty Convention text were coded as Con-Reg and link to choice and information rules (Fig. 3.6).

2.3.4 ***Constitutive boundary conditions group***

Constitutive rules also outline the generic parameters or boundaries under which decisions are to be made (S. Siddiki, personal communication) by describing the start and end dates for regulations, the means to add or remove existing legal status from rules, the partitioning of the applicability of certain rules, and the preconditions that have to be met for certain conditions/processes to apply. These rules link with boundary, information, and choice rules. Additionally, application and amendment rules connect with each other. Figure 3.7 visualizes these linkages.

Figure 3.7

Action situation adapted from Ostrom (2005, p. 189) depicting the constitutive boundary conditions rule group and their linkage to the regulatory and constitutive rules in the treaty texts. Constitutive rules are depicted in blue letters. Black letters outside the action situation box represent regulatory rules and their impact on components within the action situation are depicted through black arrows. Blue boxes outline the indirect interactions between constitutive rules of the boundary conditions group and the regulatory rules that they are connected to. In addition to interacting with regulatory rules, amendment and application constitutive rules in this group also interact with each other.



2.3.4.1 Commencement rules | Counts As: shall enter (into force)/shall cease (to be in force)/shall remain (open for signature/accession)/shall take effect/is adopted

Commencement rules (5-11% occurrence rate) outline the beginning or end time parameters at which a particular law or legislative document enters into effect or ceases to be legally effective (Ceci et al., 2018). For example: “Amendments adopted at a

meeting shall enter into force 90 days after that meeting for all Parties” (CITES, 1973 Article XV(1)(c)). As such, they often link with boundary rules (Fig. 3.7).

2.3.4.2 Amendment rules | Counts As: shall (shall not) become (effective)/repeals

Amendment rules provide the parameters under which new forms of behavior are defined by adding, removing, or modifying existing legal effects/state of affairs. In doing so, amendment rules immediately create new legal effects/state of affairs (Ceci et al., 2018). These rules link with information and constitutive application rules (Fig. 3.7) and occurred only in the wildlife treaties (CITES and CBD) where they made up about 2% of all constitutive statements (Data Table, Appendix J). Neither the CBD nor the ICRW have dedicated repeal processes and all resolutions/decisions remain active, thus, eliminating the need for amendment rules (see, e.g., CBD, 1996 Decision III/3) (IWC, 2020d).

2.3.4.3 Application rules | Counts As: includes/does not include/applies/does not apply

Application rules (3-8% occurrence rate) represent constitutive rules that, without constituting new entities, create necessary conditions for an event to occur (Ceci et al., 2018, p. 110 Table 2). As such, they outline the specific parameters within which new forms of behavior are to be applied. Application rules link with choice and information rules, as well as constitutive amendment rules (Fig. 3.7).

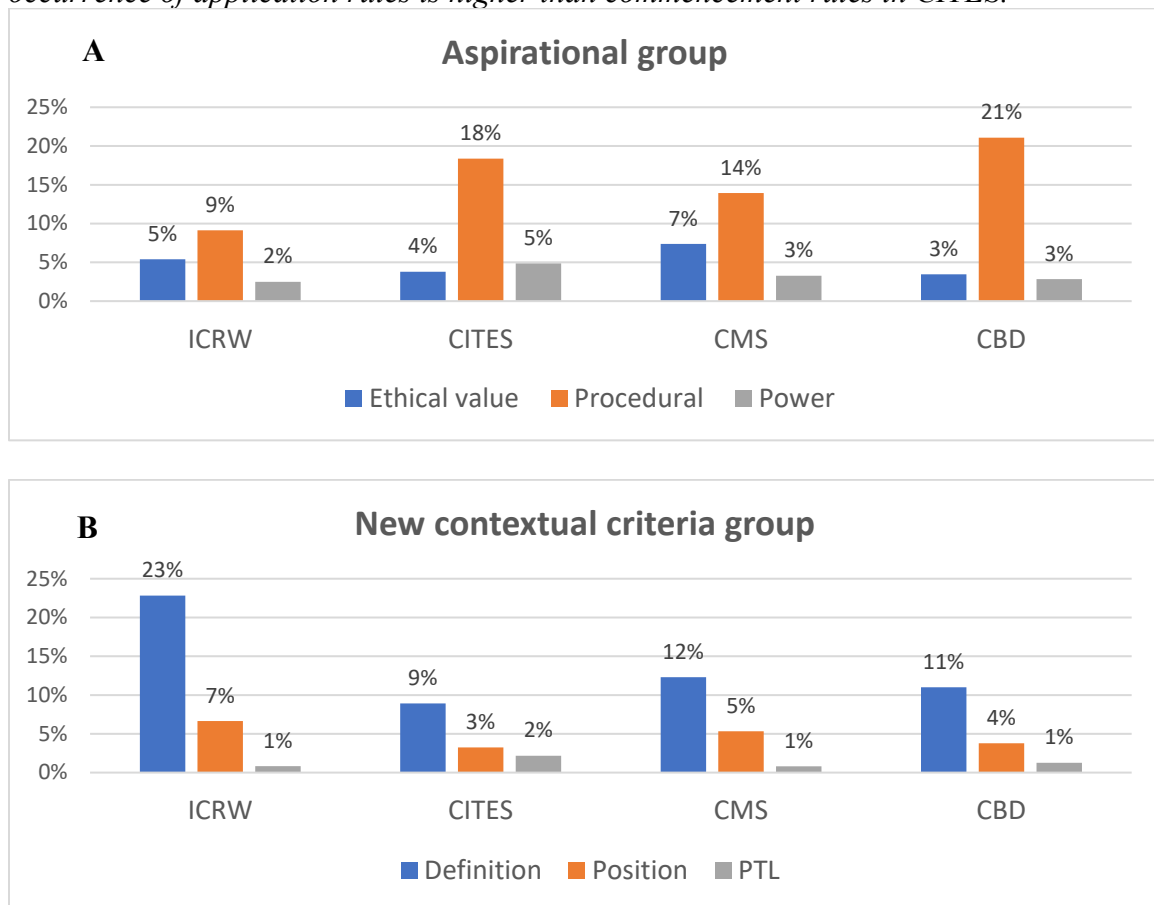
2.3.4.4 Relative necessity rules | shall be deemed/is regarded as/is understood as

Relative necessity rules (3-4% occurrence rate) represent preconditions that need to be present in order to trigger the application of another rule which then restricts or

expands the jurisdictional reach of the actor/legal entity. In doing so, they outline a particular context which needs to be present for a certain set of decision-making authority to apply and often link with boundary rules (Fig. 3.7).

Figure 3.8

Constitutive rule typology distribution by typology group and by treaty. Graphs reflect very similar distribution of rule classes across regimes with the exception of the constitutive boundary group where the wildlife treaties include amendment rules and the occurrence of application rules is higher than commencement rules in CITES.



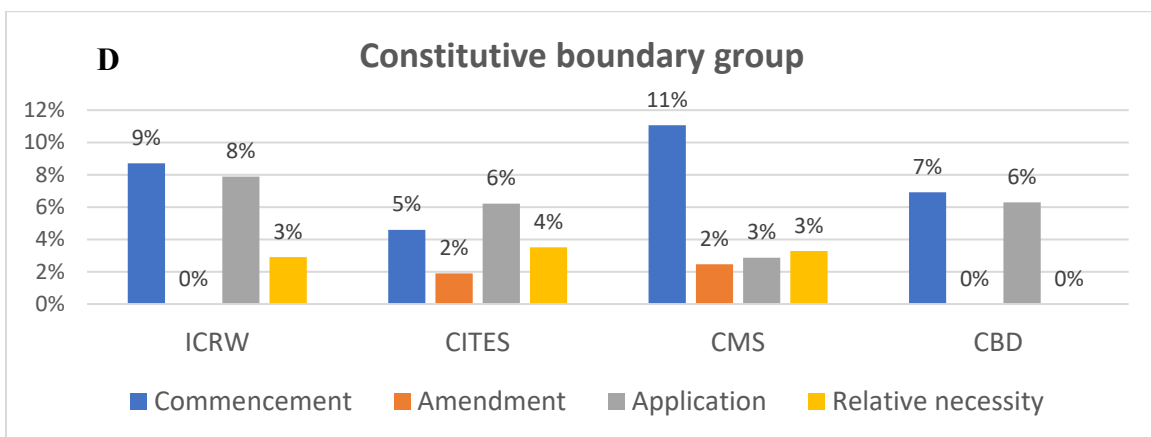
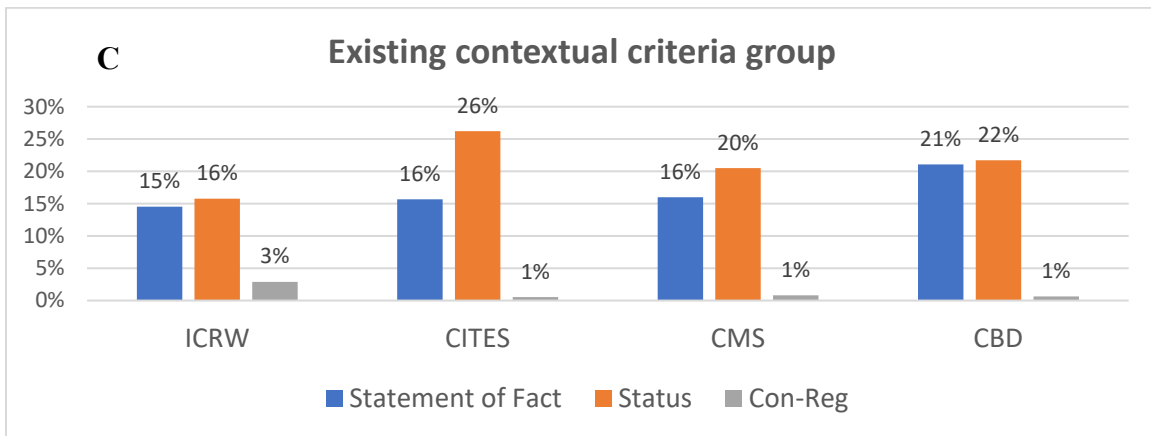


Figure 3.8A-D outlines the distribution of rule classes in each constitutive rule grouping revealing substantial similarities in rule composition across regimes. The pattern is interrupted in the constitutive boundary group where the use of amendment rules reveals the formal resolution process in the wildlife treaties (CITES and CMS) which does not exist in the ICRW and CBD. CITES also favors the use of application rules in its rule-making over commencement rules, while CMS’ overuses commencement rules by including statements of adoption at the beginning of each resolution passed.

Finally, the CBD did not define any preconditions in the texts included in this analysis resulting in zero relative necessity rules.

2.4 Levels of analysis (vertical rule structure)

The IAD framework organizes decision-making by action situations which are conceptual areas “where policy choices are made” (McGinnis, 2011). Figures 3.4-3.7 are instantiations of action situations in which certain groups of constitutive rules influence regulatory policy choices. These interactions can be examined *vertically* at three different levels of action (or analysis); each representing a different authoritative relationship. At the *operational level*, constitutive rules indirectly influence the rules that outline choices actors shall or should make (Carter, 2017 Table 2), e.g., application rules applying the convention rules to factory ships and whale catchers in the ICRW. At the *collective choice level*, constitutive rules influence authoritative decisions related to rule making, rule changing, monitoring and enforcement activities (Carter, 2017), e.g., by defining core contextual criteria, such as migratory species and specimens, as well as defining the power structure and applicability of rules. Finally, at the *constitutional choice level* constitutive rules influence the rules that guide the entities dictating decisions at the collective choice level (McGinnis, 2011), e.g., power rules that reaffirm contracting States’ sovereign rights over resources.

Figure 3.9

Graph depicting the distribution of constitutive institutional statements across the four treaty regimes by rounded percent total. Graph reveals most constitutive rules occurred at the collective choice level of analysis across regimes followed by operational and constitutional choice level. (Data taken from Data Table, Appendix J).

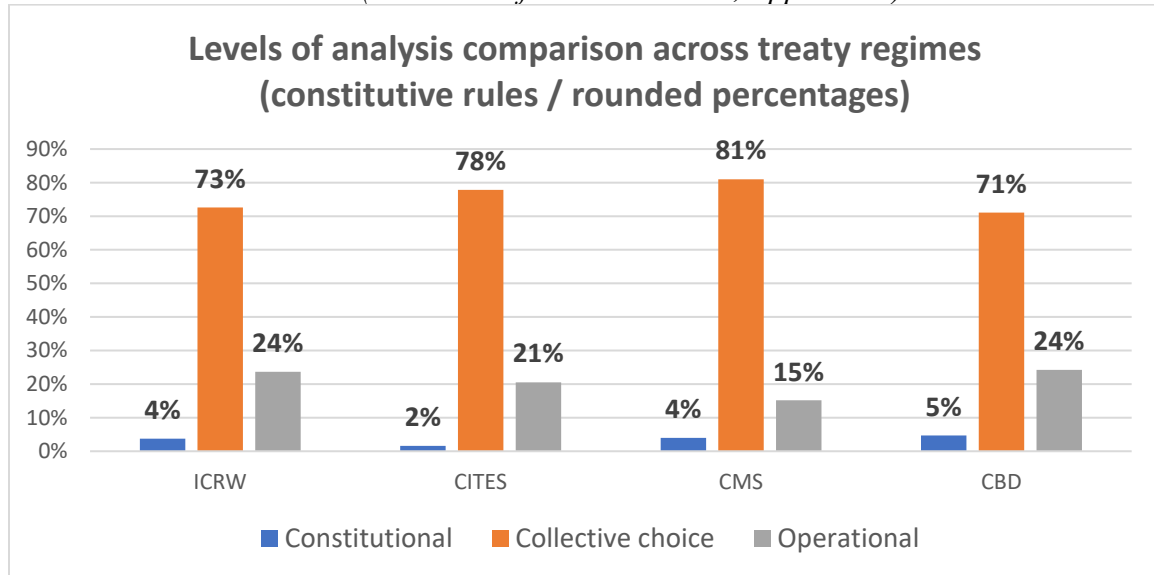


Figure 3.9 outlines the distribution of constitutive rules across analysis levels by treaty regime and reflects an emphasis on authoritative decision-making at the collective choice level in all forums. In general, constitutive rules are similarly distributed across levels of analysis with minor differences in the constitutional choice and operational level rules where CITES and CMS are outliers. CITES only devotes 2% of its rules to the constitutional level, and CMS focuses the least on operational level rules (15%) in contrast to the other three regimes. More details can be found in Appendix M and will be discussed in Section 3 as they relate to monitoring and opt out mechanisms.

Coding constitutive rules *vertically* allows not only an analysis of the hierarchical decision-making processes but also the relationship between constitutive and regulatory rules at various authority levels which can be cross-linked with the institutional design principles (Ostrom, 1990, 2005; Carter et al., 2015) to provide further information on the internal fit and robustness of the rule structure (Controller K_t).

3 Discussion

Parsing the constitutive statements in the treaty documents demonstrated static rule structures that articulate their policy foundations and aims as institutional facts which indirectly affect regulatory rules at various levels of analysis. While the occurrence rate of treaty regulatory rules was consistent across regimes (with some exceptions), the constitutive rules showed greater variation with both the ICRW and CMS assuming outlier status. Ethical values expressed in the treaty texts revealed CBD and the ICRW as highly anthropocentric instruments, whereas in CITES and CMS the degree of anthropocentrism was medium to low, respectively. Amendment rules were indicators of regimes that include a formal resolution repeal process (CMS and CITES) and those that do not (ICRW and CBD). Finally, the number/percentage of constitutional choice level statements in the treaty regimes seemed to increase over time, with the CMS and CBD including the highest number/percentage (Data Table, Appendix J). This indicates a greater emphasis on outlining the given context and aspirations in younger regimes than in the older, more regulatory ones. A pattern that is particularly noticeable in the CBD which includes nearly double as many constitutive aspirational statements in its

Convention text than the ICRW (Appendix J). Whether these aspirations are matched by the requisite regulatory rules will be part of this analysis, as will be the processes they generate with a focus on monitoring and opt out procedures.

3.1 Using monitoring mechanisms to determine fit

Examining monitoring mechanisms to determine the internal fit of regulatory and constitutive rules allowed a more bounded comparison across regimes which would not be possible by cross-comparing the composition of all formal documents due to variation in document size and number of statements/documents between regimes. Furthermore, as the process model (Fig. 1) outlines, monitoring and information sharing processes (x and x_h) are crucial to generating robust decision-making feedbacks (u_s) within a SES.

Knowledge about the system, even though it can never be perfect, allows informed assessments of vulnerability/robustness trade-offs by Sensor H and Controller K_{cop} which—when supported by the appropriate rules (Controller K_t 's software design)—can enhance the likelihood of the system functioning within desirable parameters.

Research into long-lasting small-scale common-pool resource (CPR) governance systems has confirmed that effective “monitoring and sanctioning arrangements” (Ostrom et al., 1994, p. 48) can help transform social dilemma situations. Some of the most enduring CPR systems included three forms of monitoring (i.e., institutional design principle DP4): resource monitoring (DP4A); appropriation monitoring (DP4B); and monitoring the monitors (DP4C), as well as graduated sanctions (DP5) (Ostrom, 2005). In global resource governance systems, monitoring has been found to improve rule

compliance; one element of robust institutional design (Dietz et al., 2003). International regime scholars also see monitoring and enforcement as crucial but focus more on the information sharing aspect. Providing state actors with information on others' behavior is thought to increase cooperation and compliance by signaling to participants that (a) their behavior is being monitored, and (b) defection will result in consequences (Keohane et al., 1994). Institutional design that provides a variety of monitoring systems conducted by different entities is generally recommended (Martin, 1995). This section will draw on these findings to assess the linkages between constitutive and regulatory rules as they relate to monitoring and information sharing/reporting feedbacks horizontally (at one analysis level) and vertically across levels.

3.2 Monitoring mechanisms in the ICRW

In the ICRW, the horizontal constitutional choice level rules lay the supra-national conceptual foundation for a system of whale fisheries regulation (procedural rule) to conserve and develop whale stocks based on utilitarian fisheries management philosophies and one "biocentric" acknowledgement that whales require "protection" from overfishing (ethical rule). These constitutive rules loosely guide the development of the rule design at the lower analysis levels. At the collective choice level an additional procedural aspirational rule "desires" to include whaling inspections in its Schedule (Table 3.5 indicated in red font). This constitutive rule is horizontally matched by position and boundary rules mandating Governments create (maintain) these positions on factory ships/whale catchers, and that they are responsible for appointing and paying the

inspectors (Table 3.5, yellow-highlighted cells). At the operational level, information rules require whaling operators to record whaling data and to provide inspectors access to those records.

In combination, the yellow-highlighted rules in Table 3.5 establish a means to monitor appropriation (design principle DP4B) at the operational level and to monitor the appropriation monitors (DP4C) at the collective choice level. However, a formal vertical reporting feedback to the authoritative level is lacking. There are no corresponding regulatory rules at the operational level that outline whaling inspectors' responsibilities with regard to the inspected data, e.g. are they to provide inspection reports and, if so, who are they to report to? This means the collective choice procedural aspiration of including inspection methods is only partially met due to this gap in the internal rule fit at the operational level and the lack of vertical reporting feedback mechanism to an entity with oversight responsibility at the collective choice level. In this instance, the Commission only has the authority to make general recommendations on matters relating to whales and whaling (Table 3.5); a weak vertical link which does not provide direct oversight capacity.

In practice, subsistence whalers in Greenland utilize fisheries and hunting inspectors which monitor the hunts and report back to their government (IWC, 2015). It is unclear, however, whether this practice is adopted in other whaling communities and what, if any oversight, the Commission has on these matters. Even if this practice is widely adopted and the Commission is informally tasked with oversight, improving the

horizontal and vertical fit through formal rule configurations (e.g., coupled PTL, information, and aggregation rules) would clarify and fill existing rule gaps in the whaling inspection process. This, in turn, would likely enhance the ICRW’s ability to meet its constitutional choice level aspirations and goals of safeguarding whale stocks and preventing “overfishing” (Table 3.5).

Table 3.5

ICRW monitoring mechanism demonstrating the horizontal and vertical connections between constitutive and regulatory rules. Statements are modified from their original version and do not include all relevant statements. Red font indicates constitutive rules. Yellow and green-highlighted cells indicate fit between linguistic forms and/or across analysis levels with regard to the whaling inspectors (yellow highlight) and reporting requirements (green highlight).

ICRW Monitoring mechanism			
Constitutional choice level (constitutive rules)			
Rule typology	Actor	Statement	DP
Ethical (anthropocentric)		Nations' interest to safeguard whales for future generations	
Ethical (biocentric)		Whaling history has seen overfishing of areas and species to a degree that it is essential to protect all whale species from further overfishing	
Procedural		Desiring to establish an international regulation system to ensure proper and effective conservation and development of whale stocks	
Collective choice level			
Rule typology	Actor	Statement	DP
Aggregation	Commission	make recommendations to Contracting Gov. on any matters relating to whales or whaling and to the objectives and purposes of the Convention	DP4C
Procedural	Contracting Gov	desiring to include provisions on methods of inspection among Schedule provisions	DP4C
Position (regulatory)	Contracting Gov	maintain at least two inspectors of whaling on factory ship and at least one inspector on each catcher	DP4C
Boundary	Contracting Gov	appoint and pay inspectors	DP4C
Operational level			
Rule typology	Actor	Statement	
Information	Master of factory ship/whale catcher	enter whaling data in a permanent record	DP4B
Information	Master of factory ship/whale catcher	make available permanent whaling record to whaling inspectors	DP4C

3.2.1 Opt out mechanism

Intact reporting mechanisms are also important in the context of opt-outs (Table 3.6). At the collective choice level, the filing of an objection to a Schedule amendment by any ICRW Government triggers a 90-day pause on the Schedule amendment becoming effective (commencement rule). During that time period any Contracting Government can present an objection to a Schedule amendment (regulatory boundary rule) after which the amendment is not effective for those member states who filed objections (commencement rule) (Table 3.6, red-highlighted cells). This reveals a good horizontal match between the aggregation rule providing the Commission with the authority to amend the Schedule and concomitant constitutive commencement and regulatory boundary rules that allow Governments to file objections and the constraints for doing so. It also represents evidence of DP3 (collective choice arrangements) by allowing those who are affected by the rules (member states) to influence the rules that affect them (Ostrom, 1990).

At the operational level, the Commission is required to notify all Governments of objections, and the Governments need to acknowledge receipt of the same (information rules). Again, a structure is created to facilitate information sharing related to the opt-out process but no feedback across analysis levels is generated to monitor and report on whaling conducted under objection. There is a general information rule at the operational level that requests Governments transmit scientific information on whales and whaling, but it does not specify the body to report to nor does it state that it applies to whaling

under objection. There is also no separate rule at the collective choice level to which these structures could connect, meaning the fit across levels between the constitutional choice aspiration to safeguard whales for future generations could be undermined by a lack of oversight into whaling under objections at the collective choice level (missing position/PTL and aggregation rules).

Some may argue that opt outs exempt countries from their obligations under the Convention for the species under objection. However, since the Governments remain ICRW Parties, their commitment to uphold the core aspirational and procedural objectives of the Convention remain and should require, at a minimum, sharing statistics on species killed under objection since such activities may jeopardize overarching treaty aspirational goals. In practice, ICRW countries whaling under objections, like Iceland and Norway, have been reporting their catches annually to the Commission (IWC, 2020k). While that is encouraging and provides opportunities for oversight, formalizing those actions via coupled cross-level constitutive and regulatory rules would improve information flows and reduce the opportunities for non-reporting that exist under voluntary reporting requirements.

Table 3.6

ICRW opt out mechanism constitutive and regulatory rule configurations. Constitutive rules are identified by red font letters.

ICRW Opt out mechanism			
Constitutional choice level (constitutive rules)			
Rule typology	Actor	Statement	DP
Ethical (anthropocentric)		Nations' interest to safeguard whales for future generations	
Ethical (biocentric)		Whaling history has seen overfishing of areas and species to a degree that it is essential to protect all whale species from further overfishing	
Collective choice level			
Rule typology	Actor	Statement	DP
Aggregation	Commission	may amend the provisions of the Schedule by adopting regulations with respect to the conservation and utilization of whale resources,	DP3
Commencement		[Schedule] amendments shall become effective with respect to the Contracting Governments ninety days following notification	DP3
Commencement		except Schedule amendment shall not become effective with respect to any Government for an additional 90 days if any Government presents an objection	DP3
Boundary	any other Contracting Government	can present objection to the Schedule amendment during the additional 90 day time period	DP3
Commencement		thereafter Schedule amendment becomes effective for any Government which has not presented objection	DP3
Commencement		but shall not become effective with respect to any Government filing objection until objection is withdrawn	DP3
Operational level			
Rule typology	Actor	Statement	DP
Information	Commission	notify each Contracting Government of each objection and withdrawal received	DP3
Information	Contracting Gov	acknowledge receipt of all notifications of ... objections	DP3
Information	Contracting Gov	transmit to such body as may be designated by the Commission in so far as practicable, annually, scientific information available re whales and whaling...	DP4C

3.3 Monitoring mechanisms in the CITES

Constitutional choice ethical rules in the CITES outline the anthropocentric values of wild fauna and flora and the need to protect the same. These are coupled with procedural aims that express the urgent need to engage in international cooperation efforts to protect commercially-valuable species from international trade overexploitation (Table 3.7). At the collective choice level, a constitutive application rule advises that the provisions of Convention Articles III, IV, and V apply to all trade in Appendix-listed

species. The Convention also provides the Parties (as a collective body) with the oversight authority to ensure that any trade that occurs meets those provisions, which includes the mandate to receive and consider reports, and the power to review and make recommendations related to treaty implementation and effectiveness (four aggregation rules). This constitutes a good horizontal match between constitutive and regulatory rules at the collective choice level.

At the operational level, three actors/entities are involved in ensuring operationalization of the collective choice rules. The Parties (individually) are tasked with ensuring and enforcing trade within the parameters of the provisions outlined in the application rule, as well as maintaining trade records, preparing implementation reports and transmitting them to the Secretariat (information and choice rules) (Table 3.7). Additionally, domestic Scientific Authorities are charged with monitoring export permits and actual exports, and the Secretariat is directed to study Party reports (choice and information rules). There are no constitutive rules at this analysis level, but the regulatory rules outline complementary monitoring and reporting responsibilities. They also create vertical linkages to the collective choice level application rule, e.g., by only allowing trade in accordance with Article provisions. The vertical reporting feedback to the authoritative body is indirect with the Parties required to submit their reports to the Secretariat at the operational level which then compiles a report for the COP on the implementation of the Convention (statement not included in Table 3.7). Operational level information gathering activities, like the Parties' annual trade reports, are also

distributed to the Secretariat for further study (information and choice rules) before being received and considered by the Parties as a collective body at the collective choice level (aggregation rule).

Table 3.7

CITES monitoring mechanism example demonstrating the horizontal and vertical connections between constitutive and regulatory rules as they relate to monitoring trade in Appendix-listed species. Statements are modified from their original version and do not include all relevant statements. Red font indicates constitutive rules.

CITES			
Monitoring mechanism			
Constitutional choice level (constitutive rules)			
Rule typology	Actor	Statement	DP
Ethical (ecocentric)	Contracting States	recognize wild fauna and flora in their beautiful and varied forms as irreplaceable parts of earth's natural systems	
Ethical (anthropocentric)	Contracting States	which must be protected for this and generations to come; conscious of value of wild fauna and flora:	
Procedural	Contracting States	International cooperation is essential for protection of certain species against over-exploitation through international trade	DP8
Collective choice level			DP
Application	Contracting Governments	Trade in Appendix I, II, and III specimens should be in accordance with the provisions of Articles III, IV, and V	
Aggregation	Parties (collectively)	review implementation of the Convention	DP4C
Aggregation	Parties (collectively)	receive and consider reports presented by Secretariat or Party	DP4C
Aggregation	Parties (collectively)	make recommendations for improving effectiveness of the Convention	DP4C
Aggregation	Parties (collectively)	make recommendations for implementation of Convention aims and provisions	DP4C
Operational level			DP
Choice	Parties	shall not allow trade in specimens of Appendix I, II, or III species, except in accordance with the provisions of the Convention	DP2
Choice	Parties	take measures to enforce Convention provisions	DP4C
Choice	Parties	prohibit trade in specimens in violation of treaty, including measures to penalize trade...	DP5
Information	Parties	maintain records of trade of Appendix I, II, and III species	DP4B
Choice	Parties	prepare periodic reports on implementation of the Convention	DP4C
Information	Parties	transmit to Secretariat annual report on trade; biennial report on legislative, regulatory and admin. measures taken to enforce Convention	DP4C DP5
Information	Scientific Authority	monitor both export permits granted and actual exports; advise Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of species in order to ensure population is maintained throughout its range...	DP4B
Choice	Secretariat	study reports of Parties	DP4C

This monitoring and reporting feedback facilitates oversight to ensure that trade in Appendix-listed species meets the provisions in the Convention as outlined by the

constitutive application rule (internal fit between regulatory and constitutive rules), although the reporting feedback between the individual Parties, Secretariat, and the Parties as a collective body could be made more explicit. While the review of Party reports by the Secretariat is good practice, one would hope that authoritative decision-making does not rely on summarized reports only, and that the governing body has the opportunity to review unfiltered Party reports.

3.3.1 *Opt out mechanism*

Like the ICRW, CITES allows its Parties to file opt-outs when faced with species listings they oppose. However, unlike in the ICRW, there is a formal recognition that such reservations can “cause implementation problems” (CITES, 2020a) which resulted in the adoption of a resolution to address the issue (CITES, 2019 (1983) Conf. Res. 4.25 (Rev. COP18)). Table 3.8 outlines parts of Resolution 4.25’s institutional design, including three status rules at the collective choice level that remind the Parties of the existing rules related to reservations, and a procedural aspirational rule desiring uniform interpretation of reservations by all CITES Parties. Finally, a regulatory boundary rule instructs the Depositary Government not to validate any reservations filed after the 90-day deadline. By describing the contextual background and procedural aspiration that necessitated the development of the resolution, while also providing the Depositary Government with specific requirements to determine the validity of filed reservations (boundary rule), the collective choice rules exhibit a good fit. The boundary rule also puts

the Parties on notice that further leniency with regard to late filings should not be expected.

At the operational level, constitutive rules emphasize the critical need to provide clarity on reservation deadlines and the handling of late submissions (procedural rule). They also restate that the different interpretations of reservation provisions by the Parties necessitated further clarification (statement of fact). Linked regulatory rules address these aims/context by requiring Parties to notify in writing the Depositary Government of any reservation to species listings within 90 days after the meeting (information rule). Furthermore—and unlike the ICRW—CITES requires its Parties to maintain and communicate statistical records on trade in species under reservation as part of their annual reports (information rule). Additionally, if the species under reservation is an Appendix I (endangered) species, the Parties are also required to treat it as if it were in Appendix II for all purposes, including documentation and control (choice rule). Although these requirements are all phrased as recommendations (“should” DEONTIC), they create a standardized information sharing and monitoring procedure for opt out mechanisms.

While Table 3.8 outlines a good horizontal fit at the collective choice and operational analysis levels, the rules also create an implicit vertical reporting feedback. The operational information rules require the filing of reservations with the Depositary, and the reporting of the trade data on species under reservation in Parties’ annual reports. These processes link with collective choice level rules outlined in the Convention text,

e.g., the authority of the Parties as a collective body to receive and consider these reports (see Table 3.7). While the ICRW Governments voluntarily report the data on whaling under objections to the Commission, the CITES COP utilized its resolution process to incorporate a formal opt out handling process crafted as a series of vertically and horizontally well-connected constitutive and regulatory rules. Even though the regulatory rules are crafted as recommendations, and there is no formal enforcement process, the CITES monitoring and feedback process provides much clearer guidance to its Parties (and observers as well) and is likely more robust than the ICRW's informal process.

Table 3.8

CITES opt out mechanism constitutive and regulatory rule configurations. Constitutive rules are identified by red font letters.

CITES			
Opt out mechanism			
Collective choice level			
Rule typology	Actor	Statement	DP
Status		Article XXIII of the Convention is recognized as providing a State with the option to enter a reservation with respect to any species included in Appendix I, II, or III and that in those instances it shall be treated as a State not a Party to the Convention with respect to trade in the specified species until it withdraws such reservation	DP1
Status		Amendments of Appendix I or II in accordance with Article XV of the Convention are recognized as providing any Party with the option within 90 days to make a reservation with respect to the amendment	DP3
Status		Amendments of Appendix I or II set out that in those instances a State shall be treated as a State not a Party to the Convention with respect to trade in the species concerned until reservation is withdrawn	DP1
Procedural	COP	desires to ensure that all Parties should interpret the Convention in a uniform manner	
Boundary	Depositary Government	should not consider valid any reservation with respect to amendment to Appendix I or II listing which was entered after 90-day deadline	DP1
Operational level			
Procedural	COP	acknowledges the critical need for clarity on the deadline for submission of a reservation, treatment of a later reservation, and effective date of the withdrawal of a reservation	DP
Statement of Fact	Parties	have taken different interpretations of these provisions of the Convention	
Choice	COP	any Party having entered a reservation with regard to any species included in Appendix I treat that species as if it were included in Appendix II for all purposes, including documentation and control	DP1
Information	Parties having entered reservations	should maintain and communicate statistical records on trade in the species under reservation as part of their annual reports so that international trade in specimens may be properly monitored	DP4C
Information	Parties	should notify Depositary Government in writing of a reservation to amendment to Appendix I or II species listing within 90 after meeting	DP1

3.4 Monitoring mechanisms in the CMS

The CMS is more detailed in the description of its constitutional choice level ethical values than any of the other treaties. These expressions include an

acknowledgement of migratory species' intrinsic values and the need to protect their habitats, but also anthropocentric considerations, including "wise use" principles in instances where "taking" occurs. These values are coupled with procedural aspirations desiring concerted international conservation action (Table 3.9). At the collective choice level, CMS' framework convention approach is revealed in the duality of general conservation goals versus conservation implementation which is outsourced to subsidiary AGREEMENTS which Parties and non-Parties to the CMS can enter into (Baldwin, 2011).

The CMS COP, unlike the ICRW Commission, has the collective choice level authority to review, assess progress, and to make decisions and recommendations related to treaty implementation, objectives, and conservation issues (aggregation rules) (Table 3.9, yellow highlighted cells). A procedural constitutive rule at this level also recognizes the importance of implementing all available conservation measures under the Convention, including AGREEMENTs (green highlighted cells). Here, the COP has the authority to review progress under the AGREEMENTs (aggregation rule), while Range State Parties are encouraged to conclude AGREEMENTS that would benefit Appendix II species (scope rule) (green highlighted cells). In combination, these collective choice level regulatory rule configurations (yellow and green highlighted cells) provide the COP with the requisite authority to review and take action to further core conservation objectives for migratory species within and outside the treaty context. The collective choice regulatory rules also loosely link to the collective choice procedural rule just

mentioned and an ethical value rule that emphasizes the need for the Parties to take individual and cooperative steps to conserve species.

At the operational level, the regulatory rules describe the duties of Parties and AGREEMENT administrators to submit regular reports to the CMS COP and provide the Secretariat with copies of new AGREEMENTs and updates on existing ones (information rules) (Table 3.9, green highlighted cells). General reporting requirements to the COP also require that the Parties provide information on measures taken to implement the Convention; the Scientific Council recommend solutions to scientific aspects of treaty implementation; and the Secretariat obtain information, prepare reports, and raise attention to any matters pertaining to treaty objectives and implementation (regulatory information, choice and aggregation rules) (Table 3.9, green highlighted cells). These rules link vertically to the authoritative structures at the collective choice level, and they represent complementary horizontal information gathering duties by multiple entities. Overall, the monitoring mechanism in CMS exhibits a good vertical fit between constitutive and regulatory rules in which the regulatory rules combine to meet the procedural and ethical value aspirations. However, unlike in CITES and the ICRW, there appears to be no guidance related to specific data collection requirements at the operational level, e.g., what data are to be collected, analyzed, and reported. The emphasis is on reporting data (DP4B – monitoring the monitors), but there is little reflection on monitoring the resource or appropriation (DP4A and DP4B). One has to look to a separate resolution on national reporting requirements (CMS, 2017b Res. 12.05)

and a related 28-page national report form (CMS, 2020b) for such details. This gap could be addressed through definition and status rules defining data to be collected and outlining the related resolution where further information on data collection methods/requirements can be obtained, along with the requisite information, aggregation, and choice rules specifying joint and individual action to be taken in that regard.

Table 3.9

CMS monitoring mechanism example demonstrating the horizontal and vertical connections between constitutive and regulatory rules as they relate to monitoring migratory species conservation efforts within the treaty context and through external AGREEMENTs. Statements are modified from their original version and do not include all relevant statements. Red font indicates constitutive rules.

CMS			
Monitoring mechanism			
Constitutional choice level (constitutive rules)			
Rule typology	Actor	Statement	DP
Ethical (ecocentric)	Contracting Parties	recognizing wild animals in their innumerable forms are irreplaceable parts of earth's natural system	
Ethical (anthropocentric)	Contracting Parties	which must be conserved for the good of mankind... and where utilized, is used wisely	DP2
Ethical (biocentric)	Contracting Parties	concerned with those species that migrate across or outside jurisdictional boundaries	
Procedural	Contracting Parties	convinced conservation and management of migratory species requires concerted action of all States...	DP8
Collective choice level			
Ethical value eco	Parties	take individual or cooperative steps to conserve species and their habitat	
Procedural		Recognizing the importance attached to the implementation of the full scope of conservation measures envisaged by the Convention	
Scope	Range State Parties	endeavor to conclude AGREEMENTs that would benefit species listed in Appendix II	DP3
Aggregation	COP	review the implementation of Convention at each meeting	DP4C
Aggregation	COP	review and assess conservation status of migratory species	DP4A DP4B
Aggregation	COP	make recommendations to the Parties for improving conservation status	DP4C
Aggregation	COP	review progress made under AGREEMENTs	DP4C
Aggregation	COP	make recommendations to the Parties for improving effectiveness of Convention	DP4C
Aggregation	COP	decide on additional measures to be taken to implement objectives of Convention	DP4C
Operational level			
Information	Parties	provide Secretariat with copy of each AGREEMENT concluded	DP4C
Information	Parties	inform COP through Secretariat prior to meeting on measures taken to implement Convention provisions for migratory species	DP4C
Aggregation	Scientific Council	recommend to the COP solutions to the problems re: scientific aspects of implementation, in particular with regard to habitats	DP4C
Information	Secretariat	obtain from any appropriate source reports or other information which will further the objectives and implementation of the Convention	DP4C
Information	Secretariat	invite attention of the COP to any matter pertaining to objectives of the Convention	DP4C
Choice	Secretariat	prepare reports for COP on... implementation of Convention	DP4C
Information	Party or other administer of AGREEMENT	keep the Secretariat of the Convention informed on conduct of AGREEMENT	DP4C
Information	Party or other administer of AGREEMENT	make regular reports to the meetings of the CMS COP	DP4C

3.4.1 *Opt out mechanism*

CMS Parties can also file reservations. At the collective choice level, the COP has the authority to amend Appendices I and II by a two-thirds majority vote (aggregation rules) (Table 3.10). A related commencement rule provides the date that such an amendment becomes valid for all Parties, except those making reservations. Two regulatory boundary rules outline the requirements to file a reservation and the change in status of a Party to a Non-Party with regard to the species under reservation. This indicates a good horizontal match between the constitutive and regulatory rules providing boundary and collective choice arrangements (DPs 1 & 3) that allow CMS Parties impacted by certain species listings to opt out of the same (Table 3.10).

At the operational level, the Depositary is required to inform all Parties of any reservations made, but there is no reporting feedback contained in the Convention or elsewhere in the coded formal documents, like exists in CITES. This feedback gap was addressed at the recent CMS meeting in early 2020, when the COP adopted a resolution on reservations¹⁵ (CMS, 2020d Res. 13.8) which mirrors CITES Resolution 4.25 (CITES, 2019 (1983) Res. Conf. 4.25), *except* it does not include the reporting requirement for species under reservation that ties the CITES opt out feature into its overall monitoring mechanism. Instead, the CMS resolution utilizes at the collective choice level two coupled constitutive rules (yellow highlighted cells, Table 3.10) that acknowledge “the

¹⁵ The CMS meeting occurred after coding for this research was complete. The resolution was subsequently reviewed and relevant statements were added to Table 10.

excessive use of reservations could limit the effectiveness of the Convention” (statement of fact rule), but in response only outlines a desire to ensure that reservations are withdrawn when they are no longer necessary (procedural rule). It is unlikely that this particular procedural aspiration will do much to mitigate the excessive use of reservations while they are still being used. Unlike CITES, the CMS resolution on reservations does not add any regulatory rules at the operational level that recommend/mandate reporting of species harvested under reservations in the Parties’ national reports or otherwise (and the national report form available online also does not request such information).

This example illustrates the limits of governance by constitutive rules and highlights how dependent effective feedback mechanisms are on carefully balanced constitutive and regulatory rules. In effect, the collective choice constitutive rules added through Resolution 13.8 maintain the existing vertical reservation reporting and monitoring feedback gap between the operational and collective choice levels. The lack of regulatory rules in Resolution 13.8 also preserve the existing horizontal rule gaps at the collective choice and operational levels by not addressing data collection requirements and oversight authority making it doubtful that the treaty’s aspirations to limit excessive reservations, conserve migratory species, and/or utilize them “wisely” will be met.

Table 3.10

CMS opt out mechanism constitutive and regulatory rule configurations. Constitutive rules are identified by red font letters.

CMS			
Opt out mechanism			
Constitutional choice level (constitutive rules)			
Rule typology	Actor	Statement	DP
Ethical (ecocentric)	Contracting Parties	recognizing wild animals in their innumerable forms are irreplaceable parts of earth's natural system	
Ethical (anthropocentric)	Contracting Parties	which must be conserved for the good of mankind... and where utilized, is used wisely	DP2
Procedural	Contracting Parties	convinced conservation and management of migratory species requires concerted action of all States...	DP8
Collective choice level			DP
Ethical value bio	Parties (collectively)	acknowledge the need to take action to avoid any migratory species becoming endangered	
Aggregation	COP	amend Appendices I and II	DP3
Aggregation	COP	adopt amendments by two-thirds majority of Parties present and voting	DP3
Commencement		amendment to Appendix I or II enters into force for all Parties 90 days after meeting, except for those Parties which made reservation	DP1
Boundary	Party	may make reservation with respect to amendment of Appendix I or II by written notification to the Depository; withdraw reservation by written notification to the Depository	DP1
Boundary	Parties	Party filing reservation shall not be regarded as Party in regard to the subject of reservation	DP1
Statement of Fact	COP	is aware that excessive use of reservations could limit effectiveness of the Convention	
Procedural	COP	desires to ensure that reservations are withdrawn when no longer necessary	
Operational level			DP
Information	Depository	inform all States/Parties of... specific reservations	DP1

3.5 Monitoring mechanisms in the CBD

The CBD does not allow reservations. Accordingly, this subsection will focus on its monitoring mechanism only. The constitutional choice level rules in the CBD reassure its Parties of their sovereign rights. Ethical values tie biological diversity tightly to the human enterprise, and procedural rules describe the treaty's three objectives, and its

desire to enhance and complement existing conservation instruments (Table 3.11). At the collective choice level, regulatory aggregation rules authorize the CBD COP to review implementation and scientific/technical advice on biological diversity, and to consider that information (aggregation rules) (Table 3.11, yellow highlighted cells). There are no regulatory statements allowing the COP to make recommendations or take any further action related to such review. There are also no constitutive rules that provide guidance or procedural aspirations related to these actions at the collective choice level, although the COP's review authority is diffusely designed to foster the treaty objectives outlined in the constitutional choice level procedural rule (Table 3.11).

At the operational level, as part of their national reporting requirements, the Parties are asked to inform the COP on measures they have taken to implement the Convention provisions and their effectiveness in meeting treaty objectives. CBD's technical body, the SBSTTA, is tasked with providing the COP and other subsidiary bodies with implementation advice (information rules, yellow highlighted cells, Table 3.11). These regulatory rules link vertically to the COP's review authority at the collective choice level and provide it with complementary information on similar issues (yellow highlighted cells in Table 3.11). A rudimentary reporting feedback (DP4C – monitor the monitors) is generated, although, like in CMS, details as to what should be reported (i.e., monitoring the resource and/or appropriation; DP4A and DP4B) are located elsewhere in a Decision on national reporting requirements (CBD, 2016 Dec. XIII-27). The horizontal operational level rule configuration as outlined in Table 3.11 is likely insufficient to

facilitate the constitutional choice aspiration of biological diversity conservation and sustainable use.

Table 3.11 also reflects coupled constitutive and regulatory rules which aim to address human impacts on biological diversity (green highlighted cells). At the operational level, a statement of fact rule reports on the Parties' concern about the decline in biological diversity due to human activities. The related procedural rule acknowledges the concomitant need to “anticipate, prevent and attack” causes of significant biodiversity decline at the source (Table 3.11, green highlighted cells). These rules are matched by two regulatory rules. One which requires the Parties to identify and monitor processes and categories of activities which have significant adverse impacts (information rule), and another to introduce arrangements that will take into account such environmental consequences (choice rule). This represents a broad horizontal fit in which at least the sources of biological diversity decline are identified, monitored, and potentially taken into account when considering legislation. There is, however, no operational level requirement to report this information to the authoritative level, leaving only the general national reporting requirement information rule as a vertical feedback mechanism (yellow highlighted cell at the end of Table 3.11). While the CBD online national reporting form includes a section on “implementation measures taken and associated obstacles” which Parties could use to broadly report on those issues (CBD, 2019 Section II), this is a weak feedback connection that is dependent on Party interpretation of the form and the rules. A more direct vertical feedback could be forged by adding specific operational level

regulatory rules mandating the inclusion of such information in national reports and identifying a collective choice level entity to report to (constitutive position and/or PTL rules) would make for a stronger vertical feedback connection.

Furthermore, the CBD COP, much like the ICRW Commission has only been imbued with one authority—in this instance, a review authority. It does not appear to have any power to make recommendations or enforce implementation. Its functions as they relate to monitoring and oversight activities are also limited in contrast to the CITES and CMS. Without more specific and clearly developed vertical and horizontal linkages, meeting constitutional choice level aspirations will likely be challenged in the CBD. Adding collective choice level constitutive PTL and application rules to provide new authority and related duties/responsibilities to the COP, along with supporting regulatory aggregation, payoff, and choice rules to guide authoritative decision-making related to oversight functions from the operational to the collective choice level would likely aid in addressing this vertical gap.

Table 3.11

CBD monitoring mechanism example demonstrating the horizontal and vertical connections between constitutive and regulatory rules as they relate to monitoring biological diversity within the treaty context. Statements are modified from their original version and do not include all relevant statements. Red font indicates constitutive rules.

CBD			
Monitoring mechanism (treaty text)			
Constitutional choice level (constitutive rules)		Actor	DP
Ethical (anthropocentric)	conservation and sustainable use of biological diversity is of critical importance to meet food, health, and other needs of growing world population	Contracting Parties	
Ethical (ecocentric)	recognizing importance of biological diversity for evolution and for maintaining life sustaining systems of the biosphere...	Contracting Parties	
Collective choice level		Actor	DP
Aggregation	keep under review implementation of Convention; consider such information [Party reports on implementation], as well as reports submitted by any subsidiary body	COP	DP4C
Aggregation	review scientific, technical and technological advice on biological diversity	COP	DP4C
Operational level		Actor	DP
Statement of Fact	concerned that biological diversity is being significantly reduced by certain human activities; aware of the general lack of information re biological diversity	Contracting Parties	
Procedural	acknowledge the need to anticipate, prevent and attack the causes of significant reduction or loss of biological diversity at the source	Contracting Parties	
Information	identify components of biological diversity important for conservation and sustainable use [having regard to indicative list of categories in Annex I] monitor... components of biological diversity... paying attention to those requiring urgent conservation measures and greatest potential for sustainable use	Contracting Parties	DP4A
Information	identify processes and categories of activities which have or are likely to have significant adverse impacts on conservation and sustainable use of biological diversity; monitor their effects through sampling and other techniques	Contracting Parties	DP4B
Information	maintain and organize data derived from identification and monitoring activities	Contracting Parties	DP4A DP4B
Information	provide COP and other subsidiary bodies with advice re implementation of Convention	SBSTTA	DP4C
Aggregation	provide scientific and technical assessments of the status of biological diversity (under the authority and request of the COP)	SBSTTA	DP4A
Information	present to the COP reports on measures it has taken for the implementation of the provisions of the Convention and their effectiveness in meeting the Convention objectives	Contracting Party	DP4C

4 Conclusion

The constitutive rule configuration of Controller K_t 's international conservation treaty “software” design was—much like the regulatory structure—remarkably similar in the distribution of rule typologies across regimes. Exceptions to that pattern were observed in the amendment, application, and commencement rules. Amendment rules in particular performed an important administrative function that allowed a distinction between treaties who follow a formal repeal process and those who do not. Participants in CITES and CMS which utilize amendment rules are able to discern contemporary guidance, whereas those in the CBD forum have to sort through prior decision-making to determine which rules have been “retired”. The ICRW has no repeal process, and all its resolutions represent “mission statement[s]” of the Commission at the time of adoption (S. Duff, email communication, 14 Apr. 2020). From a historical decision-making perspective that may be interesting, however, it is not very effective policy guidance.

A review of the institutional arrangements in the four regimes showed carefully crafted constitutive and regulatory rule linkages in CITES that enhanced the internal fit and vertical feedback mechanisms making it more likely that these structures are nimble to change. CITES’ “software” design is also notable for the use of a high percentage of procedural aspirations, status, application, and relative necessity rules. This indicates a focus on utilizing constitutive rules as governance guidance, i.e., to outline policy aims (procedural) and to inform participants about existing rules that are relevant to issues under consideration (status), as well as to clarify the applicability of existing rules and

any relevant preconditions that would trigger rule applications (application and relative necessity). The fact that CITES utilizes far fewer constitutive position and PTL rules indicates a potential strategy to assign these positions/functions through regulatory rules. Further research will need to assess this preliminary finding further.

Finally, the observed increase in constitutional level aspirational statements in the CMS and the CBD appear to be indicators of ineffectively crafted constitutive rule configurations. The translation of CITES' resolution on reservations into a CMS resolution revealed how a reliance on constitutive rules—in that instance a coupled statement of fact and procedural rule—can ruin a well-crafted resolution, thus, undermining the intended procedural aim and policy outcome. Similar issues exist in the CBD, where procedural rules that describe a desire for increased female participation in conservation governance turn into institutional dead-ends because the supporting regulatory rules to operationalize the procedural aim are missing. Rules matter and carefully crafted and well-balanced regulatory and constitutive rule configurations—as CITES's "software" design seems to suggest—can improve governance clarity of purpose and perhaps decrease sensitivity to shocks and disturbances as well.

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CHAPTER 4

ROBUST ANARCHY: INSTITUTIONAL DESIGN PRINCIPLES AS FEEDBACK INDICATORS IN INTERNATIONAL CONSERVATION GOVERNANCE

Introduction

Environmental policies are social feedback systems. They are designed to measure system conditions, determine what the measurement means, decide on an appropriate action, and take that action. Given the interconnectedness and emergent properties of coupled social-ecological systems (SES), such an undertaking involves working with incomplete knowledge, including the accuracy of the measurement (e.g., species population dynamics) and the actual impact of that measurement on the system (value of the measurement, delays in information processing), as well as dealing with uncertainty and change. The key to overcome these challenges is to acknowledge these limitations, gain an understanding of the governance system's fundamental features and feedbacks, and then use those feedbacks wisely by monitoring and adjusting them regularly so that core conservation objectives continue to be met (Anderies & Janssen, 2013).

There are no policy panaceas, complete information about the SES is not possible, and there are no specific rules that “create” robust governance systems. Instead, most systems that are managed effectively include certain institutional characteristics that facilitate nimble feedback systems with built-in redundancies that allow experimenting with the rules without risking institutional collapse (Ostrom, 2005). Yet, there are few

studies that have dissected institutional arrangements (Basurto et al., 2010; Siddiki, Weible, et al., 2011; Carter et al., 2016) or analyzed policy robustness (Therville et al., 2018; Guerbois et al., 2019; Naylor et al., 2019), and none that have done both. This study aims to address that gap by comparatively examining the institutional arrangements of four international conservation treaties¹⁶ for robust design features.

Treaty robustness was measured based on three key characteristics of infrastructure feedback systems: Institutional fit, the presence of Ostrom's institutional design principles (DPs), and polycentric institutional design. These characteristics were compared across treaties to determine the likely governance response to shocks based on the configuration of the treaty feedback system. The study was informed by international relations, common-pool resource (CPR), and robust institutional design theory (Ostrom, 1990; Young, 2002; Anderies et al., 2004; Cox et al., 2010; Anderies, 2015) and aimed to answer the following research questions: (1) what are the key institutional characteristics present in each treaty regime?; and (2) based on those characteristics, theoretically how robust to disturbance/shock are these governance systems?

The analysis revealed an overall robust polycentric treaty design in all forums. However, polycentricity alone was not an indicator of robustness. Instead, regulatory rule architecture coupled with the full complement of DP configurations and good institutional fit seemed to correlate with decreased sensitivity to change, as was the case

¹⁶ International Convention on the Regulation of Whaling (ICRW); Convention on International Trade in Endangered Species (CITES); Convention on Migratory Species (CMS); and the Convention on Biological Diversity (CBD).

in CITES. In instances, like the ICRW, where regulatory rules existed but there was poor internal and external rule fit, robustness decreased. DP gaps in the CMS and CBD were also indicative of fragilities in the information processing feedbacks, including incomplete reporting and enforcement mechanisms.

The next section will introduce the analytical framework underpinning this research (SES robustness, Ostrom's design principles, institutional fit, and polycentricity). Section 3 provides an overview of the research design and methods used. Section 4 assesses each treaty regime for its institutional fit, design principle configurations, and degree of polycentric design. These findings are then incorporated with the results of prior research, and an overview of each treaty's theoretical robustness is provided before coming to a conclusion.

1 Analytical Framework: Robustness in SES, Ostrom's Design Principles, Fit, and Polycentricity

In order to assess robustness in the governance structure of the treaty regimes, this research draws on several analytical frameworks. Primarily, international conservation rules are conceptualized as soft infrastructure embedded in the complex social-ecological systems (SESs) they aim to govern. Robustness is the outcome variable and defined as a governance system that copes with change by generating policy feedback processes that trigger necessary behavior changes so that the system can operate within acceptable parameters even during times of disturbance and stress (Anderies et al., 2007; Anderies &

Janssen, 2013; Anderies, 2015). The following analytical frameworks were used to measure governance robustness.

1.1 Internal and external fit

The concept of fit is borrowed from research focused on the congruence between environmental/natural systems and the institutional arrangements designed to govern them (Young, 2002), but is applied herein very specifically to the institutional arrangements themselves. Good internal fit is achieved when the regulatory and constitutive rules complement each and generate feedback processes that monitor for and respond to change, thus keeping the governance system operating within acceptable parameters (Anderies et al., 2007; Anderies & Janssen, 2013). Good external fit indicates that the formal rules are well understood, considered legitimate, and represent meaningful guides for actors affected by the rules in the conservation forums (Watkins & Westphal, 2016). Treaties that exhibit congruence within internal and external rule structures are likely to be robust.

1.2 Polycentric design (design principle 8 expanded)

Design principle 8 (nested governance) was split from the rest of the design principle (DP) analysis to be examined as a separate predictor variable/condition of treaty robustness with a particular focus on the polycentric design aspect of nested governance. Polycentric systems are characterized by three attributes: (1) they consist of many centers of decision-making; (2) they are governed by a single system of rules which can be institutionally or culturally enforced; and (3) they foster contestation of ideas, methods,

and “ways of life” that lead to the emergence of a spontaneous social order that fosters robustness to change (Aligica & Tarko, 2012). Aligica & Tarko’s (2012) *Logical Structure of Polycentricity* (LSP) framework provides indicators for each of the three attributes and is utilized to assess the degree of polycentric institutional design in the four treaty regimes.

1.3 Design principles

Based on the careful study of small-scale CPR systems, Ostrom found that the institutional design of effective and long-term governance systems included certain institutional “design principles” which characterized bundles of institutional arrangements, such as, e.g., rules related to boundary, monitoring, or sanctioning conditions (Ostrom, 1990). These findings have found broad empirical support (Ostrom, 2009; Cox et al., 2010). More recently, researchers have begun analyzing design principle (DP) configurations to determine their connection to “successful” and “robust” CPR governance systems (Baggio et al., 2016). Gari, et al. (2017) utilized the DPs to assess local CPR systems across the globe in order to determine if there was a connection between robustness and governance success. In that instance, robustness was defined as a temporal variable, i.e., the longer the institutions were in existence, the greater the level of robustness (Gari et al., 2017, p. 1). In contrast, this research project defines robustness as the system’s ability to receive information about changing social and environmental conditions, and then translate that information into appropriate action that can mitigate behavior so that agreed-upon policy parameters are met. In this context, institutional

robustness is not measured by its temporal longevity but by a compilation of various institutional characteristics; of which DP occurrence is one.

It should be noted that the DPs are *not* “causal variables of a process” that explain why people engage in collective action to solve resource problems. They are also not policy panaceas, and their presence does not guarantee a robust system. However, they do represent “an effort to understand why the results of variable processes are robust in some cases and fail in other” (Ostrom, 2009, p. 38). They also represent evidence of the presence of information processing infrastructure that is crucial to functioning SES feedbacks (Anderies et al., 2016). Furthermore, certain DP co-occurrence has been associated with more “successful” resource governance systems (Baggio et al., 2016).

Using the design principles to assess the robustness of the four treaties subject to this analysis contributed insights into the dynamics of international rule configurations, and it also provided empirical evidence that the design principles are useful infrastructure components of institutional design. To date, many argue that even though collective action dilemmas at the local and global level may be similar, CPR concepts and tools do not apply at higher governance scales due to various factors, including differences in actor composition and resource dependence (Snidal, 1995; Young, 2002; Araral, 2014). Proponents disagree (Bernauer, 1995; Keohane & Ostrom, 1995; McGinnis & Ostrom, 1996; Stern, 2011), and only a few scholars have applied the DPs empirically to assess international resource governance systems (Hall, 1998; Gibson et al., 2005; Nagendra & Ostrom, 2012; Epstein et al., 2014). In those instances, however, the design principles

proved to be useful, even though they were not employed to specifically assess system robustness.

The remainder of this section will introduce each DP in turn and its potential contribution to formal treaty rules. This information will then be further expanded on in Section 4 where each regime's potential robustness is analyzed based on its micro structure, rule perceptions, DP configurations; and degree of polycentricity before coming to a conclusion.

1.4 Design principle 1 (social and resource boundaries)

Some argue that the boundary DP (DP1) is not useful at the global governance level (Stern, 2011), while others have shown that defining boundaries is important to cost/benefit assignment and coordination efforts even in international systems (Giordano, 2003; Cox et al., 2010). In global tuna fisheries management, clearly defining the boundaries of specific fish stocks is important to the sustainability of certain stocks which may be more depleted than others (Epstein et al., 2014). DP1 was initially conceptualized to test for clearly defined boundaries of the resource systems *and* appropriators with harvesting rights. It was, however, subsequently split into two criteria to clarify the distinction between social (DP1A) and resource boundaries (DP1B) (Cox et al., 2010). From an infrastructure/feedback perspective, clearly defined social and resource boundaries are foundational to establishing effective monitoring mechanisms (DP4) (Anderies et al., 2016).

1.5 Design principle 2 (congruence)

The congruence DP assesses the match between benefits received from and investments made into a particular resource. At the local resource governance level, this means assessing whether the benefits individual users receive are (1) proportional to local environmental conditions (DP2A), and (2) equivalent to the inputs they have made into the resource in the form of financial contributions, labor, and/or other materials (DP2B) (Ostrom, 2005; Cox et al., 2010). Testing to determine whether a governance system considered equivalency with cultural conditions (DP2C) was also found to have merit (Ostrom, 2009) and included in this analysis. DP2 has been found to be an important indicator of “successful” resource governance systems as it tests for the “fit” or match between environmental systems and institutions (Folke et al., 2007). Furthermore, a recent meta-study confirmed the congruence principle’s function as a “linchpin for success” with its presence indicating a more “successful” resource governance system, independent of resource sector (Baggio et al., 2016, p. 15). From a robustness perspective, the congruence principle influences the spillover effect of different infrastructures (natural, institutions, etc.) by reducing the coordination, monitoring, and provisioning costs within a governance system (Anderies et al., 2016). The treaty formal and informal structures were explored for congruence with their environmental context (DP2A), costs and benefits (DP2B); and cultural conditions (DP2C).

1.6 Design principle 3 (collective choice arrangements)

This design principle assesses whether many of the individuals who will be affected by the rules are able to participate in modifying those rules (Ostrom, 2005). From an infrastructure perspective, the actors who are directly affected by the rules receive information on system outputs (e.g., information on biodiversity declines, wildlife trade/whale/migratory species overexploitation) which they process and transform into coordinated decision-making that feeds back into the system to affect the necessary response. In local governance systems, DP3 often co-occurs with DP7 (rights to organize) indicating a good vertical feedback between governments and communities (Baggio et al., 2016). In the treaty context, DP3 is associated with voting and other decision-making mechanisms, such as exceptions and opt out features that allow the Contracting Parties to affect change in general and to mitigate politically unfavorable impacts of decision-making when necessary.

It should be noted that this application of DP3 is a different approach than that taken of other researchers which correlate DP3 occurrence with the ability of local users to influence regional and international rule-making that may affect them (Epstein et al., 2014). There are ongoing debates in each of the forums with regard to the need of community input and most interviewees acknowledged the importance of that. However, there was also overwhelming agreement that it is difficult to include community considerations at the international level for various reasons. First and foremost, a difficulty identifying “community” and the appropriate entity to represent said

community. Second, most experts agreed that community voices are more appropriately considered at the national level, and then aggregated and incorporated into countries' positions, since it is impossible to adequately consider *all* relevant local positions in an international forum. Of course, this solution overlooks the fact that national level consideration of local people varies and can also result in inequitable decision-making that undermines conservation efforts. Acknowledging these limitations which cannot be addressed in this paper, the analysis herein assesses the presence of DP3 based on the ability of nation states to represent their countries' positions and to influence rule-making in a manner that is meaningful to their interests and goals.

1.7 Design principle 4 (monitoring)

The monitoring DP tests whether there are monitors who actively monitor resource conditions (DP4A), appropriation (DP4B), and who are accountable to the appropriators (DP4C) (Ostrom, 2005; Cox et al., 2010). Monitoring is a key feedback system in a SES where it collects data on resource conditions, appropriation, and monitor behavior that informs decision-making and subsequent action. At the local governance level, monitoring exposes actors in non-compliance and aids in effective sanctioning mechanisms (Cox et al., 2010). Monitoring in international environmental governance can improve rule compliance, information sharing, and transparency by alerting state actors that their behavior is being monitored and non-compliance will result in consequences (Keohane et al., 1994; Dietz et al., 2003). Monitoring mechanisms that rely on multiple actors at different governance levels are recommended since information

from a variety of sources can improve data reliability (Martin, 1995). Although many international regimes rely on self-reporting by the Parties, NGOs and IGOs also play an important, albeit, indirect role in holding states accountable, particularly in the context of conservation treaties. Their contribution to monitoring implementation at the local level has been acknowledged as important and some treaties, such as CMS, are increasingly partnering with local NGOs to gain a better understanding of local environmental and social conditions (Prideaux, 2014, 2015). From an infrastructure perspective, monitoring is a crucial activity to provide information as to whether the actions decided upon (feedbacks) are being implemented (Anderies et al., 2016).

1.8 Design principle 5 (enforcement)

In local governance systems, graduated sanctions (DP5) indicate that rule violators are likely to receive sanctions based on the seriousness, repetitiveness, and context of the offense. Sanctions are meted out by other users, officials, or both (Ostrom, 2005; Cox et al., 2010). Sanctioning is often the consequence of monitoring which reveals the violation that is subsequently punished. Such mechanisms are fairly easy to implement in small, tight-knit communities where there is little tolerance for noncompliance due to its detrimental effects on community cohesion. As systems become larger, monitoring and sanctioning becomes more difficult and costly. Small scale systems that are missing congruence, accountability of monitors and graduated sanctions DPs are likely to be non-successful (Baggio et al., 2016). From an infrastructure perspective, sanctions are corrections to aberrant feedbacks and designed to prevent

system instabilities (Anderies et al., 2016). In the treaty context, sanctioning equates to enforcement mechanisms which are thought to induce party compliance (Mitchell, 2006).

1.9 Design principle 6 (conflict resolution)

The presence of DP6 in small-scale governance systems indicates there are easily accessible, low cost dispute resolution arenas (Ostrom, 2005). Systems with such mechanisms in place are more likely to be long-enduring (Cox et al., 2010). In fact, international relations scholars argue that it might be more effective to foster conflict resolution mechanisms than implement sanctioning and enforcement since the “close connection between law and dispute resolution” means that “legal systems can be treated as procedural devices for arriving at authoritative judgments [on contested issues]” (Young, 1994, pp. 195-196). From an infrastructure perspective, conflict resolution mechanisms reconcile instances of conflicting information (measurement error) and ameliorate “the consequences of undesired outcomes” for participants involved in a dispute (Anderies et al., 2016). Particularly in international regimes where “differences in power and values across parties” facilitate conflict, conflict resolution mechanisms can mitigate those conflicts and facilitate learning and change (Dietz et al., 2003, p. 1909).

1.10 Design principle 7 (minimal rights)

In local governance systems, DP7 assesses whether resource users have the right to devise their own institutions without interference from external governments or other entities (e.g., NGOs), and/or whether they have tenure rights (Ostrom, 2005). Much like DP1, 2, and 4, this DP tests for more than one condition, however, it has not been subject

to reformulation. From an infrastructure perspective, DP7 improves the conformity of information processing and “strengthens the linkage between information processing and appropriate feedback action through empowerment of local appropriators to devise their own rules” (Anderies et al., 2016, p. 18). Since the focus of this paper is on the institutional structure and decision-making context at the international level, this DP was used to explore the tradeoff between sovereign rights and treaty obligations imposed on member States by each regime.

1.11 Design principle 8 (nested governance)

Design principle 8 (along with DP7) was intended to reach beyond the local governance level to explore the extent to which all other DPs are organized vertically (at multiple governance levels) and horizontally (intercommunity linkages) within a governance structure (Ostrom, 2005; Cox et al., 2010). For global systems, such nesting should include robust institutional arrangements that are “complex, redundant, and nested in many layers” (Dietz et al., 2003, p. 1910). This aligns well with the infrastructure component of DP8 which is intended to provide “capacity for information processing (decision-making) and action at multiple [levels]” (Anderies et al., 2016, p. 18). In combination, these characteristics describe a polycentric governance structure (McGinnis, 2002; Ostrom, 2005), and the analysis of this DP utilized the indicators provided by the Logical Structure of Polycentricity (LSP) framework to assess treaties’ degree of polycentric governance design (Aligica & Tarko, 2012).

2 Methods

This research was motivated by an interest as to how rule configurations influence decision-making and action, as well as a deep concern over accelerating species/biodiversity declines (Ceballos et al., 2015; Ceballos et al., 2017; IPBES, 2019). It was methodologically supported by the institutional grammar (IG) (Crawford & Ostrom, 1995) and theoretically informed by social, common-pool resource (CPR), international relations, and robust institutional design theories (Ostrom, 1990; Searle, 1995; Young, 2002; Anderies et al., 2004; Cox et al., 2010; Searle, 2010; Anderies, 2015). International treaties were selected as the illustrative examples to explore the connection between institutional design, feedback mechanisms, and theoretical robustness.

Based on the premise that there are no natural or humanly designed systems that can ever be fully analyzed, understood, planned, or “optimized” due to their complex properties and interconnections which tend to “evolve” in unexpected and unanticipated directions (Ostrom, 2005; Simon, 2019), one has to begin to examine the smaller components these systems are built upon, and then use the knowledge of those micro components and the design principles as a starting point for a broad search into appropriate means for solving macro problems, such as improving governance robustness (Ostrom, 2005, 2009). This paper will build on that theory and utilize the findings of prior research into the micro components and feedbacks of the four conservation treaties to determine the presence of various characteristics of robust institutional design and their

potential influence on governance robustness. While the focus of this paper was on the design principles, as they are crucial to information processing in a governance system, as outlined below, the analysis also drew on other elements of robustness to provide a more comprehensive assessment of treaty robustness.

2.1 Treaty and document selection

The treaties included in this analysis (Table 4.1) are similar in their objectives (conservation for sustainable use), but differ in age, focus, and organization. The ICRW is more than 70 years old, whereas the CBD went into effect 28 years ago. CMS and CITES focus on different aspects of wildlife governance, the ICRW reflects the characteristics of a fisheries agreement, while the CBD focuses broadly on biodiversity. All treaties are organized under the United Nations (U.N.), except for the ICRW which was concluded before U.N. formation. (See Appendix A for more details on the treaties' historical and decision-making context, membership status, objectives, and organizational structure).

Table 4.1

Treaties included in the analysis. The “Signed/entry into force” row distinguishes when the Convention text was first agreed upon by member states (signed date) and when it entered into force (once the required number of States ratified the agreement). The “Member states” row outlines the number of member states as of June 1, 2020. All treaties, but the ICRW, are organized under the United Nations (U.N.). Treaty governing bodies are the Conference of the Parties (COP) in the U.N. treaties and the International Whaling Commission (ICRW or “Commission”) in the ICRW. Voting procedures are taken from the treaty formal rules. It should be noted that within each treaty, consensus agreement is generally sought but infrequently achieved in CITES and the ICRW.

	ICRW	CITES	CMS	CBD
Signed/Entry into force	Dec.1946 / Nov. 1948	March 1973 / July 1975	June 1979 / Nov. 1983	June 1992 / Dec. 1993
Member states	88	183	130	196
Core objective	Conservation of whale stocks and development of the whaling industry	Regulation of wildlife trade	Conservation of migratory species of wild animals	Conservation and sustainable use of biological diversity; fair and equitable sharing of the benefits arising out of the utilization of genetic resources
Species covered	Cetaceans	Wild animals and plants subject to international trade	Migratory species (Mammals, birds, reptiles, fish, and one insect)	Biodiversity in general – not species focused
Scope	Global	Global	Global	Global
Organization	Non-U.N. treaty	U.N. treaty	U.N. treaty	U.N. treaty
Frequency and duration of governing body meetings	Commission meeting every 2 years Duration: 3-10 days	COP meetings every 2-3 years Duration: >10 days	COP meetings every 3 years Duration: 5-7 days	COP meetings every 2 years Duration: >10 days
Voting procedure	Simple majority vote. Schedule amendments require three-fourths majority vote.	Simple majority vote on procedural matters. All other decisions two-thirds majority vote.	Every effort should be made to reach consensus. Two-thirds majority unless otherwise specified.	De facto consensus (no agreement on voting mechanism).

Treaty (n = 4) and document (n=60) selection was based on a purposive, non-probability sampling method which is appropriate for intensive case studies attempting to research a particular phenomenon (Bernard et al., 2017), such as the one pursued here. Appendix B provides details on treaty and document selection processes, including theories used to determine document categories, a treaty output comparison, and bias mitigation strategies.

2.2 Semi-structured interviews/participant observation

In order to determine external fit, this study drew on semi-structured expert interviews (n = 150) conducted in each of the forums at the time of regularly scheduled meetings of the Commission/Conference of the Parties (COP). Participants in each forum were selected based on their position and evidence of prior forum participation. Such purposive sampling of key informants is necessary when seeking specialized information about a particular phenomenon (Bernard et al., 2017).

Potential interviewees were solicited via email about two weeks prior to each scheduled conference and resulted in a total of 154 interviews; all of which were conducted in English. 150 interviews were included in the analysis¹⁷. The average interview sample size was 37 interviews per forum which is within the 20-40 person interview range appropriate to “reach data saturation for metathemes across [study] sites” (Hagaman & Wutich, 2017). Approximately two-thirds of the interviews were conducted

¹⁷ Three interviews were excluded by researcher due to group interview dynamics and translation issues. One participant withdrew consent.

in-person during the meetings. Post-conference telephone or online interviews were administered in instances where participants expressed an interest in being interviewed but were unable to do so during the meeting due to time constraints/scheduling conflicts. All interviews were recorded with interviewee permission (and appropriate institutional review board protocol) and transcribed by the interviewer. Transcripts were subsequently emailed to each study participant for review and approval. Table 4.2 outlines the number and average length of interviews taken in each forum, as well as overall category totals.

Table 4.2

Details on interviews conducted in each forum.

	CMS COP17 10/23 to 10/28/17	67th IWC meeting 9/4 to 9/14/18	CBD COP14 11/17 to 11/29/18	CITES COP18 8/17 to 8/28/19
Interviews (in-person)	15	32	28	34
Interviews (telephone/online (post-meeting))	19	2	9	11
Total interviews	34	34	37	45
Average interview length (minutes)	38	32	35	49
Average transcript length	4566	3895	4396	6070
Total interviews (all)	150			
Average interview length (all) (minutes)	39			
Average transcript length (all) (words)	4732			

Table 4.3 outlines general information on interview participants, including their affiliation (delegation, non-governmental (NGO), intergovernmental organization (IGO) etc.), as well as their country development status, and forum experience. 62% of all

participants had more than 10 years' forum experience. It should be noted that many interview participants represented their organization/country at more than one conference. However, each interviewee was only interviewed once.

Attempts were made to obtain interviews from experts who represented pro-use and no-use positions. However, due to difficulty in registering as an independent academic observer, access to participants was often limited by researcher's NGO affiliation¹⁸. Efforts were also made to include experts from lower income countries, however, the majority of people interviewed were from developed countries.

¹⁸ NGO delegation sponsorship did not go beyond attendance as informal part of the delegation. All participation costs were borne by interviewer.

Table 4.3

Distribution of interviewees across participant categories (top section); by country development status (middle section), and by forum experience. Country development status was obtained from the U.N. Conference on Trade and Development (UNCTAD, 2020). Note: the percentage of participants interviewed with 10+ years of experience increased with treaty age.

	Country delegates	NGO	Secretariat	IGOs	Non-Party delegate	Experts	National/local representatives	Private sector	Total interviews	
ICRW	13	13	3	0	0	2	3	0	34	
CITES	16	20	4	3	0	0	0	2	45	
CMS	11	10	7	3	3	0	0	0	34	
CBD	15	8	4	5	1	3	1	0	37	
ALL	55	51	18	11	4	5	4	2	150	
Country Development Status										
	Developed	Transition	Developing	Total interviews						
ICRW	33	0	1	34						
CITES	34	0	11	45						
CMS	27	1	6	34						
CBD	27	0	10	37						
ALL	121	1	28	150						
Forum experience										
	<1	1-4	5-9	10-14	15-19	20-29	30-39	40+	Total interviews	Participants with 10+ years of experience (%)
ICRW	1	3	3	8	5	10	4	0	34	79%
CITES	3	6	8	5	3	12	6	2	45	62%
CMS	1	7	7	5	8	6	0	0	34	56%
CBD	3	10	5	7	6	6	0	0	37	51%
ALL	8	26	23	25	22	34	10	2	150	62%

2.3 Outcome variable (robustness)

Institutional robustness (outcome variable) was measured through three categories of predictor variables: (1) the configuration of Ostrom’s institutional design principles within the treaty governance structures and their external fit; (2) the internal fit of monitoring and opt out mechanisms; (3) the degree of polycentricity (i.e., an expanded analysis of design principle 8 (DP8)). The IG-coded formal treaty rules (previously analyzed in papers 1 and 2) provided the base data that was used in a qualitative content analysis to determine (2) and (3). The design principle analysis (internal fit) was

supplemented with information drawn from expert interviews in order to provide a preliminary assessment of external rule fit. The following sections will provide details on the method and measurement of each predictor variable. (See Appendix N for the data table containing robustness calculations).

2.4 Predictor variables

2.4.1 Design principles and external fit

Design principle (DP) occurrence was assessed by reviewing the IG-coded regulatory and constitutive institutional statements for evidence of DPs. Since a single institutional statement cannot confirm the presence of a broad condition such as, e.g., a monitoring mechanism, care was taken to review groups of coded data indicative of DPs. For example, information rules were likely to be associated with monitoring and related reporting or information sharing mechanisms. The presence or absence of a particular DP in the formal rules was marked in a spreadsheet with one of the following values: present = 1; present with issues = 0.5; not present = 0.

The next step was to review the interview transcripts for DP occurrence, assign the same values depending on DP presence in the spreadsheet, and then assess an external value by calculating the average value (see Fig. 4.4). Accordingly, the DP occurrence in this analysis is based on an assessment of DP occurrence in the formal texts and their perception by experts, i.e., DP occurrence includes a measure of external fit.

Table 4.4

Sample assessment of external fit of DP configuration in CITES. In this instance, based on CITES formal rules DP1A user boundary is present (DP1A = 1). However, participant interviews indicate issues with user boundaries resulting in a lowered score (DP1A = 0.5). External fit of DP1A in the ICRW is thus 0.75 ((1+0.5)/2).

		Design principle 1 (boundaries)		Design principle 2 (congruence)		
ICRW		DP1A User	DP1B Resource	DP2A (environment)	DP2B (costs/benefits)	DP2C (culture)
	Formal rules	1	1	1	1	1
	Informal rules	0.5	0.5	1	0.5	1
	Assessment (avg)	0.75	0.75	1	0.75	1

2.4.2 Polycentric design (design principle 8 expanded)

Design principle 8 (nested governance) was split from the rest of the DP analysis as a separate predictor variable/condition of robust institutional design with a particular focus on the polycentric design aspect of nested governance. Polycentric systems are characterized by three attributes: (1) they consist of many centers of decision-making; (2) they are governed by a single system of rules which can be institutionally or culturally enforced; and (3) they foster contestation of ideas, methods, and “ways of life” that lead to the emergence of a spontaneous social order that fosters robustness to change (Aligica & Tarko, 2012). Aligica & Tarko’s (2012) *Logical Structure of Polycentricity* (LSP) framework provides indicators for each of the three attributes and was utilized to assess the degree of polycentric institutional design in the four treaty regimes. The coded IG data was reviewed for each of the ten indicators of the LSP and based on their occurrence were assigned the following values: 1 = indicator present; 0.5 = indicator present but

there are issues (e.g., consensus voting according to the LSP is aligned with a higher degree of polycentricity than majority voting. Accordingly, the CBD which is the only forum with consensus voting was assessed a value of 1; whereas the other three forums which use both majority and consensus received 0.5 value).

2.4.3 *Internal fit*

Internal fit is determined by assessing whether the formal constitutive and regulatory rule arrangements are well-matched and supportive. Internal fit was calculated by drawing on the examination of the regulatory and constitutive rule match within the monitoring and opt out mechanisms in the treaty regimes conducted in previous research (paper 2). The data was qualitatively analyzed and assigned a value based on the degree of fit between the regulatory and constitutive formal rule structures (1 = rules are well-matched; 0.5 = fit exists but there are gaps; 0 = no fit).

2.5 Ethical value, regulatory design, and formal repeal process

The analysis of the treaties' micro components revealed three other factors which seemed important drivers in the context of the treaties. Although not indicative of robustness per se, constitutive ethical value rules, the degree of legal commitments imposed on member governments, and the presence of a formal repeal process influenced member governments' perceptions, respect, appreciation, and ability to quickly ascertain valid rules. As such, they were thought to act as nudges that could move a governance regime into a more or less robust state. Accordingly these nudge conditions were coded as present/absent (1/0) in the case of the formal repeal process; and in the instance of

degree of anthropocentricism and legal commitment, they were coded as: 1 = high; 0.5 = medium; 0 = low.

3 Analysis

This section will analyze each treaty for its DP configurations and external fit before summarizing the findings. When not specifically stated, DP presence or absence is indicated by (+DP) or (-DP), respectively, although calculations of the same were based on three values: 1 = present without issues; 0.5 = present with issues; and 0 = absent.

3.1 International Convention on the Regulation of Whaling

DP1 (boundary): The ICRW is at its heart a fisheries agreement. As such, many of its formal rules deal with organizing resource appropriation at the local level. The Schedule, for example, clearly defines the boundaries of whaling resources, both in terms of geographical ocean area and particular whale species caught. Under the existing whaling moratorium, indigenous people represent the only group with legal whaling rights (+DP1A & +DP1B).

Expert interviews, however, reflect both boundaries to be contentious. From a resource boundary perspective, it appeared that there was disagreement over certain whale population estimates and stock structures in certain regions, e.g., sperm whales and fin whales; the latter species which is being hunted commercially under a reservation by Iceland, despite “poorly known” abundance estimates in the North Atlantic (IWC, 2020g). In other instances, combined opt-out rules and different approaches to whale population estimates (lumping v. splitting stocks) are leading to overharvesting of J-stock

minke whales in the Sea of Japan. Finally, there is ongoing disagreement whether the International Whaling Commission (IWC) should only concern itself with the large whale species originally hunted by whalers (Birnie, 1989) or whether small cetaceans also fall under the IWC's remit (-DP1B).

Although subsistence whaling rights under the moratorium are clearly outlined in the Schedule and little disagreement was observed among delegates and NGOs at the 67th IWC meeting with regard to those rights, a clear definition of “indigenous people” and “traditional whaling” has not been specified, although generally it is thought not to maximize profits or catches (IWC, 2020a). Nevertheless, contentious “aboriginal subsistence whaling” claims have been made by the Bequia of St. Vincent and the Grenadines, the Makah tribe in the United States, and Japanese coastal communities. Currently, the Bequia are entitled to harvest humpback whales under aboriginal subsistence whaling exceptions (IWC, 2020b), the Makah are in litigation in U.S. courts with regard to their rights to harvest from the Pacific gray whale population (IWC, 2020i), and Japanese whaling communities were deemed not to qualify (Fisher, 2016) (-DP1A).

DP2 (congruence): In response to escalating whale population crashes, the ICRW implemented a whaling moratorium in the mid-1980s (IWC, 2018 Schedule 10(e)) which facilitated the recovery of many great whale species, although not to pre-industrial whaling levels (Rocha et al., 2014) which is, in part, why the moratorium remains in effect (+DP2A). The benefits countries receive from participating in the forum are the

ability to collaborate on and share information related to conservation efforts. In the case of countries with aboriginal subsistence users, the maintenance of whaling quotas is also a benefit. The investment into the forum is through financial (membership fees and other sponsorship of work) and scientific knowledge generation (participation in the IWC's Scientific Committee) contributions. Finally, whaling countries, like Iceland, Norway, and Japan¹⁹, have the added benefit of being able to continue limited commercial whaling under objections/reservations or special (scientific) whaling permits despite the moratorium in exchange for providing data on whales and whaling (+DP2B). Congruence with culture is met, since the treaty rules specifically acknowledge the rights of aboriginal subsistence whalers (IWC, 2014) (+DP2C).

Experts in the ICRW forum expressed divergent cultural²⁰ perspectives with regard to whaling which can be lumped into pro- and anti-whaling positions or camps. Interviews conducted with members in each camp revealed polarization in which members of the opposite camp were viewed as wrong and/or unreasonable in their positions, thus preventing progress towards whatever goal the interviewee favored. Some respondents also mentioned that the treaty allowed the continuation of whatever practice Governments favor (+DP2B). Whaling countries continued to whale as they pleased, and those who choose not to, didn't. Anti-whaling advocates expressed concern that the

¹⁹ Japan denounced ICRW membership in July 2019, although it has indicated a desire to continue to participate in the meetings as a non-member country.

²⁰ Interviewees' complex underlying perspectives of whales and whaling, including their environmental ethics, values, and socio-economic perspectives are lumped into the term "cultural".

commercial whaling conducted under opt outs was threatening the population recovery of certain species, e.g., fin whales (-DP2A). In contrast, aboriginal subsistence whaling rights were nearly unanimously supported by all interviewees (+DP2C).

DP3 (collective choice arrangements): All decisions taken in the ICRW require a simple majority vote, except for Schedule changes which require a three-fourths majority. ICRW Governments can also present objections to Schedule amendments they disagree with which means they retain their membership status but are not required to abide by the Schedule change they objected to. Objections remain in effect until withdrawn by the Government making them. They are the primary means by which Norway and Iceland have maintained their post-moratorium commercial whaling (IWC, 2020c), although Iceland's relationship with the ICRW is more complex and included a time period when it denounced its membership (IWC, 2020f). The ICRW also provides a special permit whaling exception that allows any country to issue a permit to its nationals to engage in "scientific" whaling; a feature utilized by Japan to engage in controversial Antarctic whaling prior to its departure from the Convention in July 2019 (IWC, 2020j). These examples illustrate that the formal rules in the ICRW facilitate collective choice arrangements among its member Governments (+DP3).

However, as critics have pointed out, the presence of DP3 in form does not mean that it exists in practice or is implemented in the spirit it is intended (Cox et al., 2010). The ICRW is such a case. Expert interviews indicate issues with its operationalization in the international forum. Some cite a voting stalemate where "both sides" (pro- and anti-

whaling) cannot move their objectives forward because neither can garner a three-quarter majority vote for their proposals. Many attribute forum polarization to its particular voting structure and think consensus voting would lead to better outcomes because it would force existing voting blocs to address the issues directly. Others see the ICRW's voting structure as a strength and argue that consensus voting creates vulnerabilities for certain actors to spoil progress by refusing to consent until they have their way (-DP3).

DP4 (monitoring): The ICRW formal rules include fairly robust monitoring mechanisms that include monitoring of whale populations and whaling activities (+DP4A & +DP4B), as well as monitor accountability (+DP4C) by setting up a reporting system, including whale inspectors and methods of inspection. While monitoring (on paper) occurs at the international, national, and appropriation level, the formal rules only task a select few entities with monitoring responsibilities.

Interviewees reported that national reporting is voluntary and mainly conducted by countries currently engaged in whaling activities with the ICRW being perceived as weak on ensuring that member governments provide their conservation and national reports (-DP4A&B). Vessel monitoring requirements and the use of independent observers have not been agreed upon by the Commission and are, thus, conducted based on national requirements by some countries and not by others (-DP4C). There is also no DNA registering to track whale meat in national markets (-DP4B). While data reporting to the Scientific Committee on catch data was deemed fairly good, other data on time to death and bycatch varied by country. Like in most international forums, there is no

independent mechanism to check the accuracy of the data reported by the Parties (-DP4C). This is where NGOs often perform the role of independent monitor by alerting the Commission and IWC Secretariat to potential rule violations. For example, respondents reported that the Scientific Committee was provided with monitoring data on small cetacean populations and appropriation activities (+DP4A,B,C), yet problems persist related to such hunts in the Faroe Islands and Japan.

DP5 (enforcement): The ICRW's regulatory rule structure includes a large proportion of mandatory, legally binding institutional statements and a high percentage of payoff rules outlining prohibited actions related to whaling activities. It also requires its Contracting Governments to sanction whaling crews by withholding bonus or other remuneration in instances where whales were captured illegally, as well as to instigate prosecution for such infractions (ICRW, 1946; IWC, 2018). Of all treaties, these are the most explicit and direct enforcement rules for noncompliance, and they directly affect appropriators which is unusual in the context of international governance (+DP5).

Experts in the ICRW forum, however, overwhelmingly agreed that sanctioning mechanisms within the ICRW are either ineffective or non-existent. Some stated that since the moratorium, only aboriginal subsistence whaling is subject to sanctions/enforcement and when violations do occur, e.g., whales are killed outside the allotted quota, there are no repercussions. A recent governance review report confirmed these perceptions by outlining problems within the forum related to enforcement and compliance (Prip et al., 2018) (-DP5).

DP6 (conflict resolution): There is no conflict resolution mechanism in the ICRW formal rules (-DP6). Interviewees frequently noted conflict and decision-making gridlock within the forum, although there appeared to be no desire to add a dispute resolution mechanism or mediation process to address these issues (and a specific question to that effect was not part of the interview protocol). In practice, however, Australia instituted proceedings against Japan in the International Court of Justice in 2010 for breach of its obligations under the ICRW as a result of its special permit whaling program in the Antarctic (IJC, 2014) (+DP6).

DP7 (minimal rights): The ICRW Convention text does not specifically acknowledge member Governments' sovereign rights (-DP7). This does not imply that such rights are not considered, merely that they are not a part of the formal record. In practice, as noted during attendance of the 67th IWC meeting, governments tended to treat each other with respect and, although some debates around the subject of sustainable use became heated, relationships off the debate floor appeared cordial and diplomatic. Some experts attributed the respect for other countries' sovereign rights coupled with the three-quarter majority voting rules as one of the causes of impasse in the treaty forum because it facilitated the status quo instead of forcing the Parties to address lingering issues. Generally, experts' perception of the ICRW was that the human and historical rights of aboriginal people have always been a part of the decision-making consideration in the Convention (+DP7). Some thought these considerations did not go far enough and

that indigenous people should be able to represent themselves as sovereign nations, instead of having to rely on their governments to speak on their behalf.

3.2 Convention on International Trade in Endangered Species

DP1 (boundary): CITES regulates access to commercially valuable wildlife under its auspices by listing them in one of three Appendices based on species' population status and the threat that international trade poses on their survival. The Appendix listings are linked to specific treaty provisions which drive trade measures that the Parties have to implement nationally to monitor wildlife trade imports/exports (CITES, 1973). In instances of trade in endangered species, CITES governing body, the Conference of the Parties (COP), also has the authority to review and issue/deny export quotas. Constitutive rules define what a species or specimen is under the Convention (+DP1B).

Unlike in the ICRW, the user boundary is relegated to the national level where CITES Parties are charged with establishing a Management Authority that is required to monitor wildlife trade permits issued, as well as the actual number of species traded. CITES rules also define what a Party is, thus bounding the decision-making authority in the international forum (+DP1A).

Expert interviews indicate disagreements and sometimes frustration with species listing proposals and related economic restrictions. There were also complaints about lack of data collection once a species was listed and about national implementation of Appendix II listings. However, these complaints were related to outcomes of the listing.

Unlike in the ICRW, there was no confusion or dispute about the resource boundary itself which is determined by the species listing (+DP1B). Even though disputes as to access and decision-making rights for local communities were more pronounced in the CITES, these issues were, again, implementation related. DP1A, social boundaries, at the international level appeared to be clearly understood and assigned voting rights to national delegates and the authority to provide wildlife trade permits to national Management Authorities.

DP2 (congruence): CITES formal rules aim to establish a connection from the international forum to the national level through the Management and Scientific Authorities that individual CITES Parties have to create within their countries as part of their treaty commitments (CITES, 2020b). In theory, if set up properly, this should provide for wildlife appropriation that is sustainable over the long-term (+DP2A). CITES Parties are required to pay their membership dues and invest in trade infrastructure that facilitates the tracking of wildlife and wildlife products according to treaty provisions. The benefit received from these investments is the ability to trade with the 183 CITES Parties which represent a majority of the 195 recognized nation states in the world, including most major wildlife importers and exporters (African Wildlife Foundation, 2017; United States Department of State, 2019) (+DP2B). While CITES formal rules are not necessarily concerned with cultural aspects of wildlife trade directly, their decision-making context provides for exceptions to the rules that facilitate split-listing of elephant

populations so that sustainable use countries, like South Africa, can utilize these species under limited conditions (+DP2C).

Rule perceptions of the treaty with regard to DP2 were as divided in CITES as they were in the ICRW with members of the pro-use and anti-use camps each asserting that CITES rules do not accommodate their special environmental (species population) and cultural (community) circumstances. This fracture was observed at the 2018 meeting of the COP not only between developed and developing Parties, but also among African nations with many southern African countries advocating pro-sustainable use and northern African countries favoring non-use oriented policies. Interviews with experts in some of the southern African states indicated a cost/benefit analysis that was no longer in their favor and innuendos were made of potentially leaving the Convention due to this factor. Additionally, some pro-use advocates indicated that conservation decisions were being made by NGOs and governments from industrialized nations at no consequence or cost to them but which imposed great financial burdens on range state countries while providing no added benefit (-DP2B). In contrast, many conservation oriented experts perceived the treaty as being an effective instrument to balance the environmental and community/development needs of wildlife rich developing nations. Whether CITES rules are deemed to contribute to congruence between wildlife appropriation for trade without undermining species long-term survival, differed among participants. Some acknowledged successes were achieved, and others provided a more nuanced perspective in which species listing success was differentiated from conservation success. In

summary, while formally the congruence principle is present, informally its presence is dependent on the context within which participants are embedded.

DP3 (collective choice arrangements): CITES voting rights require two-thirds majority of the Parties present and voting, except for financial regulations which require a unanimous vote. Parties can file reservations when they object to particular species listings which remain in effect until the Party withdraws them. Accordingly, the formal rules provide the Parties with opportunities to modify the rules that affect them (+DP3).

Interviewees in CITES complained of bloc voting and a divide between pro-use and non-use countries which some thought was fueled by the inappropriate influence of animal welfare NGOs or hunting organizations, depending on the person interviewed. The fact that countries can impose their conservation philosophy on other countries through species listings without being affected by the vote was another complaint that echoed the DP2B issue outlined earlier. The related issue from a DP3 perspective is that equal voting rights mean the vote of countries who will not be affected by proposed conservation measures are equal to range state Party votes which bear the implementation costs of such listing decisions. Parties who perceived collective choice arrangements related to certain species listings as inequitable and unfair subsequently often exercised their right to file reservations meaning DP3 is met, albeit in a manner that likely affects DP2A.

DP4 (monitoring): CITES formal rules outline a layered and fairly robust monitoring mechanism that includes multiple actors at multiple governance levels. The

rules also provide for reporting of similar data by separate entities, e.g., Scientific Authority, Parties, and Secretariat are involved in monitoring export permits and other wildlife trade data, as well as reporting that data to the governing body. Monitoring in CITES, thus, encompasses all components of DP4; monitoring the resource (species population), appropriation (trade data), and monitoring the monitors (review of reports by the Secretariat and the Commission). While there remains the inherent issue of self-reporting without any designated double-checking of the data, minimal oversight mechanisms are in place (e.g., gathering similar data from different sources; Secretariat review) which do not exist in the ICRW. A particularly strong aspect of CITES' monitoring mechanism (discussed in detail in an earlier paper) is its handling of reservations which mandate that countries continue to maintain and communicate records on trade in species under reservation in their national reports (CITES, 2019 (1983) Conf. Res. 4.25).

Experts generally agreed that CITES monitoring and reporting system was a strength, and that national reporting and trade database information was useful (+DP4A&B), given the constraints associated with data collection and reporting. Some mentioned that delayed reporting by Parties can lead to decisions based on outdated data. In instances where species are affected by trade in dozens of countries, disparities or delays in, or failure to report by a significant number of range states can impair the quality of the trade assessment report (-DP4B). Interviewees also mentioned that oversight provided by the Animals and Plants Committee which is tasked with reviewing

monitoring data and reports was effective in highlighting disparities in reporting and requesting report resubmission with corrected data (+DP4C).

Respondents also discussed two negative spillover effects of CITES monitoring requirement. First, in instances where species are listed on Appendix II (trade is possible but must be monitored), countries with lower monitoring capacity may choose to implement zero quotas for fear their inability to monitor could lead to noncompliance. The spillover effect of the zero quotas on local livelihoods, however, can lead to continued harvesting without oversight potentially undermining resource sustainability. Second, in instances where species are listed on Appendix I (no trade), countries dependent on wildlife trade may no longer invest in species monitoring, since there is no economic value and no revenue generation to support the cost of monitoring. This could also result in threats to species survival (-DP4A&B). Such spillovers mean that DP4A&B are present but can be undermined due to the lack of support for low capacity countries.

DP5 (enforcement): CITES mandates that its Parties prohibit trade in specimens in violation of the Convention and, in instances where such violations occur, the Parties are required to take measures to penalize such trade (CITES, 1973) (+DP5).

In contrast to the ICRW, experts were in general agreement that CITES' sanctioning mechanisms are effective. In some instances, the mere threat of sanctions was reported to be sufficient to induce compliance (+DP5). Others agreed that the sanctions were effective but thought they were too rarely applied. The trade suspension procedure, in particular, was deemed to be an effective tool to invoke compliance, although not

without problems. Several interviewees mentioned that trade sanctions were not always fairly applied and, depending on the political clout of the offending Party, were more likely to be initiated against some countries than others.

DP6 (conflict resolution): Like all U.N. conventions, CITES has a dispute resolution mechanism included in its Convention text which provides for a two-step process in which Parties to a dispute first attempt to resolve the issue by negotiation. If that fails, they can mutually choose to submit their dispute to the Permanent Court of Arbitration at the Hague. Arbitral decisions are binding on the Parties (CITES, 1973) (+DP6). A search of the arbitration court's website did not reveal any CITES arbitrations.

Experts did mention CITES' dispute resolution mechanism, but only because it had been improperly raised at the last COP by Parties involved in a dispute over an amendment to the rules for the live transport of animals. Otherwise, respondents associated conflict with CITES' sanctioning mechanism.

DP7 (minimal rights): CITES' formal documents also do not specifically address their Contracting Parties' sovereign rights per se, although the Convention includes an ethical value statement recognizing that "peoples and States are and should be the best protectors of their own wild fauna and flora" (CITES, 1973 Preamble) (-DP7). Again, this lack of acknowledgement in the formal rules is not an indication of a missing DP7, since diplomatic relations between nation states continue to be practiced between members of delegations, as observed during the 2019 meeting of the COP.

Expert opinions with regard to the minimal recognition of Parties' rights was mixed. Some indicated an asymmetry in positions within the forum that accords less power to developing countries, particularly some of the smaller and poorer nation states. Deference to states' sovereign rights was also mentioned as a challenge to the conservation goals of the forum with regard to non-detriment findings that certify the take of wild animals as not detrimental to the overall population. While guidelines exist on the handling of such findings, in some experts' opinion too much flexibility and deference was given to individual Parties which they felt undermined conservation efforts and the standardization of the procedure across member states.

In contrast, other experts complained that CITES was often overreaching in its conservation attempts and infringing on sovereign rights by, e.g., trying to impose rules on confiscated specimens which should be left under domestic purview. Then there were also the enduring discussions about local community/indigenous peoples' inclusion in international decision-making (-DP7).

3.3 Convention on Migratory Species

DP1 (boundary): Much like in CITES, resource boundaries (DP1B) in CMS are defined by listing migratory species in Appendices based on their threat level which drives the treaty conservation provisions that Parties must comply with. Appendix I-listed endangered species fall under a "no take" restriction (with certain exceptions), and Appendix II species' conservation is delegated to separate AGREEMENTs that the CMS Parties can enter into with any affected range state, whether they are Parties to the CMS,

non-Parties, IGOs, or NGOs (CMS, 1979). Constitutive rules provide a definition for migratory species which was reaffirmed in a resolution adopted at the 2017 CMS COP (CMS, 2017a) (+DP1B). Social boundaries within the treaty define the COP as the decision-making entity and defer conservation action to the national level in an albeit much more diffuse manner than in CITES by asking Parties to engage in separate AGREEMENTS (+DP1A).

Participant observation and interviews, however, indicate that there is disagreement over the definition of a migratory species. Many interviewees felt very strongly that only species that migrate due to biological imperatives should be covered under CMS' auspices; a definition that clashes with the formal rules which define migratory species as any animal that crosses jurisdictional boundaries regularly for any reason (-DP1B). DP1A user rights was again questioned with regard to the perceived lack of influence and consideration for local communities and their connection/dependence on migratory species. Aside from these implementation issues, the rights of governments to make decisions related to migratory species use and conservation was not in dispute (+DP1A).

DP2 (congruence): CMS mandates that its Parties prohibit the taking of Appendix I-listed endangered migratory species and enter into AGREEMENTs with other countries to manage conservation of Appendix II species. In theory, these rules, if implemented correctly would indicate the presence of DP2A. There is no acknowledgement of cultural considerations in CMS' formal rules (-DP2C), and it is

difficult to assess cost/benefits under treaty rules because the treaty itself, aside from mandatory financial contributions, requires little investment from its Parties (-DP2B). Unlike, CITES, the CMS has major Party coverage gaps with no membership in North America and only a few countries in Asia. This means that the investment in treaty participation (dues and implementation measures) may be greater than the benefits of membership for many countries. The outsourcing of conservation measures to AGREEMENTs that allow non-member countries to participate in conservation efforts without having to become CMS Parties has also facilitated participation in CMS on the margins without investing into the actual CMS infrastructure. In combination, while CMS' formal rules indicate the presence of DP2A, DP2C is not present, and DP2B's presence is limited.

Participants' perceptions related to DP2B align with the formal rules with many perceiving the development of AGREEMENTs under the Convention as costly while only marginally improving migratory species conservation efforts due to oversight and implementation issues (-DP2B). Others viewed the ability of non-member countries to engage in AGREEMENTs as a positive conservation benefit with some attributing the success of, e.g., the Gorilla Agreement, to its congruence with community costs/benefits in which the communities' needs for employment are met with ecotourism job opportunities leading to increased conservation benefits. Most participants agreed that considering local culture was appropriate to successful conservation efforts, but these statements did not align with any particular rules or processes related to CMS rules. In

summary, CMS experts' perceptions of congruence within CMS seem to match the formal rule structure.

DP3 (collective choice arrangements): CMS voting rules mirror those of CITES with a two-thirds majority vote required for all decisions, except financial regulations (unanimous vote). CMS Parties can also file reservations for listings they do not approve of. However, in contrast to CITES, CMS' decision-making until 2017 was de facto by consensus with no reservations filed until agreement could not be reached on the listing of giraffes, lions, leopards, and chimpanzees. This indicates that the Parties who are affected by the rules have options to modify the rules and are exercising those options (+DP3).

Interviewees all commented that CMS traditionally reaches agreement by consensus. Many referred to it as "the friendly Convention." Some saw the need to vote in 2017 as evidence of a failure in communication, while others felt that CMS had a culture of agreement which was not helpful to addressing conservation issues meaningfully. Experts also expressed divergent views on voting, with some favoring majority voting and others consensus. Many respondents noted asymmetrical decision-making influence by the EU bloc. Based on CMS' voting rules, one EU vote counts as many times as there are EU member states providing a tremendous amount of voting power to that region in comparison to the African or Asian countries in CMS which vote individually. As of 2020, one EU vote counts for approx. 20% of the total vote in CMS (27 EU member states/130 CMS Parties) (-DP3). Interviewees did not comment as much

on reservations, likely because prior to the 2017 COP when the interviews were taken, this was not an issue.

DP4 (monitoring): CMS' formal monitoring and reporting rule structure is very similar to CITES in that it appears to meet all three DP4 components. It facilitates limited monitoring of the resource and appropriation, with a focus on monitoring the monitors. There are also several actors involved in monitoring activities, including the Secretariat and the Scientific Council. However, the regulatory language in CMS is much more vague than it is in CITES, particularly with regard to the AGREEMENTs. This is likely a function of its framework convention design which is less regulatory and more intended as a guidance tool (Baldwin, 2011). It also lacks in specificity with regard to the data that is to be collected by the Parties (-DP4A&B). While CITES and the ICRW are very precise in what is to be monitored (e.g., catch data, trade data), CMS Parties are required to “inform the COP on measures taken to implement provisions for migratory species” (CMS, 1979). The national reporting form intended to guide Parties' responses and improve data collection suffers from the same shortfall in that it also does not request reporting of specific data (-DP4C). For example, if the taking of a prohibited migratory species occurred, the form inquires whether exceptions were provided and, if so, that the general reason for that exception be given. A blank box for more “details” is included in the form, but it is up to the member government to decide whether to include specifics, e.g., number of animals taken, age, sex, impact on the overall population, etc. (CMS, 2020b). Since the assessment of the conservation impacts for the taking of migratory

species depends on the quality and depth of data reported, the chance of obtaining comparable data is likely lower than if the guide requested more specific information.

Experts perceived CMS' monitoring and reporting mechanism as improving but overall not very good (-DP4A&B). Some drew a distinction between CMS and its daughter agreements with the former being challenged, and the monitoring in the latter being generally good. As with the other treaties, there is no independent data verification process. CMS also suffers from perpetual budget shortfalls which means that funding to provide additional monitoring oversight through other entities, as in CITES, is not available (-DP4C).

DP5 (enforcement): CMS' formal rules only prohibit the taking of Appendix I migratory species. There is no indication of a sanctioning mechanism or other enforcement feedback in the written rules. DP5 accordingly is not present. Interviewees perception of the sanctioning rules matched the formal rules.

DP6 (conflict resolution): The formal settlement dispute mechanism in CMS is identical to the one in CITES. There have been no cases filed with the Permanent Court of Arbitration. Some interviewees noted that the lack of access to a court to address disputes was a drawback in comparison to disputes in the EU where the European court has a reputation for subjecting countries to stiff fines. However, in general, CMS experts perceived the forum to be low conflict and, thus, did not specifically address conflict resolution issues.

DP7 (minimal rights): There was equally no mention about sovereign rights in CMS' formal rules, although they were implicitly acknowledged in interactions and considerations of the Parties, and diplomatic interactions were observed during the 2017 meeting of the COP, even in instances where there were disputes over species listings. CMS experts did not express any concerns or opinions related to sovereignty or other rights issues.

3.4 Convention on Biological Diversity

DP1 (boundary): The CBD aims to conserve and sustainably use biological diversity. While a definition for biological diversity is provided in the Convention, it is very broad (CBD, 1992). The Convention text also provides further definitions related to the jurisdictional scope of the treaty relegating the applicability of its definition of “components of biological diversity” to individual jurisdictions, i.e., its Parties (CBD, 1992 Article 4(a)). The usefulness of such definitions for purposes of coordinating international conservation action of a particular resource is questionable since it is at once all-encompassing and all-applicable which makes it less beneficial to targeted action (-DP1B). With regard to clearly defining those authorized to use or govern resources, the CBD again defers all authority to its member States which have “the sovereign right to exploit their own resources...” (CBD, 1992 Article 3) (-DP1A). While elements of DP1A & 1B exist in the treaty formal rules, they are not “clearly defined”.

The amorphous nature of the resource boundary (DP1B), was captured in the expert perceptions. Many tied resource boundaries to the Aichi targets implemented by

the Convention as 2020 biodiversity goals, e.g., the establishment of a certain percentage of protected areas (CBD, 2018a). Others defined resource boundaries across a spectrum that ranged from nature conservation to sustainable use to the preservation of historical rights of developing countries, thus confirming resource boundaries as not clearly defined. However, DP1A was present with most Interviewees confirming the Parties as decision-makers in the forum.

DP2 (congruence): CBD's rules are very focused on sustainable use and the benefit sharing aspects of biodiversity conservation. There is very little in the coded rules that implies consideration of environmental conditions in biodiversity exploitation situations. In fact, most of the rules do not mandate any particular action by the Contracting Parties, instead they recommend Parties monitor biodiversity conditions and the impact that certain activities may have on those conditions. CBD's Decision on "Sustainable Wildlife Management" is a good example in that it acknowledges wildlife overexploitation as a serious biodiversity concern but the action recommended to address this issue is for the Parties to share their national programs' best practices on sustainable wildlife management (CBD, 2018b). It is unlikely such recommendations will lead to congruence with environmental conditions (-DP2A).

The cost for Parties to engage in CBD commitments is marginal (few, vague commitments) while the benefits are high, including information sharing opportunities and access to funding through the CBD's financial mechanism (-DP2B). Cultural

considerations are mentioned but are phrased so vaguely that very little action, if any, is required to be in compliance (-DP2C).

In contrast to the formal rules, interviewees, particularly those from developing countries, often felt very passionate about the CBD indicating it was a good forum for them to link conservation to development projects (+DP2A&B). Others expressed concern over the anthropocentric focus of the CBD which they thought led to cost/benefit analyses that emphasized human and economic considerations over biodiversity conservation, and also habitually applied price tags to all of nature. This indicates DP2A&B might be weakened in the perception of some participants. Others indicated that the CBD provided a good forum for indigenous and community voices to be heard, including recognizing hunting as part of the culture, where appropriate. Personal observations indicated an emphasis on including indigenous and local community perspectives in working groups and elsewhere within the CBD meeting forum. This indicates the presence of DB2C.

DP3 (collective choice arrangements): The CBD Parties could never agree on a voting procedure and, thus, decision-making operates under no rules, i.e., de facto by consensus (W. Yifru, email communication, Apr. 9, 2020). It also has no reservations.

Interviewees in the CBD forum felt strongly about voting procedures with many favoring what they described as the slow and deliberate process of consensus building which was thought to eliminate bloc voting and other undue influence from powerful state actors. Consensus voting was also perceived as leveraging the equal decision-

making playing field. While some concerns were expressed that certain Parties might abuse or hijack the consensus process in order to negotiate a better position on a particular issue, in general CBD's decision-making process was seen as favorable and inclusionary, in contrast to voting processes which served to exclude Parties/positions. These considerations were particularly important to smaller, lesser developed member countries.

DP4 (monitoring): Monitoring processes within the CBD formal rules are more nebulous than in CMS. This is likely due to its framework treaty design. CBD's formal rules require its Parties to identify and monitor "components of biodiversity" (DP4A), as well as processes and categories of activities likely to impact biological diversity (DP4B), and then present to the COP reports on measures taken to implement the provisions of the Convention (DP4C). These are not very specific guidelines, and the national reporting guide provides more of an outline of issues to include in national reports. The number of entities involved in monitoring processes was also limited to the Parties and the COP with limited scientific advice to be provided upon request by the CBD's scientific body (SBSTTA).

Experts were near unanimous that monitoring and reporting mechanisms in the CBD were ineffective and needed improvement, particularly with regard to the number of reports submitted (Party compliance), quality of the data provided (inconsistent), and the inefficient use of the submitted data.

DP5 (enforcement): The CBD formal rules also do not provide for an enforcement mechanism. There was general consensus among interviewees that the lack of enforcement mechanism is a purposeful part of CBD's institutional design.

DP6 (conflict resolution): In contrast to the other treaties, the CBD Convention includes extensive dispute resolution mechanisms (CBD, 1992 Article 27), including two separate sections on formal arbitration and conciliation procedures (CBD, 1992 Annex II, Part 1 & 2). No case was found to have been filed with the Court. Experts made no mention of conflict or dispute resolution in their interviews (again, no specific question related to conflict resolution mechanisms were in the interview protocol).

DP7 (minimal rights): In contrast to the other treaties, the CBD Convention includes three separate statements acknowledging member States' sovereign rights (1) over their own biological resources; (2) "to exploit their own resources pursuant to their own environmental policies"; and (3) "the authority to determine access to genetic resources" (CBD, 1992 Preamble; Articles 3 & 15).

Some experts perceive the CBD as being strong and very inclusive to indigenous peoples' and local community interests and view that as a very positive development. Others agree that such rights are important but see the Parties' role similar to the one outlined in the formal rules. In their opinion, the focus on local/indigenous rights often goes beyond the core objectives of the treaty and hampers treaty implementation.

3.5 Polycentricity (all treaties)

3.5.1 Attribute: *Multiplicity of decision centers*

The “multiplicity of decision centers” attribute of polycentric governance is broken down into three indicators. The first indicator tests whether these decision centers have the right to “actively exercise [their] different opinions and preferences in practice” (Aligica & Tarko, 2012, p. 254). The second one tests for autonomous decision-making layers, and the third assesses the system’s aims. It is helpful to clarify that while there is only one formal decision-making body in the treaty forums, there exists multiple informal “decision centers” which are more aptly described as multiple decision *influencers* in the form of IGOs, NGOs, business groups, etc. Having multiple, semi-autonomous decision centers is thought to improve robustness because it facilitates experimenting with a system without fear of institutional collapse (Ostrom, 2005).

3.5.1.1 Active exercise of diverse opinions

This indicator tests whether the ideas, methods, or opinions of actors within the system are actually “implemented into practice by at least one decision center” (Aligica & Tarko, 2012, p. 255). It is useful to expand on this by also looking at ways that the actors cooperate and compete with each other, and the way that contestation is used to inform decision-making. The hypothesis is that a certain level of cooperation, competition, and contestation will provide more robust decision-making that is viewed as legitimate by the actors and, thus, more likely implemented and/or abided (Ostrom, 2005).

In the **ICRW**, contestation has been replaced with hardened positions that fall along the pro-whaling/non-whaling philosophical divide. Experts frequently referenced decision-making gridlock and an inability to move issues forward, e.g., come to an agreement whether small cetaceans fall under ICRW auspices. Pro-whaling advocates perceive the forum as having low legitimacy. Now that Japan has left the forum (although it likely will continue to participate as a non-voting non-member observer), it is unclear whether the gridlock will remain or whether the Contracting Governments will find ways to address long-standing contested issues. These problems notwithstanding, the Governments were able to set aside their differences and come to an agreement with regard to the aboriginal subsistence whaling quotas at their last Commission meeting indicating that certain ideas are implemented into practice.

In **CITES**, the same pro-, anti-use divide as in the ICRW exists. However, it appears that the Parties have used this contestation more productively and avoided the decision-making gridlock of the ICRW. Decision-making occurs and in many instances consensus can be reached, despite the presence of different opinions. However, certain conservation issues remain contested and can lead to decision-making that is likely less robust long-term. For example, at the last meeting of the COP, several species were listed on Appendix II (trade restriction); three of which led to the subsequent filing of reservations by more than ten countries in one region (giraffe, shortfin and longfin mako shark) (CITES, 2019). Such reservations and rule perceptions from pro-use advocates indicate lower legitimacy of the forum in certain instances.

The pro-use/non-use philosophical divide also exists in **CMS**, albeit less pronounced than in CITES and the ICRW. CMS has a history, or as some experts call it a “culture of agreement”, which has resulted in consensus listings in all but one of the meetings of the COP in its 41-year existence. While many see this culture positively, others disagree and believe contestation is necessary in order to reach robust decisions, thus implying that the level of commitment behind CMS listings may be below what is necessary and/or should be aimed for. This high level of agreement was rattled during the 2017 listing dispute which resulted in fractured decision-making and subsequent filing of reservations by four African nations. Overall, there is indication of active exercise of different opinions which may be less expressed due to the specific culture of the forum, its institutional structure (pushing conservation of Appendix II threatened species to external Agreements), and the lack of obligations that CMS commitments place on their Parties.

The **CBD** similarly places very few obligations on its Parties but its decision-making is based on consensus. All decisions that are passed are agreed-upon by all the Parties and, thus represent the active exercise of different opinions. In fact, most experts interviewed, particularly from developing countries, viewed CBD decision-making as legitimate and also favored the equality of power structure inherent in the consensus process. Accordingly, while the treaty itself places few commitments on the Parties, and the effective implementation of the treaty’s goals are questionable, this indicator is *met*.

3.5.1.2 Autonomous decision-making layers

Polycentric governance systems are characterized by “overlapping decision centers that make operational decisions autonomously from the higher level” (Aligica & Tarko, 2012, p. 256). Carlisle & Gruby (2019) envision this particular aspect of polycentric governance as “a dense and evolving web of (transitory and fixed) decision-making centers and supporting actors from diverse sectors and domains” (p. 7). “Autonomy” implies that decision-making occurs without centralized coordination (Carlisle & Gruby, 2019) and should be formal rather than informal (Gruby & Basurto, 2013; Gelcich, 2014).

All four treaty regimes are characterized by multiple decision centers at various governance levels. While there is only one decision-making authority in each regime (Commission/COP), they are supported by various administrative and technical bodies. Decision-making is additionally influenced by observers, including local communities, environmental groups, IGOs, and some business interests. These decision-making centers are complemented by various related national, regional, and local entities.

3.5.1.3 Aims of the governance system

This indicator tests whether the aims of a polycentric system are based on the existence of a set of common/shared or individual goals. The aim of each treaty is defined by its objectives, and these objectives all pursue conservation and economic goals which, if not implemented appropriately, at best can cancel each other out, at worst favor economic over conservation goals. Due to the general fracturing between non-use and

sustainable use camps in each of the treaties (except the CBD), many Parties prefer pursuing one over the other goal. Interviews indicate there are Parties which take more measured approaches, and positions also differ depending on the issue/species listed. Nevertheless, the treaty that most meets the shared goals criteria is the CBD. In the other three, the goals are to a certain extent commonly shared but often diverge from each other.

3.5.2 Attribute: Institutional/cultural framework (overarching system of rules)

This attribute reviews the jurisdictional boundaries of the decision centers, their involvement in drafting the rules, whether these rules are seen as legitimate, and the decision-making context in which rule-making occurs (Aligica & Tarko, 2012). Here the framework is designed to assess the role of observers in the treaty governance systems, so-called “outsiders —agents that are not subject to the same rules as the ‘insiders’” (Aligica & Tarko, 2012, p. 254).

3.5.2.1 Incentive compatibility: Alignment between rules and incentives

This indicator determines whether the rules within the forum “are considered useful by the agents subjected to them, and the consequences of the rules are relatively transparent” (Aligica & Tarko, 2012, p. 256). Lack of such an alignment is associated with an absence of polycentric design. Interviews indicated instances where participants in the ICRW, CITES, and more recently in CMS expressed that certain conservation rules were not useful to their national context. In the ICRW, such an assessment may have led to the departure of the Japanese from the forum. Although gridlock is more pronounced

in the ICRW, most agents in all forums appear to find the rules and participation in the forums useful. The consequences of the rules in all four forums are also well-known.

3.5.2.2 Jurisdiction

Jurisdictional boundaries of governance systems can be territorial (limited to one jurisdiction) or nonterritorial (overlapping jurisdictions), or a combination of both (Aligica & Tarko, 2012). All four treaties are characterized by territorial jurisdiction with clearly defined boundaries that delineate international, regional, national, and local decision-centers. Depending on the Party, national jurisdiction can be overlapping. However, since this analysis is restricted to the international governance level, the assessment is *territorial for all four regimes*.

3.5.2.3 Rule design

This indicator tests what influence outsiders—actors not subject to the rules—have on rule design and crafting. Drawing on outside stakeholders to gain more information on a decision-making context can be an important factor in improving conservation governance (Prideaux, 2015). CPR theory also asserts that collective choice rules that allow actors who are affected by the rules to participate in rule making and rule changing activities are more robust than others (DP3) (Ostrom, 1990, 2005). However, outsider influence can also undermine a polycentric system if it allows corruption, elite capture, and asymmetric decision-making (Ostrom, 2005).

The right to speak during debate is granted to third party observers in all forums. Personal observation indicated decreased hostility towards observers by forum with the

highest level of suspicion and hostility in the ICRW followed by CITES. CMS and CBD were the most welcoming to observers. Influence and information sharing was not relegated to statements made during debates but also occurred outside of meetings with many delegations collaborating on conservation issues with NGOs and other groups intersessionally.

Expert interviews indicated suspicion by pro-use groups and national delegations towards NGOs with “animal rights” persuasions, including claims of inappropriate vote buying. Such assertions were also made by non-use country delegations and environmental NGOs against pro-use country delegations, business groups, and NGOs. No cross-over was observed in which country delegations had members from both pro- and non-use groups included on their delegations. Members of pro-use and non-use NGOs also were not observed interacting with each other. This observation was made in the ICRW, CITES, and to a certain extent, although not as pronounced, in the CMS forum. CBD was more dominated by community and indigenous activists than environmental NGOs, and the dynamics in that forum were quite different.

In summary, rule design in each forum facilitates a diversity of voices being heard. Outsiders in all four forums have an indirect influence on rule design and crafting, although that influence often does not extend beyond the particular philosophies held by a government or organization with little cross-over between use and non-use camps. Proposals can only be brought forward by a Party in which sole decision-making authority is vested. Although interviewees in all forums mentioned undue influence by

either pro-use or non-use outsiders, including vote-buying, economic pressure, etc., assessing such claims is beyond the scope of this paper. From the perspective of this research, the influence of a diversity of opinions on government decision-making is equated with a more polycentric and robust design and such influence is present in all regimes.

3.5.3 *Collective choice*

Collective choice decision making in the forums is majority voting in the ICRW and CITES whenever consensus cannot be reached (which often is the case when Schedule and Appendix listings are discussed). CMS formally operates under a majority voting system, but in practice has reached consensus at every meeting but one. The CBD Parties could not come to a consensus on their voting rules and, as a result, are making decisions de facto by consensus. Aligica & Tarko (2012) assert that majority voting is closer to power-based decision-making than consensus and creates a higher possibility of an instable polycentric design. Accordingly, the CBD's rating in this category is higher than that of the other treaties.

3.5.4 *Attribute: Spontaneous order, evolutionary competition*

The final attribute included in Aligica and Tarko's (2012) framework assesses the "spontaneous order process, how evolutionary competition works", and how information flows through the system (2012, p. 257).

3.5.4.1 Entry

The entry indicator assesses whether entry into the treaty forum is free, spontaneous, or merit based. Free means that “any decision center can decide to enter the polycentric system” without existing decision centers being able to prevent entry (Aligica & Tarko, 2012, p. 254). It is one of the requirements for a polycentric system to develop. New member governments in all four treaties have to file letters of ratification, acceptance, or approval with the Depositary Governments of the respective treaty which will then be shared with the Secretariat and existing country members. No other requirements other than being a nation state are required. Thus, all treaties are characterized as free entry polycentric systems.

3.5.4.2 Exit

The exit indicator assesses whether exit from the treaty forum is free or constrained. Free exit means that the relevant information for the decision to exit is made public and available to all decision centers. Constrained exit means information related to the decision to exit is secret (Aligica & Tarko, 2012)(Aligica & Tarko 2012). In all treaties, member countries can file letters denouncing treaty membership with the respective Depositary Government. These letters of denouncement are then shared with all other member countries. All treaties also list detailed information on their Contracting Parties publicly on their websites. Accordingly, exit is free.

3.5.4.3 Information

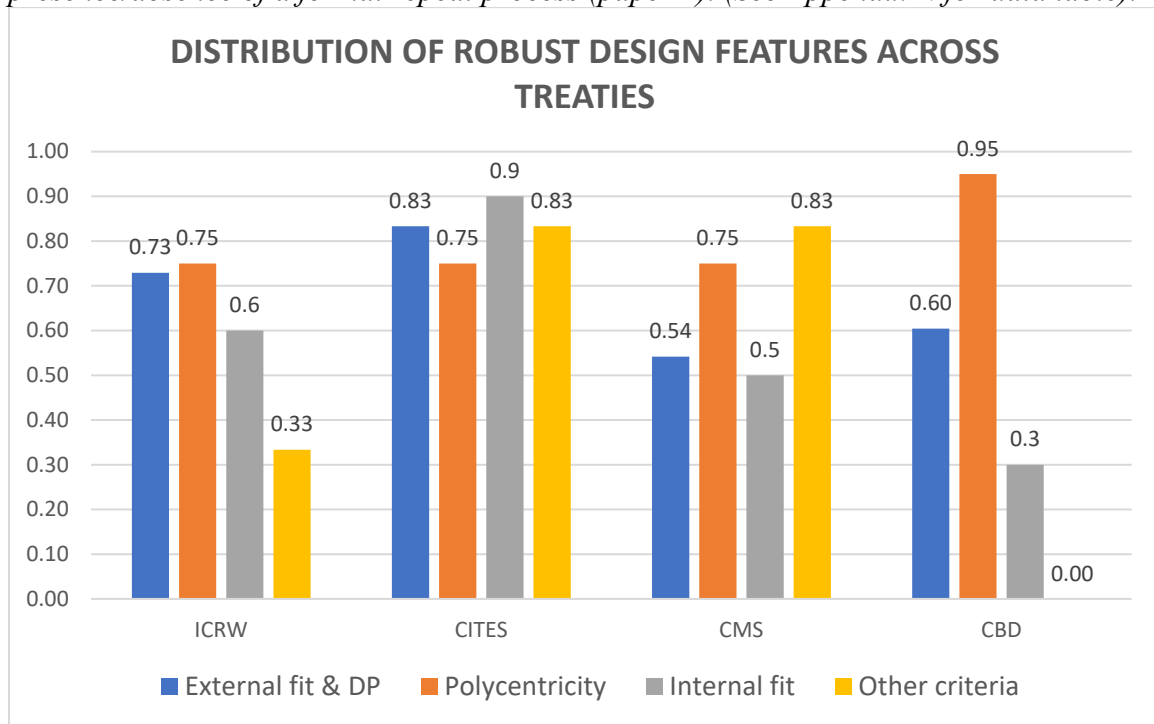
This indicator assesses whether information related to the polycentric system is public or private. Except for financial and budget related documentation, all information related to treaty governance, rules, member countries, species covered, etc., are publicly available on the treaties' respective websites. However, because financial information is not publicly available, the treaties are classified as mixed with regard to the information indicator.

3.6 Summary

The analysis conducted in this paper has shown similarities and differences between the four conservation treaties with regard to the composition of robust institutional design features within their formal and informal rule configurations. Fig. 4.1 reflects the distribution of these configurations across treaty regimes.

Figure 4.1

Data table reflecting the distribution of robust institutional design features across the four treaty regimes. Data were gleaned from the robustness and polycentricity analyses conducted in this paper (“External fit & DP”; “Polycentricity”). The data for internal fit was taken from the paper 2 analysis. The “Other criteria” design feature category reflects values based on degree of legal commitment, anthropocentrism, and presence/absence of a formal repeal process (paper 1). (See Appendix N for data table).



Each category in Fig. 4.1 was assessed as one of three values (1=present; 0.5=present but issues; 0=absent). For the “external fit & DP” category, each design principle (and relevant components) was determined based on the average of the assessed values for the formal and informal rules. For example, in the ICRW, the formal rating for DP3 was 1 and the informal rating was 0.5. Accordingly, the value included for DP3 in the “external fit & DP category” for the ICRW was 0.75 (Fig. 4.1). A total value of 12

was possible for each regime, if all categories were present without problems (one external fit average value for each of the 12 DP components). CITES scored the highest (10/12), followed by the ICRW (8.75/12); CBD (7.25/12) and CMS (6.50/12) (see Appendix N for further details on calculations and values).

The “polycentricity” assessment yielded interesting results with the CBD displaying most of the components of polycentric design (9.5 out of a possible 10 points; one for each of the indicators of polycentricity). The other three treaties yielded identical results indicating similar polycentric designs. This was again unexpected, not the least because these treaties generally have not been found to perform similarly throughout this examination.

The “internal fit” measure was taken from the paper 2 analysis and reflects values (1; 0.5; 0) for internal fit (monitoring & opt out features) and fit across levels of analysis (monitoring, enforcement, information/reporting mechanisms). CITES scored the highest in this category (4.5 out of a total of 5 points), followed by the ICRW (3/5); CMS (2.5/5); and the CBD (1.5/5).

Finally, the “other criteria” category encompassed values taken from the first and second paper’s analyses with regard to the assessed degree of legal commitment and anthropocentrism, as well as whether the treaty had a formal repeal process. Here the CITES and CMS scored the highest (2.5/3), mainly because they include a formal repeal process. The ICRW’s score was 1/3. The CBD received a zero in this category, since it

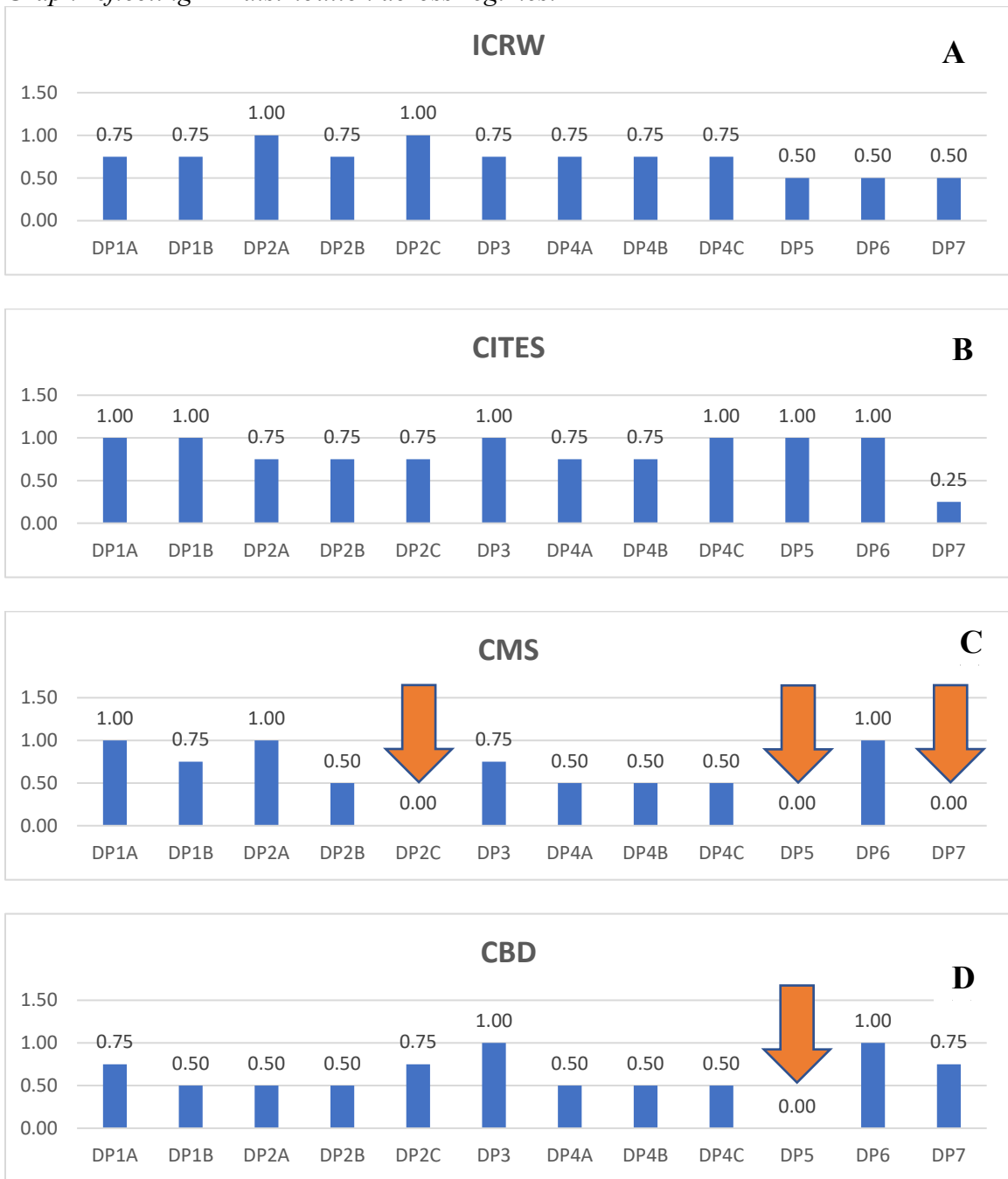
does not have a formal repeal process, the legal commitment placed on its Parties is weak, and it is the treaty with the highest emphasis on anthropocentric considerations²¹.

Visualizing the DP configurations across regimes illustrated the weaknesses in particularly the CMS (Fig. 4.2C) where three DPs are missing: Congruence with culture (DP2C); enforcement (DP5), and minimal rights to organize (DP7). While minimal rights to organize is associated with state sovereignty rights, this DP is implicitly present and is likely not listed because it is not part of the formal rules or was discussed in interviews. DP2's function in an information feedback system, however, is to reduce coordination and monitoring costs. DP5 is designed to correct aberrant feedbacks and prevent system instabilities (Anderies et al., 2016). This coupled with the fact that implementation oversight may be challenged (DP4 is only weakly present) indicates the CMS rules might be theoretically less robust in those aspects of their institutional design.

²¹ The value for “degree of anthropocentrism was reverse to that of other categories. If anthropocentric values are high in a regime, e.g., CBD, then the score would be zero. This is based on the hypothesis that all treaties are based in anthropocentric values (Gillespie, 2014), and therefore an overemphasis on anthropocentrism is likely an indicator of cost/benefit analysis that favor development over conservation.

Figure 4.2

Graph reflecting DP distribution across regimes.



The CBD is also missing the enforcement DP (Fig. 4.2D). Additionally, while it performed well based on polycentricity indicators, only two of the remaining DPs were present without issues DP6 (conflict resolution) and DP3 (collective choice arrangements) indicating this governance regime might also be sensitive to change.

The ICRW and the CBD have the most comprehensive occurrence of DPs with the values of CITES' DPs generally higher than those of the ICRW. In the ICRW, the congruence DPs and DP7 (minimal rights) are more pronounced than in CITES which is likely a feature of its emphasis on aboriginal subsistence whaling and the whaling moratorium. In contrast, CITES outperforms ICRW in all other DP categories. Their polycentric structure is identical. This indicates that CITES is theoretically most robust to change. However, because of its high level of congruence (DP2), which has been associated with better performing systems, the ICRW's robustness might be able to compensate for areas where it's outperformed by CITES, if feedbacks are used wisely.

3.7 Limitations

This paper utilizes content analysis to examine IG-coded data and interview transcripts for evidence of the predictor variables utilized to assess treaty robustness. The variety of measures used to assess robustness and the fact that the findings build on and complement earlier analysis into the micro components of the treaty formal rules indicates reliable research findings. However, moving forward with this research warrants utilizing a multi-method approach, including qualitative-quantitative analysis

and other statistical methods, in order to confirm study findings and their generalizability, as well as to increase reliability in the results presented.

4 CONCLUSION

This paper examined the presence/absence of several soft infrastructure (rule) components that have been shown to facilitate robust feedbacks and information processing governance systems. While the findings might not be surprising to experts and scholars of the forums, it was interesting to see the similarities between the ICRW and CITES which were not as evident based on the analyses in papers 1 and 2. Despite their seeming comparability, CITES' governance structure is likely theoretically more robust due to the strength of its internal and external fit, its ability to enforce the rules it deems important, and its DP configurations.

Research findings also seemed to indicate that it is not the CBD that is theoretically most sensitive to change, but likely the CMS due to a combination of factors, such as missing DPs and challenges in external and internal fit of its rule structures. This finding is disappointing because experts in the CMS forum are very passionate about its purpose and scope, and it is the only wildlife oriented treaty that to a certain degree acknowledges non-human rights.

The strange similarities in the distribution of polycentricity indicators which gave the CBD an uncharacteristically high rating and ranked the remaining three treaties as equal in their polycentric design could be related to an improper application of the LSP. It could also be an indication that polycentricity is present, but that its presence alone is not

an indicator of a robust system. Rather its contribution to robust institutional design is predicated on its coupling and interaction with the other components/characteristics of robustness. Future research will be required to further assess this curious phenomenon.

The exploration into comparative rule design is a reminder that policies which are overly reliant on science and associated measurement protocols may inhibit policy change by focusing attention on “debatable human constructs and protocols” that tend to generate conflict and are thus prone to poor (formal and informal) fit (Anderies & Janssen, 2013, p. 525). This is not to suggest that science does not matter. On the contrary, it does. However, as experts in most forums indicated, gathering data on species, analyzing it, and agreeing on its meaning is costly and the source of much dispute. This research has begun to demonstrate that monitoring the emergent properties of rules is as important to robust governance as monitoring the wildlife and biodiversity they aim to manage. While there are no policy panaceas or “right” policies, “good fit” policies are well-crafted, well-understood, and foster decision-making based on practical principles and common sense measurements. They can also help guide decision-makers towards better measurement and more robust decision-making.

Finally, this analysis is limited in its scope to the international collective action level and, thus, can only opine on the theoretical governance robustness of the four regimes. Further research is required to assess treaty implementation and operationalization in a multi-country, multi-species comparison in order to determine the functional robustness of these instruments.

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CHAPTER 5

RESEARCH FINDINGS SYNTHESIS

This dissertation sought to address and understand three issues of concern to policy analysts and those involved in international conservation governance: What are the static components, rule configurations and decision-making feedbacks of treaty rules, how are they perceived, and are these governance systems robust to change? My research generated fairly conclusive findings on the general structure of the treaties. It also provided insights on general decision-making (feedback) mechanisms and showed that constitutive and regulatory rules perform complementary tasks and, when well-designed, can provide a formal rule foundation that knits proscribed and prescribed actions together so that they are likely to lead to the operationalization of treaty aims and goals. However, I learned that much more work lies ahead to confirm those findings and to be able to provide insights to policymakers on how to use the feedback systems generated by the rules in each treaty wisely, i.e., be able to determine the direction in which to nudge the system in order to maintain desired policy objectives.

I started this dissertation by coding the formal *regulatory* treaty rules into their IG components to determine their basic grammar elements and the required, permitted, and prohibited actions imposed on actors in each treaty forum. For each institutional statement, I also identified the level of analysis of the action and the related rule typology. While I found that the treaty deontic structure divided the regimes into those that were regulatory (contained a larger percentage of legally binding commitments on

their Parties) and those that were not, the data generated from parsing the statements was overwhelming. I was forced to narrow the analysis to individual processes that were meaningful to robust design, e.g., examining the monitoring mechanisms created in the treaty rules, including related enforcement and information sharing/reporting processes by reviewing the coded statements for evidence of design principles 4 (monitoring) and 5 (enforcement) and information, payoff, and choice rules. I found that the two treaties that were strongly regulatory also had strongly connected aggregation and choice rules at the collective choice and operational level outlining the regime's monitoring requirements, although the rules differed in the number of statements used, actors involved, and their connectedness. The information/reporting configuration and feedback, however, was only well-connected to the monitoring system in one of the two regulatory treaties. The two weakly regulatory treaties successively utilized less components to structure their monitoring mechanisms.

In Chapter 3, I coded the formal *constitutive* rules by rule typology and levels of analysis. This required expanding on an existing set of five constitutive rule typologies developed for financial rules in order to create a rule typology protocol which was useful to code all constitutive statements in the treaty texts. I found that constitutive rule typologies can be organized in groups based on their function, e.g., as aspirational or constitutive boundary, etc., and that, to a certain extent, they can be identified by their "Counts As" element which resembles the AIM verb of the IG. I utilized the constitutive rule typologies to re-analyze the monitoring mechanisms in combination with the coupled

constitutive rules. I also assessed the linkages between regulatory and constitutive rules in opt out processes that allow Parties to circumvent species listings they object to. I found that CITES, the treaty with the best internal fit, used constitutive rules as governance guidance, i.e., to outline policy aims and to inform participants about existing rules that are relevant to the issues under consideration, as well as to clarify rule applicability. Non-regulatory treaties, such as the CBD and CMS, seemed to deploy a larger proportion of constitutive rules in a less targeted manner than regulatory regimes. It is unclear how much these findings are related to purposive rule design that has shifted over the decades from more regulatory, less constitutive rules in older treaties to more constitutive less regulatory in contemporary treaties. More research will be required to confirm the origin and generalizability of these observed patterns.

After having assessed core components and connections related to monitoring mechanisms in each of the treaties, in Chapter 4 I focused on assessing the likely feedbacks and robustness of each treaty regime. I measured robustness based on several criteria of robust design, including primarily the institutional design principles (DPs). DP occurrence and external fit were determined by analyzing the coded data for evidence of the DP, and then searching through expert interview transcripts to determine experts' perception of that DP. Internal fit was the second measure of robustness and was assessed by assigning a value to the mechanism and opt out data analyzed in Chapter 3.

Polycentricity was the third measure of robustness. Here I utilized the indicators of polycentric institutional design outlined in Aligica and Tarko's (2012) Logical Structure

of Polycentricity (LSP) framework to qualitatively assess the coded IG data for evidence of these indicators. I found that the degree of polycentricity was nearly the same in all four treaties implying that all treaties are based in polycentric design. This was not a particularly useful finding. Further research should be conducted to determine whether polycentricity's contribution to robust institutional design is predicated on its coupling and interaction with other characteristics of robustness, e.g., co-analyzing DP3 collective choice arrangements with the LSP collective choice indicator. I also found that in all categories important to robust institutional design, the CITES scored the highest. The ICRW—a very contentious conservation forum—scored second, while the CMS displayed the theoretically most sensitive institutional design which may be linked to the fact that it was missing 3 DPs.

With this comparative study of institutional design I was able to explore treaty design from different perspectives, based on different ontologies utilized, while addressing different but related questions. Each component of my research built on the next until theoretical robustness was assessed in the final chapter. The review of the Chapter findings demonstrated the usefulness of the IG to gain an understanding of the underlying rule components and general feedbacks in a governance system. IG coding also facilitated the subsequent analysis of the robustness components in the formal treaty text, and future research will expand this method to assess the interview transcripts for a better assessment of external fit across DP mechanisms.

Given the interconnectedness and emergent properties of coupled social-ecological systems (SES), resource governance structures, like the treaties examined in my research, must be able to deal with incomplete knowledge, uncertainty and change. Accordingly, it is important for analysts to be familiar with the basic structure of the rules since that enables deducing some of the most common or likely feedbacks and facilitates wise use of those feedbacks to nudge the system towards robustness. The opt out structure in CITES and the CMS was a particularly illuminating example as to how feedbacks can be used wisely and unwisely to generate reporting feedback mechanisms that alert Parties to the excessive use of reservations by certain Parties. The opt out process in the two regimes is nearly identical, except the CMS version relies on a large number of constitutive rules to “aspire” Parties into action and lacks the regulatory institutional statements to create a reporting and data collection feedback generated which is present in the CITES. Such differences lead to greater sensitivity to change, since it is likely that lack of reporting will allow excessive taking of migratory species under reservations to go unnoticed. This is not to say that reporting mechanisms in CITES are without flaw. In fact, the limitation of this research is that it only analyzed theoretical robustness based on the written rules and to a limited extent based on expert perceptions of those rules. Future research is planned to assess implementation of these findings in a multi-country/multi-species comparison.

Using different lenses through which to examine treaty governance systems, I was able to study treaty rule design from a micro and macro perspective in order to answer

different, yet complimentary questions. This synthesis of findings reveals that institutional design and structure influences the decision-making context or feedbacks within the system and, in doing so, robustness to change is affected. Based on my research findings, I suggest that the design of regulatory instruments appears to reduce their sensitivity to disturbance, theoretically. However, internal and external fit appear equally important, and it appears difficult to overcome poor fit with a regulatory structure only, as the ICRW appears to reflect. Although my research appears to imply that less regulatory instruments are less robust, this may be more a function of missing DP configurations, in particular DP5 (enforcement) in the CBD and DP5 and DP2C (cultural congruence) in the CMS. The one thing that both the CBD and CMS have that the regulatory instruments appear to be lacking is less contention and more conviction to the underlying cause by their participants. More research is needed to explore the connections between values and contestation to robust institutional design. While my research has allowed me to answer my initial research questions, it has also raised many more which, if I am lucky enough, I intend to pursue over the years to come. In the meantime, I am grateful that my work has contributed to existing studies and confirms, yet again, the wisdom and foresight of Elinor Ostrom's work.

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APPENDIX A
TREATY CONTEXT

INTERNATIONAL CONVENTION ON THE REGULATION OF WHALING (ICRW)

Historical context and membership status

The International Convention on the Regulation of Whaling (ICRW) was signed in Washington, D.C., on December 2, 1946, and entered into force in November of 1948 (IWC, 2020a). It is not only the oldest international conservation agreement in the group of treaties subject to this analysis, but also the oldest conservation agreement that is currently still active. The ICRW's entry into force predates the creation of the United Nations (U.N.) and, as such, the Convention is not organized, nor supported by the U.N. or the U.N. Environment Programme (UNEP). As of May 27, 2020 the International Whaling Commission (IWC), which is the governing body of the ICRW, had 88 member states, including whaling and nonwhaling countries (IWC, 2020b). An indication of the contentiousness among member governments in this forum was evident when Japan publicly withdrew from the Convention in order to pursue coastal whaling outside the treaty scope effective July 1, 2019 (Normile, 2019).

Aside from having the smallest membership of the four treaties examined in this research project, the IWC²² has membership gaps that include whaling countries and former members, such as Japan and Canada, as well as Denmark, Norway, and Iceland who have established a schizophrenic relationship with the convention by maintaining membership or non-Party participation status while continuing to actively engage in

²² This Convention is commonly referred to by its governing body, the International Whaling Commission or IWC. This is in contrast to the other three treaties which are colloquially referenced by treaty name.

whaling activities under objections or through withdrawal, thereby, circumventing the whaling moratorium that's been in place since the mid-1980s.

The ICRW is an outgrowth of a pre-existing Convention adopted in 1931 by the League of Nations (Birnie, 1989). That agreement had many flaws, including the lack of a commission that met regularly to review data and adjust whaling quotas. World War II ended most commercial whaling, and when nations reconvened in 1945, they were ready to address the weaknesses of the 1931 agreement. The 1946 ICRW remedied its predecessor's core weaknesses by establishing the International Whaling Commission (IWC), and by adding a separate Schedule of whaling regulations and catch quotas as an integral but separate part of the Convention that could be amended regularly by the Commission based on up-to-date scientific data (Birnie, 1989). Unlike CITES and CMS, the ICRW is at its core a fisheries agreement with the purpose of conservation to "develop whale stocks" for whaling (ICRW, 1946). This perception began to change for many member states prior to 1986 when the moratorium came into effect but, according to personal observations and interview data, persists among pro-whaling nations to this day.

Core objectives

The treaty's core objective is two-fold: (1) "the proper conservation of whale stocks" in order to "make possible the orderly development of the whaling industry" (ICRW, 1946). As mentioned, an integral but separate part of the Convention is a Schedule that outlines the catch limits for both baleen and toothed whale species. With

the exception of special permit (aka scientific) whaling and aboriginal subsistence whaling, “the catch limits for the killing for commercial purposes of whales from all stocks for the 1986 coastal and the 1985/1986 pelagic seasons and thereafter shall be zero” (IWC, 2018 Schedule, Article III(10)(e)). This moratorium remains in place to date.

In general, the IWC is focused on the conservation and management of a single species: “whales”. It should be noted that in the original context in which the ICRW was drafted “whales” was the term used by whalers to describe the species they hunted: “Greenland right whale or bowhead, North Atlantic right whale, North Pacific right whale, Southern right whale, gray whale, blue whale, fin whale, sei whale, Bryde’s whale, minke whale, humpback whale, and sperm whale” (Birnie, 1989). Interviews and participant observation at the IWC meeting in 2018 revealed that many whaling country representatives continue to argue that these are the only species governed under the auspices of the Convention, while non-whaling countries and conservation NGOs argue that the treaty should cover all cetacean species, including all members of the Odontoceti family (toothed whales), e.g., narwhal, beluga, orca, pilot whale and other small cetaceans.

Organizational structure

The ICRW established the IWC as its decision-making body in which each member country is represented by a Commissioner (IWC, 2020d). The Commission meets every two years to discuss conservation and other cetacean-related issues, as well as to regularly review the aboriginal subsistence whaling quotas and other proposals, e.g.,

the establishment of whale sanctuaries or whale watching guidelines. The IWC Secretariat coordinates and organizes the IWC activities. Since the treaty is not organized under the U.N., the Secretariat is funded directly by contributions from the Parties (IWC, 2020c). Seven Commissioners elected by the IWC constitute the IWC Bureau which oversees any work conducted intersessionally between IWC meetings. The IWC also consists of the following committees and sub-committees: Finance and Administrative Committee, Scientific Committee, Conservation Committee, Aboriginal Subsistence Whaling Sub-Committee, Infractions Sub-Committee, and a working group on Whale Killing Methods and Welfare issues (IWC, 2020e).

Decision-making context

The ICRW treaty text has not been changed since 1946. However, the Schedule has undergone regular amendments at every Commission meeting with the most recent changes made in 2018 following the 67th Commission meeting (IWC, 2018 Schedule). Commissioners meet every two years. Adoption of most proposals and resolutions requires a simple majority, except Schedule amendments which require a three-fourths majority vote (IWC, 2018 Schedule). Consensus is encouraged but voting is the norm.

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

Historical context

The Convention on International Trade in Endangered Species of Wild Fauna and Flora, also known as the Convention on International Trade in Endangered Species (CITES) was signed in Washington, D.C., on March 3, 1973 (CITES, 2020h). The Convention entered into force on July 1, 1975, after the mandatory ten state ratifications had been deposited (Huxley, 2000; Brown & Swails, 2005; Gillespie, 2011). As of April 2020, CITES membership is at 183 Parties (CITES, 2020h). In contrast to the CMS and the ICRW, CITES member governments include most of the countries engaged in high volumes of wildlife trade, including major wildlife importers such as the United States, China, and Russia; and wildlife exporting countries such as Tanzania and South Africa (African Wildlife Foundation, 2017).

CITES was conceptualized as a resolution adopted by the International Union for Conservation of Nature (IUCN) at its 1963 members meeting. A first draft of the Convention was prepared in 1964 but languished until 1969, when the passing of the U.S. Endangered Species Act (ESA) significantly propelled its development forward (Sand, 1997; Huxley, 2000). Due to the competitive global disadvantage that the American wildlife trade industry was experiencing under ESA restrictions, the U.S. government was under pressure to encourage the development of similar laws in other countries, including a “binding international convention on the conservation of endangered species”

in order to level the playing field (Sand, 1997). These instructions coincided with the IUCN's ongoing work and at their March 3, 1973 Washington Conference, members of 88 countries reviewed the final draft of the Convention which was then signed by representatives of 21 states (Huxley, 2000; Curlier & Andresen, 2002).

Core objectives

CITES' core objective is the regulation of international trade in wild plants and animals through a system of import/export permits and certificates that are managed at the national level within member countries. Each member country is required to establish one or more Management Authorities to administer the licensing system, and one or more Scientific Authorities which provide scientific input to the Management Authority on the potential impact of trade on species (CITES, 2020e). The title of the Convention is deceiving because its core focus is not only on regulating trade in endangered species—technically, trade in endangered species should only occur in exceptional circumstances—instead, it is about regulating trade in species that are not endangered but are subject to high levels of international trade. Here, the goal is to maintain trade at levels that do not threaten long-term species survival. Since the treaty focuses only on species that are commercially valuable and traded internationally, many species that are not commercially valuable and/or are subject to domestic exploitation, are not covered under treaty auspices (Nuwer, 2018), e.g., crocodile skins (Janssen & Shepherd, 2018).

Species governed under CITES are organized in three Appendices. Appendix I governs endangered species which generally should not be (but many still are) subject to

international trade. Species that are in this category include, e.g., all species of baleen whale, sea turtles, and great apes. Appendix II governs species that could be threatened by international trade if trade controls are not implemented. Species in this category include, e.g., zebra and giraffes. Appendix III is a voluntary category that allows individual states to request international assistance with trade controls of a select domestic species that may be threatened by international trade. Atlantic walrus is an example of an Appendix III listed species in which Canada has asked for voluntary protection because Canadian walrus populations are threatened by hunting activities in Greenland (COSEWIC, 2017; CITES, 2020b).

Organizational structure

As a UNEP Convention, CITES consists of a governing body, the Conference of the Parties (COP) with voting representation from each member state (CITES, 2020d). The Secretariat performs administrative functions, such as organizing meetings, gathering and disseminating information, monitoring and making recommendations on the implementation of the Convention (CITES, 2020g, 2020c). The Standing Committee consists of representatives of countries from each of the six geographical regions represented in CITES. It “provides policy guidance to the Secretariat concerning the implementation of the Convention,” manages the Secretariat’s budget, provides oversight of the work conducted in committees and working groups, and performs any tasks it has been assigned by the COP (CITES, 2020f). Similar to the ICRW’s Scientific Committee, CITES established two permanent expert committees—the Animals and Plants

Committees—to provide expert advice and recommendations on species listings and trade impacts, to conduct periodic reviews of species, and to draft resolutions on animal and plant trade issues for consideration by the COP (CITES, 2020a).

Decision-making context

Since its original inception, the CITES treaty text has been amended twice. Both the Bonn and the Gaborone amendments have reached the required number of ratifying countries and these changes have been included in the treaty text analyzed for this research (CITES, 1979, 2013). Not unlike the IWC Schedule, the Appendices are updated to list or delist species according to contemporary threat levels every two to three years at the meetings of the COP. Adoption of the rules of procedures, Terms of Reference for Administration of the Trust Fund, and procedural matters is by simple majority vote. All other decisions are taken by a two-thirds majority vote (CITES, 2016 Rules of Procedure, Rule 28(1)(2)). Consensus decision-making is encouraged but voting regularly occurs on contentious issues which are often related to species listing proposals.

CONVENTION ON THE CONSERVATION OF MIGRATORY SPECIES (CMS)

Historical context

The Convention on the Conservation of Migratory Species of Wild Animals (CMS), which is also sometimes known as the Bonn Convention, was signed in Bonn, Germany, on June 23, 1979 by twenty-eight states. The treaty entered into force on November 1, 1983, three months after the treaty Depository government received the fifteenth instrument of ratification (Lyster, 1989). As of November 2019, the CMS had 130 member states with notable coverage gaps in North America, Asia, and Russia (CMS, 2020e).

In many ways, migratory species, in particular birds, are the poster child species for international conservation collaboration efforts. These species are often compelled to traverse great distances to follow their biological imperatives or to search for food or new territory, and do not abide by human jurisdictional boundaries when doing so. Effective conservation efforts for these species demand, at a minimum, international cooperation among all countries that lie on the migratory path. In 1972, in recognition of the particular conservation challenges surrounding migratory species, the United Nations Conference on the Human Environment in Stockholm included in its Action Plan a recommendation that governments need “to enact international conventions and treaties in order to protect species which inhabit international waters or migrate from one territory to another” (United Nations, 1972; Lyster, 1989, p. 980). Germany subsequently took the lead in preparing a draft convention in 1974, and after several years of

negotiations the CMS was concluded and signed by twenty-eight states in June of 1979. The Convention did not enter into force until the fifteenth instrument of ratification was received in November of 1983 (Lyster, 1989). The nearly four and a half years from signature to entry into force is the longest delay of the four treaties subject to examination in this paper.

Core objectives

The treaty's core objective is the conservation of migratory species of wild animals. It currently covers under its auspices a wide variety of mammals, birds, reptiles, fish, and one insect (the Monarch butterfly) (CMS, 2020g). Like in CITES, species are organized in Appendices based on the threats to their long-term survival. Appendix I lists migratory species that are endangered, such as gorillas. Appendix II lists species "which have an unfavourable conservation status and which require international agreements for their conservation and management" (CMS, 2020b), like chimpanzees and dugongs. Although CMS appears to handle species listings similarly to CITES, there is a major difference. CMS applies a "framework Convention" approach (CMS, 2020c) to the conservation of its Appendix II-listed species by requesting the Parties enter into separate AGREEMENTS (capitalization follows CMS form) with each other, non-Party states, or other entities. While such outsourcing can be a strength because it expands the potential for conservation collaboration from the relatively small number of CMS Parties, a drawback is that there does not appear to be a well-structured coordination of those efforts within CMS due in part to financial considerations but also because of a rule

structure that set up such outsourcing without also providing a dedicated feedback and coordination mechanism. Although further inquiry to test this hypothesis is required, it is also conceivable that this flexibility in conservation engagement might be inhibiting countries from formally joining CMS, thus, reducing its visibility, importance, and financial resources (funding is dependent on country contributions).

As an umbrella or framework convention (Baldwin, 2011; CMS, 2020c), migratory species conservation efforts were originally tackled in three ways. First, in the case of endangered species listed in Appendix I, Range State Parties are required to cooperate and coordinate transboundary conservation efforts leading to Agreements and Memorandums of Understanding, such as the Agreement on the Conservation of Gorillas and their Habitats and the Memorandum of Understanding on the Conservation and Management of Dugongs (*Dugong dugong*) and their Habitats (CMS, 2020a, 2020d). Second, for Appendix II migratory species—species that “have an unfavorable conservation status and require international agreements for their conservation and management” (CMS, 1979 Article IV(1))—the Range State Parties “shall endeavor to conclude AGREEMENTS covering the conservation and management of the species” (CMS, 1979 Article IV(3)). Third, are the lower case “agreements” which encouraged the Parties to engage in conservation efforts, regardless of species conservation status, Appendix listing, or whether it’s a migratory species (Caddell, 2005). The handling of these lower case “agreements” was modified to be the same as the handling of AGREEMENTS at the CMS COP12 in 2017 (CMS, 2017a). As previously mentioned,

this “framework convention approach” in which the treaty “establishes shared goals and values” (Baldwin, 2011) but the actual work of implementing conservation is outsourced to the Parties to deal with amongst themselves depends on tight reporting and oversight measures to ensure that implementation at the national level moves the Parties towards their conservation goal.

This reliance on AGREEMENTS to handle the bulk of migratory species’ conservation efforts also stifled the startup of the Convention. In 1989, ten years after the Convention was introduced and six years after it entered into force, no AGREEMENTS had been concluded (Lyster, 1989). It wasn’t until 1991—twelve years after entry into force—that the Agreement on the Conservation of Seals in the Wadden Sea entered into force as the CMS’s first daughter agreement (Wadden Sea World Heritage, 2020). To date, there are a total of 30 daughter agreements under CMS: 7 Agreements (CMS, 2020a); 19 Memoranda of Understanding (CMS, 2020d); and 4 Special Species Initiatives (CMS, 2020f).

Organizational structure

The CMS is organized into four distinct bodies. The Conference of the Parties (COP), which consists of delegates from each member country, is its decision-making organ. It meets every three years to discuss implementation, conservation, and species listing issues. The Secretariat is the coordinating body tasked with organizing the meetings and providing support to the COP, the Standing Committee, and the Scientific Council. The United Nations Environment Programme (UNEP) provides and administers

the Secretariat. The Standing Committee performs policy and administrative duties during the time period between meetings, and the Scientific Council consists of experts who provide scientific advice and recommendations on research and conservation issues (CMS, 2018).

Decision-making context

Like the ICRW, the CMS treaty has not been amended. However, the Appendices are regularly updated (amended) at each COP; a total of thirteen times as of the last COP in 2020. This process allows the member countries to list and delist species from the Appendices based on current conservation concerns. Its rules of procedure state that “[t]he Parties shall make every effort to reach agreement on all matters by consensus” (CMS, 2017b Rules of Procedure, Rule 14(1)), and until the 12th meeting of the COP in 2017, that was the case. However, at the 2017 COP, a disagreement over listing proposals for giraffes, leopards, lions, and chimpanzees led to an unresolvable disagreement necessitating a vote. In that instance, as consensus could not be reached, a roll-call vote was taken, and the Appendix listings were adopted by a two-thirds majority of votes cast (CMS, 2017b Rules of Procedure, Rule 14(2)). It should be noted that the meetings of the CMS COP are only one week in comparison to the two-week COPs/Commission meetings of the other three treaties. This compressed agenda means that committee meetings and working groups often run simultaneously placing countries with small delegations at a significant disadvantage.

CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

Historical context

The Convention on Biological Diversity (hereinafter “CBD”) is one of the three Rio Earth Summit Conventions that were advanced by the United Nations Conference on Environment and Development (UNCED) in response to a growing recognition that “traditional conservation” measures were ineffective in halting the decline of biological diversity, and that the Earth system had to be viewed as a single complex system (CBD, 2007). The convention text was adopted in May 1992 in Nairobi and opened for signature later that month in Rio de Janeiro (CBD, 2007). The CBD Convention entered into force 19 months later in December of 1993 after being ratified by 30 countries (Herkenrath, 2002). With 196 Parties, the CBD has near universal membership with only two recognized nation states not being a Party: the Holy See and the United States of America (CBD, 2020c).

Much like in the preparation of the CITES treaty, the World Conservation Union (IUCN) was the entity that first explored advancing a treaty to conserve national resources. Early drafts of the Convention developed from 1984 to 1989 focused on the need to “conserve biodiversity at the genetic, species and ecosystem levels, and focused on in-situ conservation within and outside protected areas” (CBD, 2007). These early drafts also contained a provision for a designated funding mechanism to “share the conservation burden” between wealthy and developing nations—something that is missing from the other treaties in this analysis. In the subsequent years, a “Group of

Experts” was formed and then replaced by an “Intergovernmental Negotiating Committee for a Convention on Biological Diversity” to work on the draft treaty language. In contrast to the other three treaties, in the preparation for the Rio Earth Summit, the convention framers’ intent was to “create an instrument that would take a comprehensive, global, and coordinated approach to protect biological diversity across the globe” (Harrop & Pritchard, 2011, p. 475). The CBD was designed to “establish a shared responsibility for the conservation and sustainable use of biodiversity” while respecting its member states’ sovereign rights to the conservation and sustainable use of biological resources within their individual jurisdictions” (Harrop & Pritchard, 2011, p. 475).

Despite the treaty’s seemingly rapid acceptance—as evidenced by the relatively quick turnaround from adoption to entry into force—the initial treaty negotiations were conflictual and revealed a north-south divide on conservation issues. Industrialized countries’ aim was to promote conservation of biological diversity. Developing countries wanted to foster the sustainable use of those biological resources; many of which were contained within their jurisdictional boundaries; along with mechanisms for sharing financial and technological resources equitably (Harrop & Pritchard, 2011). These north/south divisions persist to date. It should be noted that the United States, having played a significant role in the negotiations leading up to the treaty adoption, was unhappy with the final treaty. Its refusal to ratify the Convention has now led it to be the only non-Party industrialized nation, though it continues to exert pressure on CBD decision-making indirectly via a contingent of delegates participating as non-Party

observers at CBD COPs; much to the displeasure of some delegates (personal observation at CBD COP18).

Core objectives

The CBD has three core objectives: (1) “the conservation of biological diversity”; (2) “the sustainable use of its components”; and (3) “the fair and equitable sharing of the benefits arising out of the utilization of genetic resources” (CBD, 1992 Article I). These are very broad and reinforcing goals which “bring nearly all topics within the scope of the CBD” (Wold, 1998, p. 4). However, they also acknowledge the different economic conditions and moral responsibilities of the world’s nations with regard to conservation and sustainable use of biological diversity (Wold, 1998). Some argue that the all-encompassing approach of the CBD is the foundation for an unmanageable agenda and framework of action (Wold, 1998). Others claim that the negotiators purposely designed the treaty to be comprehensive so that the resulting flexibility (or vagueness) of the Parties’ obligations would facilitate a process in which aspirations and commitments would lead to the development of subsidiary hard law protocols (Harrop & Pritchard, 2011). However to date only two protocols have been developed: The Cartagena Protocol on Biosafety, and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits; neither one of which is focused on ameliorating biodiversity declines.

Organizational structure

The governing body of the Convention is the Conference of the Parties (COP) which meets biannually to advance the implementation and objectives of the Convention (CBD, 2020a). The Secretariat's function—much like that of the Secretariats—is to provide administrative support, including organizing meetings, preparing reports, assisting governments with implementation issues, collecting and distributing information (CBD, 2020d). The CBD also has a Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) which reports on and provides advice related to the implementation of the Convention and the status of biological diversity. It is also charged with responding to specific questions directed to it by the COP. Members of the SBSTTA are government representatives that are “competent in their relevant field of expertise” (CBD, 2020e). Intersessionally, the CBD is governed by the COP Presidency which consists of the President—generally the Minister of Environment from the host government of the last meeting—and the Bureau. The Bureau comprises of ten Parties or “Vice Presidents”, plus the President and his/her representative. The President and Bureau are elected at the beginning of each COP and remain in that position until the beginning of the next one. During the meeting at which they are elected and in the following intersessional period, the President and Bureau provide leadership, manage negotiations, and steer efforts towards meeting the Convention objectives (CBD, 2018).

What sets the CBD apart from the other three Conventions is the aforementioned dedicated financial mechanism which is operated by the Global Environment Facility

(GEF) and “functions under the authority and guidance of, and is accountable to the COP” (CBD, 2007). The GEF was established ahead of the Rio Summit to set up a mechanism in which developed country Parties would provide the necessary financial resources so that developing country Parties are able to fully implement their treaty obligations (GEF, 2016). The CBD also provides for the establishment of a clearing-house mechanism to promote and facilitate technical and scientific cooperation (CBD, 2007).

The CBD claims to be “dedicated to promoting sustainable development” and a “practical tool” to operationalize the United Nations Agenda 21 principles (CBD, 2020b). As such it is not a Convention focused on species conservation—although that is an aspect of it—but it is more concerned about the connection between ecosystems, species, and the needs of human societies and nation states. It is also trying to position itself as the overarching conservation umbrella under which to unite the other conservation treaties. And it may be in a good position to do so, since it is the only Convention that includes a specific financing mechanism in its treaty text and governance setup, the aforementioned GEF. This makes conservation partnerships with the CBD desirable for cash-strapped conventions, such as CMS, although interviews indicate a desire to keep the Conventions maintaining collaborations as separate entities rather than reorganizing under the CBD umbrella.

Decision-making context

The CBD treaty has not been amended, although as indicated above, two non-conservation related Protocols have been added under its umbrella. CBD's rules of procedure which govern the decision-making context during the biannual Conference of the Parties' meetings has bracketed the entire Rule 40 dealing with the CBD's voting mechanism (CBD, 2008 Rule 40). Based on information received from the CBD Secretariat, "no [voting] rules are currently in effect" (W.D. Yifru, CBD Secretariat, email comm. April 2020). The CBD's decision-making, thus, is *de facto* by consensus, since the Parties could not reach agreement on their own voting rules.

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APPENDIX B
SAMPLING STRATEGY AND SAMPLE SIZE

TREATY SELECTION

The four treaty regimes included in the analysis were selected based on a purposive, non-probability or reference sampling method (Bernard, 2011; Krippendorff, 2013) beginning with a search under the “biological diversity” section of the U.N.’s Information Portal on Multilateral Environmental Agreements (InforMEA, 2020a). This yielded a total of 54 regional and 11 global treaties and protocols (InforMEA, 2020b). The following three inclusion criteria were then applied to narrow the scope of treaty candidates: (1) treaty membership had to be global and open to any nation state; (2) it had to be an independent conservation instrument, not a protocol or daughter agreement to another treaty; and (3) it had to focus on wildlife or biodiversity conservation (see Table 1). Based on these criteria, three treaties were identified: The Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species (CITES), and the Convention on Migratory Species (CMS) (Table 1). The International Convention on the Regulation of Whaling (ICRW) was subsequently added to the list because it provided an interesting governance design contrast to the three U.N. treaties, as it is the oldest conservation treaty still in existence which predates U.N. creation and is, thus, not governed under it (or listed on the U.N.’s InforMEA site).

Inclusion criteria	Exclusion criteria
Global in scope	Regional multilateral environmental agreements (MEAs), e.g., AEWA, EuroBats; ASCOBANS, Carpathian; Lusaka; SPAW
Not a protocol or daughter agreements to another treaty	Protocols or daughter agreements, e.g., Nagoya Protocol and Cartagena Protocol on Biosafety which are both daughter agreements of the CBD

Focus on biodiversity/wildlife conservation	Non-biodiversity/wildlife conservation focused MEAs, e.g., World Heritage, Ramsar, Plant Protection and Plant Treaty
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Table 1: Inclusion/exclusion criteria for treaty selection.

Treaty	Signed/Entry into force	Member states	Core objective	Species covered	Scope
ICRW	Dec.1946/Nov. 1948	88	Conservation of whale stocks and development of the whaling industry	Cetaceans	Global
CITES	March 1973/July 1975	183	Regulation of wildlife trade	Wild animals and plants subject to international trade	Global
CMS	June 1979/Nov. 1983	130	Conservation of migratory species of wild animals	Migratory species (Mammals, birds, reptiles, fish, and one insect)	Global
CBD	June 1992/Dec. 1993	196	Conservation and sustainable use of biological diversity; fair and equitable sharing of the benefits arising out of the utilization of genetic resources	Biodiversity in general – not species focused	Global

Table 2: Treaties selected for analysis. Table is organized by date of inception with the oldest treaty, the ICRW listed first. All four treaties are global in scope meaning that any recognized nation state can become a member. Species covered vary from a single species focus (ICRW) to biodiversity in general (CBD). The core objective aims to address a particular social dilemma which in all four instances is the overexploitation of the species listed in the “Species covered” column. Country membership data under the “Member states” column were last updated in April 2020.

From the conservation of the world’s largest marine mammals to the conservation of biodiversity as a whole, each treaty aims to tackle a particular overexploitation social dilemma with its core objective (see Table 2). There are drawbacks though, such as varying membership size, membership gaps, and differing conservation objectives. For example, the ICRW’s membership size includes only 88 member states versus the near universal membership of the CBD (196 countries) (CBD, 2020; IWC, 2020). CMS includes membership coverage gaps in countries/regions, such as North America, Russia, China, and Japan (CMS, 2020). CITES focuses only on governing the trade in

commercially valuable species with minimal consideration to domestic wildlife trade issues. While CMS and the ICRW contain provisions related to habitat conservation of the species under their auspices, CITES does not. CBD, on the other hand, is focused on habitat only with little concern for the species inhabiting the same.

These differences, however, are outweighed by the complementarity of the treaty objectives. If linked and coordinated effectively, these four conservation instruments could provide a comprehensive web of global conservation guidance and standards that would address a majority of global species/biodiversity issues. ICRW's single species focus on cetaceans addresses an iconic and from an ocean ecosystem perspective important marine keystone species (Roman et al., 2014). Whale sanctuaries created by the International Whaling Commission (IWC)—the ICRW's governing body—have the potential to create marine conservation benefits that extend beyond cetaceans, including contributions to ecosystem-based management, local fisheries, and livelihood improvements (Zacharias et al., 2006; Cook et al., 2019). While CITES is focused on the impact of international trade on commercially valuable plants and wildlife, the regulatory system it establishes in member countries could likely be adapted to aid in the reporting and monitoring of species covered under the other treaties. Migratory species that are not covered under CITES or the ICRW, may be covered under CMS auspices which take a much broader conservation perspective, including the protection of key habitat. Finally, any species not covered under ICRW, CITES, or CMS, should be able to find conservation consideration under CBD's Articles 8 and 9, in-situ and ex-situ

conservation, which require the establishment of a system of protected areas and the adoption of “measures for the recovery and rehabilitation of threatened species and their reintroduction into natural habitats” (CBD, 1992 Articles 8, 9). More details on each treaty’s history, objectives, organizational structure, and decision-making context are provided in Appendix A.

FORMAL TEXT SELECTION

This research comparatively explores the institutional design of four conservation treaty regimes to determine the structure of Controller K_t (Fig. 1), the feedbacks generated by that structure, and how that may contribute or counteract robust governance of the SES. Accordingly, formal document selection was conducted using a relevance non-probability sampling method in which the websites of each treaty were manually mined in order to find texts that addressed the document categories identified in Table 3. Such a sampling method is appropriate when trying to understand a process and when random sampling is unlikely to produce insights that answer the research questions (Krippendorff, 2013; Bernard et al., 2017).

Treaty governance is based on two kinds of formal documents. First, there are the foundational documents which include the Convention text that establishes the regime, and the rules of procedure which outline the decision-making context for each meeting and during the intersessional period between meetings. These documents are generally viewed as the mandatory, legally-binding structure that undergirds treaty governance

(Bodansky, 2016). Identification of foundational documents was straightforward as they are part of every regime and publicly accessible on treaty websites.

The second type of formal document included in this report provides a record of the contemporary decision-making processes that occur at each meeting of the Conference of the Parties (or Commission meeting in the IWC forum²³) where Parties and other treaty bodies put forth proposals on species listings, whaling quotas, compliance, administrative, financial matters, etc., for discussion and vote. All four treaties have each generated hundreds of documents recording such contemporary decision-making in the decades since they respectively entered into force. With some exceptions, the policy vehicles used to advance such decision-making are resolutions and decisions. These documents are generally viewed as providing non-legally binding recommendations and guidance (Rajamani, 2016; Mitchell, 2020). The distinction between the two is that *resolutions* address decision-making of a more permanent nature over longer periods of time and include guidance with regard to species listing, budgets, interpretation of Convention provisions, etc. (CMS, 2017; CITES, 2020). *Decisions*, on the other hand, generally cover short-term decision-making and recommendations that pertain to specific actions or tasks that need to be taken or completed. Often these tasks

²³ Unless reference is made to the Convention text itself, the Whaling Convention is generally referred to as the IWC, not as the ICRW. This is in contrast to the other three treaties where the Convention name is used to reference the Convention text and its governing body synonymously.

are assigned at one meeting of the COP and need to be completed by the next meeting (CMS, 2017).

With that distinction in mind, document selection in the contemporary decision-making category focused on resolutions since they provide long-term policy guidance. The exceptions to the rule are the IWC and the CBD. The IWC only uses resolutions to advance recommendations to the Parties which made it unnecessary to parse different types of contemporary decision-making documents. The CBD, on the other hand, only uses decisions. Since these decisions are structured to provide long-standing guidance criteria, they were determined to be comparable decision-making instruments and selected based on the same criteria as the resolutions. While subsequent IG coding revealed linguistic differences between the CBD decisions and resolutions in the other forums (i.e., a greater use of shared strategies instead of norms), the decision-making content, i.e., long-lasting guidance, proved to be the same.

Contemporary decision-making documents were selected by mining the treaty websites to determine: (1) the resolutions/decisions currently in effect; and (2) selecting those documents most salient to the context of robust institutional design based on five document criteria (Table 3). This was a fairly straightforward process in the three U.N. treaties where resolutions that are currently in effect are easily identified. However, the IWC has no formal resolution repeal process, and its website contains all resolutions adopted since 1976; 44 years of data. Additionally, searching by topic is difficult, since unlike in the U.N. treaties, IWC resolutions are reported by lumping all resolutions into

one document that is labeled by Commission meeting, e.g., “2018 – All Resolutions”. This necessitated a chronological one-by-one review of resolutions to find the most recent resolution related to each document category.

Once identified as potentially salient to robust institutional design, documents were downloaded and underwent a secondary, more detailed review to determine whether they fit into one of the five overarching categories informed by the theoretical underpinnings of the Institutional Analysis and Development (IAD) framework (Kiser & Ostrom, 1982; Ostrom, 2005, 2011) and the institutional design principles (Ostrom, 1990; Cox et al., 2010):

- (1) Foundational: Convention texts and rules of procedure.

Theoretical underpinning: IAD – establishment of the action situation, design principle 3 (collective choice arrangements).

- (2) Maintenance and amendment of core governance features: This category included resolutions that address the maintenance and amendment of each treaty’s core governance features. For example, resolutions related to species listing/delisting criteria in the Appendices, whale harvesting quotas and other rules related to aboriginal subsistence and special permit whaling, as well as CBD decisions related to sustainable use issues and sustainable wildlife management. Documents addressing opt-out features, such as reservations and objections, were also included here.

Theoretical underpinning: Position and boundary rules; design principles 1 (user boundary), 3 (collective choice arrangements, and 7 (minimal recognition of rights to organize).

- (3) Financial & Administrative: Resolutions related to financial and administrative matters, including the acceptance of financial contributions. In the IWC, these issues are dealt with under the treaty's rules of procedure and there are no separate resolutions. The CBD has its own financial mechanism and generated more documents in this category, although the content of those rules generally mirrored the financial rules in the other three treaties.

Theoretical underpinning: Payoff rules outlining payments and benefits/incentives; design principle 2 (congruence between costs and benefits)

- (4) Organizational: Resolutions selected for analysis in this category focused on the governance of the scientific expert body in each treaty, as well as the intersessional bodies that coordinate activities between meetings of the Commission/Conferences of the Parties: the Presidency/Bureau in the CBD and ICRW; and the Standing Committee in CITES and CMS.

Theoretical underpinning: Aggregation rules; design principle 3 (collective choice rules).

- (5) Interpretation, implementation and compliance: This category included resolutions that govern general monitoring and oversight mechanisms. Due to differences between the treaties, this category was the most difficult to match across regimes. CITES, as the treaty with the most well-developed compliance and enforcement procedures included eleven documents outlining rules related to

interpretation and definition of key governance aspects, national reporting requirements, species trade oversight measures, compliance, review and enforcement measures (see Table 3). In contrast, CMS only recently adopted a review mechanism. Beyond what is outlined in the Schedule and the treaty text, IWC resolutions only review subsistence and special permit (scientific) whaling, although it recently adopted a resolution in response to an Independent Review of the treaty conducted ahead of the 67th IWC meeting in 2018 (Table 3) which was included in the analysis.

Theoretical underpinning: Information and payoff rules; design principles 4 (monitoring) and 5 (graduated sanctioning).

The total number of documents included in this study was $n = 60$ which was distributed across the regimes as follows: IWC ($n=8$); CITES ($n=21$); CMS ($n=12$); and CBD ($n=19$). There is no agreed-upon metric to determine the appropriate sample size for nonprobability text analysis. The literature generally recommends including a large enough sample size to reach data saturation and increasing the sample size “when the units of text that would make a difference in answering the research question are rare” (Krippendorff, 2013, p. 122; Bernard et al., 2017). Ethnographic field studies assert that identifying common themes in interviews requires interviewing about 16 people, whereas meta-themes that apply more broadly across participants and study sites require 20-40 interviews per site (Hagaman & Wutich, 2017). Since this research project is based on a novel research design, it is difficult to identify which units of text will make the

difference in answering the research questions. However, the identification of cross-cutting themes is important making a larger sample size appropriate. Since the IG coding parses texts into institutional statements, having a large sample size of institutional statements is more important than a large sample size of texts. While the number of texts included per treaty varied between 8 (IWC) and 21 (CITES) texts, the total number of coded institutional statements per treaty were between 876 (CMS) and 1465 (CITES) which is sufficient to identify commonalities (or meta-themes) among the treaty regimes.

Formal text comparison/match (all documents valid and in effect as of Feb. 2020)			
Treaty / Document category	CMS (n = 12)	CTEW (n = 8)	CBD (n = 19)
	Treaty text	Treaty text	Treaty text
Foundational	Rules of Procedure	Rules of Procedure (Sep. 2018)	Rules of Procedure (October 2016)
	Res. 03.01 Species listing in the Appendices	Res. 03.01 Species listing in the Appendices (Sep. 2018)	<ul style="list-style-type: none"> Res. 8.21 Range States consultation re amend Appendices I and II Res. 5.20 Guidelines Secretariat re: Article XV [Amendments to Appendices]
Maintenance & amendment of core governance features (Appendices/Schedule, treaty text)	Res. 11.33 Guidelines Assessing Appendix Listing Proposals	Harvesting quotas included in the Schedule (Sep. 2018)	<ul style="list-style-type: none"> Dec. VII/12 Sustainable use (Article 10) Dec. 14/7 Sustainable wildlife management
	Reservations (included in treaty text) Res. 12.02 Financial & Administrative	Objections (included in treaty text) See Rules of Procedure (Sep. 2018)	<ul style="list-style-type: none"> Res. 4.25 Reservations Res. 18.1 Financing/costed programme for the Secretariat
Financial & Administrative	Res. 5.7 Guidelines acceptance of financial contributions	See Rules of Procedure (Sep. 2018)	Dec. III/8 Memorandum of Understanding CBD & GEF
	Res. 09.15 Standing Committee	Bureau (established in 2012) (see Rules of Procedure (Sep. 2018))	<ul style="list-style-type: none"> Subsidiary Body on Scientific Technical and Technological Advice (See CBD Article 25) Bureau (see Rules of Procedure, Rule 21)
Organizational	Res. 12.04 Scientific Council	Scientific Committee (see Rules of Procedure & Res. 2014-4)	<ul style="list-style-type: none"> Dec. XII/26 Subsidiary body on implementation Dec. I/3 Clearing-house mechanisms
	Res. 11.06 Review of Decisions	See Rules of Procedure (Sep. 2018)	Dec. X/15 Scientific and technical cooperation and the Clearing-House mechanism
Interpretation, implementation, compliance			

Table 3: Formal document selection details by document category.

One of the reasons so few IWC resolutions were included in the analysis is related to its lower decision-making output. An arbitrary review of decision-making in the four treaty forums, based on resolutions adopted over the course of the past five meetings, showed an average of four resolutions per meeting adopted by the IWC, in comparison to an average of 35 resolutions each in the other three forums (Table 4). How much this disparity is linked to the divisions among the IWC Contracting Governments, and/or to the fact that the IWC only deals with single species issues and has maintained a moratorium on most whaling activity since 1986, would be interesting to investigate but is outside the scope of this report. However, it does explain why the number of IWC resolutions included is lower than in the other forums.

ICRW		CITES	
Commission meetings	Resolutions adopted	COP meetings	Resolutions adopted
IWC 67 (2018)	5	COP18 (2019)	36
IWC 66 (2016)	6	COP17 (2016)	39
IWC 65 (2014)	5	COP16 (2013)	36
IWC 64 (2012)	1	COP15 (2010)	30
IWC 63 (2011)	2	COP14 (2007)	39
Average number of resolutions adopted	3.8	Average number of resolutions adopted	36
CMS		CBD	
COP meetings	Resolutions adopted	COP meetings	Decisions adopted
COP13 (2020)	25	COP14 (2018)	38
COP12 (2017)	68	COP13 (2016)	34
COP11 (2014)	34	COP12 (2014)	35
COP10 (2011)	29	COP11 (2012)	33
COP9 (2008)	20	COP10 (2010)	47
Average number of resolutions adopted	35.2	Average number of resolutions adopted	37.4

Table 4: Number of resolutions passed by treaty forum over the course of the past five meetings of the Conference of the Parties/Commission, along with the calculated averages. It should be noted that the International Whaling Commission is focused on single species issues which may account for the discrepancy in decision-making output, while all other

Conventions deal with multiple species and biodiversity issues. Nevertheless, this Table does show that the guidance output to member states is higher in CITES, CMS, and CBD than it is in the IWC. COP12 of the CMS was uncharacteristically productive because it was in the process of updating its administrative procedures to align them with the way governance issues are handled in the other fora. As a result, only 36 of the 68 Resolutions were new issues. The rest were adjustments and refinements to prior Resolutions.

ADDITIONAL DOCUMENT SELECTION NOTES

The administrative handling of resolutions within the IWC is also distinct from the other forums. First, as mentioned earlier, all resolutions adopted at a Commission meeting are included in one single document, instead of being organized individually which makes it difficult to locate decisions by topic. Then, in contrast to CITES and CMS—where resolutions that are no longer in effect are formally repealed and then archived—the IWC does not have a formal repeal or retire process, and all resolutions remain in effect (S. Duff, IWC Secretariat, email communication April 14, 2020). The IWC also handles amendments to the Schedule via strikethroughs and bold italicized text, instead of incorporating these changes into the text at the time the revisions come into effect.

Finally, it should also be noted that the CBD Rules of Procedure, Rule 40 (CBD, 2008), which outlines a mix of consensus and majority voting rules, is bracketed in its entirety. This bracketing means the Parties could never agree on particular voting rules. As a result, CBD decision-making is *de facto* by consensus (W.D. Yifru, CBD Secretariat, email communication, April 9, 2020).

BIAS MITIGATION

The selected texts outlined in Table 3 and included in this analysis do not purport to be representative of the population of texts for each treaty. Rather, they represent “the population of relevant texts [to answer the research questions], while excluding the textual units that do not possess relevant information” (Krippendorff, 2013, p. 120).

While such a relevance sampling strategy is appropriate given the context of the research design, “[a]bandoning randomness in case selection opens the door to many sources of bias” (King et al., 1994, p. 128).

Selection bias can lead to underestimates of the true causal effect, unless estimates are adjusted appropriately (King et al., 1994, p. 130). The best way to remedy this issue is to intentionally select observations that ensure variation in the explanatory or predictor variables “without regard to the values of the outcome variable” (King et al., 1994, p. 140). By ensuring variability in the predictor variables, the value of the outcome variable (i.e., a robust governance system) is discovered by comparing a variety of values and combinations of predictor variables and its effects on the outcome variable. The components of the IG syntax, the rule typology, and the levels of analysis are the predictor variables that are consistently coded across treaty texts. The resulting discovery of a variety of values and rule configurations will provide the necessary opportunities for outcome variable (degree of robustness) variation and mitigate the selection bias inherent in the reference sampling design (King et al., 1994).

Endogeneity bias occurs when the values of predictor variables are a consequence, instead of a cause of the outcome variable (King et al., 1994), i.e., the values of the IG syntax, typology, and levels of analysis are inherent features of robust institutional design, instead of causal contributors. King, et al. (1994) outlined five ways in which an endogeneity problem can be remedied. Two of these are built into this research design and will be considered in another publication on the analysis of robustness. The first one is using comparison and counterfactuals to parse whether a given variable is endogenous or exogenous. This particular strategy also addresses the omitted variable bias in which the spurious effects of other variables may be producing the effect on the outcome variable, instead of the predictor variables (King et al., 1994). By examining the formal and informal rule structures of the four conservation treaties, “potential sources of omitted variable bias” can be isolated and a subsequent search conducted to determine “a subset of observations within the coded data in which these would not apply” (King et al., 1994, p. 193). These potential alternative explanatory hypotheses can be explored and identified, thus, mitigating the omitted variable and endogeneity bias. Additionally, by parsing potentially endogenous predictor variables into two components—one that is clearly exogenous and one that is partly endogenous—and then using the exogenous portion of the variable in the analysis can further reduce endogeneity bias (King et al., 1994, p. 193).

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APPENDIX C
INSTITUTIONAL GRAMMAR CODING MANUAL

INSTITUTIONAL ANALYSIS OF RULES-IN-FORM CODING GUIDELINES

VERSION 1.0 | May 14, 2018

Authors

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These Coding Guidelines represent a compilation of coding methods from various sources, including: the *Formal Institutional Analysis Coding Guidelines* published by Saba Siddiki, Chris Weible, Xavier Basurto, and David Carter in 2011; codebook additions formulated by Edella Schlager, Jeffrey Hanlon, Tomás Olivier, Elizabeth Clark, and Abigail Bennett; institutional “mechanisms” coding protocol by Edella Schlager, Tomás Olivier, and Jeffrey Hanlon, and; definitions of regulatory and constitutive rules provided by David P. Carter - all of which were incorporated herein. The authors would like to thank Lynne Westphal for her helpful comments on earlier drafts of the coding guidelines.

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Introduction

Institutions are “the prescriptions that humans use to organize all forms of repetitive and structured interactions” (Ostrom, 2005, p. 3). Regardless of the label by which they are referred, such as rules or norms, institutions are social constructions: they represent shared understandings of behavior among actors who recognize, follow, and enforce the prescriptions. This document outlines a series of coding methods that can be used to

analyze institutions-in-form, such as those found in public policy documents - from administrative rules to constitutions. The method is inspired by, and built upon, the conceptual foundations of Elinor and Vincent Ostrom's institutional analysis and development (IAD) framework (Kiser & Ostrom, 1982; Ostrom, 2005).

How to Use these Coding Guidelines

These guidelines are written for the researcher with a relatively thorough understanding of the IAD framework and central IAD framework concepts. Researchers with less exposure to the framework are advised to familiarize themselves with core IAD framework literature - most notably Elinor Ostrom's (2005) *Understanding Institutional Diversity* - prior to applying the guidelines. Additional notices on applying these coding methods follow.

Intended application. These methods have been developed for analysis of rules-in-form (sometimes referred to as "formal institutions") found in policy documents, such as regulations, legislation, and city charters. They were not developed for application to unwritten institutions (aka rules-in-use). See Cristy Watkins and Lynne Westphal's (2016) article "People Don't Talk in Institutional Statements" for a discussion of applying such methods to an analysis of rules-in-use.

Relative reliability of coding methods. These methods vary in the strength of their confirmed reliability across different types applications and documents. For example, most of the procedures in the Institutional Statement Identification & Syntax Coding sections have been applied across a variety of documents including laws, regulations, and city charters, and appear in a number of publications. Identifying monitoring and compliance institutional configurations, in contrast, is a relatively recent addition to these methods. The extent to which the reliability of each method has been confirmed is noted in the guidelines that follow.

Coding method selection. While the following methods are presented as steps in a coherent coding protocol, it is probable that in practice only certain steps will be warranted. Coding methods should therefore be adopted and applied based on the research objectives in question. For example, in some cases researchers may be more interested in the distribution of rule types, and may forgo analysis of all institutional statement syntax components. In other cases, researchers may seek a more fine-grained understanding of policy documents, in which case full syntax coding may be called for.

Sequence of coding. For sake of presentation, the methods are presented here as a series of steps applied in succession. In practice, the coding steps are applied iteratively, and coding may evolve somewhat as the researcher gains a deeper understanding of the rules-in-form of interest.

Document Preparation

In this first step the analyst conducts a preliminary review of the rules-in-form/policy document in question, familiarizing herself with the document, organizing its contents, and beginning the process of identifying institutional statements.

1) **Identify and read all definitions, titles, preambles, and headings.**

Definitions, titles, and headings are first identified because they are fairly easy to locate and provide information on the intent and context of the policy in question. Headers of sections and subsections should be retained as a manner of classifying and categorizing the statements in a given legislation or rule. The nature of the heading may also provide the coder with an initial indication of the types of institutions she will find in a given section.

2) **Identify sections and subsections of the bill as initial units of observation.**

We call headers of sections and subsections “outline indicators.” Outline indicators are titles, subheadings, capital or lowercase letters, colons, semicolons, or Roman numerals, used to separate sections from subsections and subsections from sub-subsections, etc. These initial units of observation are temporary and may be divided into additional units when there is more than one rule, norm, or strategy within them.

3) **Subdivide all initial section or subsection units from step 2 that have multiple sentences into sentence-based units of observation.**

If a section or subsection does not have a complete sentence ending in a period, code the entire section or subsection as one unit of observation. If there are multiple sentences in the section or subsection, code each sentence as a unit of observation. In some instances, a single rule, norm, or strategy may span outline indicators. For example, a statement may include a colon with a list of Objects (see below) separated by semicolons. In such examples, the coder will decide, based on the existence of grammar components, whether a statement is bound by the outline indicators, or spans them.

Institutional Statement Identification & Syntax Coding

In this coding step, individual institutional statements are identified and then dissected into syntactic components. Institutional statements can follow one of two basic syntaxes: constitutive or regulatory. The grammar of institutions, as created by Crawford and Ostrom (1995, 2005) applies to regulatory rules. Constitutive rules are defined and examined in depth by John Searle (1995, 2010). The determination of whether an institutional statement follows a constitutive or regulatory syntax is made based on the presence/absence of syntactic components, and the nature of the sentence verb (aIm) in question.

It should be noted that of all the coding steps outlined in these guidelines, the regulatory syntax has been applied the most reliably and across the greatest number of applications (note, however, the exception regarding condition types below). Coding of the constitutive syntax is a more recent addition. While addition of the constitutive syntax may improve coding validity (as asserted by at least one of the authors of these guidelines), the constitutive syntax coding methods may require further development to attain satisfactory reliability.

1) Code constitutive statements following the X/Y syntax.

In contrast to regulatory rules, constitutive rules either declare a specified entity or define an entity or a position, or outline conditions/actions that ought to exist. Constitutive syntax accordingly has one of two forms: “There is *X*” or “*X* is *Y* [under specified Conditions].” Indicators of constitutive statements include linking verbs that lack action, such as “is,” “means,” or “defines.” In written policy documents, such empty verbs frequently take the form of “shall be.” A second indicator is a lack of agency - it is difficult to imply what individual or entity is responsible for executing the rule. In contrast with regulatory statements (see below), this means that identifying an Attribute is problematic. Coding examples are provided in the institutional syntax codebook, found in Appendix II.

2) Code regulatory statements following the ABDICO syntax.

Regulatory statements outline allowed, prohibited, and required actions. Regulatory statements are coded with respect to the *Attribute*, *Deontic*, *alm*, *Object*, *Condition*, and *Or else*. Definitions and coding examples are provided in the institutional syntax codebook, found in Appendix II.

a) To verify coding, re-state the coded institutional statement in active voice in the following order: [A] [D] [I] [B] [C] [O]. The statement should make sense when coding is done properly. This strategy is most useful when the Attribute is explicitly stated. When the Attribute is implied adjustments may need to be made to the alm in order for the statement to make sense. Difficulty in implying an attribute may indicate the statement is constitutive (see above).

b) When applicable, imply components when they are not explicitly provided in the statement. In some cases, the Attribute is missing because the statement under consideration is actually an extension of the statement prior to it in the document. In this case, the coder should use the Attribute from the previous statement. In other cases, an Attribute will not be obvious, in which case the implied Attribute will be the agent that is expected to carry out the alm, or who is requiring that the action being discussed in the statement is carried out. With respect to the Condition component, unless stated otherwise in preceding statements, the default Condition

will be “at all times,” meaning that the directive is applicable in all cases unless an exception is explicitly stated.

- c) Distinguish between oBject and Conditions. Carefully assess whether certain words in an institutional statement constitute descriptors of the oBject (code as oBject) or modifiers of the aim (code as one of the Conditions). Depending on the research question of interest, it may not be theoretically necessary to distinguish between the oBject and Condition(s). Because the distinction introduces considerable difficulty in coding, if there is no a priori reason for distinguishing between them, it is suggested that the oBject and Conditions be coded together under the Conditions category.

3) Code Conditions as What, When, Where, and/or How Conditions

For certain research purposes and/or when statements contain a complex set of conditions concerning “what, when, where, and how” an action is to be performed, it may be desirable to further categorize the temporal, geographic, or contextual circumstances by specifically coding the What, When, Where, or How Conditions. Some institutional statements may have no Conditions (in which case, Conditions may be implied; see above), while some statements have multiple Conditions. The focused coding of different condition types is a relatively recent undertaking, and as a consequence, coding instructions are still in a developmental stage. For example, there exists some disagreement among the authors of these coding guidelines as to whether “What” conditions sufficiently meet the conceptual definition of a condition. Researchers have found these to be useful coding techniques in practice, however, and they are therefore outlined here.

- a) **What Conditions:** The oBject specifies the recipient of the action of the aIm. The what condition specifies the “thing” that the oBject receives or experiences. The what condition therefore defines the purpose of the aIm. Warning: it is easy to confuse the oBject and the what condition; to minimize such confusion a) identify an animate (or an inanimate) oBject, if possible; one way to do this is to implicitly add “to” or “from” or “for” to the aIm; b) if it is not possible to identify an oBject, then the oBject remains blank and the “thing” that defines the purpose of the aIm is the what condition, do not treat it as the oBject (especially do not treat it as an inanimate oBject)
- b) **When Conditions:** The when condition can take two forms. Sometimes, a statement will give an explicit time that an action should be taken. Other times, a statement will signify a trigger event that should then promulgate a following action.

- c) **Where Conditions:** A statement has a where condition when it explicitly states a particular place in which the action should take place. The where condition does not apply to a whole category of place.
- d) **How Conditions:** Sometimes a statement will include information regarding how a particular end is to be achieved or outline a mechanism to achieve an outcome. How conditions also can reflect aggregation rules by specifying who is involved in a decision making process.

Rule Typology Coding

In this coding step, each institutional statement is categorized as one of seven rule types: Position, Boundary, Aggregation, Information, Payoff, Choice, and Scope. While there exist some ambiguities in coding rule types - particularly in regards to differentiating choice and scope rules - the following guidelines appear relatively robust and reliable across applications.

- 1) Code institutional statements as one of five rule types – position, boundary (credential or procedural), aggregation, information, or payoff

The primary indicator of the institutional statement’s influence on an action situation is its aIm. The first step in classifying institutional statements, therefore, is to focus on the aIm of the statement. Compare the statement’s aIm with the basic aIm verbs listed in Table 1, and in the rule typology codebook in Appendix III. Determine which basic aIm verb best approximates the aIm in question, and code the statement according to the corresponding rule type.

- a) Sometimes the aIm of the statement is ambiguous or reflective of more than one basic aIm verb. For example, both information and payoff rules may have an aIm that falls under the “receive” basic aIm verb identification.
- b) The rule types have additional indicators, specific to rule type, which can be found in the codebook in Appendix III. These additional indicators can be particularly helpful in situations where the aIm verb is ambiguous.
- c) Some statements cannot be coded simply as one rule type and may fall under two or more categories. For example, the statement: “The applicant must pay an entry fee to the organizer.” The statement is reflective of a payoff rule, as it assigns a cost to the applicant, and a benefit to the organizer. The statement is also reflective of a boundary rule, as it identifies a necessary action for the applicant to enter a position. *In such instances, the coder should code the statement in question according to the following order: position, boundary,*

aggregation, payoff, information. This means, for example, that if a statement can be coded as both a boundary and an information rule, the coder will code it as a boundary rule.

Table 1. Rule types

Rule type	Basic aim verb	Regulated component of an action situation
Position	Be	Positions
Boundary	Enter or leave	Participants
Choice	Do	Actions
Aggregation	Jointly affect	Control
Information	Send or receive	Information
Payoff	Pay or receive	Costs/Benefits
Scope	Occur	Outcomes

Adapted from Ostrom (2005, p. 191)

2) Code remaining statements as either choice or scope rules

Choice rules refer to directives regarding what specific actions must, must not, or may be taken by an actor. The aim of a choice institution is an action. Scope rules outline or affect the outcome variable that must, must not, or may be affected as a result of actions taken within the action situation (Ostrom 2005, p. 208). The aim of a scope institution refers to an outcome rather than an action (Ostrom, 2005, p. 209).

Both the scope and the choice rule categories are designed as “all other” categories. If a rule is neither a position, boundary, aggregation, information, or payoff rule, then it is either a choice rule (aim = an action) or a scope rule (aim = an outcome) (Ostrom, 2005, p. 209).

Additionally, one can distinguish between scope and choice institutions by determining if the statement prescribes specific actions or action sets to be used in obtaining an outcome, in which case it is a choice institution.

- a) If the coder is interested in comparing the desired outcome of the rules, norms, and strategies in question, she may wish to track choice rules that also display elements of scope rules. For example, the statement: “The student must cite references in a manner that conforms to the university honor code.” In this case, “cite references” is the action set (choice rule), but also references an outcome with “conforms to the university honor code” (scope rule). The coder may choose to code this statement as a choice/scope rule.

Identifying Institutional Configurations

The IAD framework makes clear that rules do not operate in isolation, but rather as interdependent configurations. For some research purposes it may be desirable to conceptualize the configurations through which rules-in-form are intended to function. Of the coding steps in this codebook, rule configuration analysis requires the most interpretation and should be directed by the theoretical underpinnings of the analysis in question. It is also the area in this codebook with the least amount of empirical verification.

One approach to analyzing rule configurations, developed by Carter, Weible, Siddiki, and Basurto (2016), is to conceptualize the empirical action situations that are targeted by the rules-in-form of interest, and to group institutional statements by their corresponding “target action situations.” Identification of target action situations is facilitated by first identifying the outcome(s) of concern - defined as the intended changes in empirical conditions sought by a policy or a subset of a policy’s rules-in-form. The analyst then backtracks to identify the institutional statements that are directly linked to the realization of the identified outcome. For example, in the context of organic food certification, Carter *et al.* identify “certification approval/denial” as an outcome, and group corresponding institutional statements into an “application of organic certification” target action situation leading to that outcome.

As Carter *et al.* (2016) note, target action situations may be more-or-less clearly specified in regards to time, setting, and actors. Target action situations may be readily identifiable in some policy documents, and difficult or impossible to identify in others. Subsequent applications of the target action situation coding step have revealed that identifying target action situations may be contingent on the type of policy being analyzed. For example, target action situations appear to be more evident in regulations, but difficult to discern in the case of city charters.

In this codebook, we highlight a second approach to configurational analysis. In this sample coding scheme, institutional statements that delineate monitoring, compliance and enforcement mechanisms are identified in order to guide and standardize coding of statements that create or condition clusters of public goods or governance mechanisms. More detailed coding guidelines are provided in Appendix IV.

- 1) Code statements as monitoring, compliance, consequence, or collective-choice rulemaking mechanism statements
 - a) **Monitoring mechanism statements:** Institutional statements related to the gathering, reporting, or reviewing of data that has been reported to determine whether someone has behaved according to the rules or whether rule following behavior is having the desired effect on the biophysical system.
 - b) **Compliance mechanism statements:** Institutional statements related to encouraging or maintaining rule following behavior by creating processes

through which actors may question the actions of others or have those actions reviewed.

- c) Consequence mechanism statements: Institutional statements that determine a penalty (either a created penalty such as a fine or an inherent penalty such as a loss of a benefit realized by compliance of rules in effect) for an act of noncompliance or the nullification of rules.
- d) Collective-choice rulemaking mechanism statements: Collective choice rule making grants an actor or actors the authority to adopt or change rules. If the statements direct that something cannot happen unless a resolution is adopted, it should be considered a rule change/rulemaking mechanisms. Note that this step is identified in a separate section, below, for those coding collective choice rulemaking mechanisms without identifying the other mechanisms described here.

Coding Collective-Choice Rules-In-Form

For some research purposes it may be desirable to identify the rulemaking authority and mechanisms that are established, granted, or governed by the rules-in-form in question. In such instances, the analyst may code for the “collective choice rulemaking mechanism” statements, as described in the preceding section (and in Appendix IV), with or without coding for the other identified mechanisms.

It is worth noting that in other institutional research, multiple levels of analysis are studied or applied, including (but not limited to) the operational, collective-choice, and constitutional levels (Ostrom, 2005). Due to ambiguities and difficulties associated with identifying constitutional level statements, this codebook focuses on identifying collective-choice rules only. By default, all statements not coded as collective-choice statements will be understood as operational level institutional statements.

Operational institutional statements: Statements that structure situations which relate to day-to-day activities/actions, decisions, and interaction of individuals. Such statements communicate rules-in-form in which the actors are required to take (or not to take) direct action or adopt strategies for future actions.

Collective-choice institutional statements: Statements that constitute the manners in which the rules structuring operational level situations are monitored, reviewed, enforced, and altered. Collective choice rules can be described as rule making because they grant an actor or actors the authority to adopt or change rules. If the statements direct that something cannot happen unless a resolution is adopted, it should be considered a rule change/rulemaking statement.

The mechanisms identified above, i.e., monitoring, compliance, consequence, and rule change/rule making statements occur at the collective choice level.

Intercoder Reliability Testing

It is recommended that coding be assessed by another coder. Preferably 20% of the coded statements should be subject to intercoder reliability testing. At this time, coder agreement is generally assessed through simple percent agreement. Although not specifically agreed upon, generally intercoder agreement $\leq 85\%$ is evidence of low coder agreement and should result in codebook revisions and re-testing until higher agreement ratings can be reached (Guest and MacQueen 2008:131). Basurto et al. (2010) and Siddiki, et al. (2011) set acceptable intercoder agreement at $\geq 80\%$.

It should be noted that Krippendorff (2012) and Guest and MacQueen (2008) do not view simple percent agreement as an effective intercoder agreement statistic because it does not consider agreement by chance. Given the nature of the coding outlined in this document, however, applying a different statistic, such as Krippendorff or Cohen's kappa is difficult and may not be appropriate. Further research into appropriate intercoder reliability statistics is recommended.

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APPENDIX I DEFINITIONS

Action situation: a social setting in which “two or more individuals are faced with a set of potential actions that jointly produce outcomes” (Ostrom, 2005, p. 32).

Aggregation rule: Aggregation rules relate to actions or decisions that require two or more individuals.

Aim (alm): The goal or action of an institutional statement that the deontic refers to.

Attribute: An animate actor (such as an individual or organization) that carries out the aim or is expected to perform the aim.

Boundary rule: Identify the prerequisites (characteristics, skills, possessions) of individuals eligible to occupy a position.

Choice rule: Specify specific actions – what an actor must, must not, or may do. Will often also indicate the conditions that affect what an actor must, must not, or may do.

Condition: The temporal, geographical, or contextual qualifiers of an institutional statement under which an aim is to be performed (or not performed).

Deontic: The prescriptive operator of an institutional statement that describes what is permitted (may), obliged (must, shall), or forbidden (must not, may not, shall not).

Information rule: Statements that indicate what is the permitted, obliged, or prohibited channel of communication, how the information is to flow, to whom, and when; May indicate the form that the information is to take.

Institution: The prescriptions that humans use to organize all forms of repetitive and structured interactions” (Ostrom, 2005, p. 3).

Institutional statement: “The shared linguistic constraint or opportunity that prescribes, permits, or advises actions or outcomes for actors (both individual and corporate)” (Crawford and Ostrom 1995, 583).

Object (object): The inanimate or animate part of an institutional statement that is the receiver of the action described in the aim and executed by the agent in the Attribute.

Or else: The punitive sanction resulting from noncompliance with a rule.

Outcome: The intended change or achievement in the condition of the world as a result of the policy.

Payoff rule: Assign external rewards or sanctions to actors relative to specified actions and/or outcomes.

Position rule: Identify roles to be filled by individuals and the absolute, minimum, or maximum number of individuals that can occupy a given position.

Rules: The “shared prescriptions (must, must not, may) that are mutually understood and predictably enforced in particular situations by agents responsible for monitoring conduct and for imposing sanctions” (Ostrom 2007, p. 23).

Scope rule: Identify required, desired, or prohibited outcomes; may also identify the parameters, or range, of outcome variables that can be affected, or identify limits or parameters to a required, desired, or prohibited outcome.

Target action situations: The intended action situation structured by a configuration of institutional statements identified within a policy text.

Appendix II. Institutional Statement Syntax Codebook

Table A1. Examples of constitutive statement X/Y coding

Syntax	Examples
There is <u>X</u>	<p>“There shall be <u>an international whaling convention.</u>”</p> <p>“There shall be <u>a mayor.</u>”</p>
<u>X</u> is <u>Y</u> [under specified Conditions]	<p>“<u>The Mayor</u> shall be <u>the Chief Executive Officer of the city.</u>”</p> <p>“<u>The President of the Commission</u> shall become <u>the acting mayor</u> [during absences of the Mayor].”</p>

Table A2. Regulatory syntax (institutional grammar tool; IGT) coding guidelines

Attribute
<p>Definition: an animate actor (such as an individual or organization) that carries out the aIm or is expected to perform the aim.</p> <p>Coding guidelines/indicators:</p> <ul style="list-style-type: none"> ● The Attribute may be explicit or implicit in any given institutional statement. ● The words coded in the Attribute category must include with it all relevant descriptors. ● In many cases, the attribute is most clearly identifiable once one has identified the aIm of the statement; By first identifying the aIm , the coder can ensure that there is a logical relationship between the Attribute and the action being described in the aIm, that is, it is possible for the former to perform the latter. ● If there are two attributes for which all other fields are identical, including the Deontic, aIm , Condition, etc., then the statement does not need to be divided up into multiples statements. ● Coder may encounter instances in which agents are nested within larger organizations/groups, but only the former, the primary agent, is explicitly stated and the secondary agent may be inferred. <ul style="list-style-type: none"> ○ For example, such an occasion is observed when an actor is a representative or employee of an organization and he/she is carrying out an aIm on behalf of his/her organization as a whole. In this case it may be useful for the coder to know both the nested agent in addition to the secondary agent. In such an instance, the explicitly stated agent may be listed as the Attribute and the secondary agent may also be included in brackets next to the other.

- In instances where the Attribute of an institutional statement is an inanimate actor (e.g., “Appendix I”) reword the statement to include the implied animate actor who will be performing the action of, e.g. listing a species in an Appendix.
- Attribute must be logically able to perform the aIm.

Deontic

Definition: The prescriptive operator of an institutional statement that describes what is permitted (may), obliged (must, shall), or forbidden (must not, may not, shall not).

Coding guidelines/indicators:

- Deontics are usually explicit, but may also be implicit.
- Deontics are useful markers for delineating institutional statements.
- Start separating institutional statements by first looking for a Deontic. It may help to follow this coding order: [D][I][B][C][O]/[A]

alm

Definition: The goal or action of the statement that the deontic refers to.

Coding guidelines/indicators:

- The aIm is usually the verb of the sentence.
- The aIm includes all non-deontic verbs.
- Any qualifiers of the aIm , including the identification of temporal and spatial boundaries relating to the action being discussed, should be included under the Condition(s).
- The interpretation of the aIm will determine what is the attribute and what is the oBject and this may also potentially modify the deontic. This is particularly applicable in cases where the definition of the aIm is vague or when the aIm has multiple definitions and thus there is ambiguity about the meaning as applicable for the statement.
- If you have multiple aImS in a statement assigned to one attribute, the definitions of which are unambiguous and well understood, than the statement does not need to be broken up.
 - If, however, you have multiple aImS and multiple attributes, then the statement should be broken up so that each attribute is distinctly assigned the aImS being discussed.
- If you have two aImS for the same attribute but there are multiple conditions that comprise multiple institutional statements, then the statements should be broken up based on the aIm and relevant conditions/statements.

oBject

Definition: The inanimate or animate part of a statement that is the receiver of the action described in the aIm and executed by the agent in the attribute.

Coding guidelines/indicators:

- The oBject helps distinguish the actor (Attribute) from what the actor is acting upon (oBject) in instances when an institutional statement does not contain an explicit attribute.
- The words coded in the oBject category must include with it all relevant descriptors.
- If there are two oBjects for which all other fields are identical, including the Deontic, aIm, Condition, etc., then the statement does not need to be divided into multiples statements.
- If there are two oBjects and the other fields are NOT identical, including the Deontic, aIm, Condition, etc., then the statement should be divided into multiple statements.
- There is an important distinction between the IGT oBject and the indirect object of a sentence. The IGT oBject is the receiver of the action described in the aIm, but the indirect object receives the direct object of the sentence; not the action of the verb.

This can lead to instances in which institutional statements grammatically have no indirect object, but an IGT oBject is present and should be coded.

Or else

Definition: The punitive sanction resulting from noncompliance with the rule.

Coding guidelines/indicators:

- Or else statements must be explicit in order to be coded, although the explicit “or else” can be located in the same institutional statement or a different one.

Condition (generally)

Definition: Indicate the temporal, geographical, or contextual qualifiers under which the aIm is to be performed (or not performed).

Coding guidelines/indicators:

- Conditions can be explicit or implicit.
- Conditions set the prerequisites or restrictions on the aIm.

What Condition

Definition: The what condition specifies the “thing” that the oBject receives or experiences. The what condition therefore defines the purpose of the aIm.

Warning: it is easy to confuse the oBject and the what condition; to minimize such confusion a) identify an animate (or an inanimate) oBject, if possible; one way to do this is to implicitly add “to” or “from” or “for” to the aIm; b) if it is not possible to identify an oBject, then the oBject remains blank and the “thing” that defines the purpose of the aIm is the what condition, do not treat it as the oBject (especially do not treat it as an inanimate oBject) **Coding guidelines/indicators:**

- Can be the purpose of the action
- May be a person, organization, animate or inanimate object,
- The “what” condition can thus be thought of as answering questions such as “why?”, “for what purpose?”, “for what?” or “for whom?”
- Sometimes the what condition is the direct object of the statement.

When Condition

Definition: Temporal qualifiers of the action.

Coding guidelines/indicators:

- Sometimes, a statement will give an explicit time that an action should be taken.
- Other times, a statement will signify a trigger event that should then promulgate a following action.

Where Condition

Definition: Geographical/contextual qualifier in which the action/directive should take place.

Coding guidelines/indicators:

- The where condition does *not* apply to a whole category of a place.
 - Example: “The City will pay the entire costs of designing and implementing stormwater pollution prevention measures where lot constraints prevent the construction of the home outside the limiting distances” does *not* have a “where” condition. Even though the word “where” is used and it implies that there are many places with similar lot constraints, this statement actually signifies a physical condition of a category of thing. It implies that there are many properties that have lot constraints throughout the watershed, but doesn’t say where they actually are.

How Condition

Definition: Information regarding how a particular action/end is to be achieved.

Coding guidelines/indicators:

- The how condition provides information on how a particular end is to be achieved.
 - Example: “The coalition shall choose qualified contractors using a bidding procedure acceptable to the city.” This statement includes a prescription as to how the action is to be done, i.e., “using a bidding procedure acceptable to the city.”
- The how condition can also be an aggregation rule outlining who is to be involved in a decision-making process.

- Example: “CW Corporation shall develop program standards in consultation with NYCDEP and the Identified Communities where septic districts shall be formed.” In this statement, you would code “in consultation with NYCDEP and the Identified Communities” under the how condition.

Table A3. Regulatory syntax coding examples

Syntax component	Definition	Examples
Attribute	An animate actor (such as an individual or organization) that carries out the alm or is expected to perform the alm.	
Deontic	The prescriptive operator of an institutional statement that describes what is permitted (may), obliged (must), or forbidden (must not).	
alm	The goal or action of the statement that the Deontic refers to.	
oBject	The inanimate or animate part of a statement that is the receiver of the action described in the alm and executed by the agent in the attribute.	
Or else	The punitive sanction resulting from noncompliance with the rule.	
What Condition	The what condition specifies the “thing” that the oBject receives or experiences; The what condition therefore defines the purpose of the alm.	
When Condition	Temporal qualifiers of the alm action.	

Where Condition	Geographical/contextual qualifier in which the action/directive should take place.
How Condition	Information regarding how a particular action/end is to be achieved.

Appendix III. Rule Typology Codebook

Table A4. Rule typology coding guidelines

Definition	Basic alm verb	Regulated component	Additional coding guidelines/indicators
Position Rules			
Identify roles to be filled by individuals; also identify the absolute, minimum, or maximum number of individuals that can occupy a given position.	Be	Positions	<ul style="list-style-type: none"> ● Statements that create identifier categories. That is our ability to say, ahh he is a fisher, he is a farmer... identify generic positions to be filled. ● Statements related to the number of individuals that can occupy positions.
Boundary Rules			

Identify the requirements (characteristics, skills, possessions) of individuals eligible to occupy a position, or the constraints and conditions for entering and exiting positions.	Enter or leave	Participants	<ul style="list-style-type: none"> ● Boundary rules define the requirements for participants to access a particular position, NOT the mechanism as to how they get that position. ● Boundary rules are to be coded as either boundary-credential or boundary-procedural. ● Boundary-credential: Statements delineating the characteristics and skills of individuals requisite to fill positions (e.g.: age, experience, education level). ● Boundary-procedural: Statements delineating requirements for entry to a position, such as fees for permits, applications, etc. ● Statements that identify parameters pertaining to positions. For example, statements that identify the term limits of individuals occupying a particular position.
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Aggregation Rules			
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Outline actions or decisions that require two or more individuals.	Jointly affect	Actions	<ul style="list-style-type: none"> ● Statement that address how participants are related in decision making processes. ● To be coded as an aggregation
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rule, joint action is evidenced by the presence of two or more actors in the Attribute field who must, in concert, perform the activity specified in the alm of the institutional statement.

- Aggregation rules specify who is to be involved in a decision process. Without necessarily delineating particular responsibilities or roles (like a position rule) they refer to who is “at the table.”
- Sometimes, aggregation rules occur as a part of a scope or choice rule. That is, the entire institutional statement specifies who must be involved in a decision or action, and what that decision or action should or should not be/ may or may not be.
- An institutional statement is only aggregation when the actors are specifically required to carry out the action described in the aim jointly or via collaborative action.

Information Rules			
Statements that indicate which is the permitted, obliged or prohibited channel of communication, how the information is to flow, to whom, and when. They also may indicate the form that the information is to take.	Send or receive	Information	<ul style="list-style-type: none"> ● Statements that combine a form of information and communication. The combination may be who the information is to be communicated to, from whom, when, or how. Statements about what information is <i>prohibited</i> from being communicated. NOT statements that communicate <i>what</i> is to be communicated (these are generally coded as choice).

Payoff Rules			
Assign external rewards or sanctions to specific actors relative to distinct actions.	Pay or receive	Costs/ Benefits	<ul style="list-style-type: none"> ● Statements that contain all ABDICO components. ● Statements that allocate benefits or costs.
Choice Rules			
Specify specific actions – what an actor must, must not, or may do.	Do	Control	<ul style="list-style-type: none"> ● Statement cannot be confidently classified as a position, boundary, aggregation, information, or payoff rule, but identify specific actions or action sets. ● May also identify outcomes if coded as choice/scope institutions
Scope Rules			
Identify required, desired, or prohibited outcomes. They may identify the parameters, or range, of outcome variables that can be affected, or identify limits or parameters to a required, desired, or prohibited outcomes.	Occur	Outcomes	<ul style="list-style-type: none"> ● Scope rules define a particular goal that is to be achieved. ● Statement cannot be confidently classified as a position, boundary, aggregation, information, or payoff rule, and that refer to outcomes, goals, or results. ● Statements that do <i>not</i> identify defined action sets or limit the processes that lead to an outcome. ● May also identify specific actions or action sets if coded as choice/scope institutions.

Table A5. Rule typology coding examples

	Definition	Examples
Rule Type		
Position	Identify roles to be filled by individuals; also identify the absolute, minimum, or maximum number of individuals that can occupy a given position.	
Boundary	Identify the requirements (characteristics, skills, possessions) of individuals eligible to occupy a position, or the constraints and conditions for entering and exiting positions.	<i>Boundary-credential:</i> <i>Boundary-procedural:</i>
Aggregation	Outline actions or decisions that require two or more individuals.	
Information	Statements that indicate which is the permitted, obliged or prohibited channel of communication, how the information is to flow, to whom, and when. They also may indicate the form that the information is to take.	
Payoff	Assign external rewards or sanctions to specific actors relative to distinct actions.	
Choice	Specify specific actions – what an actor must, must not, or may do.	
Scope	Identify required, desired, or prohibited outcomes; may identify the parameters, or range, of outcome variables that can be affected, or identify limits or parameters to a required, desired, or prohibited outcomes.	

Appendix IV. Identifying Institutional Configurations (Mechanisms)

In this coding step, the configuration of rules, norms, and shared strategies which influence the choices of individual actors are examined. Identifying institutional statements that create or condition the following mechanisms enables the standardized identification of institutional configurations that connect monitoring and compliance mechanisms within rules-in-form with likely positive or negative compliance consequences and related public goods production or control.

Table A6. Identification of rule mechanisms

Monitoring Mechanisms Statements

Definition/criteria:

- Monitoring is the act of collecting data or information regarding the behaviors and activities of an actor or a biophysical or a social condition (i.e. flooding, socioeconomic issues). Monitoring is the foundation for determining compliance.
- Monitoring \neq information rules, if the information shared is about whether someone is complying with the rules, then code it as a monitoring rule. Otherwise, code it as something else.
- Monitoring is a shared act. A single actor collecting information for its own purposes only is not monitoring.
- The single fact of requiring that an action should be conducted in consultation with other actor/s is not considered monitoring.
- Inspections count as a form of monitoring.
- *Who* monitors *what* varies.
 - **Self-monitoring** is the act of collecting data on one's own organization/agency/government's behaviors. The act of collecting data on one's own organization is for the purpose of sharing it or making it available to other actors.
 - **Other party monitoring** is the act of collecting data on the behaviors and activities of another actor/party. Other party monitoring is engaged in by an actor who is part of the agreement or is engaged in the interaction.
 - **Third party monitoring** is the act of collecting data on the behaviors and activities of another actor/party. Third party monitoring is also the act of collecting data on a biophysical or social condition that is dependent on one or various actor behaviors. The actor in charge of collecting this data is somebody who's independent of the interaction, and is brought in to monitor the interaction. This actor is not a participant or has a stake in the action taking place.

Coding guidelines: Monitoring statements satisfy any of the following:

- The statement prescribes an actor to collect data on its own or other actors' behaviors, or identifies data to be collected and shared. Information sharing in the form of advice or best practices is not monitoring.
- The statement prescribes a means of gathering/collecting data and/or receiving/reviewing data.

Compliance Mechanisms Statements

Definition/criteria:

- Compliance determines the means and methods by which an actor determines if another actor has complied with a rule. This definition includes, but is not limited to, those statements prescribing mechanisms to address disagreements among actors (i.e. processes of arbitration to solve a dispute between two or more actors).
- If the statement defines circumstances in which an action will not be considered a violation of the rule and doesn't mention any punishment, then code it as compliance.
- Compliance involves always a process through which actors determine what it is noncompliant behavior.
- If a statement forbids an actor to challenge another actor's compliance with a rule, then that statement is defining a compliance mechanism and should be coded as such.
- A statement that tells an actor to "follow the rules" does not define compliance.

Coding guidelines: Compliance statements satisfy any of the following:

- The statement determines the means/criteria/process by which an actor (or group of) determines another actor is out of compliance with a rule. The statement identifies a compliance process, triggering of review, means/criteria of review.
- The statement defines the authority of one actor (or group of) to correct another actor's noncomplying behavior.
- When a rule forbids an actor from challenging another actor's behavior.

Consequence Mechanism Statements

Definition/criteria:

- Consequences do not necessarily (or often) show up in the "or else" portion of an institutional statement, but are more likely to be defined broadly, and serve as the "or else" consequence for noncompliance with some or all of the other rules in the set or as a consequence of rule nullification.

- Enforcement may refer to specific sanctioning authorities such as levying fines for noncompliance, or it may be a loss of a benefit or a desirable action given a failure to act.

Coding guidelines:

- The statement generally defines a consequence for rule noncompliance, inactivity, or nullification.

Collective Choice Rule Making Mechanisms

Definition/criteria:

- Institutional statements that define **which actor(s)** hold the authority to make a rule change, the **process** of rule change, the **criteria** upon which a change is based, the **trigger** for a rule change, or **identifying** the rule to be changed.

Coding guidelines:

- When a collective body (e.g. town council, city council, agency) goes through a rulemaking process, those are considered collective-choice rulemaking processes, thus they should be coded. To be coded, the action really has to focus on some

collective body engaging in rule changing or rulemaking process.

- Resolutions adopted by local governments, understood as expression the will of a collective body, don't count as rule changes. Approvals are not considering being a rule changing or rule making mechanisms.
- Adoption of a contract is not a rule change.
- Adoption of agreements is not a rule change.
- Adoption of laws is a rule change.
- Requests for extensions do not count as rule changes.

Identifying and coding public goods and governance clusters

Coding guidelines:

- Always read each statement in context. To properly identify the monitoring/enforcement nature of a statement it is necessary to analyze it in terms of the role it plays within the context of the prior/subsequent rules. Also, the portion of the statement that contains the Attribute, Deontic, aIm, and oBject indicates the mechanism. Any "mechanisms" that show up in the conditions will be not coded as such.
- Each public good cluster or governance mechanism is bounded by the coded document's sections. Distinct clusters and mechanisms occur within each section. That is, the clusters and mechanisms do not cross over sections.

- Within each section, public good clusters and governance mechanisms consist of TWO (2) or more contiguous statements. Single statements do not count as a distinct mechanism and are included within the mechanism in which they appear, if they are in the middle of a series of statements defining a specific mechanism or cluster. Or, they are included with the mechanism that precedes or proceeds depending on meaning. The contiguous statements must be contained within a section and cannot overlap a section.
 - A section may consist of a mechanism or a cluster; or multiple clusters and mechanisms may appear in a single section. That is, a section may contain a public goods cluster and a governance mechanism.
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APPENDIX D
INSTITUTIONAL GRAMMAR CODING STRATEGIES
(FORMAL TREATY DOCUMENTS)

The regulatory rule structure of Controller K_t (Fig. 1) outlines the actions that are permitted, required, or prohibited (Crawford & Ostrom, 1995; Ostrom, 2005). Coding formal regulatory documents with the institutional grammar followed a multi-step process which is detailed in the updated IG coding manual (Basurto et al., 2018) (see also Appendix C). The remainder of this section will outline the processes that were specific to coding the treaty texts.

Document preparation

Once the treaty texts were copied from the original document to a spreadsheet, the next step was to go through each row of the spreadsheet and mark headers, notations, and footnotes as non-codable text segments, by labeling the relevant row as “TITLE”, “INTRO”, etc. The remaining paragraphs of text were then broken down into institutional statements, and identified by their linguistic structure as either regulatory or constitutive. Constitutive statements were tagged as such and later removed to a separate coding sheet.

In its simplest form, an institutional statement is a sentence of text. Based on the structure of the grammar components within each sentence—in particular, evidence of multiple DEONTICs or AIMs—the sentence may be further broken down into smaller text segments. For example, the following passage from the CITES treaty:

*The Secretariat **shall** consult the other Parties and interested bodies on the amendment in accordance with the provisions of subparagraphs (b) and (c) of paragraph 2 of this Article and **shall** communicate the response to all Parties not later than 30 days before the meeting.*

(CITES, 1973 Article XV(1)(a)) (Emphasis added).

Here, the presence of two “shall” DEONTICs necessitates a split into the following two institutional statements.

Institutional statement CITES_141:

The Secretariat shall consult the other Parties and interested bodies on the amendment in accordance with the provisions of subparagraphs (b) and (c) of paragraph 2 of this Article and

Institutional statement CITES_142:

shall communicate the response to all Parties not later than 30 days before the meeting.

While the second institutional statement may appear incomplete, when coding, elements of the prior statement, for example, the ATTRIBUTE “The Secretariat”, are carried over into the second institutional statement (CITES_142) as implied ATTRIBUTES, e.g., “[Secretariat]”. The “[]” signifies an implied element in the coding syntax.

Once all text segments were categorized and split based on their particular DEONTIC and/or AIM structure, the *regulatory* institutional statements were parsed into their ABDICO syntax components:

- (7) ATTRIBUTE (the actor of the statement),
- (8) OBJECT (the entity that is the receiver of the action outlined in the AIM and executed by the ATTRIBUTE);
- (9) DEONTIC (an indicator as to how enforceable the statement is, e.g., the DEONTIC “shall” indicates a mandatory, legally binding action versus a “should” statement signifies a recommendation);

- (10) AIM (the verb of the sentence indicating the specific action an actor is to take);
- (11) CONDITIONS (WHAT, WHERE, HOW, AND WHEN the institutional statement is to occur); and
- (12) OR ELSE (outlines the consequence of noncompliance with the institutional statement)

(Ostrom, 2005; Siddiki et al., 2011).

Regulatory statements that include all six ABDICO components are considered true rules; without the “OR ELSE” component, the statement is considered a norm; and if both the “OR ELSE” and the “DEONTIC” are missing, the statement is considered a shared strategy (Ostrom, 2005). It is worth noting that none of the over 3,000 formal regulatory institutional statements coded across the four treaty regimes included an “OR ELSE”. In fact, Siddiki asserts that including the “OR ELSE” in the IG syntax was a mistake, since formal rules generally address the consequences of noncompliance in separate sections of a legislative document, sometimes even in separate rule structures altogether (S. Siddiki, personal communication, March 31, 2020).

The parsing of the CONDITION portion of the IG syntax into WHAT, WHERE, HOW, AND WHEN is a more recent development (Schlager et al., Unpublished). Although it was incorporated into the revised version of the institutional grammar coding manual (Basurto et al., 2018) (see also Appendix C), it has not been applied and/or reported on in empirical studies. This research contributes to that aspect of IG scholarship.

While parsing the condition may not be necessary in all instances, given the complex and often densely packed institutional statements that were found in the formal

documents of the four treaty regimes, distinguishing between difference types of conditions enabled a better examination of the context under which the actor outlined in the ATTRIBUTE should act.

Shared strategies

Since exploring the structure of Controller K_t in the governance system is important to understanding decision-making feedbacks and robustness, the overarching coding strategy was to maintain the original structure of the institutional statement as much as possible. This was, however, not always feasible and modifications were necessary. The linguistic structure of treaty resolutions and decisions was a particularly vexing issue in which a desire to reflect the “true” rule structure conflicted with the need to facilitate the effective analysis of the coded data.

Treaty resolutions/decisions are designed as guidance/recommendations from the Conference of the Parties to the Parties and other entities within the treaty forum (Rajamani, 2016). They are adopted through voting mechanisms or, in the case of the CBD, by consensus, during regularly scheduled meetings. Depending on the resolution/decision, the linguistic structure used within these texts can follow the format: “Conference of the Parties urges Parties or other entities to do something”; or “Conference of the Parties directs the Secretariat/Scientific Council to do something”. In documents which rely heavily on such a syntax, coding the institutional statements as stated would result in a large number of shared strategies with identical ATTRIBUTES

(e.g., “Conference of the Parties) and with little variation in the AIMS, e.g., “encourages”, “recommends”, “urges”, “directs” would be the dominating AIMS. From a purist perspective, this might tell us something about the treaties’ syntax structure. However, given the scope of this research, this syntactic information would be outweighed by the fact that such a coding strategy obscures the actual activities and interactions structured by the COP guidance. Illustrative examples of this phenomenon include:

13. INSTRUCTS the Secretariat to remind affected Parties explicitly of the reservations that will be rendered invalid, in time for the Parties to renew their reservations if they so desire; (CITES, 2019 (1983) Res. Conf. 4.25).

Coding option 1: From a purist perspective, this statement could be coded as a shared strategy:

[Conference of the Parties] [implied ATTRIBUTE] instructs [AIM] the Secretariat [OBJECT] to remind affected Parties of the reservations that will be rendered invalid [WHAT CONDITION] explicitly [HOW CONDITION] in time for the Parties to renew their reservations if they so desire [WHEN CONDITION].

Coding option 2: Applying the assumption that all resolutions represent COP guidance to various forum entities, one could also modify this statement in order to code it as a more direct interaction:

Secretariat [ATTRIBUTE] [shall] [“INSTRUCTS” translates into the implied DEONTIC “shall” which legal scholars define as a legally binding obligation] remind [AIM] affected Parties [OBJECT] of the reservations that will be rendered invalid [WHAT CONDITION] explicitly [HOW CONDITION] in time

for the Parties to renew their reservations if they so desire
[WHEN CONDITION].

As this coding example outlines, the benefits of option 2 are three-fold. First, the modified norm retains the intent of the shared strategy but by moving the OBJECT “Secretariat” in the shared strategy (option 1) into the ATTRIBUTE position (option 2), the coded statement provides more detail on who should be taking action. Second, in the modified statement (option 2), the AIM more accurately reflects the type of action that is to be taken, e.g., “instruct” versus “remind”. Based on the AIM alone—without considering the context of the entire statement—option 1 would be coded as a choice rule typology, instead of an information rule which based on the described action is the more appropriate typology. Third, by restructuring institutional statements to more directly reflect the ATTRIBUTE actor and who is being acted upon in the OBJECT, the coding avoids “burying” key ATTRIBUTE actors, like the Secretariat, in the OBJECT field, and key OBJECT actors, like the Parties, in the WHAT condition of the coded data. This is an important factor that will influence the ability to assess the decision-making structure of the coded data in any subsequent network analysis to be performed.

Based on the aforementioned, the adopted coding strategy in this research was *option 2*. In order to ensure that shared strategies were coded consistently across all documents, the following test was applied to determine whether a given institutional statement in the shared strategy form (i.e., no OR ELSE and no DEONTIC present) was to be coded “as is” (option 1) or modified to include an implied DEONTIC (option 2): If

the shared strategy outlined a direct interaction between an ATTRIBUTE and an OBJECT or WHAT condition, then it was coded “as is”. For example: “Parties are encouraged to take action towards concluding AGREEMENTS” (CMS, 1979) or “The Conference of the Parties directs, oversees, and provides general policy guidance on implementation matters” (CMS, 2017 Res. 12.09(D)(2)). Both of these statements would be coded “as is” (option 1).

If no direct interaction was outlined in the institutional statement, it was restated to reflect a direct interaction between the key actor ATTRIBUTE and the OBJECT, and an implied DEONTIC was added (option 2). For example: “INVITES the ASW countries to continue to provide regular data ...on all aspects of their hunts and needs” (IWC, 2014 Res. 2014-1) would be coded as follows: “ASW countries [should] continue to provide [to the Commission] data on all aspects of their hunts and needs regularly.”

The implied DEONTIC that was added to the modified norm (option 2) was driven by the AIM of the original shared strategy. AIMS such as “directs” and “instructs” which assert an authoritative interaction between the COP and the entity receiving the directive/instruction were coded as implied DEONTIC “shall”, i.e., legally-binding mandatory action. AIMS such as “encouraging”, “inviting”, or “recommending” were coded as implied DEONTIC “should”; a recommended action. This follows legal scholars’ guidance with regard to the legal obligation of the DEONTIC in an international treaty context (Bodansky, 2016; Rajamani, 2016).

Other coding modifications

Most other coding modifications made were common features of institutional grammar coding and followed the guidelines of the updated institutional grammar codebook (Basurto et al., 2018) (Appendix C). For example, the splitting of sentences containing multiple DEONTICs or AIMs can lead to incomplete sentences that mandate adding missing syntactic components, such as implied ATTRIBUTES. In the treaty context, often a document will outline, e.g., that the Secretariat “shall” perform several functions that are listed in the subsequent subparagraphs. In those instances, the DEONTIC “shall” was carried over to all statements listed in the subparagraphs. In order to illuminate such modifications, all implied syntactic elements in the coding spreadsheets were identified by placing “[]” around them.

Since part of the reason for exploring the institutional treaty structure was to determine what actions/decisions actors are required/permitted/prohibited to take, it was also necessary to convert statements from passive to active voice. For example:

Trade in specimens of these species must be subject to particularly strict regulation in order not to endanger further their survival and...

(CITES, 1973 Article II(1))

Article II of the CITES treaty outlines the Convention’s fundamental principle of regulating international trade in wild animal and plant species. While this passage from the treaty text does not indicate a particular actor who should perform this action, the context of treaty governance is that the implementation of treaty decision-making

structures is at the national level. As such, it is the responsibility of CITES' Parties to perform the required action outlined in the above statement which was modified to reflect this responsibility:

[Parties] must subject trade in specimens of these species
[included in Appendix I] to particularly strict regulation...

Rule typologies

Each institutional statement was only assigned one rule typology. In instances where more than one rule typology could have been coded, the rule typology order outlined in the updated coding manual (Basurto et al., 2018, p. 7) (Appendix C) was consulted, and the rule typology that was highest ranked was applied to the institutional statement. For example:

...where the recommendations have been met, the Secretariat shall, following consultation with the Chair of the Standing Committee, notify the range States concerned that the species/country combination was removed from the review process...

(CITES, 2002 (Rev. 2018) Resolution 12.8(1)(i) 2002)

The AIM “notify” signifies an information rule. However, the WHEN condition “following consultation with the Chair of the Standing Committee” indicates a joint action, i.e., an aggregation rule. Since an aggregation rule has a higher ranking than an information rule (Basurto et al., 2018, p. 7) (Appendix C), this institutional statement was coded as an aggregation rule.

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APPENDIX E
DATA TABLE REGULATORY

REGULATED BY INSTITUTIONAL STATEMENTS		OPERATIONAL RISK		CREDIT RISK		LIQUIDITY RISK		MARKET RISK		COMMODITY RISK		COUNTERPARTY RISK		OPERATIONAL RISK		CREDIT RISK		LIQUIDITY RISK		MARKET RISK		COMMODITY RISK		COUNTERPARTY RISK																																																																												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	
100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200

APPENDIX F
REGULATORY RULES CODING DETAILS
(INCLUDING WATERED-DOWN DEONTICS AND CONDITIONS)

Syntactic composition (regulatory and constitutive)

The Data Table (Appendix E) outlines the coded data for the regulatory rules and is organized by treaty with the oldest treaty, the IWC, and the formal documents coded under it, listed first and the newest, the CBD, listed last. Columns B, C, and D under the heading “Institutional Statements” outline the number of regulatory and constitutive institutional statements coded for each treaty and, within each treaty, for each document, as well as the total counts and percentages by treaty regime. At the end of the table are two summary sections entitled “Total institutional statement counts (All)” and “Percentage of totals (All)” which repeat the total tallies for each Convention to allow an at-a-glance comparison across regimes.

As discussed in the document sampling strategy (Appendix B), except for the foundational criteria, direct document matches were not always possible due to the differing organizational structures of the four treaty regimes. Even in the foundational document category (convention texts and rules of procedure) where direct matches were possible, the number of institutional statements per treaty varied between similar documents. For example, the ICRW treaty text consists of 58 institutional statements versus 246 institutional statements in the CBD. To allow a more accurate comparison of the coded data, the Data Table (Appendix E) provides both the raw counts of the coded institutional statements, as well as the percentage values to provide a common baseline of comparison.

Based on the coded data, CMS had the lowest number of institutional statements (632 regulatory and 244 constitutive), while CITES had the highest (1,095 regulatory and 370 constitutive). It is worthwhile noting that because CMS outsources the conservation of its Appendix II species to agreements that are managed outside the scope of CMS, there is a lesser need to issue resolutions than there is in CITES which actively manages conservation and trade of its Appendix II-listed species. This accounts for the greater number of documents included in the “maintenance” and interpretation” document categories (Appendix B, Table 3) for CITES than for CMS and the concomitant higher number of institutional statements coded. The IWC and CBD had a similar number of institutional statements; 1,005 and 1,191 respectively (Data Table, Appendix E).

While the number of institutional statements vary, the percent distribution of constitutive and regulatory rules within each treaty regime is surprisingly consistent with each reflecting a mix of about 75% regulatory to about 25% constitutive institutional statements (Figure 2). This means that on average three-quarters of the rule structure is needed to create and maintain the aspirations and objectives of the treaty regime that are outlined in the remaining one-quarter of the rules. This seems unexpectedly balanced across the four treaty regimes indicating a purposive design that might be generalizable to other policy regimes.

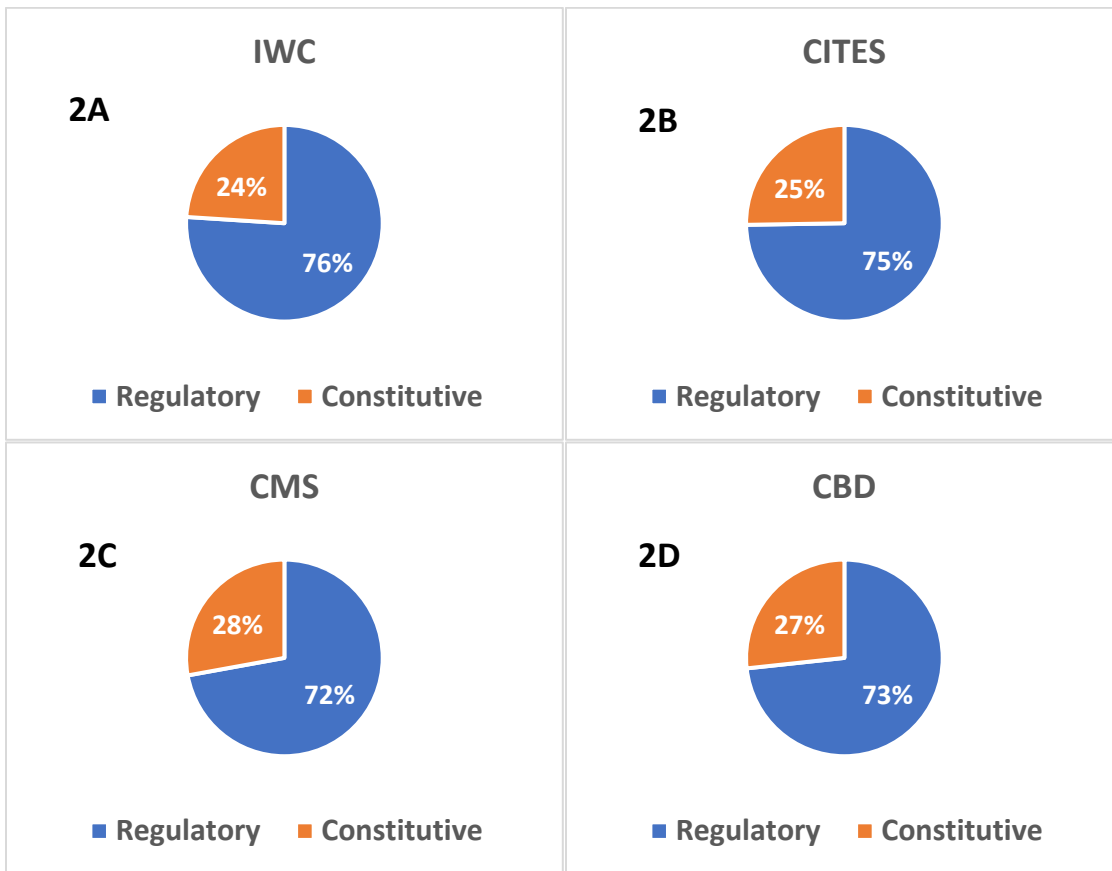


Figure 2A-D: Pie charts visualizing the rounded percent distribution of coded institutional statements by treaty regime (IWC=2A; CITES=2B; CMS=2C; and CBD=2D) and syntax based on the coded data outlined in Data Table (Appendix 4). Regulatory rules reflect about three-quarters of all coded institutional statements for each treaty, while one-quarter is dedicated to outlining the aspirations, ambitions, and context under which the treaties are envisioned to operate.

Regulatory rules syntax

The regulatory syntax composition of each treaty is outlined in Columns E through H of Data Table (Appendix E). “True” rules are defined as institutional statements that contain all syntactic elements, i.e., they include coded values for the ATTRIBUTE (A), OBJECT (B), DEONTIC (D), AIM (I), CONDITION (C), and OR ELSE (O); which represents the ABDICO or ADICO syntax (Crawford & Ostrom, 1995; Ostrom, 2005; Siddiki, Christopher, et al., 2011). When the OR ELSE is missing, an

institutional statement is considered a norm (ADIC/ABDIC syntax), and when both the OR ELSE and the DEONTIC are missing, it is considered a shared strategy (AIC/ABIC). As mentioned, none of the examined texts contain true rules (ADICO/ABDICO), and the rules-as-norms format (ADIC/ABDIC) prevailed in each treaty regime. The lack of true rules is, however, not a hallmark of rule-making in a supra-national context, as very few policy documents regardless of governance scale include true rules (Schlüter & Theesfeld, 2010; Carter et al., 2016).

The treaties are governed by norms with shared strategies occurring infrequently in some of the documents across treaty regimes (Data Table, Appendix E). In the IWC, CITES, and CMS, shared strategies made up about two percent of the institutional statements, and in the CBD they were around one percent (Fig. 3). As discussed earlier in the [Shared Strategies](#) section, the occurrence of shared strategies (Data Table, Appendix E) (Fig. 3) is related to the coding strategy more than it is a reflection of the texts' linguistic structure. This is particularly true in the case of the CBD where Decisions were generally crafted in the shared strategy "Conference of the Parties requests the Secretariat to do something" format that required restructuring into a norm with an implied DEONTIC, thereby, potentially inflating the occurrence of norms. Nevertheless, the similarity of the syntactic composition between the four regimes appears consistent and could be part of a larger design pattern.

It is worth noting that none of the over 3,000 formal regulatory institutional statements coded across the four treaty regimes included an "OR ELSE". In fact, Siddiki

asserts that including the “OR ELSE” in the IG syntax was a mistake, since formal rules generally address the consequences of noncompliance in separate sections of a legislative document, sometimes even in separate rule structures altogether (S. Siddiki, personal communication, March 31, 2020).

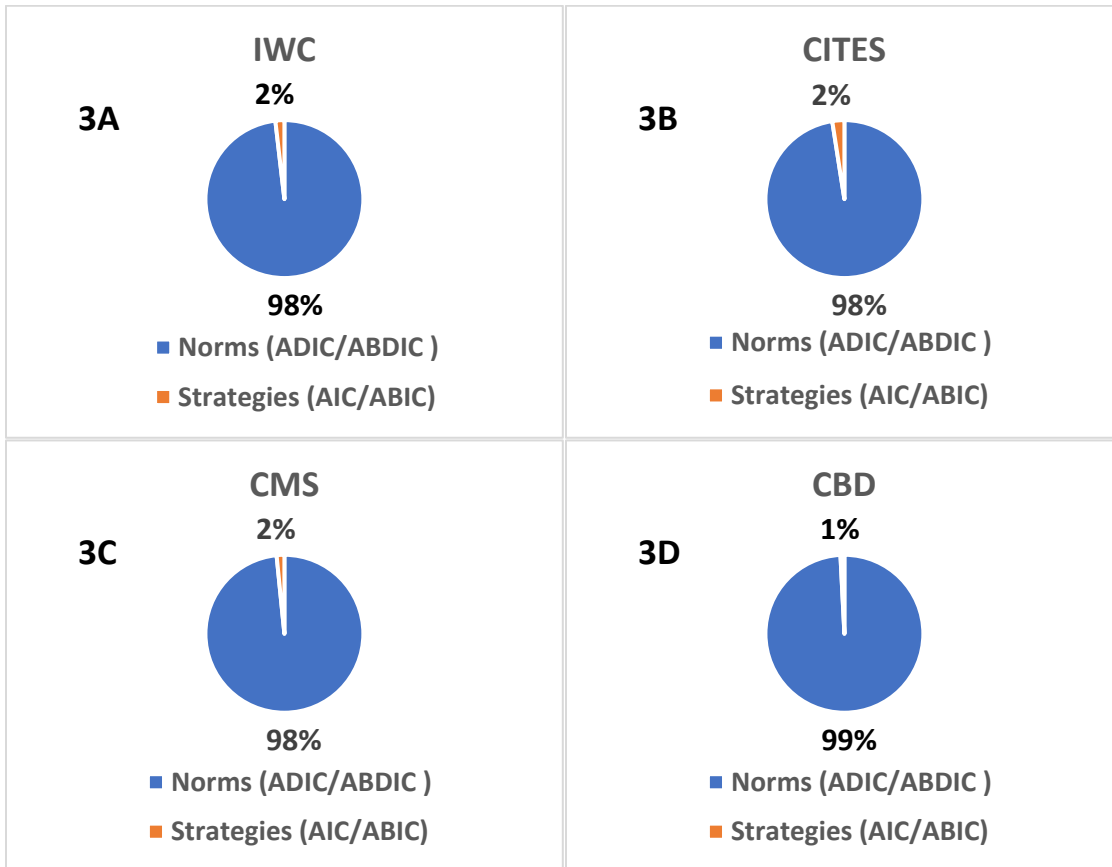


Figure 3A-D: Pie charts visualizing the rounded percent distribution of norms and shared strategies by treaty regime (IWC=3A; CITES=3B; CMS=3C; and CBD=3D) based on coded institutional statements and coding strategy. The coded data reveal treaty governance by norms which is not unexpected and follows patterns observed in other policy documents (Siddiki, Weible, et al., 2011; Carter et al., 2016). What is interesting is the similarity of syntax composition between the four regimes which may be a reflection of the coding strategy but could also be part of a larger design pattern.

Distinguishing between rules, norms, and shared strategies can be useful “to understand how these institutions affect the incentives actors face in action situations” (Siddiki et al., 2019, p. 8). Shared strategies establish expectations about the behavior and actions of others and are particularly useful to coordinate actions where otherwise no rules exist. In contrast, the deontic component of norms provides information on right and wrong actions, and ascribes a degree of legal commitment to the prescribed decision-making context or activity (Siddiki et al., 2019). While the distinction between shared strategies and norms may be of value in other policy contexts, it did not seem that way in the treaty regimes where the choice of crafting an institutional statement appeared to be driven by (a) linguistic choices made by the document drafters; or (b) part of an administrative process that mandated a certain format be used for a certain type of document, e.g., decisions in the CBD are often crafted as shared strategies. The expectations and coordination activities that the literature ascribes to shared strategies were instead expressed as norms with a “should” deontic operator in the treaty context. Further research into this specific linguistic conundrum is, however, warranted.

Deontic structure

Deontic operators outline the permissibility of a prescribed action which can either be permitted, prohibited, or required (Ostrom, 2005). The linkage between a particular deontic operator used in a treaty text, and its prescribed permissibility on the ATTRIBUTE was determined by the language aspect of a treaty’s “legal character”

(Rajamani, 2016, p. 343). DEONTICs “shall” and “must” create mandatory rights and obligations, “will” implies a promise or expectation, and “should” a recommendation (Bodansky, 2016; Rajamani, 2016) (D. Bodansky email communication March 8, 2017) (see also Table 1).

Deontic operator	Legal obligation
Shall/shall not	mandatory (legally binding)
must/must not	mandatory (legally binding)
may/may not	permissive (legally binding)
will/will not	normative expectation (not a legal obligation - somewhere between shall and should)
should/should not	recommendation (not legally binding)

Table 1: Deontic operators and their legal obligation. Adapted from Bodansky 2016; Rajamani 2016, D. Bodansky email communication March 8, 2017).

Based on the linkage between deontic operators and their legal obligation (Table 1), it was assumed that institutional statements that include “shall” or “must” DEONTIC operators impose a greater commitment on the target actor than statements containing a “should”. Accordingly, foundational documents, like the Convention text and the rules of procedure, are likely to impose greater legal obligations on the Parties than resolutions/decisions which are generally viewed as recommendations/guidelines (Bodansky, 2016; Rajamani, 2016; Mitchell, 2020). By that logic, one would expect to find more mandatory or permissive legally binding DEONTICs in the former than in the latter. The coded data in the Data Table (Appendix E, columns I-M) follow that logic with all treaties exhibiting the greatest percentage of institutional statements in the mandatory legally-binding category (DEONTICs “shall” and “must”). The IWC has the highest percentage (58%) followed by CITES and the CBD (45% each), and the CMS (43%).

Institutional statements that reflect non-legally-binding recommendations (DEONTIC “should”) occurred to a lesser degree with CBD reflecting the highest percentage rate at 41%, CITES 36%, CMS 31%, and the IWC 9%. At first glance this indicates that the IWC DEONTIC structure is highly regulatory, and the CBD is mainly focused on providing guidance to its Parties. This perspective does not necessarily conflict with the literature and expert perceptions. However, moving beyond a review of the “lumped” summary DEONTIC data represented in the Data Table (Appendix E) (columns I-M, rows 90-101) reveals that the largest number of coded “shall” statements in each treaty regime are located in the foundational documents. This configuration indicates that the percentage values, which lump all “shall” statements together, may be skewed and reflect treaties to be more regulatory or legally binding than they actually are. Subsequent splitting of the deontic structure by document type revealed a slightly richer perspective (Figs. 4A-C, 5A-C, 6A-C, and 7A-C).

Lumping and splitting the DEONTIC by document category

The pie charts in Figs. 4A, 5A, 6A, and 7A outline the “lumped” percent distribution of the treaty DEONTIC structure for each treaty and **all** coded documents. The coded data indicate that legally binding statements (“shall” and “must”) are the dominant DEONTIC in all treaties, except in the CBD where “shalls” and “shoulds” appear more balanced. This seems counterintuitive to the assertion that resolutions/decisions do not represent legally binding commitments on the Parties (Rajamani, 2016; Mitchell, 2020).

Upon “splitting” the foundational documents from the resolutions, a different perspective of the DEONTIC structure emerges in which the legal texts more clearly perform the function legal analysts and treaty participants assign to them. The percentage of mandatory legally-binding statements in the foundational documents (convention texts and rules of procedure) increases in all four forums (Figs. 4B, 5B, 6B, and 7B). For example, in the IWC “shall” and “must” statements move from 59% of the lumped coded statements to 65% in the foundational documents (Figs. 4A&B). The mandatory nature of the foundational documents is similarly solidified in CITES and CMS with a move from 46% to 69% of “shalls” and “musts” in CITES (Figs. 5A&B), and an increase from 45% to 58% in CMS (Figs. 6A&B). The most dramatic transformation, however, occurs in CBD where the mandatory DEONTIC shifted from a lumped 45% to 81% (Figs. 7A&B)!

Similarly, splitting the DEONTIC coding also confirmed the status of resolutions/decisions as rooted in recommendations/guidance. Here, the most dramatic changes occurred in the IWC and CBD where the DEONTIC “should” increased from a lumped 9% to 44% in the IWC (Figs. 4A&C), and from a lumped 41% to 78% in the CBD (Figs. 7A&C). In CITES and CMS the “should” statements increased by 20 points from 36% to 56% (CITES) (Figs. 5A&C), and 31% to 51% (CMS) (Figs. 6A&C).

Splitting the DEONTIC structure coding illustrated how the treaty texts in each treaty regime performed according to the functions ascribed to them by legal scholars. A majority of the statements in the foundational documents (treaty texts, rules of procedure) provided the mandatory legally-binding obligations that Parties are to follow, and a

majority of the statements in the resolutions/decisions provided the Parties with recommendations and guidance. Interestingly, though, the treaty that is generally considered to be the one that imbues the fewest obligations on its Parties—the CBD—is the one whose DEONTIC structure reflects an almost pure instantiation of the function of foundational texts and resolutions/decisions.

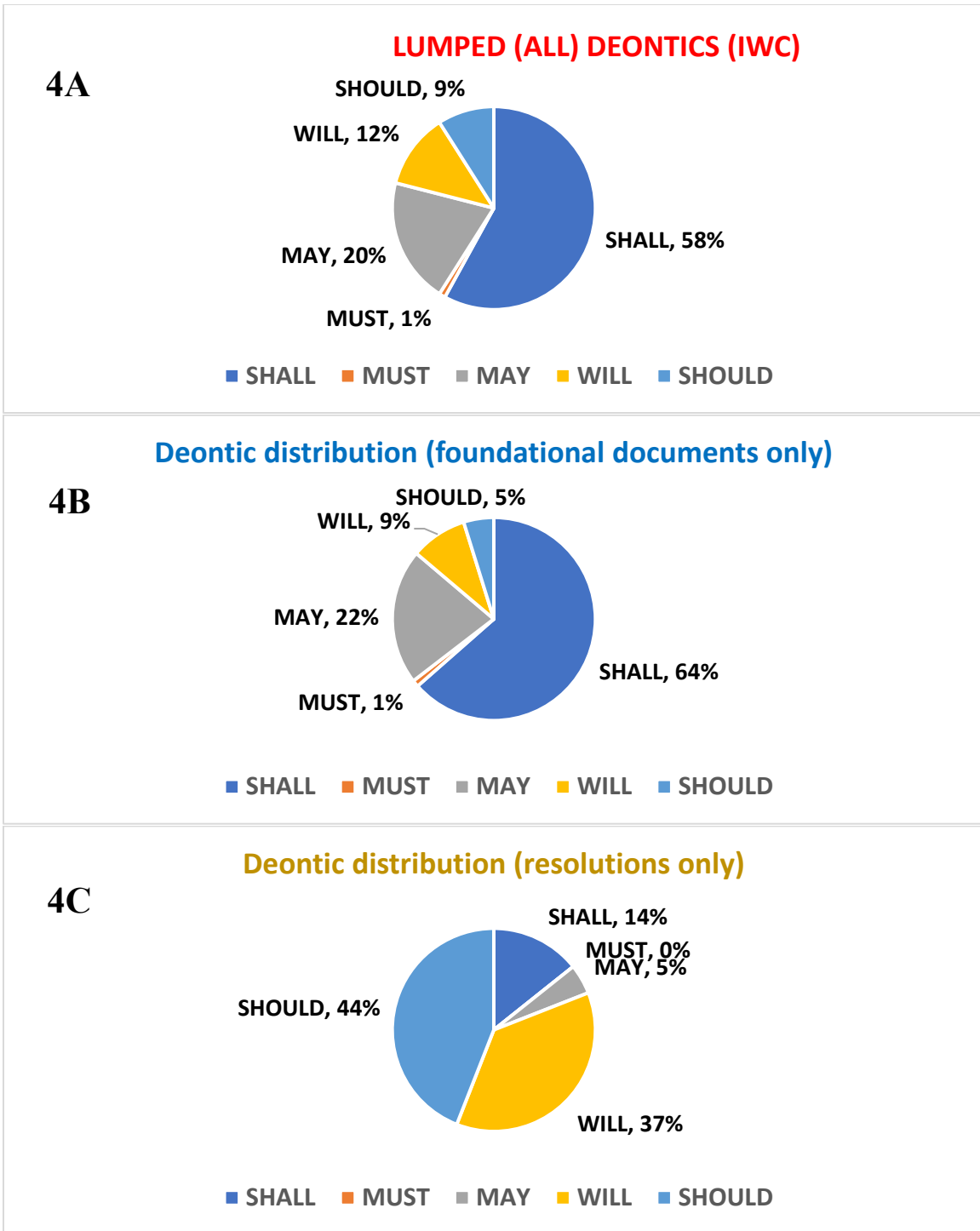


Figure 4A-C: Pie charts depicting the lumped DEONTIC structure of the IWC, including institutional statements in *all* documents (Fig. 4A). Fig. 4B reflects the IWC DEONTIC structure isolated in the foundational documents; and Fig. 4C reflects the distribution of the DEONTIC in the IWC resolutions only.

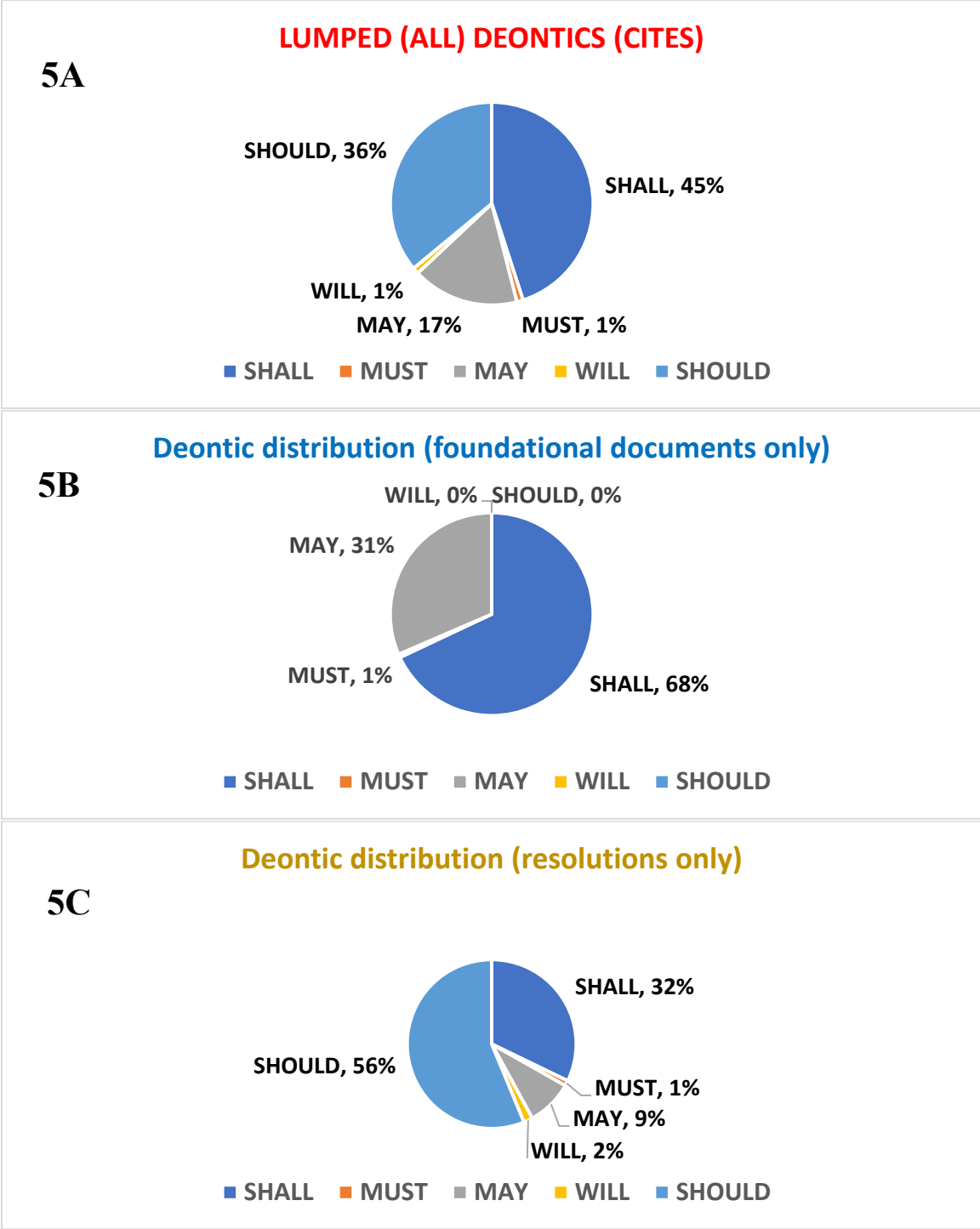


Figure 5A-C: Pie charts depicting the lumped DEONTIC structure of the CITES, including institutional statements in all documents (Fig. 5A). Fig. 5B reflects the CITES DEONTIC structure isolated in the foundational documents; and Fig. 5C reflects the distribution of the DEONTIC in the CITES resolutions only.

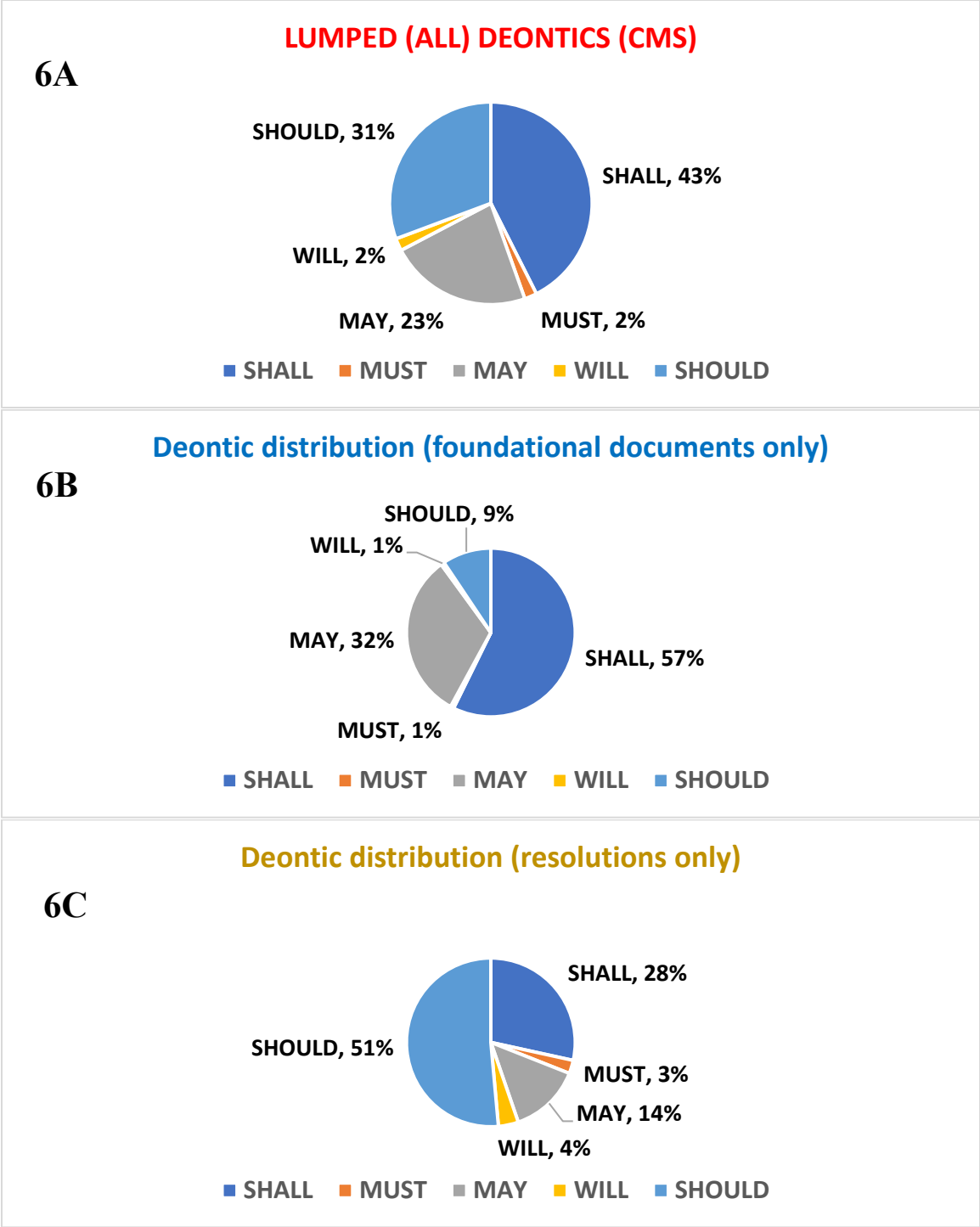
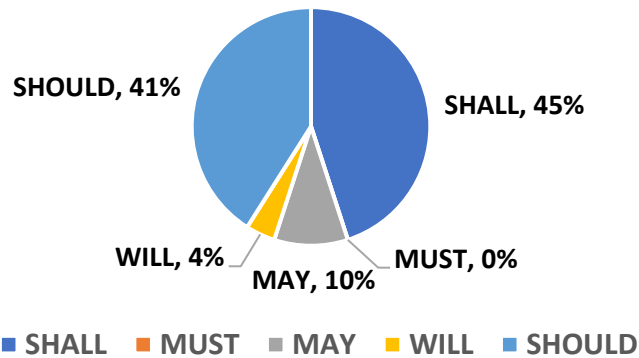


Figure 6A-C: Pie charts depicting the lumped DEONTIC structure of the CMS, including institutional statements in *all* documents (Fig. 6A). Fig. 6B reflects the CMS DEONTIC structure isolated in the foundational documents; and Fig. 6C reflects the distribution of the DEONTIC in the CMS resolutions only.

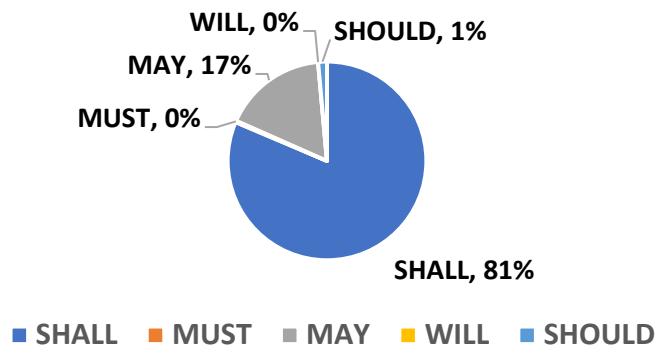
7A

LUMPED (ALL) DEONTICS (CBD)



7B

Deontic distribution (foundational documents only)



7C

Deontic distribution (decisions only)

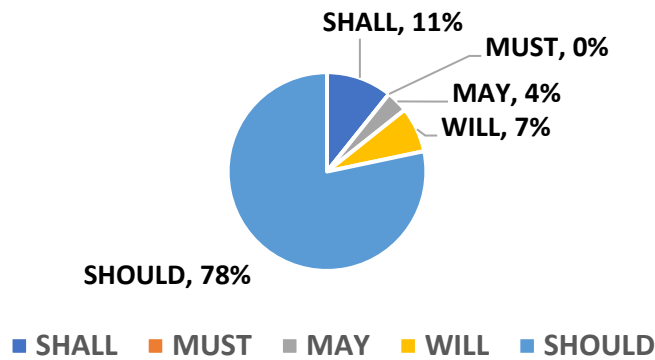


Figure 7A-C: Pie charts depicting the lumped DEONTIC structure of the CBD, including institutional statements in *all* documents (Fig. 7A). Fig. 7B reflects the CBD DEONTIC structure isolated in the *foundational* documents; and Fig. 7C reflects the distribution of the DEONTIC in the CBD decisions only.

Splitting the DEONTIC also shifted the focus of analysis to those resolutions which included a large number of “shall” statements (Data Table, Appendix E). In CITES, these resolutions are: Resolution 14.8 (Periodic review of species included in Appendices I and II) (23 coded statements); Resolution 12.8 (Review of Significant Trade in specimens of Appendix II species) (51 coded statements); Resolution 18.1 (Financing and the costed programme of work for the Secretariat) (29 coded statements); and Resolution 18.2 (Establishment of Committees) (86 statements). In Resolutions 14.8 and 12.8, the “shall” DEONTICS outnumber all other DEONTICS (Data Table, Appendix E). This is likely not by coincidence, since these resolutions outline oversight mechanisms that are important to CITES’ core objective of wildlife trade regulation by, e.g., ensuring that species listings are appropriate and that the review of significant trade process prevents overexploitation. It makes sense then to utilize mandatory, legally-binding statements to signal to the Parties that decision-making and action on these issues is critical to the objectives of the regime.

A similar pattern emerges in CMS, where two resolutions stand out: Resolution 12.09 (Establishment of review mechanism and national legislation programme) which for the first time establishes a review mechanism to report and track implementation of CMS treaty obligations at the national level. The other, Resolution 9.15 Standing Committee, outlines the rules that govern the actions of the Standing Committee, the treaty governing body during the intersessional period. Much like in CITES, these resolutions aim to govern decision-making and behavior that is critical to the

effectiveness of the treaty. This seriousness is again reflected in the legal weight of the DEONTIC structure within the documents.

Split-coding the DEONTICs by document type revealed resolutions with a DEONTIC structure that is counter-intuitive to their reported/perceived intent as legislative guidance. This demonstrates that underneath the simplified division between foundational texts and resolutions lies a greater complexity in which some guidance is more mandatory than others. Resolutions/decisions dealing with crucial governance aspects, such as compliance and financial commitments, hold Parties to a higher obligation than generally is assumed. However, there still remains the puzzle of the overwhelmingly mandatory nature of the CBD treaty commitments based on its DEONTIC structure, and its perception as a somewhat soft (or weak) international instrument.

The “regulatory” nature of conservation treaty regimes

Exploring the DEONTIC structure facilitated an examination of the connection between the degree of legal obligation of a treaty regime as expressed by the presence of a more mandatory-legally binding DEONTIC structure, and its potential effect on decision-making feedbacks and robust governance design. The inclusion of a greater number of mandatory legally-binding commitments is generally thought to promote better rule-following, in part, because legally-binding commitments require more specificity in rule crafting that “can deliver the benefits of consistent application, certainty, predictability, and accountability” (Rajamani, 2016, p. 339). This assertion was

echoed by interview participants in the CITES forum who frequently perceived CITES' rule structure to be more specific and attributed that to the treaty's greater effectiveness. This links well to an "evolutionary" DEONTIC treaty design hypothesis developed early on in the research of these regimes. Based on preliminary test coding of the convention texts, it seemed as though older treaties, such as the IWC and CITES, had a higher percentage of mandatory, legally binding "shall" or "must" statements that in more contemporary conventions, such as the CBD, were replaced with "should" recommendations. This early hypothesis seemed to be confirmed in the literature which generally views CITES and the IWC as more regulatory instruments (Nagtzaam, 2009; Bowman et al., 2010), and CMS and the CBD as "hard law with a soft nature" (Harrop & Pritchard, 2011, p. 476) intended to provide a guidance framework out of which it was envisioned more mandatory protocols would emerge (Baldwin, 2011).

However, the coded data in the Data Table (Appendix E), and the lumped/split analysis outlined in Figs. 4A-C to 7A-C, reveals a fairly similar "lumped" and "split" DEONTIC distribution across treaty regimes, with the exception of the CBD. Does this consistency, however, imply that all four treaties convey similar legal commitments on their member countries, contrary to assertions in the literature? Further parsing of the DEONTIC structure by analyzing the co-occurrence of mandatory, legally-binding DEONTIC operators ("shall" and "must") with AIMS and/or WHEN conditions that serve to decrease or "water-down" the legal effect of the DEONTIC aids in explaining DEONTIC puzzles such as the CBD and CMS which appear to be structured similarly to

the IWC and CITES, but neither the literature nor participants in the forums view them as regulatory.

Watering down mandatory legally-binding DEONTICs via AIM and/or WHEN conditions

What is not immediately evident from the DEONTIC structure as outlined in the Data Table (Appendix E) and Figs. 4-7 is the effect that certain AIM and WHEN conditions might have on the mandatory, legally-binding nature of the institutional statement by effectively reducing or “watering down” a “shall” or “must” to a mere recommendation. This phenomenon is most prevalent in the CMS and CBD treaty forums where around 2% of all coded statements include some form of watered-down effects (Data Table, Appendix E, columns O-P, rows 100-101).

Illustrative examples from the CMS Convention text include:

Parties [ATTRIBUTE] shall [DEONTIC] endeavor to provide [AIM] immediate protection for migratory species included in Appendix I [endangered species] [WHAT CONDITION].
(CMS, 1979 Article II(b))

Watered-down DEONTIC “shall” via the AIM “endeavor to provide”.

The Range State Parties [Attribute] shall [Deontic] prevent, remove, compensate for or minimize [aIm], as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species [Condition].
(CMS, 1979 Article III(4)(b))

Watered-down DEONTIC “shall” via the WHEN CONDITION “as appropriate”.

Based on the crafting of these institutional statements, it is difficult to imagine how any Party could be in noncompliance with the required obligation. There is very little, if any, action required in order to “endeavor to provide” immediate protection to an endangered migratory species or to “endeavor to conclude” AGREEMENTS related to Appendix II species conservation measures. The CMS Convention text contains ten such attempts to limit the Parties’ obligation (three via the WHEN Condition and seven via the AIM), all ten statements are related to actions that are crucial to the conservation efforts of endangered/threatened migratory species. This means that the lack of action due to the watered-down effect of the Deontic may undermine the core objective of the treaty and ostensibly the reason why the Parties joined the Convention in the first place.

In the CBD Convention text there are 26 instances of watered down DEONTICS; 18 via the AIM and another eight via the WHEN condition. Representative samples of such statements include:

[Each Contracting Party] [shall] [e]ndeavour to provide the conditions needed for compatibility between present uses and the conservation of biological diversity and the sustainable use of its components;

(CBD, 1992 Article 8(i)).

Watered-down DEONTIC “shall” via AIM “endeavor to provide”.

Each Contracting Party shall, as far as possible and as appropriate: (a) Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity;

(CBD, 1992 Article 8(a))

Watered-down DEONTIC “shall” via the WHEN CONDITION “as far as possible and as appropriate”.

As the above examples illustrate, CBD treaty institutional statements “are beleaguered by vague commitments, ambiguous phrases and escape clauses that permit avoidance of obligations” (Wold, 1998; Harrop & Pritchard, 2011, p. 476). In fact, Harrop & Pritchard (2011) specifically referenced what they call the “dilution” of the “shall” obligation through AIMS and WHEN conditions (although they do not refer to them as such), and call the CBD Convention “fundamentally flawed” (p. 476). This confirms the findings of this report that watered-down DEONTICS serve to confuse Parties’ understanding of their commitments, thus, increasing the likelihood of key objectives not being met. The fact that the CBD has not performed well against the goals that it has set for itself seems to confirm such an inference (Bowman et al., 2010; Harrop & Pritchard, 2011).

Watering down or “dilution” of the DEONTIC also occurs in the IWC and CITES but to a much lesser extent. In the IWC, these affect, among others, the transmission of scientific research collected by the Contracting Parties regarding whales, whaling, and in particular related to any scientific research whaling conducted under IWC’s Article VIII special permits. In CITES, watered down AIMS in the rules of procedure indicate that Committees I and II “*shall strive* to achieve regional balance [within their working groups]; and “[t]he Presiding Officer *shall aim* to ensure a fair and balanced

representation of delegates and observers with the number of observers not exceeding the number of delegates” (CITES, 2016 Rules of Procedure, Rule 7(3)). Here the AIMS “strive to achieve” and “shall aim to ensure” balanced representation reduce the DEONTIC power of the “shall” from a mandatory, legally required action to a recommendation. While personal observations at COP18 indicated that Chairs of the Committees were very conscious of equality in representation, there were complaints both from the animal welfare as well as from pro-sustainable use groups that working groups were stacked in favor of one or the other position, or that one or the other group had too much influence within CITES. Whether eliminating the watered-down DEONTIC of these statements and making working group organization more mandatory would address these perceptions will be further discussed in a future publication.

In order to clarify how watered-down DEONTICs may be affecting the regulatory nature of the treaty regimes outlined in Figs. 4-7, a summary ranking of the four treaties based on the degrees of commitment the formal texts impose on the Parties was performed (Table 2). The degree of commitment within treaty regimes was measured by exploring the interplay between the percentage of mandatory, legally-binding statements (DEONTICs “shall” and “must”) in all coded texts and the occurrence of “watering down” AIM and WHEN conditions. Instances where watered-down AIMS and WHEN conditions were paired with “should” DEONTICs were excluded from the summary ranking as they were deemed to have minimal, if any effect, since there is no “lower” commitment than a recommendation.

The ranking in Table 2 ranges from 0-7% and is based on the occurrence of these pairings in the four treaty forums with the lowest occurrence in CITES at 0.61% and the highest at 6.67% of all coded regulatory statements in the CBD. Treaties are deemed to be “strongly regulatory” if they impose a greater degree of legal commitment on their Parties and include none or only a small percentage of watered-down AIMS or WHEN conditions. Aside from a study which ranked city charters based on the presence of a strong or weak mayoral position (Feiock et al., 2016), no such ranking of treaty regimes, or other legislative documents has been performed. Accordingly, the cut-off parameters for ranking are based on the occurrence of the phenomenon in the texts and are provided for illustrative purposes only. Further testing of the usefulness of such a ranking structure (and the value of the established cut-off points) is highly recommended but beyond the scope of this paper.

	ICRW	CITES	CMS	CBD
Shall/must statements (number of coded institutional statements)	442	488	276	390
Percentage shall/must (total coded institutional statements)	59%	46%	45%	45%
Number of watered-down Deontics affecting shall/must statements	6	3	10	26
Percentage watered-down	1.36%	0.61%	3.62%	6.67%
Regulatory ranking strong (0-2.3%); medium (2.4-4.6%); weak (4.7-7.0%)	strong	strong	medium	weak

Table 2: Effect of watered-down DEONTICS on the degree of legal commitment of a treaty structure. The occurrence of DEONTICS “shall” and “must” in the coded formal documents (number and percentages of coded statements) is coupled with the occurrence of “watering-down” AIMS and WHEN conditions to determine their theoretical effect on the mandatory, legally-binding nature of affected treaty commitments. The highest occurrence of watered-down DEONTICS was in CBD, the lowest in CITES. Using these two percentage values as high and low cut-offs, the scale of strong to weakly regulatory was set from 0 (no occurrence of watered-down DEONTICS = strongly regulatory) to 7 (high occurrence of watered-down DEONTICS = weakly regulatory). Dividing 7 through 3, the cut-off for the strong, medium, weak regulatory range was set at approx. 2.3%, thus providing the ranking scheme outlined above. 0% to 2.3% = strong degree of legal commitment; 2.4% to 4.6% = medium degree of legal commitment; and 4.7% to 7% = weak degree of legal commitment.

Table 2 contributes yet another perspective on the potentially legally binding nature of the commitments within each treaty by taking into account the co-occurrence of “shall” or “must” mandatory, legally-binding institutional statements with watered-down AIMS and WHEN conditions. Based on the lumped DEONTIC structure in the treaty regimes (Data Table, Appendix E, Figs. 4A-7A), the IWC would be considered the one with the most mandatory, legally-binding commitments on its Parties. However, when considering the theoretical watering-down effect of certain AIMS and WHEN conditions, CITES emerges as the more strongly regulatory instrument (Table 2) since it has the lowest percentage of watered-down AIMS and WHEN conditions—0.61% occurrence of watered-down AIM and WHEN conditions versus 1.36% in the IWC.

Similarly, assessing the watered-down effect of AIM and WHEN conditions also contextualizes the data in the Data Table (Appendix E, columns I-M, rows 98-101) which display little difference in the regulatory structure of CITES (46%), CMS (45%), and CBD (45%) based on the coded “shall” and “must” statements. When considering the occurrence and theoretical effect of watered-down DEONTICS (Table 2), however, the regulatory nature of the Parties’ commitment in these instruments scales from strongly (CITES) to medium (CMS) to weakly (CBD) regulatory. Such a distinction may be

relevant to the decision-making feedbacks and robustness of these governance structures. It also gives merit to the earlier mentioned “evolutionary nature of treaty design” hypothesis as the two oldest treaties appear to be the more regulatory instruments. Finally, it also confirms that the CBD, despite its lumped DEONTIC structure, is the treaty that imposes the fewest obligations on its Parties.

Condition structure

Columns R through V in the Data Table (Appendix E) outline the occurrence of conditions coded by treaty and, within treaty, by document. As previously discussed, the OR ELSE condition was initially thought to represent the consequence or incentive component of the IG syntax (Crawford & Ostrom, 1995; Ostrom, 2005). However, there was no evidence of OR ELSE conditions in any of the over 3,000 coded regulatory institutional statements. Accordingly, this column is zero throughout and will not be further discussed.

The CONDITION portion of an institutional statement outlines the constraints on the action that is to be taken by the ATTRIBUTE/actor. In the past, the CONDITION was coded as one element in which all constraints were lumped together (Crawford & Ostrom, 1995; Ostrom, 2005). The parsing of CONDITIONS into WHAT, WHERE, HOW, and WHEN components is a fairly new and largely untested contribution to the IG with little practical application thus far, although it is outlined in the updated IG coding manual (Basurto et al., 2018) (Appendix C). This section will briefly introduce each

condition type and the benefits of its use before discussing the coded data and its potential implications on treaty structure and robustness.

WHAT condition

The WHAT condition is perhaps the most ill-defined and difficult to code aspect of the expanded CONDITION elements. There is also disagreement among the authors of the revised IG coding guidelines as to whether this truly represents “the conceptual definition of a condition” (Basurto et al., 2018, p. 6). However, for purposes of coding the treaty texts, the WHAT condition was useful to further parse the often very complex institutional statements into their component parts.

Generally, the WHAT condition defines the purpose of the AIM and specifies the thing that the OBJECT receives. As such, it was used to code segments of the institutional statements that included the purpose of the AIM and/or answered the question “why”, “for what purpose”, “for what”, or for whom?” (Basurto et al., 2018) (Appendix C). An illustrative example from CITES includes:

*[Secretariat] [ATTRIBUTE] shall [DEONTIC] report [AIM] to the Standing Committee and the Conference of the Parties [OBJECT] its **findings, recommendations, or progress [on necessary measures for effective implementation of the Convention] [WHAT CONDITION] at each meeting of the [Standing Committee and] Conference of the Parties [WHEN CONDITION].***

(CITES, 1992 (Rev. 2010) Resolution Conf. 8.4(1)(c)).

Here, the WHAT condition qualifies the AIM “report” by indicating *what* the CITES Secretariat shall report to the Standing Committee and the Conference of the

Parties, namely, “its findings, recommendations, or progress [on the necessary measures for effective implementation of the Convention]. The “[]” brackets indicate that this element of the institutional statement is implied—in this instance taken from the prior institutional statement in order to provide context to the WHAT condition. It should be noted that WHAT conditions can include legal entities, such as the Conference of the Parties or the Secretariat.

The coded data in the Data Table (Appendix E) highlights that WHAT conditions were the most frequently coded of the four conditions (WHAT, WHERE, HOW, and WHEN) which occurred on average about 45% of the time in each treaty regime. This reflects its status as a “work horse” condition that was heavily used to dissect complex statements into meaningful bits of information. As such, its high rate of occurrence is an indicator of the complexity of the underlying linguistic structure of the coded documents more than it is evidence of a constraint on the AIM.

WHERE condition

The WHERE condition outlines a “geographical/contextual qualifier in which the action/directive should take place” (Basurto et al., 2018, p. 16) (Appendix C). In contrast to the WHAT condition, the WHERE condition was the least frequently coded element across the treaty forums (Data Table, Appendix E) with CITES and the IWC’s statements including 2% WHERE conditions. Only 1% of all coded institutional statements included WHERE conditions in the CBD. CMS was the only outlier without any geographical or contextual qualifiers.

Some may argue that the relative absence of WHERE conditions is characteristic of treaty institutional design, since State sovereignty dictates that international rules defer geographical implementation details to member governments and national legislation. In fact, the lack of WHERE conditions in treaty texts seems to confirm assertions made by some institutional analysts that clearly defined boundary rules (institutional design principle (DP) 1) (Ostrom, 1990) are not useful in anarchical systems (Stern, 2011). However, the fact that WHERE conditions occurred most frequently in the IWC Schedule (= 25 coded WHERE conditions) to identify specific geographical locations where whaling is permitted not only reveals the treaty's roots in fisheries management, but also the fact that DP1 can and does occur in anarchy.

WHERE conditions were also utilized to identify areas designated for delegations and observers at CITES meetings—visually depicting the user boundaries of authority among forum participants. In the CBD, the WHERE condition outlined where in-situ and ex-situ conservation efforts should take place (national level and/or developing countries); another DP1 connection. These instances seem to confirm the applicability of the boundary rule design principle at the international scale, and its link to the WHEN condition as an indicator of its presence, although further empirical testing is necessary.

WHERE conditions were also used to identify non-boundary/contextual information, such as what should be posted on the CITES website. In CMS, the lack of WHERE conditions and associated boundary rules is likely a feature of CMS' framework design that outsources Appendix II conservation efforts to separate AGREEMENTS. In

short, the WHERE condition can provide a lot of insight into institutional design and, for purposes of a robustness analysis, often links directly to the boundary design principle (DP1).

HOW condition

HOW conditions can test for two types of constraints in an institutional statement. First, they can outline how a particular action is to be achieved (Basurto et al., 2018). For example, resolutions shall be adopted “by consensus” or “by a three-quarter majority vote”. Second, HOW conditions also indicate who else is to be involved in the decision-making process aside from the actors/entities identified in the ATTRIBUTE and OBJECT fields (Basurto et al., 2018) (Appendix C). For example, in the ICRW treaty: “The Commission may encourage, recommend or organize studies and investigations relating to whales and whaling **either in collaboration with or through independent agencies of the Contracting Governments...**” (ICRW, 1946 Article IV(1)(a)). In this instance, the HOW condition “either in collaboration with or through independent agencies” is an indicator of an aggregation rule where joint action/decision-making is required in the context of studies and investigations of whaling effects on whale populations.

The occurrence of HOW conditions among the treaty texts was again unexpectedly balanced with little variance across regimes. CBD had the highest number of HOW conditions with 23% of all coded statements, followed by CMS with 19%, while 18% of the IWC’s and CITES’ institutional statements reflected HOW conditions (Data

Table, Appendix E). These figures include all HOW conditions, including aggregation rules. Much like with the DEONTICs, parsing HOW conditions into regular HOWs which outline how something is to be done and aggregation rules would be useful to determine differences in treaty design. It would also facilitate linkage with two other institutional design principles: (1) DP3 –collective choice arrangements which test whether most individuals affected by collective choice and operational rules can participate in modifying them (Ostrom, 1990, 2005; Cox et al., 2010); and (2) DP8— nested enterprises which assesses how governance structures are nested within multiple governance layers (Ostrom, 1990; Dietz et al., 2003).

Table 3 parses the coded HOW conditions per treaty into the number of HOW conditions that were coded as aggregation rules, indicating required, permitted, or prohibited joint decision-making processes vis-à-vis simple HOW conditions. Such parsing revealed a distinction between the four treaties that the numbers and percentages in the Data Table (Appendix E) did not. Based on the Data Table, CBD has the highest number of HOW conditions within all coded statements. However, once those HOW statements are parsed, CITES is revealed as the treaty with the highest percentage (43.08%) (Table 3), followed by the CBD, the IWC, and CMS. This may be indicative of a more robust governance structure that emphasizes interconnectivity and joint actions, providing further evidence that CITES may be the treaty with a hypothetically more robust governance structure.

HOW condition	ICRW	CITES	CMS	CBD
Total aggregation (number of HOW conditions coded as aggregation rules within each treaty)	76	137	51	109
Total coded aggregation rules (% of total HOW conditions)	34.55%	43.08%	28.81%	35.05%
Regular HOW - how is a particular action to be achieved (total number of coded statements)	144	181	126	202
Total HOW (total aggregation + total regular HOW)	220	318	177	311

Table 3: HOW condition distribution across treaty regimes. First row lists the number of statements coded as aggregation rules within each treaty. The second row provides the percentage of total HOW conditions that were coded as aggregation rules (Total aggregation ./ total HOW * 100). The third row lists the number of regular HOW conditions that were NOT coded as aggregation rules. The "Total HOW" column indicates the total number of HOW statements coded by treaty which matches column/row T/91-94 in the Data Table (Appendix E).

WHEN condition

WHEN conditions were the second most prevalent condition coded across the four treaty regimes, after the WHAT condition. The CMS exhibited the highest percentage at 38% of all coded regulatory statements, followed by CITES (36%) and the IWC (33%). CBD had the lowest percentage of WHEN conditions in its texts (31%) (Data Table, Appendix E).

Much like HOW conditions, WHEN conditions are dual indicators (Basurto et al., 2018, p. 16). First, they are *temporal qualifiers* for when an action or decision must be taken. For example:

*The text of the proposed amendment [to Appendix I or II] shall be communicated to the Secretariat **at least 150 days before the meeting [WHEN condition – temporal indicator].***

(CITES, 1973 Article XV(1)(a)).

WHEN conditions can also represent *trigger events* that require further action. For example:

This suspension of voting rights applies until payment is received by the Commission [WHEN condition – trigger event] (IWC, 2018 Rules of Procedure, Rule E(2)(A)).

Here the voting rights of IWC Contracting Governments who have not paid their membership dues are suspended until they have paid their arrears along with any outstanding interest, i.e., a payment by the Contracting Government triggers the lifting of the voting suspension. As mentioned earlier in the paper, these trigger events can also include WHEN conditions that water down the DEONTIC power of the institutional statement, e.g., WHEN conditions “whenever possible” or “where appropriate and feasible”.

WHEN CONDITIONS can thus be useful to determine rule consistency and compliance, since they provide specific information on next steps that are required to be taken when a particular temporal or trigger event is reached. For example, using the trigger event, one could explore whether the suspension of voting rights is applied in practice, i.e., are Parties who have not paid their dues indeed prohibited from voting in the IWC forum? And if such a suspension is applied, is it applied equally across member states, regardless of region or development status of the non-dues paying Party?

In summary, the CONDITION structure of the four international conservation instruments seems remarkably consistent given the varying age, aims, and context of the treaties. While part of this can be attributed to the complex linguistic structure of the legal texts, these similarities could also be indicative of a more purposive design and future

research should compare these findings to the structure of other policy instruments. The coded CONDITIONS also serve as indicators that can help determine rule consistency, compliance, as well as interconnectivity within and across treaty regimes with regard to joint decision-making, consultation, and action. Additionally, the WHERE condition and aggregation rule function of the HOW condition provide linkages to design principles 1 (boundary), 3 (collective choice arrangements), and 8 (nested enterprises) which are useful to the determination of robust governance design.

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APPENDIX G
SUPPLEMENTAL TREATY CODING GUIDELINES

SYNTAX CODING

AIM/OBJECT/WHAT CONDITION “recommend” or “make recommendation

Whenever the Conference of the Parties (COP) ATTRIBUTE “recommends” (AIM) something or “makes” (AIM) a recommendation (OBJECT or WHAT CONDITION)

- ⇒ Code as aggregation rule
- ⇒ Collective choice level of analysis

Justification: COP is a group of Parties who are jointly deciding to recommend something.

Note: There are instances where the COP can recommend something without it rising to the level of joint decision-making. For example, in CMS Resolution 11.06, the COP recommended a series of desirable actions to be included by proposers in draft Resolutions and Decisions. Such recommendations are more correctly coded as Scope rules, since they outline desired, required, or prohibited outcomes. [Context matters!]

Institutional statements to be taken by Parties at national level

Whenever the regulatory rules outline an action to be taken by the Parties at the national level, e.g., conserve species, prohibit taking of migratory species, eliminate factors that inhibit or prevent species migration

- ⇒ Code at the operational level of analysis

Watered down deontics via AIM and/or WHEN condition

When encountering watered-down AIMS or WHEN conditions, e.g., “endeavor to do something” or “encourage to take action”; “where feasible and appropriate”; “aim to achieve”; or “if possible”

- ⇒ Watering down the deontic via AIM and/or WHEN condition reduces the mandatory obligation of an institutional statement. For example, a “shall” deontic paired with an “endeavor to” AIM effectively turns the action from a mandatory legally binding one to a recommendation. This means that if the action is a choice rule – specifying a specific action—then the watered down AIM/WHEN would have the effect of modifying the action to a desired outcome which is a scope rule.
- ⇒ In short, when encountering watered-down AIMS/WHEN conditions which outline actions to be taken, then code as Scope rule instead of Choice rule.

OBJECT/WHAT condition conundrums

When coding institutional statements that have more than one animate/inanimate actor that could be placed in the OBJECT category, give preference to animate actors.

Put differently, if there is an animate and an inanimate actor that is being acted upon by the ATTRIBUTE, place the animate actor in the OBJECT field and the INANIMATE actor in the WHAT condition field.

Institutional statements including “of something” or “including something” – placement in OBJECT descriptor/WHAT CONDITION

If the institutional statement includes “of something” segment, check to see if this is a descriptor of the OBJECT. If so, place in OBJECT descriptor field.

Most “for something” segments indicate WHAT conditions and should be placed there.

WHERE condition usage

Although the coding manual indicates that the WHERE condition is a “geographical/contextual qualifier in which the action/directive should take place” (IGT coding manual, p. 16), this has been interpreted to mean a specific, physical location.

In the context of international conservation treaties, use the WHERE condition to code the specific venue where an action should occur. For example, if voting only occurs at the triennial meetings of the Conference of the Parties, code meetings of the COP as the WHERE condition. Another example would be Observers representing Parties who are not Standing Committee members who are allowed to participate in Standing Committee meetings. Code “in Standing Committee meetings” as WHERE condition.

Unusual DEONTICS

The Whaling Convention Rules of Procedure includes DEONTICS that are normally not found in other treaty texts. For example:

“Exceptions to the rule can be granted by the Chair of the Committee where there are exceptional extenuating circumstances.”

From a syntax perspective, “can” is a DEONTIC. However, since it is not used frequently, and not included as an indicator of the legally binding nature of a statement by legal scholars, the DEONTIC should be modified to “may”. So, the above statement would be coded:

Chair [ATTRIBUTE] [may] [IMPLIED DEONTIC] grant [AIM] exceptions [OBJECT] to the rule [OBJECT DESCRIPTOR] where there are extenuating circumstances [WHEN CONDITION].

RULE TYPOLOGY CODING

General

Only code one rule typology per institutional statement. If more than two rule typologies could be applied to a given institutional statement, use the ranking order outlined on p. 7 (1c) of the *Coding Guidelines* to determine which of the two rules rank higher. Then apply the rule typology code that ranks the highest.

For example, if an institutional statement could be coded both as boundary and aggregation, the code you would apply is “Boundary” because it ranks higher than aggregation in the ordered list.

Boundary-Procedural rules

In the treaty context, entering a reservation is considered a boundary-procedural rule because it “delineates requirements for entry into a position” (IGT coding manual, p. 19) in that entering a reservation changes the status of the country entering a reservation to one of non-Party with regard to the species they are entering reservations on.

Aggregation rules

Code aggregation rules when the AIM of the institutional statement is:

1. Adopt (resolutions, rules, etc.)
2. Vote (motions, amendments, etc.)
3. Cooperate (with other Parties, NGOs, IGOs, etc.)
4. Participate or right to participate (in meetings, forums, working groups)
5. Elect (chair, vice-chair, Bureau members, etc.)

Code aggregation rules when there is evidence that:

- Two or more actors are required to cooperate or decide jointly. This can be determined by the fact that the institutional statement outlines more than one actor in the ATTRIBUTE or OBJECT fields and the statement indicates that these actors need to do something in collaboration, cooperation or jointly.
- If a treaty governance body is deciding, adopting, or rejecting something, by virtue of the process (individual Party representatives agreeing or voting on whether this action should occur), these actions should also be coded as aggregation rules.

- There is a HOW condition that states that an action needs to happen “by mutual consent” or “with the approval of the COP”, etc.

Information rules

Information rules are institutional statements that outline permitted, obliged or prohibited channels of communication, how the information is to flow, to whom, and when. They may also indicate the form that the information is to take (Coding manual 2018).

In the context of treaty formal rules, also code as information rules statements indicating:

- Receiving or providing advice
- Notifying someone of something
- Reporting on something
- Statements that communicate what is to be communicated (this is in contrast to the instructions in the IGT coding manual)
- “have the right to speak” – which in most cases is coded “ATTRIBUTE may speak” –should also be coded as information rule.
- A Contracting Party furnishing the name of a delegate/Commissioner to the Secretariat
- The provisioning of translation services (verbal and written)

Payoff rules

Payoff rules assign external awards or sanctions to actors in relation to distinct actions taken or not taken. Statements that allocate costs or benefits should also be coded as payoff rules.

The following are examples of institutional statements coded as payoff rules:

“...forbidding/prohibiting factory ships from whaling or taking whales...”

Scope rules

Statements that include AIMS, such as:

- “encourage” to do something
- “might submit”
- “endeavor to take action”
- “ensure”

code as scope rules since these statements are likely outlining required, desired, or prohibited outcomes.

LEVELS OF ANALYSIS

General overview of collective choice/operational level of analysis, take from David Carter, IUPI paper (2017):

Differentiating choice and authority helps to address this threat by adding a nuanced understanding to how discretionary rules differ between collective choice and operational situations (Table 2).^{vii} By definition, collective choice rules structure collective choice processes, such as making, changing, and enforcing rules (Ostrom, 2005). These rules establish authority, defined as “the power or right to give orders, make decisions, and enforce obedience.”^{viii} Operational rules, in contrast, structure operational situations - “the world of action” (Kiser & Ostrom, 1982). At the operational level, discretion is limited to choice, defined as “making a decision when faced with two or more possibilities.”

Table 2. Differentiating discretion across levels of analysis.

Level of analysis	Type of discretion	Processes	Output
<i>Collective choice</i>	Authority	Rule-making, changing, and enforcing	Decisions that influence the choices of others
<i>Operational</i>	Choice	Decisions resulting in actions	Actions

Collective choice level

It can be helpful when reviewing an institutional statement to think about whether the statement outlines an activity that generates a constraint in the form of a rule or process that will affect the decisions/choices of others at the operational level.

For example:

All monetary contributions shall be paid in freely convertible currency. (CMS Resolution 5.7)

This statement regulates behavior directly. The type of discretion is a choice (you can follow the rule or not) – decision resulting in action. This is coded at the operational level of analysis.

Versus

Donors which are not governmental institutions of Parties or non-Parties to the Convention must be approved as such by the Standing Committee before their contributions are accepted by the Secretariat. (CMS Resolution 5.7)

This statement generates a constraint in the form of a process. Specifically, NGO donors must first be approved by the Standing Committee before they can donate money. Type of discretion is authority, and it is a rule-making process leading to an output that will influence the decision/choice of others; namely the Secretariat's ability to accept donations from NGOs is constrained by an approval requirement.

Constitutional level

Although rare, they might occur in treaty institutional statements. Constitutional level institutional statements first affect collective choice activities by determining who is eligible to be a participant and the rules to be used in crafting the set of collective-choice rules that then, in turn, affect operational rules (Ostrom 2005, p. 58).

Example of constitutional level rule:

The Secretary shall establish an agricultural advisory committee that can mandate national organic food standards.

Most constitutional level institutional statements, like the one above, are constitutive rules.

MISCELLANEOUS

Parsing institutional statements

Generally formal texts are parsed into institutional statements based on the identification of deontics and aims in the text. Multiple AIMS may be grouped into one institutional statement if the ATTRIBUTE and OBJECT are identical.

Multiple DEONTICS in an institutional statement generally means that the statement needs to be further broken down and coded by DEONTIC. However, as the Whaling Convention Schedule and Rules of Procedure outline, sometimes multiple DEONTICS cannot be split.

See, for example, this statement:

If it appears that the maximum catches of whales permitted by paragraph 11 may be reached before 7 April of any year, the Secretary to the International Whaling Commission shall determine, on the basis of the data provided, the date on which the

maximum catch of each of these species shall be deemed to have been reached. (Whaling Convention Schedule)

Here, it is important to reflect on the purpose of the DEONTIC versus the function of the DEONTIC. The purpose of the DEONTIC is to outline the legal power or prescriptive/nonprescriptive nature of the statement. However, in practice, as the above statement reflects, the DEONTIC can also have a function, i.e., it can be used in a non-prescriptive manner. It's syntactic function is then more a feature of the writing style and very much dependent on the context within which the statement is embedded.

The second DEONTIC in the above statement then, from a syntactic perspective, represents a limiting condition on the action to be taken by the Secretary. Accordingly, the statement is coded as one with two DEONTICs as outlined below.

Secretary [ATTRIBUTE] to the International Whaling Commission [ATTRIBUTE DESCRIPTOR] shall [DEONTIC] determine [AIM] the date on which the maximum catch of each of these species shall be deemed to have been reached [WHAT CONDITION] on the basis of the data provided [HOW CONDITION] If it appears that the maximum catches of whales permitted by paragraph 11 may be reached before 7 April of any year [WHEN CONDITION]

APPENDIX H
REGULATORY RULE TYPOLOGIES

Rule typology (horizontal rule structure)

Dissecting the regulatory rule structure of the four treaties has rendered insights into the individual building blocks of the four global conservation SES controllers, K_t , including their syntactic composition, deontic operators, and conditions. However, more information is needed to determine how these components combine/interact to generate policy processes.

Analyzing rules *horizontally* means assessing individual institutional statements by their AIM to determine the applicable rule typology. This “allows rules to be classified by the part of the relevant action situation that is most directly affected” (Ostrom, 2005, p. 187). Figure 8 focuses in on the action situation part of the IAD Framework to outline its relevant components and the rule classes governing the same. In the treaty context, the action situation could be a meeting of the Conference of the Parties where state actors are assigned positions, e.g. delegate, Bureau member, or Committee chair, and, based on the position, are assigned duties, actions, and responsibilities. These positions, actors, and actions are governed by position, boundary, and choice rules. The potential outcomes from the decisions made and actions taken will be influenced by the information and control that the actor possesses, as well as the net costs and benefits derived that make the actor more or less inclined to pursue the action. Finally, scope rules influence potential outcomes by defining a particular goal that a specific action is to achieve.

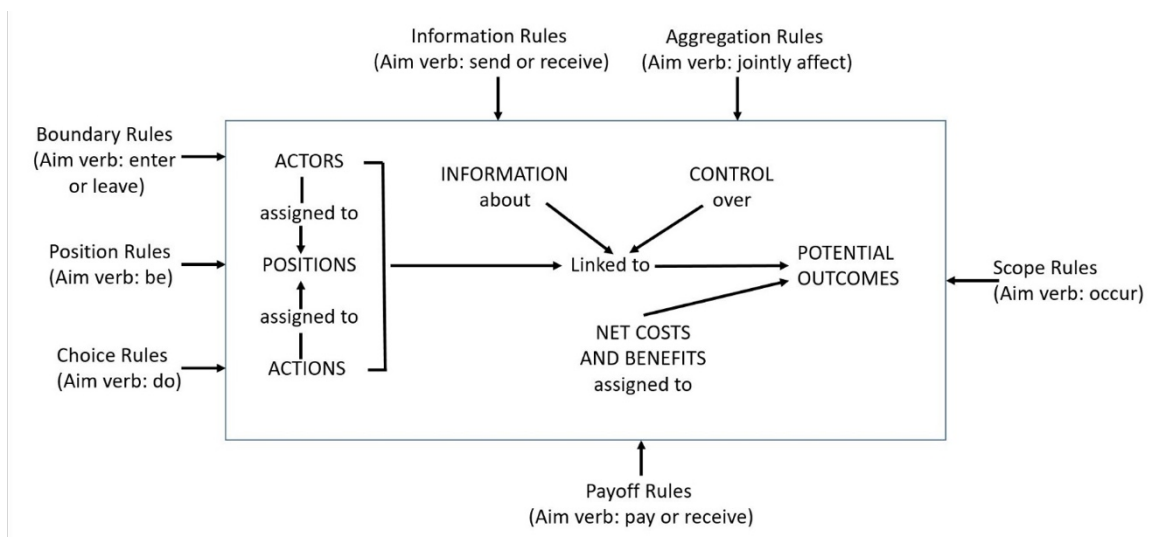


Figure 8: Analyzing rule structures horizontally by rule typology in an action situation, including matching AIM verbs (adapted from (Ostrom, 2005, p. 189). Horizontal rule classification by typology applies to the analysis of rules-in-form and rules-in-use.

The AIM verbs assigned to the individual rule classes outlined in Figure 8 are “basic verbs” designed to “assist in sorting out the various types of rules” (Ostrom, 2005, p. 190). When coding institutional statements, it was important to review the specific AIM used in individual statements, and then match it to the basic verb it most likely corresponded to. Doing so was not always intuitive and required the creation of a set of verbs associated with the basic AIM verbs to facilitate consistent coding across documents (see supplemental treaty coding guidelines in Appendix G).

Watered-down AIMs also influenced rule typology identification. For example, in the IWC Rules of Procedure: “the Contracting Governments “should endeavor to submit their comments on proposals to the Secretariat at least 30 days in advance of a meeting” (IWC, 2018b Rules of Procedure, Rule J(4)). Here, the specific AIM “submit” corresponds well to the basic AIM “send” and is indicative of an information rule.

However, adding the compound AIM “endeavor to” the verb “submit” changes the rule typology from a recommended action to a desired outcome, i.e., from an information to a scope rule.

The Data Table (Appendix E) (columns X-AD) outlines the number of coded institutional statements by rule typology (or class), treaty regime, and document; column AE provides the total rule typology by legal text. Rows 90-101 provide the total number/percentage by treaty regime. Again, the occurrence of rule typologies among the treaty regimes was very consistent with position rules being the least, and choice rules the most frequently coded rule typologies. The main outlier among rule typologies was the IWC which exhibited an unusually high percentage of payoff rules (15%) in comparison to the other three treaties.



Figure 9A-D: Pie charts depicting the rounded percentage distribution of the regulatory rule typology by treaty regime. Rule typology distribution is again very similar with the IWC (Fig. 9A) and CMS (Fig. 9C) rule structures focusing less on aggregation rules than CITES (Fig. 9B) and CBD (Fig. 9D). Payoff rules however are more prevalent in the IWC.

Position rules (Basic AIM verb: “be” | Regulated component: positions)

Position rules were the least frequently coded rule typology across all four treaty regimes with the highest percentage coded in the IWC and CMS (2% each), followed by CITES and CBD with 1% each (Fig. 9A-D). Although rare, position rules are foundational to the structure of an action situation since they establish the set of positions/entities “that are to be filled with participants... who are assigned specific action sets at junctures in a decision process” (Ostrom, 2005, p. 193). Position rules link

participants with specific authorized actions, e.g., the Conference of the Parties is established as the governing body of the CMS, CBD, and CITES. As such, the COP has the authority to jointly make decisions related to international conservation efforts and to create new positions/entities, such as committees and sub-committees with their own separate action situations, positions and authority. Aside from identifying the roles to be filled, position rules also outline the “absolute, minimum or maximum number of individuals that can occupy a position” (Basurto et al., 2018, p. 19) (Appendix C).

Position rules created in the IWC include the position of whaling inspectors and independent observers on factory ships and whale catchers; the establishment of the Animals and Plants Committees within CITES; a President of the Bureau who assumes the governing function of the Conference of the Parties intersessionally within the CBD; and the establishment of a Credentials Committee within CMS. Since position rules often create important entities within the treaties, they are mainly found in the foundational documents, like the treaty texts and the rules of procedure.

Boundary rules (Basic AIM verbs: “enter” or “leave” | Regulated component: participant)

Boundary rules detail “who is eligible to enter a particular position, as well as the process that determines *how* eligible individuals may/must enter these positions; and how individuals may/must leave positions” (Ostrom, 2005, p. 194). As such, boundary rules have a gatekeeper function that, ideally, ensures that only properly qualified individuals

can access crucial positions and that, through carefully crafted entry requirements, participants are given equal footing and say in decision-making processes. The same can be said for proper exit requirements that should be designed to prevent power grabs and allow avenues to fairly, quickly, and effectively remove corrupt or incompetent individuals from their positions. The proper balance between position and boundary rules is, therefore, a useful tool to ensure equitable governance mechanisms.

Since they provide another core aspect of institutional design, one would again expect boundary rules to be prevalent in the foundational documents which, indeed, is the case in all four treaties (Data Table, Appendix E). CITES also has a high number of boundary rules in Resolution 18.2 (CITES, 2019b Res. Conf. 18.2) which outlines the Conference of the Parties' recommendations for the establishment of committees. CMS's coding reflected a high number of boundary rules within Resolutions providing guidance to its Standing Committee and Scientific Council where they, among others, outline qualifications for membership to the Sessional Committee of the Scientific Council that deals with conservation issues that emerge intersessionally.

Institutional statements outlining procedures on filing reservations, which represent opt-out clauses for Parties to circumvent controversial species' listings, were also coded as boundary rules. Since entering a reservation changes the status of a Party to a non-Party with regard to the species that is under reservation, filing a reservation effectively "delineates the requirement for [exit]" (Basurto et al., 2018, p. 19). For example, following the 18th meeting of the Conference of the Parties of CITES, eight

African Parties, including Botswana, Namibia, South Africa, and Zimbabwe filed reservations against the Appendix II listing of *Giraffa camelopardalis* (CITES, 2019a). This means that “[u]ntil such reservation is withdrawn the[se] Part[ies] shall be treated as a State not a Party to the present Convention with respect to trade in the species concerned” (CITES, 1973 Article XV(3)(1)).

Aggregation rules (Basic AIM verb: “jointly affect” | Regulated component: actions)

Aggregation rules outline how participants in a particular action situation are related in decision-making processes. From the perspective of treaties-as-controllers, it is thought that these rules are key indicators of robust institutional design since they outline the web of interactions among actors within the treaty forums. Aggregation rules also help establish equitable decision-making processes within the treaty action arena, and they facilitate cross-treaty collaboration networks. They can be linked to DP8 (nested enterprises) to determine polycentric design features and institutional variety within and across regimes. In short, they represent a key feature in the rule structure of a robust SES controller. It would also facilitate linkage with two other institutional design principles: (1) DP3 –collective choice arrangements which test whether most individuals affected by collective choice and operational rules can participate in modifying them (Ostrom, 1990, 2005; Cox et al., 2010); and (2) DP8—nested enterprises which assesses how governance

structures are nested within multiple governance layers (Ostrom, 1990; Dietz et al., 2003).

Institutional statements were coded as aggregation rules if there was evidence that two or more actors were required to take joint action. Coding guidelines also mandated that any HOW condition outlining involvement by another actor(s) in the decision-making process would trigger coding as an aggregation rule. Additionally, evidence of the following specific AIM verbs in institutional statements triggered coding as an aggregation rule: adopt, vote, cooperate, participate, elect, add, delete, modify (Appendix listings), decide, review. While it may seem that some of these verbs do not naturally align with the aggregation rule basic verb “jointly affect”, context is what matters. The treaties’ decision-making bodies—the Conference of the Parties/Commission—can only make decisions jointly. In the IWC and CITES, such decision-making is conducted mainly by voting. Whereas, CMS (by choice) and CBD (de facto) make decisions by consensus.

If an institutional statement indicated that an entity had a “right to participate” in the meeting or forum, this was coded as an aggregation rule as well. Even though the right of NGOs to participate in a forum does not equate to voting rights, being able to participate in the forum facilitates information sharing and lobbying that can indirectly influence country delegate’s decision-making.

A review of the coded data shows that aggregation rules had the second highest occurrence rate (in percent) within all coded treaty texts (Data Table, Appendix E).

CITES reflected the highest percentage of aggregation rules (31%) followed by CBD (30%), CMS (23%), and the IWC (22%) (Fig. 9A-D). Based on this data, it seems that within the IWC and CMS, there is not as much of an emphasis on establishing joint decision-making processes as there appears to be in CITES and CBD. This is an interesting and unexpected finding. First, one would expect to see more aggregation rules in treaties that mandate majority voting rules, because such voting mechanisms require more specificity. While CITES follows that pattern, the IWC and CMS do not. And CBD which is operating by de facto consensus, because the Parties to this date have been unable to agree on a particular voting structure, has the second-highest percentage of aggregation rules.

Second, it was also presumed that a more regulatory treaty regime, i.e., one containing a higher percentage of obligatory commitments (see Table 2) would include a higher percentage of aggregation rules that aid in clarifying how these commitments are distributed among actors, e.g., who shall report to whom, and who is engaged in joint action in noncompliance instances. Therefore, it was expected that the percentage of aggregation rules in CITES and the IWC would be higher, and CBD would exhibit the lowest. Yet, based on the coding, the IWC and the CBD perform contrary to those assumptions.

When isolating the key decision-making ATTRIBUTE in each treaty (i.e., Conference of the Parties/Commission and Bureau/Standing Committee) and focusing on aggregation rules indicative of joint decision-making through voting mechanisms; i.e.,

institutional statements with AIMS “ adopt, decide, vote, agree upon, amend, decide, delegate, delete, determine, elect, establish”, the treaties perform even more confusingly with CMS indicating the highest percentage of aggregation rules outlining decision-making processes for their governing bodies (35.86%), and CITES performing lowest (10.12%) (Table 4).

Table 4 does reflect CITES and to a certain degree the IWC—the two “strongly” regulatory treaties—performing somewhat as expected with regard to aggregation rules related to non-voting joint decision-making among *other* actors/ATTRIBUTES (row 4, Table 4). However, CBD still contains a higher percentage of aggregation rules governing joint decision-making among *other* actors than the IWC. At 64.14%, CMS has the lowest percentage of aggregation rules devoted to the joint decision-making context of *other* actors.

Aggregation rules	ICRW		CITES		CMS		CBD	
Total number of institutional statements coded as aggregation	171		336		145		259	
Aggregation rules (AIM: elect, decide, etc. & ATTRIBUTE: Commission/Bureau COP/Standing Committee) [number/percentage of total]	45	26.32%	34	10.12%	52	35.86%	59	22.78%
Aggregation rules other AIMS/other ATTRIBUTES	126	73.68%	302	89.88%	93	64.14%	200	77.22%

Table 4: Values represent a parsing of the total number of institutional statements in each treaty forum that were coded as aggregation rules. Numbers reflected in row 2/columns 2-5 correspond with the values listed in column Z/rows 91-94 of the Data Table (Appendix E). This parsing of aggregation rules into aggregation rules indicating joint decision-making through voting mechanisms by the governing actor (Commission/COP and Bureau/Standing committee) counter-intuitively suggests that CMS has a high number of aggregation rules governing joint decision-making of its governing body, followed by the IWC and CBD. CITES appears to only devote a little over 10% of its aggregation rules to governing the joint decision-making web as far as voting requirements are concerned.

In combination, these findings seem to indicate that the IWC, despite its “strong” regulatory deontic structure, does not have the matching rule structure to outline joint decision-making action within the forum. An independent governance review performed

on behalf of the IWC confirmed as much (Prip et al., 2018). In it the authors suggested, among other things, that the Commission should “clarify the role and functions of the Bureau” (the intersessional decision-making body); include more effective involvement of States in intersessional decision-making, particularly developing States; and ensure that “Commission decisions are prioritized and taken up by subsidiary bodies with a clear follow-up mechanism in place” (Prip et al., 2018, pp. 6, 17).

The fact that CITES only includes a small percentage of aggregation rules aimed at joint decision-making of its COP and Standing Committee, as will be explained more fully in the next section on levels of analysis, is due in part because a significant portion of their institutional statements address the ATTRIBUTE “Parties” when referring to joint action to be taken by the COP. Additionally, many of CITES’ joint decision-making addresses national level action through the Parties’ Management and Scientific Authorities. This is confirmed by the high percentage of rules at the operational level of analysis (53%). That pattern holds true for the CBD, as well. It has the highest percentage of operational rules (Data Table, column AH, row 101; Appendix E), and the second-lowest percentage of aggregation rules governing joint decision-making through voting mechanisms of its governing body (Table 4) indicating decision-making mechanisms are deferred to the national level.

Payoff rules (Basic AIM verbs: “pay” or “receive” | Regulated component: costs/benefits)

Payoff rules “assign external rewards or sanctions to particular actions that have been taken or to particular readings on outcome state variables” (Ostrom, 2005, p. 207). Specific AIMs that triggered coding as a payoff rule in the treaty documents were “provide” (e.g. providing funding), “charge”, “contribute”, or “refund”. Much like the other rule typologies, the context of the institutional statement mattered, and often coding for payoff rules was triggered by conditions. For example: “[Commission] shall implement a moratorium on the taking, killing or treating of whales... by factory ships” (IWC, 2018c (10)(d)); or “Parties should advocate sanctions for infringements that are appropriate to their nature and gravity” (CITES, 2000 (Rev. 2019) Conf. Res. 11.3 (14)(b)). As these examples reveal, payoff rules at the treaty level generally dictate the creation of rules by the Parties to sanction activities occurring at the operational level (implementation). More frequently, payoff rules dealt with financing issues, such as Party contributions to the Conventions, reimbursement and financial support for developing country delegates, and national conservation measures. Only very few payoff rules outlined sanctioning of Parties for noncompliance with their obligations. CMS’s Resolution 12.9 which established a review mechanism is a rare exception which requires the Standing Committee, “following the identification of an implementation matter” to choose between a number of options, including issuing a written caution requesting Party response and offering assistance, or issuing a warning letter to the Party in

noncompliance (CMS, 2017b Resolution 12.9 (F)(6)(d) or (f)). In contrast, CITES' resolution on compliance and enforcement does not address Party noncompliance as a payoff rule.

The Data Table (Appendix E) shows the highest percentage of payoff rules in the IWC (15%), followed by CBD (5%), and CMS (4%). CITES had the lowest occurrence of payoff rules at 3% of all coded institutional statements within its examined texts (Fig. 9A-D). It was expected that the IWC would have the highest percentage of payoff rules given that the structure of its Schedule outlines very specific "fishing" parameters for factory ships and whale catchers. IWC's rules of procedure also include a large number of payoff rules; in contrast to the rules of procedure of the three other U.N. treaties which, but for CITES (one payoff rule), include none. This is likely related to the fact that the IWC rules of procedure include funding mechanism payoff rules which in the other treaties are outlined in separate resolutions.

Reviewing the coded data reflects that many payoff rules are located in resolutions/decisions dealing with financial mechanisms. For example, in CITES, 20 out of 34 payoff rules are located in Resolutions 17.2 Sponsored Delegates Project and 18.1 Financing and costed programme of work for the Secretariat. In CMS, 10 out of 26 payoff rules occur in Resolutions 12.02 Financial and Administrative and 5.7 Guidelines for acceptance of financial contributions). In CBD, 17 out of 44 payoff rules were coded in Decision I/6 Financing and Budget of the Convention, Decision 14/23 Financial mechanism, and Decision VII/18 incentive measures (Data Table, Appendix E).

Initially it was thought that payoff rules may provide the OR ELSE function in these instruments. Indeed, the following institutional statements may substitute as statements that perform OR ELSE functions, although the required action is at the national level. These statements also serve as indicators of the presence of design principle 5 (graduated sanctioning). In CITES, Conf. Resolution 11.3 includes four institutional statements recommending that its Parties “take appropriate measures to penalize such violations [illegal trafficking of wildlife], prosecute those involved in wildlife crime... whenever possible, as well as sanctions for infringements, and reward offers for information on illegal hunting and trafficking of species” (CITES, 2000 (Rev. 2019) Res. Conf. 11.33(14)(a)(v); (14)(b); (15)(h); and (20)). The IWC Schedule includes 21 institutional statements that outline prohibited whaling activities. The ICRW treaty also includes two institutional statements mandating that “Governments shall institute prosecution for infractions” and that “owners of whale catchers shall not pay gunners and crews bonus or other remuneration for whales taken illegally” (ICRW, 1946 Article IX(2) and (3)).

Information rules (Basic AIM verbs: “send” or “receive” |
Regulated component: information)

Information rules are crucial to the functioning of any action situation. They provide insights on the information available to the actors with regard to the “overall structure of the [action] situation”, the status of the resource that is being governed, the

status of participants' past and present moves or decision-making context, as well as actors' own past decision-making context (Ostrom, 2005, p. 206). Information on past actions is particularly important because it facilitates knowledge as to who is trustworthy and who is not (Ostrom, 2005). Information rules measure the channels of information flow, the frequency and accuracy of required and permitted communication, and what type of information is required, permitted, or prohibited from being communicated (Basurto et al., 2018) (Appendix C). For example, the IWC has rules that mandate that scientific documents/papers submitted to the Scientific Committee or Commission by non-members of the Committee, including observers, "shall not contain disrespectful statements to any participating person, organisation or government" (IWC, 2018b (4)(e)).

Aside from the basic AIMs "send" and "receive", institutional statements that contained specific AIM verbs, such as: "receive or provide [advice]", "notify", "report" were also coded as information rules. Additionally, statements that indicated a "right to speak" [coded as ATTRIBUTE [may] speak] were coded as information rules. Since information rules capture communication channels, it was important to include "right to speak" statements because they outline who has an indirect voice in the treaty forum. Only country delegates may vote and have direct decision-making in governance processes. However, observations and the perception of interview participants indicated that nongovernmental organizations (NGOs) often have indirect influence on those processes. In order to capture this, any statements giving the right to speak to an entity were coded as information rules. A distinction was made between the right to speak

which was coded as an information rule versus the right to participate in a forum which was coded as aggregation. The distinction was driven by the AIM “participate” (implies joint decision-making context = aggregation rule) versus “speak” (implies communication = information rule).

Institutional statements that indicated “sharing experiences”, explaining or identifying something, monitoring, “inviting the attention”, or maintaining and organizing data pertaining to treaty issues (species population data, harvesting data, illegal trade data, etc.) were coded as information rules as they serve to communicate and inform participants in the action situations.

Information rules were coded in almost all the treaty texts. The IWC had the highest percentage of information rules (27% of all coded statements), followed by CITES (25%), CMS (23%), and CBD (20%) (Fig. 9A-D). Again, this is interesting because it links the strongly regulatory treaties with a larger information network. It also provides insights on monitoring mechanisms within the regimes which, in turn, links with the monitoring DP (DP4).

Choice rules (Basic AIM verb: “do” | Regulated component: control)

As the basic AIM “do” associated with choice rules indicates, choice rules take on a catch-all category within the IAD rule typology. Any institutional statement that involves a permitted, required, or prohibited action, as outlined by its AIM, that cannot be

classified as position, boundary, aggregation, information or payoff rule, will be coded as a choice rule (Ostrom, 2005; Basurto et al., 2018).

The Data Table (Appendix E) outlines a fairly equal distribution of choice rules within the coded formal texts for each of the three U.N. conventions: CITES (32%), CMS (35%), and CBD (36%) (Fig. 9A-D). In contrast, the IWC has the lowest number and percentage of choice rules at 204 institutional statements representing 27% of all coded regulatory statements. This suggests that choice rules may be following the “evolutionary pattern” hypothesized for the treaty deontic structure in that the number of choice rules seems to increase in successive instruments. Further investigation is necessary, however, to determine whether this pattern is related to the fact that older treaties are syntactically more specific, thus, reducing the need to code choice rules, or whether another factor is at play.

Reviewing the choice rules coded in the formal treaty rules, it is evident that some of the specific AIMs associated with this rule typology are identical to those used in other rule classes. For example, “Parties shall adopt measures for the ex-situ conservation of components of biological diversity” (CBD, 1992). Here, the specific AIM “adopt” would normally link to an aggregation rule, as outlined earlier in this section. However, again, context matters. This institutional statement is directed at the ATTRIBUTE CBD Parties who are required to adopt measures within their jurisdictional boundaries. As such, this institutional statement does not qualify as a joint action, rather it is an individual action that each Party is required to take. The specific AIM “adopt” therefore can be linked to

two different regulated components: (1) a joint “action” or decision-making context, like voting which makes it an aggregation rule; or (2) a “control” element in which the actor is required, permitted, or prohibited to assert authority or otherwise control a certain decision-making context, e.g., adopting domestic conservation measures. Linking the rule typology to the AIM is, thus, useful but coding should always consider the context in which the statement is embedded.

Scope rules (Basic AIM verb: “occur” | Regulated component: outcome)

Scope rules “identify required, desired, or prohibited outcomes” (Basurto, et al. 2018, p. 21) (Appendix C) by outlining performance or outcome measures/targets that actors have to meet. Actors can then choose what actions to take in order to meet these targets (Ostrom, 2005). In many ways, scope rules represent the twin catch-all category to choice rules in that if the action/decision-making outlined in the AIM or elsewhere in a particular institutional statement (1) indicates an outcome, not an action; and (2) cannot be coded as position, boundary, aggregation, payoff, or information, then it is a scope rule (Basurto et al., 2018).

Examples of scope rules in the treaty context include: “Secretariat should ensure robust contracts are in place for all work being undertaken for the Commission” ((IWC, 2018a). In the CITES, “Member [elected to the Animals or Plants Committee] should endeavor to base his/her judgment and opinion upon an objective scientific assessment of

the available evidence” (CITES, 2019b). This particular recommendation also exists in the where Scientific Councillors “should endeavour to base their judgements and opinions upon an objective, scientific assessment of the best available evidence” (CMS, 2017a). Finally, the CBD treaty contains numerous scope rule recommendations asking its Contracting Parties to promote various activities, such as the “recovery of threatened species... through the development and implementation of plans or other management strategies”; international technical and scientific cooperation, etc. (CBD, 1992).

Within the treaty context, statements that included AIMs such as: “encourage”, “might submit”, “endeavor to take action”, “ensure”, “strive to achieve”, and “promote” were coded as scope rules. These particular AIMs are also often indicators of watered-down DEONTICs which can alter the rule typology assigned to an institutional statement. For example, the institutional statement “Party shall conserve migratory species within its boundaries” would be coded as a choice rule. However, “Party shall *endeavor to* conserve migratory species within its boundaries” would be coded as a scope rule since it changes the status of the “shall’ from a mandatory, legally-binding action to a recommended desired outcome leaving it up to the Parties as to what actions to take to advance migratory species conservation.

Much like the choice rules, scope rules seem to follow an evolutionary pattern in which older treaties like the IWC include fewer scope rules (1% of all institutional statements) versus CMS and CBD in which scope rules make up 3% of the coded institutional statements (Fig. 9A-D). Here, however, the contributing factor may be

linked to the watered-down effect on the DEONTIC structure of many of the scope AIMS. Table 2 outlined that treaty regimes that imposed a greater degree of legal commitment on their Parties, i.e., CITES and IWC, contained fewer watered-down DEONTICS; 0.61% and 1.36% respectively. In contrast, watered down DEONTICS represented 3.62% and 6.67% of all institutional statements within CMS and CBD, respectively, which are also the treaties with the highest percentage of scope rules. While these watered down AIMS do not entirely map onto the scope rule configuration, a review of the coded institutional statements reveals many such instances.

Final thoughts on rule typology

It was theorized based on early coding results that, except for choice rules which have a special catch-all function, information rules would be the most prevalent rule typology within the four treaty forums. However, aggregation rules play a slightly larger role both by number of coded institutional statements (911 aggregation versus 803 information total across all four regimes) and percentage distribution (Data Table, Appendix E) (Fig. 9A-D). From a treaty-as-controller perspective, this means that treaty institutional design appears to rely both on aggregation and information rule structures with an emphasis on collaboration/joint decision-making over information/communication rules. The exception to this design is the IWC where aggregation rules take on a smaller role in favor of payoff rules. At 15% of all coded institutional statements, payoff rules in the IWC occur at a much higher rate than in any

of the other treaty forums (Fig. 9A). Future research into whether these differences can be traced to the IWC's fisheries roots, its age, or the fact that it is a non-U.N. convention would be useful.

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APPENDIX I

CONSTITUTIVE RULES SYNTAX WITH EXAMPLES

Constitutive rule typology developed as part of this research project (sorted alphabetically). Table is organized by typology type (column 1), corresponding syntax (column 2), and coding examples (column 3). There are four typology sources which are listed under the typology name: (1) adapted from Ceci, et al. 2018; (2) inspired by Biagioli 2009 (qtd. in Ceci et al. 2018); (3) linked to IG position rule; and new (newly defined typology derived from the coded data).

Typology	Syntax	Coding example
Amendment (adapted from Ceci, et al 2018)	New text (Token X) be amended/be deleted/substitutes for/be added to (counts as) old text (Type Y) to an existing legal effect/state of affairs/regulatory rules that is to be replaced/repealed/modified(Context C)	Resolution Conf. 18.2 (Token X) repeals (counts as) Resolution Conf. 9.1– Establishment of committees and Resolution Conf. 11.1 (Rev. CoP17) on Establishment of committees (Type Y) within the CITES Convention (Context C)
Application (inspired by Biagioli 2009)	Rule/set of rules/laws (Token) applies/doesn't apply (counts as) action/mechanism or legal entity (Type Y) legal entity (Object) to which the action/mechanism applies or within the treaty regime (Context C) OR Rule/set of rules/laws (Token) includes/excludes (counts as) governance tool (Type Y) legal entity (Object) affected by inclusion/exclusion (Context C)	This Convention (Token X) includes (counts as) the Schedule attached thereto which forms an integral part thereof [governance tool] (Type Y) [and applies to all member governments] (Context C). Terms of Reference [for the Scientific Council contained in the Annex to this Resolution] (Token X) apply (counts as) to the Scientific Council of CMS and, mutatis mutandis, the Sessional Committee of the Scientific Council, unless stated otherwise in the Terms of Reference (Type Y) [within the CMS Convention] (Context C)

<p>Commencement (adapted from Ceci, et al 2018)</p>	<p>Law/legal regime/regulation/rule (Token X) comes into force/no longer is in force/starts/ends/is adopted (counts as) specific date or description of starting/ending conditions (Type Y). (Declaratory speech act)</p> <p>OR</p> <p>[It is necessary that] law/regulation/rule/term (Token X) comes into force/no longer is in force/starts/ends/begins/expires (counts as) specific date or description of starting/ending conditions (Type Y) for legal entity or legal source document (Context C).</p> <p>OR</p> <p>Resolution/decision (Token X) is adopted (counts as) month/year (Type Y) by Conference of the Parties at their meeting (Context C). (Special case)</p>	<p>The present convention (Token X) enters into force (counts as) 90 days after the date of deposit of the tenth instrument of ratification, acceptance, approval or accession, with the Depository Government (Type Y). (Declaratory speech act)</p> <p>[ICRW] Convention (Token X) shall enter into force (counts as) on the date of the deposit of its instrument of ratification or the receipt of its notification of adherence (Type Y) with respect to each Government which subsequently ratifies or adheres to [the International Convention on the Regulation of Whaling] (Context C).</p> <p>[UNEP/CMS/Resolution 3.1 (Rev.COP12)] (Token X) is adopted (counts as) [in] October 2017 (Type Y) by the Conference of the Parties at its 12th meeting in Manila (Context C).</p>
<p>Constitutive-Regulatory (Con-Reg) [NEW]</p>	<p>Object/information/condition [TOKEN X] should be/shall be/may be/must be [deontic operator] plus Aim [COUNTS AS] demonstrate/considered/acted upon in a legal action/document [TYPE Y] within treaty rule/regime/regulation [CONTEXT C].</p>	<p>English, French and Spanish [TOKEN X] shall be [COUNTS AS] the official and working languages of the meeting [TYPE Y] within the CMS Convention [CONTEXT C].</p>
<p>Definition (adapted from Ceci, et al 2018)</p>	<p>Word/phrase/symbol (Token X) means/is defined as (counts as) statement of meaning (Type Y) in norm/legal text (Context C).</p>	<p>Migratory species (Token X) are defined (counts as) as species that are migratory due to the predictability and cyclicity of their movements (Type Y) within the context of CMS (Context C).</p>
<p>Ethical value [NEW]</p>	<p>Object or Attribute (Token X) aims to advance / aims / advances / accepts / recognize / acknowledge (counts as) expression of an ethical world view (Type Y) in specified governance context (Context C).</p>	<p>[CMS] Parties (Token X) acknowledge (counts as) the need to take action to avoid any migratory species becoming endangered. (Type Y) within CMS and member countries national jurisdictional boundaries (Context C).</p>

<p>Party-to-the-Law (adapted from Ceci, et al 2018)</p>	<p>[It is necessary that] Attribute/Position (Token X) shall be/may be/represents (counts as) a function (Type Y) within treaty rule/regulation/treaty regime (Context C)</p>	<p>[It is necessary that] The Conference of the Parties (Token X) shall be (counts as) the decision-making organ (Type Y) of the CMS treaty (Context C).</p>
<p>Position (linked to regulatory position rule typology)</p>	<p>[It is necessary that] Attribute/Object (Token X) shall be/establishes (counts as) addressee/position (Type Y) treaty rule/regulation/treaty regime (Context C)</p> <p>OR</p> <p>Addressee (Token X) shall be/is (counts as) a position (Type Y) in treaty regime (Context C).</p> <p>OR</p> <p>[It is necessary that] Position (Token X) is composed of (counts as) X number of individuals (Type Y) within legal regime (context C).</p>	<p>Conference of the Parties to the Convention (Token X) establishes (counts as) the Standing Committee of the Conference of the Parties (Type Y) [within the context of the CITES Convention] (Context C)</p> <p>The Chair of each regional session (Token X) should be (counts as) the representative of a regional Member of the Standing Committee (Type Y) [within the context of the CITES Convention] (Context C).</p> <p>[CITES] Standing Committee (Token X) is composed of (counts as) regional Members that are Parties elected from each of the six major geographic regions consisting of Africa, Asia, Central and South America and the Caribbean, Europe, North America and Oceania, according to the following criteria... (Type Y) [within the context of the CITES Convention] (context C).</p>
<p>Power (inspired by Biagioli 2009)</p>	<p>Legal entity/object (Token X) conveys/transfers/provides (counts as) responsibility/benefit (Type Y) to another target object/entity/date (Context C)</p> <p>OR</p> <p>Legal entity/object (Token X) shall have/exercise the right (counts as) to some legal responsibility/benefit or of some other legal entity (Type Y) within the legal regime/specific rule/regulation (Context C)</p>	<p>That Commissioner (Token X) assumes (counts as) all the powers of a Commissioner appointed under A.1., including that of issuing credentials for his/her delegation (Type Y) until the end of the meeting [for which he/she was appointed] (Context C)</p> <p>The CITES Parties (Token X) shall have the right (counts as) to adopt: (a) stricter domestic measures regarding the conditions for trade, taking, possession or transport of specimens of species included in Appendices I, II and III, or the complete prohibition thereof; or (b)</p>

		domestic measures restricting or prohibiting trade, taking, possession or transport of species not included in Appendix I, II or III (Type Y) [within their national jurisdictional boundaries] (Context C).
Procedural (aspirational) [NEW]	[It is necessary that] object/legal entity (Token X) recognizes or acknowledges a need / desires to ensure (counts as) some procedural governance aspect (Type Y) as guidance for creation of legal document/subsequent action within which procedure is to be embedded (Context C)	[Conference of the Parties] (Token X) recognizes the need (counts as) for the consistent use of terminology for decision-making within the Convention (Type Y) [as guidance for the creation of this resolution] (Context C).
Relative necessity (adapted from Ceci, et al 2018)	[It is necessary that] object/legal entity (Token X) must/shall be deemed/understood to (counts as) restrict or expand jurisdictional reach of addressee/object/criteria/conditions in Context C (Type Y) for target regulatory statement/rule to apply (Context C)	[It is necessary that] Specimens of an animal species included in Appendix I bred in captivity for commercial purposes, or of a plant species included in Appendix I artificially propagated for commercial purposes (Token X) shall be deemed (counts as) to be specimens of species included in Appendix II (Type Y) [under CITES Article VII Exemptions and other special provisions relating to trade] (Context C).
Statement of Fact [NEW]	Legal entity/Object (Token) has reported/completed/made/written (counts as) some report/action/recommendation (Type) to another legal entity/Object (Context C). OR Rule/regulation/resolution (Token) directed (counts as) legal entity to take	[Scientific] Council (Token X) has now reported (counts as) on these matters [guidelines on terms used in the Convention and with regard to the species listed in the Appendices] (Type Y) to the Conference of the Parties (Context C). Resolution 1.4 from its [Conference of the Parties] first meeting (Token X) directed (counts as) the Scientific

	some action (Type Y) for/on behalf of a legal entity (Context C).	Council to formulate guidelines on terms used in the Convention (Type Y) [for the Conference of the Parties] (Context C).
Status (inspired by Biagioli 2009)	<p>Legal entity/legal text/object (Token X) represents/provides/sets out (counts as) condition/state of affairs (Type Y) related to Object/context (Context C)</p> <p>OR</p> <p>Law/rule/regulation/Object (Token X) is recalled/recognized as providing/representing (counts as) a particular status/condition/structure/definition (Type Y) within the context of the Convention/Resolution (Context C).</p>	<p>Majority of [CITES] Parties (Token X) have set out (counts as) that the import of that specimen will not be for purposes detrimental to the survival of the species (Type Y) provided that the export is within the limits set in the quota [provided by the Conference of the Parties] (Context C)</p> <p>Resolution Conf. 8.21 (Rev. CoP16) (Token X) is recalled as requiring (counts as) consultation between proposing States and range States [prior to taking stricter domestic measures] (Type Y) [within the CITES Convention] (Context C).</p>

APPENDIX J

DATA TABLE CONSTITUTIVE RULES]

APPENDIX K
ETHICAL VALUE STATEMENTS: CODING GUIDELINES AND CODED
STATEMENTS]

Ethical value statements: Coding guidelines and coded statements

Categorization by environmental worldview/ethical value was based on whether or not the institutional statement included terminology that indicated a human-centered value system (e.g., terms such as “conservation”, “future generations”, economic value, wise use, sustainability, etc.). The assignment of non-anthropocentric values was fairly liberal. If statements used terminology including “preserve”, or “avoid endangering species”, or any other nonhuman species-centered expression, it was classified as biocentric/preservationist value. The statements that were assessed as ecocentric/nature-oriented philosophies were statements that specifically acknowledged the need to preserve nonhumans and their habitats/ecosystems holistically. There was only one institutional statement that explicitly acknowledged the intrinsic value of nonhumans. It was in the preamble of the CBD (CBD, 1992 Preamble) and included in the biocentric category. Several statements acknowledged multiple values of nonhumans and nature. In those instances, if the listing of values were overwhelmingly human-centered it was grouped in the anthropocentric category, if the number of discreet values listed favored nonhuman rights more, they were grouped into the biocentric category, etc.

ICRW treaty

Future generations
protect all species of whale from further overfishing
whaling properly regulated
increased whale stocks will allow increase in whale captures

Ethical value

anthropocentric
biocentric
anthropocentric
anthropocentric

common interest to achieve optimum level of whale stocks without causing economic or nutritional distress	anthropocentric
make possible orderly development of whaling industry	anthropocentric

Res. 2014-1

purpose of IWC to provide for effective conservation and management of whale stocks	anthropocentric
importance of accommodating the needs of aboriginal people dependent on whales	anthropocentric
objectives of subsistence whaling are ensure that risks of extinction to individual stocks are not seriously increased by subsistence whaling	biocentric
enable aboriginal people to harvest whales in perpetuity at levels appropriate to their cultural and nutritional requirements	anthropocentric
maintain status of stocks at or above level giving highest net recruitment	anthropocentric
highest priority shall be accorded to objective risk of extinction is not seriously increased by subsistence whaling	biocentric

Res. 2014-4

Noting reiterated concerns expressed in relation to the conservation status and increasing threat that various cetacean stocks are facing	biocentric
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CITES treaty

wild fauna and flora are irreplaceable part of the natural systems of the earth	ecocentric
[wild fauna and flora] must be protected for this and generations to come	anthropocentric
conscious of the ever-growing value of wild fauna and flora from aesthetic, scientific, cultural, recreational, and economic points of view	anthropocentric
people and states are the best protectors of their own wild fauna and flora	anthropocentric

Res. 6.7

concern of Parties that stricter domestic measures may have adverse impact on conservation of species concerned in their countries of origin	anthropocentric
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Res. 9.21

recognizing the benefits of use of wildlife anthropocentric
recalling people and states are the best protectors of their own wild fauna and flora anthropocentric

Res. 12.8

intent of Review of Significant Trade is to ensure that trade in Appendix II species is sustainable anthropocentric

Res. 11.3

utmost moral, biological, ecological, and economic interest for all Parties that violations (illegal trade) not re-occur biocentric
in this way the natural heritage of producing countries is damaged ecocentric
economic, social and environmental impacts of illicit trafficking in wildlife anthropocentric

Res. 18.2

importance of maintaining CITES species throughout their range at a level consistent with their role in ecosystems ecocentric

Res. 9.24

avoid utilization incompatible with their survival anthropocentric
importance of the application of the precautionary approach in cases of uncertainty biocentric

CMS treaty

wild animals are irreplaceable part of earth's natural system ecocentric
[wild animals] must be conserved for the good of mankind anthropocentric
each generation holds the resources of earth for future generations anthropocentric
each generation has an obligation to ensure that this legacy is conserved anthropocentric
and where utilized, is used wisely anthropocentric
conscious of evergrowing value of wild animals from environmental, ecological, genetic, scientific, aesthetic, recreational, cultural, educational, social and economic points of view anthropocentric
concerned about species of wild animals that migrate biocentric
states are and must be protectors of migratory species that live within or pass through their national boundaries anthropocentric

Parties acknowledge importance of migratory species being conserved	anthropocentric
range states agree to take action and whenever possible pay special attention to species with unfavorable conservation status	biocentric
states take individual or cooperative steps to conserve species and their habitat	ecocentric
need to take action to avoid species becoming endangered	biocentric
object of each AGREEMENT shall be to restore migratory species to favorable conservation status	biocentric
or to maintain species at favorable conservation status	biocentric
each AGREEMENT should deal with those aspects of conservation and management that serve to achieve that object (favorable conservation status)	biocentric
Res. 9.15	
membership represents the richness and diversity of migratory species within each region	anthropocentric
Res. 11.33	
considering the unique features and phenomenon of migratory species and significance of ecological networks in this regard	ecocentric
considering that a conservation benefit is expected to arise from listing	anthropocentric
CBD treaty	
recognize close and traditional dependence of indigenous and local communities with biological resources	anthropocentric
recognize economic and social development and poverty eradication are first and overriding priorities of developing countries	anthropocentric
conservation and sustainable use of biological diversity is of critical importance to meet food, health, and other needs of growing world population	anthropocentric
conscious of intrinsic value of biological diversity and of the ecological, genetic, social, economic, scientific, educational, cultural, recreational, and aesthetic values of biological diversity	anthropocentric
importance of biological diversity for evolution and for maintaining life sustaining systems of the biosphere	ecocentric
conservation of biological diversity is a common concern of humankind	ecocentric

conservation and sustainable use of biological diversity will strengthen friendly relations among states and contribute to peace	anthropocentric
determined to conserve and sustainably use biological diversity for the benefit of present and future generations	anthropocentric
expectation of a broad range of environmental, economic and social benefits from those investments	anthropocentric
Dec 14/7	
urgent need to reduce biodiversity loss, including preventing extinction of threatened species to improve and sustain their conservation status	biocentric
to restore and safeguard ecosystems that provide essential functions and services, including services related to water, health, livelihoods and well-being	anthropocentric

REFERENCES

Convention on Biological Diversity, (1992). <http://www.cbd.int/convention/text/>

APPENDIX L
CONSTITUTIVE RULE TYPOLOGIES
(DETAILS AND CODING SAMPLES)

Rule typology (horizontal rule structure)

Classifying rules horizontally links institutional statements to action situations via the rule typology they represent and is based on the logic of the IAD framework (Kiser & Ostrom, 1982; Ostrom, 2005, 2011). The idea was to build “a set of nested rule-concepts that facilitate building a cumulative body of theoretically and empirically tested research about human behavior and outcomes in diverse situations” (Ostrom, 2005, p. 186).

Ostrom specifically selected the AIM of the regulatory rule syntax to sort institutional statements into rule classes because such a sorting mechanism would work for most, if not all, relevant rules (including constitutive ones), and because it could also be applied to sort rules across levels of analysis (Ostrom, 2005). This research project has to a certain degree been able to confirm that assertion by using the “COUNTS AS” element to substitute as the AIM of the constitutive rules. However, while it is possible to identify constitutive rule typologies by their “COUNTS AS” features, these features do not directly correspond to the basic AIM verbs. The only exception were position rules which appeared in the treaty texts both as regulatory and constitutive rules. None of the other six regulatory rule typologies/AIMs were useful to the analysis of constitutive rules, hence, the need to utilize the rule typologies introduced in this paper.

Anchoring the rule typology identification to the COUNTS AS feature was, however, useful to improve rule typology identification and to begin linking the constitutive to the regulatory rule typologies and action situations. Since constitutive rules “indirectly regulate behavior through the [regulatory] rules to which they are

related” (Hindriks, 2009, p. 265) being able to do so also facilitated the examination of fit between the constitutive and regulatory rules to determine how one supports the other, or not, and how that may affect governance robustness.

Table 3 outlines the 13 rule typologies and their associated “COUNTS AS” features grouped into the four functions that define and characterize constitutive rules and provide the means by which decisions are to be made:

1. Aspirational (i.e., how the world ought to be) (values, procedures, power rules)
2. New contextual criteria (i.e., create and define new concepts, positions, and functions) (definition, position, party-to-the law rules)
3. Existing contextual criteria (i.e., precedents in the form of background information on existing work/conditions; existing rules and state of affairs; existing language and deposit requirements) (statement of fact, status, constitutive-regulatory rules)
4. Constitutive boundary conditions (i.e., begin/end of legal effectiveness; old rule to new rule, rule partitioning, and preconditions for rules to apply) (commencement, amendment, application, relative necessity rules).

This section will provide a brief overview of each constitutive group and rule typology (see Appendix L for details on these rule typologies and examples from the treaty texts).

Functional grouping	Constitutive rule typology	Counts as
Aspirational	Ethical value	recognizes acknowledges is aware/conscious/concerned shall aim (to do something related to conservation)
	Procedural	desires to do something recognizes or acknowledges a need
	Power	shall have the right (responsibility)/shall be relieved (of a responsibility) shall (shall not) affect shall not prejudice assumes (power) serves (another entity)
New contextual criteria	Definition	means/will be taken to mean shall be construed is defined is considered
	Position	agree to or shall establish is composed
	Party-to-the-Law	shall be represents has the mandate
Existing contextual criteria	Statement of Fact	has reported/prepared/worked/received/made is aware/concerned directs
	Status	is recognized/recalled as providing sets out represents
	Con-Reg	shall be deposited shall be (some language provision)
Constitutive boundary conditions	Commencement	shall enter (into force)/shall cease (to be in force) shall remain (open for signature/accession) shall take effect is adopted
	Amendment	shall (shall not) become (effective) repeals
	Application	includes/does not include applies/does not apply
	Relative necessity	shall be deemed is regarded as is understood as

Table 3: Using “Counts As” to classify constitutive rules (following Ostrom (2005) classifying regulatory rules by AIM). Constitutive rule typology is grouped by its function based on the characteristics of constitutive rules (aspirational, precedents, generic parameters (new and boundary)) which provide the means by which decisions are to be made.

Aspirational group

Institutional statements in the aspirational rule typology group outline the aspirations and aims of the treaty drafters—the way they envisioned the world ought to be (Searle, 1995, 2010). In the treaty context, these are constitutive rules that express the ethical values that provided, in part, the impetus to create the legislative texts. They also outline desirable authority structures (power rules) and procedural goals (procedural rules). Figure 3 provides a visualization of how aspirational rules provide the contextual backdrop to a given action situation where procedural and ethical value rules indirectly influence all seven regulatory rule classes, while power rules also indirectly influence positions within the action situation. These linkages are described in detail in Appendix L.

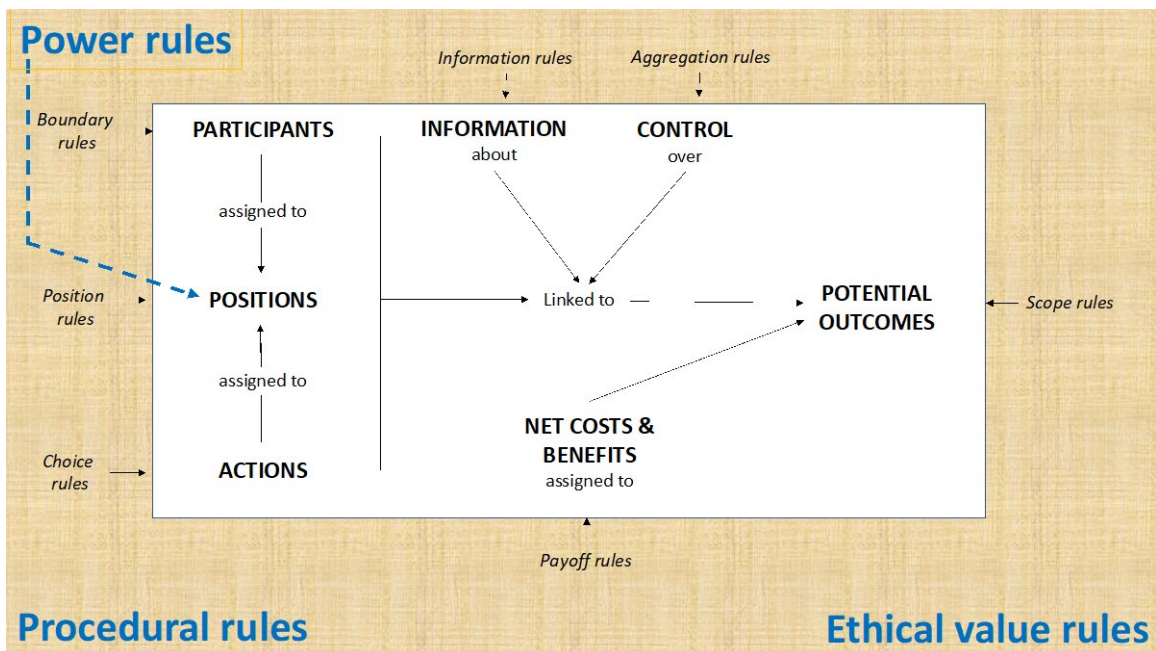


Figure 3: Action situation adapted from Ostrom (2005, p. 189) depicting the aspirational constitutive rule group providing the contextual background within which the action situation is embedded. The influence generated through ethical value and procedural rules is indirect and can affect a variety of rules. This indirect connection is expressed by representing these constitutive rules in the background tapestry of the action situation. The power rule also operates in the background but additionally can be connected to the Positions in the action situation box. This additional connection is indicated with a dashed blue arrow between power rules and Positions. More specific examples are provided in the section on power rules.

Ethical value rules | Counts As: Recognizes, acknowledges, shall aim, is aware/conscious/concerned

Definition: Ethical value rules represent *aspirational* constitutive rules which outline the ethical considerations that led to the development of the regime. They express the idealized goals, hopes, and aims of the treaty drafters and, in the case of resolutions, of the states that were Parties at the time the resolution was adopted. Once accepted/adopted, they become a part of the background tapestry of an action situation from which they indirectly influence the other regulatory rule classes.

Syntax: In ethical value power rules, TOKEN X is an object or attribute which recognizes/acknowledges an expression of an ethical worldview as important (TYPE Y) in the treaty context (see Table 3).

Literature: Most scholars agree that the environmental worldviews/ethical values expressed in environmental legislation, including international treaties, are anthropocentric and based on the belief of a dichotomy between humans and the rest of nature. However the degree of anthropocentrism is in dispute with some ethicists arguing that humans are the rational actors at the center of existence, while nonhumans and nature operate in the margins; isolated and valueless except as instruments for humanity's benefit (Gillespie, 2014). Others assert that anthropocentrism occurs on a sliding scale in which selfish human interests can take more or less enlightened approaches that are not always as exploitive and economically centered (Norton, 1991). Yet, at their core the treaties represent anthropocentric *conservation* instruments designed to exploit nature and wildlife in a manner that maximizes human benefit without undermining the long-term viability of nonhuman species (Minteer, 2009; Gillespie, 2014).

Although a full analysis of the ethical undertones of treaty rules (both formal and informal) is beyond the scope of this paper, it is useful to probe the constitutive institutional statements for degrees of ethical values. Accordingly, the ethical values expressed in the treaty texts were parsed into anthropocentric, biocentric, and ecocentric values while acknowledging the fact that all of these values are simply different degrees of anthropocentrism. A biocentric worldview in this paper implies that anthropocentric

values acknowledge that individual nonhumans have some intrinsic value. An ecocentric worldview was assigned when anthropocentric values recognized the value of nonhuman nature holistically to include populations of nonhuman species and the abiotic components of nature (Kopnina, 2012; Washington et al., 2017). It should be noted that the coding strategy used in this research also assigned ethical values to statements that expressed economic and development considerations since those correspond directly with an anthropocentric worldview.

Data analysis: Reviewing the coded data shows that the CMS included the highest percentage of ethical value expressions in its formal documents (7% of all constitutive statements). Ethical value statements made up 5% of the ICRW's total constitutive statements; 4% in CITES; and 3% in the CBD. The documents that most frequently expressed ethical values were the treaty texts where the CMS again had the highest total number of coded ethical value statements (n=15), followed by the CBD with 9, the ICRW with 6, and finally CITES with 4 ethical value statements coded in its Convention text (Table 1, Appendix J). Representative examples include:

Anthropocentric worldview

Determined to conserve and sustainably use biological diversity for the benefit of present and future generations.
(CBD, 1992).

Biocentric worldview

Considering that the history of whaling has seen overfishing of one area after another and of one species of whale after

another to such a degree that it is essential to protect all species of whales from further over-fishing;

(ICRW, 1946).

Ecocentric worldview

Recognizing that wild fauna and flora in their many beautiful and varied forms are an irreplaceable part of the natural systems of the earth...

(CITES, 1973).

Table 5 outlines the number of statements coded as ethical value per treaty and the distribution among the three worldviews they expressed. Figure 4 expresses the percentage totals of those values in a pie chart comparison. Categorization by environmental worldview/ethical value was based on whether or not the institutional statement included terminology that indicated a human-centered value system (e.g., terms such as “conservation”, “future generations”, economic value, wise use, sustainability, etc.). The assignment of non-anthropocentric values was fairly liberal. If statements used terminology including “preserve”, or “avoid endangering species”, or any other nonhuman species-centered expression, it was classified as biocentric/preservationist value. The statements that were assessed as ecocentric/nature-oriented philosophies were statements that specifically acknowledged the need to preserve nonhumans and their habitats/ecosystems holistically. There was only one institutional statement that explicitly acknowledged the intrinsic value of nonhumans. It was in the preamble of the CBD (CBD, 1992 Preamble) and included in the biocentric category. Several statements acknowledged multiple values of nonhumans and nature. In those instances, if the listing

of values were overwhelmingly human-centered it was grouped in the anthropocentric category, if the number of discreet values listed favored nonhuman rights more, they were grouped into the biocentric category, etc. (see Appendix K for list of coded statements and how they were assigned).

Environmental worldview/ethical value	ICRW (Number of coded statements coded as ethical value)	CITES (Number of coded statements coded as ethical value)	CMS (Number of coded statements coded as ethical value)	CBD (Number of coded statements coded as ethical value)
Anthropocentric/utilitarian	9	9	9	8
Biocentric/preservationist	4	3	6	2
Ecocentric/nature-centered	0	2	3	1
Total institutional statements expressing ethical value	13	14	18	11

Table 5: Distribution of ethical value institutional statements among the four treaty regimes by number of statements coded in each of the three environmental worldview/ethical value categories. (The total values listed in the “Total institutional statements row” are the total institutional statements in all coded documents for each treaty and correspond with the values listed in column J, rows 91-94 in Table 1, Appendix J) At their core, all three conservation instruments are based in an anthropocentric worldview and utilitarian values. The assignment of ecocentric or biocentric value is an indication that the institutional statement expressed a concern for species or the environment. The values in this table are depicted as percent values in Fig. 4.

Figure 4 illustrates the percent distribution of ethical value statements per treaty regime (Table 1, Appendix J). The CMS forum takes the most balanced ethical perspective with 50% of all coded ethical statements expressing a human-centered worldview, and the remaining half acknowledging the intrinsic value of nonhumans (biocentric, 33.3%) and nature (ecocentric, 16.7%) (Fig. 4). The ICRW does not address ecocentric values which is not surprising given its focus on cetacean conservation. Biocentric and ecocentric values are represented to a lesser degree in CITES and CBD than they are in CMS. Given that these are agreements among nation states whose main concerns are expected to be economic and political, the focus on anthropocentric,

utilitarian values makes sense. The fact that values other than strongly anthropocentric ones were found in older treaties was unexpected. These findings will be useful in the next paper to help explain why many interview participants seemed to view the treaties as more preservationist instruments than they are.

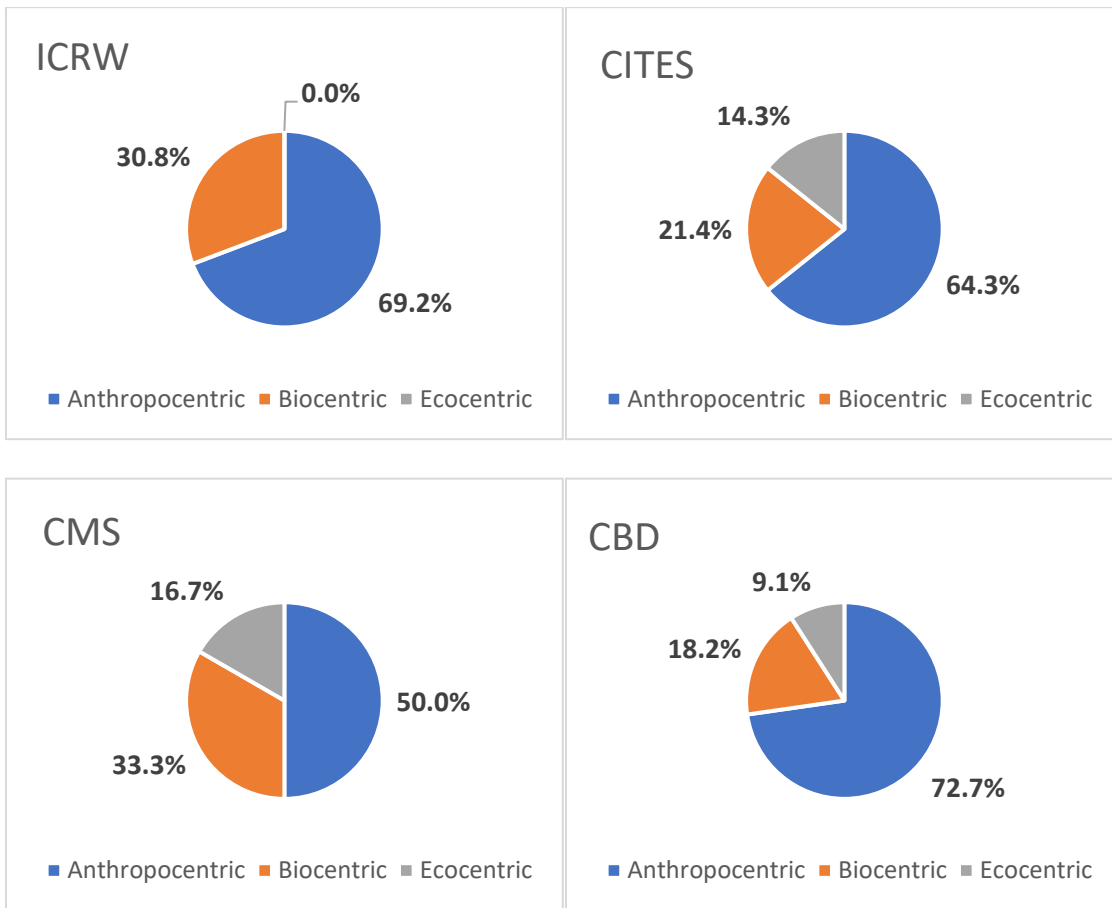


Figure 4: Pie charts depicting the percentages of ethical values expressed in the selected formal documents coded for each treaty. Anthropocentric values (blue color) dominate in all four forums. This is followed by biocentric (orange color) and to a lesser extent ecocentric value (gray color). The CMS forum takes the most balanced ethical perspective with 50% of all coded ethical statements expressing a human-centered worldview, while the remaining half acknowledge the intrinsic value of nonhumans (biocentric value) and nature (ecocentric).

Rule linkages: Ethical value rules do not pair directly with regulatory rules, rather they influence these rules indirectly (Fig. 3). For example, the CBD ethical value rule: “Determined to conserve and sustainably use biological diversity for the benefit of present and future generations” (CBD, 1992 Preamble) represents an overarching desire to conserve and sustainably use biodiversity, and one would expect multiple regulatory rules to be influenced by this objective as they outline required, permitted, and prohibited actions.

However, because of the ambiguity associated with ethical value constitutive statements, they are critically dependent on careful interpretation to ensure that their meaning is understood and accepted over time and across members of all delegations. As a result, they should cross-link with definition constitutive rules, as well as information rules to ensure that these definitions are communicated and understood by participants. This is particularly important since, at the time of writing, none of the treaties provided definitions of core concepts, such as “conserve/conservation” or “preserve/preservation”, “wise use” or “sustainable use” and delegates are left to interpret these key values independently.

Power rules | Counts As: shall/shall not have the responsibility); shall/shall not affect; shall not prejudice, assumes (power); serves (another entity)

Definition: Power rules are *aspirational* constitutive rules that attribute power to positions, processes, or other entities within the treaty forums. This can also include a reduction in power, such as is the case when member countries have their voting rights

suspended for failure to pay their contributions. The assignment of power rules to the aspirational constitutive rule group is purposive and based on the assumption that these rules aim to distribute power equitably within their respective regimes.

Syntax: Constitutive power rules can take on one of two syntactic forms (see Table 3). In both instances, TOKEN X is a legal entity/object which (a) can convey or transfer a responsibility or benefit to another target object or entity; or (b) has a legal responsibility or exercises a benefit/right within the context of the treaty regime.

Literature: In theory, international governance is guided by nation states that are “juridically equal” in that any state can utilize its sovereign rights to prohibit interference with conservation (or other affairs) within its national borders. What binds these actors in anarchy, where there is an absence of a central government, is the accepted system of rules countries agree to abide by when they ratify or accede to certain international instruments (Young, 1994, pp. 121-122). In reality, however, nation states are rarely equal and differences in power and values, particularly in environmental governance, increase the chances of conflict, gridlock, and ineffective decision-making (Dietz et al., 2003). Making sure that power is equitably (not equally) distributed so that those who have the least receive the most support is crucial, and constitutive power rules are assessed in this paper as providing that particular aspect of a treaty’s aspirational framework.

Research indicates that in certain instances unipolar power, like that asserted by a hegemon state, can functionally substitute for hierarchy and/or strong decision rules and

break decision-making gridlock (Underdal, 2002). However, international leadership by hegemon is not a panacea. Ignoring contemporary issues of diplomatic bullying and the pursuit of one-sided economic interests by certain global actors, the dominance of a hegemon state can weaken the incentives of others to participate in the resolution of benign collective action problems. In the case of malign problems—characterized by asymmetry in power and cumulative conflict—the assertion of power can generate fear and withdrawal (Underdal, 2002, p. 32). Personal observations made in the treaty forums also indicate a great deal of frustration by delegates from lower income countries with regard to the practice of a certain non-Party hegemon state using its influence to water-down key components of resolutions, even though the resolutions have no effect on the hegemon state whatsoever.

This reflects the fact that “institutional bargaining does not occur in a vacuum” and agenda formation and choice of actors that may participate can affect governance outcomes (Young, 1994, p. 123). Research has shown that individuals bargaining collectively to solve collective action/social dilemma problems can come to effective solutions without a dominant leader, even at the international governance level (McGinnis & Ostrom, 1996). The crucial ingredient, however, seems to be some form of common understanding among those involved in decision-making and collective bargaining. This includes making sure that the interests (and capacities) of all relevant groups are taken into consideration and reflected in decision-making outcomes, including limiting bullying and other inappropriate influence by non-Party and/or economically

powerful State actors. This is particularly true when decision-making is by majority vote, like in CITES and the IWC. Here, it is also critical that creative solutions are found to ensure that those whose views were not included in the final decision-making are incentivized and do not dismiss the decision as unfair or illegitimate (McGinnis & Ostrom, 1996, p. 477). Given this context, power rules in the treaty context of this research should outline efforts to distribute decision-making power in an equitable manner and should also include providing technical and financial support to low and lower middle income countries.

Data analysis: Table 1 (Appendix J) shows that power rules occur mostly in the treaty texts, except in the ICRW where they only occur in the rules of procedure. CITES is the treaty with the largest number of coded institutional statements of this typology (18 constitutive statements) and highest percentage (5%) of all coded constitutive institutional statements. CMS and CBD each have 3%, and the ICRW texts contain 2% power rules. As was often the case in the regulatory rule analysis, the two regulatory conservation instruments, ICRW and CITES, are on opposite ends of the rule typology spectrum (see paper one for details).

In the ICRW, power rules outline, among others, that an alternate Commissioner can assume all the powers of a formally appointed Commissioner for the duration of a meeting, that the heads of delegations and their alternates are the only voting members; and that the Chair and Vice-Chair of the Commission serve the Commission. They also assign specific research funds to serve the financial needs of lower income Contracting

Governments so that they may fully participate in the work of the Commission (IWC, 2018b Rules of Procedure). These rules indirectly imbue certain powers or rights upon positions in the action situation of a Commission meeting, i.e., alternate Commissioner, Chair, Vice-Chair, and lower income Contracting Governments (see Fig. 3).

In CITES and CMS, power rules in the treaty text are focused on the rights of Parties to adopt stricter domestic measures related to wildlife trade; that CITES provisions shall not affect the obligations of its Parties with regard to other domestic or international trade measures, including Customs, public health, veterinary or plant quarantine, or the Law of the Sea. These power rules convey rights back to the Parties and allow them to continue to engage in certain obligations they have domestically and internationally by allowing CITES regulations to be deferred in certain circumstances (CITES, 1973). Much like ethical value rules, these power rules operate in the background without any direct connection to the action situation. However, given the potential of these quasi opt-out features, one would hope that some form of external monitoring mechanism is in place to ensure that CITES obligations are not being undermined by ill-structured treaty overlaps. Further investigation is warranted but beyond the scope of this paper.

In CBD, three out of seven power rules emphasize States'/Parties' sovereign rights over their own biological and natural resources, as well as their right to exploit their own resources pursuant to their own environmental policies (CBD, 1992).

Additionally, power rules confirm States responsibility for conserving their biological

diversity and using it in a sustainable manner. These power rules again are not connected with specific regulatory rules within the treaty text because they actually represent a formal acknowledgment that the treaty itself has no domestic power. In this instance, power rules appear to be crafted in a manner that may undermine overarching biodiversity conservation goals by potentially deferring too much power to the Parties. Unless regulatory rules outline specific actions that need to be taken domestically and appropriate oversight mechanisms are in place, becoming a Party to the CBD may have little influence on conservation activities in member states. Other power rules within the CBD include an acknowledgment that the CBD's financial mechanism "shall operate within a democratic and transparent system of governance" (CBD 1992).

Rule linkages: Power rules in the treaty context perform two functions. First, they convey or cede power and authority to specific actors within the forums (e.g., responsibilities and duties) or to the Contracting Party with regard to other international instruments and domestic activities. Second, they attempt to provide equity within the treaty power structure by providing technical or financial assistance to member states. In both instances, constitutive power rules are implicitly connected to positions within the action situation and indirectly influence the decision-making/actions of certain actors by providing them with power or funding.

Ideally, in the first instance, constitutive power rules should also be paired with aggregation rules that outline joint actions/decisions and/or information rules that provide reporting or other oversight processes to determine whether domestic implementation or

compliance with other instruments align with core treaty objectives. In the second instance, choice, payoff, and information rules should outline how states can access technical/financial assistance, the mechanisms for distribution of those funds, as well as monitoring processes to ensure technical and financial assistance are aiding states in reaching treaty objectives.

Procedural (aspirational) rules | Counts As: desires to do something/recognizes or acknowledges a need

Definition: Procedural (aspirational) constitutive rules are the practical cousin of ethical value rules in that they outline procedural aspirations that led the document drafters to regard it necessary to craft a particular agreement, resolution, or decision. They represent the conditional context that necessitated the need to take action to create or modify rules or recommendations. Unlike ethical rules, however, procedural aspirational rules can be more easily tracked to regulatory rules in order to determine rule completeness and internal fit.

Syntax: The syntax of procedural rules assigns an object or legal entity to TOKEN X that recognizes or acknowledges a need or desires to ensure (COUNTS AS) some procedural governance aspect (TYPE Y) as guidance for the creation of the legal/policy document within which it is embedded (CONTEXT C) (see Table 2). For example: “[Conference of the Parties] acknowledge the need for clear, concise and consolidated terms of reference governing the Standing Committee” (CMS, 2008 Res. 9.15).

Literature: This particular rule typology is not gleaned from the literature and, instead, is the result of careful observation of certain recurring linguistic patterns of constitutive institutional statements found across all four treaty regimes.

Data analysis: Procedural rules occurred quite frequently in nearly all treaty formal documents. The CBD had the highest percentage of these rules (21%), followed by CITES (18%), CMS (14%), and then ICRW (9%) (Table 1, Appendix J). There is no observable pattern that would indicate that more strongly regulatory treaties (CITES and ICRW) include more of this particular constitutive rule typology in their formal rules as less regulatory treaties, like CMS and CBD. However, again, CITES and the ICRW are on opposite ends of the procedural rule use spectrum.

In the ICRW, procedural rules outline a range of aspirational procedures, such as:

- Desiring to establish a system of international regulation for whale fisheries and avoiding duplication of functions with other “U.N. specialized agencies concerned with the conservation and development of whale fisheries and the products arising therefrom” (ICRW, 1946 Article III(6)).
- Recognizing that continuous collection and analysis of biological data from factory ships and land stations is indispensable to fisheries management.
- Desiring to extend the application of the Convention to helicopters and other aircraft.

(ICRW, 1946).

Recent resolutions adopted by the Commission include procedural aspirations like:

- “The importance of continuing to work towards consensus agreement on reforming the Commission” and “ensur[ing] the Commission is on a clear path to becoming a more accountable and effective organization” (IWC, 2018a Res. 2018-1).
- Recalling the importance of transparency in international environmental agreements; “convinced that advances made in NGO participation can be further enhanced...”; and desiring to ensure that the “IWC remains an open, transparent and fully accountable organization” (IWC, 2014a Res. 2014-3).

Rule linkages: As aspirational constitutive rules, procedural rules do not link directly to regulatory rules. Instead, they provide the background context for their establishment. They do provide an important tracking function to determine internal rule fit. Analysts should be able to track the procedural aspiration for a particular process to at least one regulatory rule that operationalizes the desired procedure or process. For example, the Protocol of the ICRW Convention (which is an integral part of the Convention text) begins with a procedural rule expressing a desire to extend the application of the Convention to helicopters and other aircraft. This procedural rule was followed by a specific aggregation rule in which the Contracting Governments agreed to expand the definitions of “whale catcher” to include helicopters and other aircraft (ICRW, 1946 Protocol).

In the CBD, which has the highest percentage of procedural rules in its coded formal documents, procedural rules in the treaty text outline, among others:

- The desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components
- The need for full participation of women at all levels of policy-making and implementation for biological diversity conservation
- Recognizing the need for in-situ conservation of ecosystems and natural habitats and the important role of ex-situ measures

(CBD, 1992).

Unlike in the ICRW, however, not all these procedural aspirations have matching regulatory rules. For example, “the need for full participation of women in policymaking and implementation of biological diversity conservation” is lacking any regulatory support. The CBD treaty does provide regulatory rules related to in-situ and ex-situ conservation in its Articles 8 and 9 outlining required and permitted actions (choice rules), required and desired outcomes (scope rules), as well as select aggregation rules encouraging the CBD Parties to cooperate in providing financial and other support for such conservation efforts, so a loosely prescribed framework of action and desired outcomes is provided in these instances. Interestingly, the literature and interview participants indicate that the protected areas mandate of the CBD treaty, which is part of Article 8 in-situ conservation rules and supported by its Aichi target 11, is the only area

where the CBD Parties have had some success meeting their conservation objectives (Tittensor et al., 2014; Watson et al., 2014).

CITES, in its procedural rules, recognizes the need for international cooperation as essential to the protection of wild species from trade over-exploitation and the urgency to take appropriate measures to that end (CITES, 1973). In that sense, the procedural rules provide overarching guidance that the remainder of the Convention text generally aims to address. A more direct link can be seen in CITES Resolution 16.7 Non-Detriment Findings between the procedural rule which states:

...that the sharing of guiding principles and experience for making such findings would improve implementation of Articles III and IV of the Convention;
(CITES, 2013 (Rev. 2016) Res. Conf. 16.7).

And seems to be matched by the following regulatory information rule:

[Parties] should share experiences and examples of ways of making non-detriment findings, including through appropriate regional or subregional workshops, and communicate them to the Secretariat [for further sharing on the CITES website].
(CITES Resolution 16.7, 2013)

CMS follows a similar pattern. In its Resolution 11.33 Guidelines for Assessing Listing Proposals for Appendices I and II of the Convention, one procedural rule “recognizes the value of seeking views from other intergovernmental bodies with respect to proposals for amendments to the Appendices” (CMS, 2017b). The corresponding regulatory rule requires the Secretariat to consult with such bodies.

As the examples illustrate, procedural rules perform an informational function in that they alert the Parties to a particular procedural problem that requires intervention. They are also useful indicators of robust governance structures in that they can be used to identify a problem and the suggested aspirational procedural aspect that is called upon to address the problem which, in turn, can help track the regulatory rules put in place to address the issue.

In the four treaties, procedural rules indirectly link with all types of regulatory rule classes, except position and boundary. As such, like ethical value rules, they provide part of the background tapestry that informs actors, decision-making, and action in a given action situation (Fig. 3). It is hypothesized that aggregation, information, and payoff rules would be a better fit because these tend to identify required, permitted and prohibited actions more specifically. In contrast, procedural rules that tend to rely on scope rules outlining desired outcomes are more poorly matched and less likely to result in the procedural aspiration being reached. However, further inquiry is necessary and will be discussed in the next papers.

New contextual criteria group

Constitutive rules can create and specify new forms of behavior (Grossi et al., 2006) by establishing and defining the foundational context from which to build the treaty regime. Constitutive rules in the new contextual criteria group outline core definitions, create new positions important to a regime, and assign new functions to

existing positions/processes within the treaty regimes. In doing so, these constitutive rules link with all but the payoff regulatory rules. They also couple with constitutive application and ethical value rules. Figure 5 visualizes these linkages which are further describe in the following subsections.

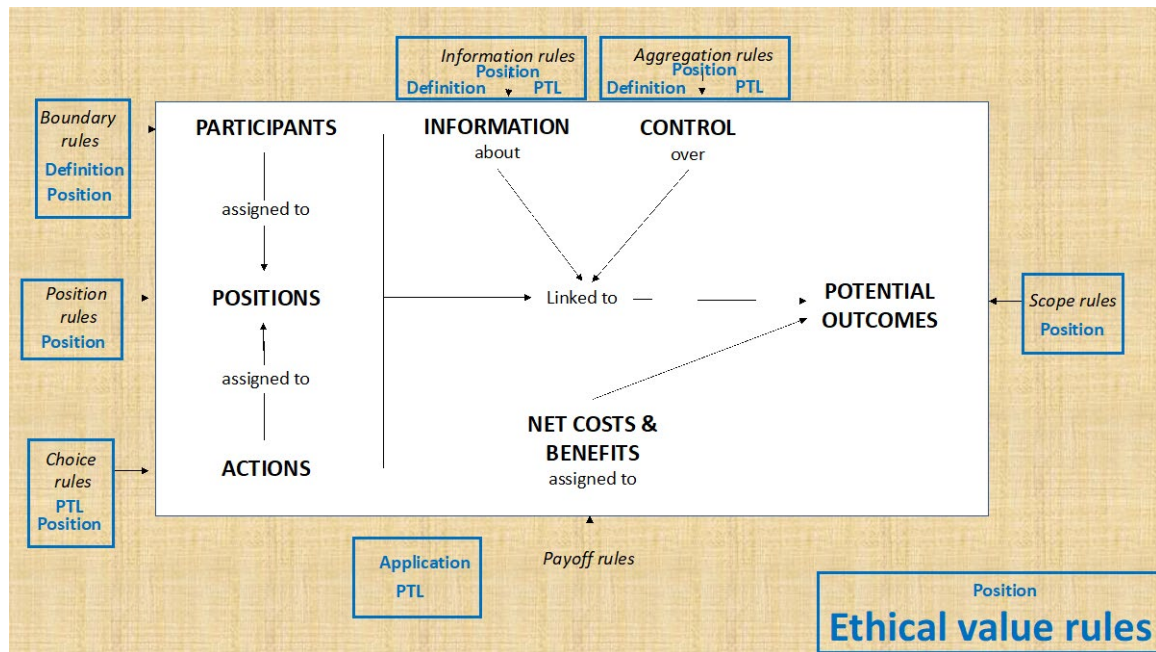


Figure 5: Action situation adapted from Ostrom (2005, p. 189) depicting the constitutive new contextual criteria rule group and their linkage to the regulatory and constitutive rules in the treaty texts (based on sample coding data). Constitutive rules are depicted in blue letters. Black letters outside the action situation box represent regulatory rules and their impact on components within the action situation are depicted through black arrows. Blue boxes outline the indirect interactions between constitutive rules of the new contextual group and the regulatory rules that they are connected to. In addition to interacting with regulatory rules, PTL (Party-to-the-Law) and constitutive application rules interact with each other, as do position and ethical value rules; the latter of which is from the aspirational constitutive rule group. More details on these connections are described in the following sections.

Definition rules | Counts As: means/will be taken to mean/shall be construed/is defined/is considered

Definition: Definition rules define abstract concepts of objects, thereby making a particular legal effect or state of affairs within a certain context possible (Ceci, et al.

2018). This includes definitions like what it means to be a Party within a particular treaty

regime, e.g., “‘Party’ means a State for which the present Convention has entered into force” (CITES, 1973 Article I(h)). In the context of the CITES treaty this also means statements that define national government entities that the Convention mandates its Parties to establish, such as the Management and Scientific Authorities.

For example in the IWC Schedule, definitions outline concepts such as “toothed whale” or “baleen whale”, and also describe multiple definitions of subconcepts of “blue whale”, e.g., “any whale known as blue whale, Sibbald’s rorqual, or Sulphur bottom, and including pygmy blue whale” (IWC, 2018b Schedule(I)(A)). These definitions are often critical to the understanding of the treaty objectives, such as the definition of migratory species in the CMS or “specimens” in CITES. Mismatches in formal and informal definitions, as the next paper will outline, can lead to conflict among member states.

Syntax: Definition rules assign a particular meaning (TYPE Y) to a word or phrase (TOKEN X) in the context of a particular legal regime (Table 3). For example, in CMS, migratory species are defined as species that cross jurisdictional boundaries regularly for any reason. This contrasts to the biological definition of migratory species which is limited to animal movements related to life cycle or seasonal events.

Literature: A literature search did not reveal any other studies that looked at the connection between definitions and decision-making in a policy context. As such, this aspect of the paper is a novel contribution.

Data analysis: Definition rules were coded frequently across all four treaty regimes (Table 1, Appendix J). While the CMS and CBD included within their texts 12%

and 11% definition rules, respectively, there was a big gap in usage of definition rules between the ICRW and CITES. Definition rules occurred in 23% of the ICRW constitutive rules, while there were only 9% in CITES. If one were to hypothesize that more strongly regulatory regimes, such as CITES and ICRW, require greater specificity to outline the degree of commitments placed on the Parties, one would expect both treaties to include a large number/percentage of definition rules to aid in specifying the context of those commitments. While the ICRW seems to support that theory, the CITES does not. In contrast, the hypothesis that a regulatory regime is one that is not characterized by a large number of definition rules because of the specificity of rules elsewhere, then the ICRW is the outlier, and CITES supports the theory. Further inquiry appears necessary to parse this puzzle.

Given their importance to establishing core contextual criteria under which decision-making in each treaty regime operates, it is predictable that the majority of definition rules are located in the Convention texts and rules of procedures since these are the foundational documents under which such decision-making is to occur. Revealing its fisheries agreement roots, the ICRW also includes 40 definitions in its Schedule. These definitions serve to differentiate whale species, provide the parameters for geographical regions in which certain whale species occur and can be hunted, and other definitions associated with whaling activities, e.g., “small-type whaling”, “strike”, “land”, “dauhval” (unclaimed dead whale found floating), etc.

Definitions in treaty texts also outline important conceptual characteristics that associate decision-making authority, such as when a state is considered a “Party” or “Contracting Government”; key concepts such as “factory ship” and “whale catcher” in the ICRW treaty, migratory species in CMS; “trade”, “export”, “Introduction from the sea”, and “specimen” in CITES; and “biological resources”, “ecosystem”, “habitat”, and “protected area” in CBD.

In the rules of procedure, definitions outline the organizational context under which decision-making occurs. For example, what constitutes a quorum (all treaties); what is a national delegate (all treaties) and/or an “accredited person” (IWC, 2018b); the difference between working and information documents (CITES, 2016); the meaning of the phrase “reduce its scope” and a definition for when a motion is considered an amendment (CMS, 2017f); the definition of the term “President”, “meeting”, and “Secretariat” (CBD, 2008).

Definition rules can also be found in some resolutions. For example, in its *Incentive measures* Decision, the CBD includes a definition for “perverse incentives” as those that “negatively affect biodiversity in other countries” (CBD, 2004 Decision VII/18). In CITES’ resolutions, definitions define what “threatened with extinction” and a “conflict of interest” means, among other things (CITES, 1994 Res. Conf. 9.24, Annex I; 2019b Res. Conf. 18.2(8)). In the CMS, they include definitions for “decisions” and “resolutions” (CMS, 2017a Res. 11.06), as well as to clarify the CMS definitions of what “endangered” and “migratory” means under the Convention (CMS, 2017b Res. 11.33).

CMS Resolution 11.33 was specifically designed to re-clarify these concepts to address varying perceptions of these definitions among member states that came to the fore during a heated dispute over the listing of, among others, lions and leopards during the CMS COP12 in 2017.

Rule linkages: Definition rules perform an informational function by outlining the key concepts that create or define new forms of behavior. In the treaty texts, these concepts link to regulatory boundary, information, and aggregation rules. For example, the IWC's rules of procedure define "accredited persons" in the context of its Scientific Committee as follows:

Accredited persons are those scientists defined under sections A.1, 2, 3 and 6 of the Rules of Procedure of the Scientific Committee.

(IWC, 2018b Rules of Procedure of the Scientific Committee,
Rule (H)(4)).

Definition rule (constitutive).

This rule directly links with several regulatory boundary rules that outline how individuals/entities may meet the "accredited person" requirement, including:

[Scientists] nominated by the Commissioner of each Contracting Government which indicates that it wishes to be represented on that Committee.

(IWC, 2018b Rules of Procedure of the Scientific Committee,
Rule (A)(1) 2018)

Boundary rule (regulatory).

And:

Further to paragraph 2 above, the International Union for Conservation of Nature (IUCN) shall have similar status in the Scientific Committee.

(IWC, 2018b Rules of Procedure of the Scientific Committee, Rule (A)(3) 2018).

Boundary rule (regulatory).

And:

Any non-governmental organisation accredited by the Commission under its Rule of Procedure C.1(b) may nominate a scientifically qualified observer to be present at meetings of the Scientific Committee.

(IWC, 2018b Rules of Procedure of the Scientific Committee (A)(5)).

Boundary rule (regulatory).

The latter statement corresponds to two information rules providing information as to how NGOs can nominate qualified observers:

Any such nomination should reach the Secretary 45 days before the start of the meeting in question and should specify the scientific qualifications and relevant experience of the nominee.

(IWC, 2018b Rules of Procedure of the Scientific Committee (A)(5)).

Information rule (regulatory).

Similarly, in the CBD Rules of Procedure the term “President” is defined as:

"President" means the President elected in accordance with rule 21, paragraph 1, of the present rules of procedure;

(CBD, 2008 Rule 2).

Which links to an aggregation rule in CBD Rule 21 that states:

At the commencement of the first session of each ordinary meeting a President and ten Vice- Presidents... are to be elected from among the representatives of the Parties.

(CBD, 2008 Rule 21(1)).
Aggregation rule (regulatory).

Position rules | Counts As: agree to or shall establish/is composed

Definition: Much like their regulatory cousin, constitutive position rules identify/establish new roles to be filled by individuals/entities and outline the number of individuals who can occupy these positions (Basurto et al., 2018). These positions represent core contextual criteria within a regime and are associated with new forms of behavior. For example, the establishment of the Standing Committee in CITES not only creates a new entity within the treaty forum but also transfers some of the power of the Conference of the Parties to this new entity so that it may handle conservation matters intersessionally (i.e., between meetings).

Syntax: In general, constitutive position rules follow one of three syntaxes (see Table 3). Either an Attribute/Object establishes an addressee/position within the treaty regime (e.g., there shall be a whaling convention or there shall be an International Whaling Commission); or an Addressee counts as a position (e.g., the Chair of each regional session shall be the representative of a regional member of the Standing Committee); or Position/entity is composed of X number of individuals (e.g., Standing Committee is composed of members of Parties elected from each of the geographic regions...) (Table 3).

The following examples from the ICRW treaty text illustrate the differences between regulatory and constitutive position rules:

Regulatory position rule in the ICRW treaty text

Commission may appoint its own Secretary and staff...
(ICRW, 1946).

Coded as:

Commission [ATTRIBUTE] may [DEONTIC] appoint [AIM]
its own Secretary and staff [OBJECT] [at all times] [implied
WHEN CONDITION].

Regulatory position rule

Constitutive position rules in the ICRW treaty text

*[Contracting Governments] have decided to conclude a
convention to provide for the proper conservation of whale
stocks...*
(ICRW, 1946).

Coded as declaratory speech act (no Context C):

[Contracting Governments] [TOKEN X] have decided to
conclude [COUNTS AS] a convention to provide for the proper
conservation of whale stocks... [TYPE Y]
Constitutive position rule.

*The Contracting Governments agree to establish an
International Whaling Commission, hereinafter referred to as
the Commission,*
(ICRW, 1946).

Coded as:

Contracting Governments [TOKEN X] agree to establish
[COUNTS AS] an International Whaling Commission,
hereinafter referred to as the Commission [TYPE Y] [within the
ICRW treaty context] [implied CONTEXT C]...
Constitutive position rule.

...to be composed of one member from each Contracting Government.

(ICRW, 1946).

Coded as:

Commission [TOKEN X] is composed [COUNTS AS] of one member from each Contracting Government [TYPE Y] [within the ICRW treaty context] [implied CONTEXT C].

Constitutive position rule.

As can be seen from the above coding examples, while constitutive and regulatory position rules convey the same information, the syntax of the institutional statements is different. Regulatory rules regulate existing forms of behavior antecedently or independently versus constitutive rules which specify and create new forms of behavior (Grossi et al., 2006). Regulatory rules are also designed to guide actor behavior. They are situational and outline a choice that needs to be made. In the above example, the Commission may appoint its own Secretary, or it can choose not to do so. In either event, an action by the actor Commission is required. In contrast, constitutive positions statements do not outline a deontic logic governing *existing* forms of behavior. Rather, these statements are based on modal logic and *create and specify new* forms of behavior.

The reason why there are syntactic differences in the same formal document may seem arbitrary. However, it can be argued that these differences are not just semantic preferences but are intentional and an indication as to whether the drafters of the treaty text viewed the context of the position rule to be something that is subject to change meaning they anticipated guiding actor behavior that would occur more than once. The

appointment of a Secretary and staff is something that is indeed subject to change, and over time Commissions have appointed various Secretaries to assist them administratively which may be why the institutional statement above is crafted as a regulatory rule. In contrast, the institutional statements creating the ICRW Convention and establishing the Whaling Commission represent one time occurrences. As such, these statements establish core contextual parameters by which new behavior is established and new decisions will be made which makes these statements constitutive.

Literature: Within the IAD framework position rules are placeholder roles that are filled by qualified participants who are then assigned particular actions and responsibilities (Ostrom, 2005). Within the constitutive rule typology, position rules perform a similar task except that the establishment of the position is not intended to guide actor behavior but to create new behavior. The differences between the two position forms are linguistic, subtle, and often murky (see “rule linkages” below for distinctions between the two position forms). Constitutive position rules are an outgrowth of this research project. They have not been discussed in the literature and, thus, require further verification.

Data analysis: Table 1 (Appendix J) reflects that constitutive position rules occur in the treaty text of all conventions, except CITES. Additionally, they also occur in the Rules of Procedure and Resolutions/Decisions that establish committees or programs, such as the Resolutions on the Scientific Council and Standing Committee in the CMS, the Resolution on committee establishment in CITES, and the Resolution on the

Scientific Committee in the ICRW. In essence, they are often found in documents where the context requires establishment of position rules.

Tables 1 and 6 (Appendices E & J) reveal that the percentage of constitutive position rules is higher than the percentage of regulatory position rules in all four treaties. In ICRW, the mix is 7% constitutive versus 2% regulatory. In the CITES, it is 3% to 1%; in CMS 5% to 2%, and in the CBD 4% to 1% constitutive to regulatory position rules (Fig. 6). Given that the creation of new positions and entities, including outlining their composition, in the treaty forums generally followed the linguistic format of a constitutive statement, this is not surprising. Notable exceptions are electable positions that are voted on and filled at each meeting of the Parties, e.g., committee chairs, presiding officer, etc.

What is interesting, however, is the discrepancy in occurrence of constitutive position rules which fluctuates from 7% of all constitutive statements in the ICRW to as little as 3% in the CITES. Here, again, the two strongly regulatory conservation treaties seem to structure themselves differently. In contrast, the CMS and the CBD seem more aligned at 5% and 4%, respectively (Table 1, Appendix J; see also Fig. 6).

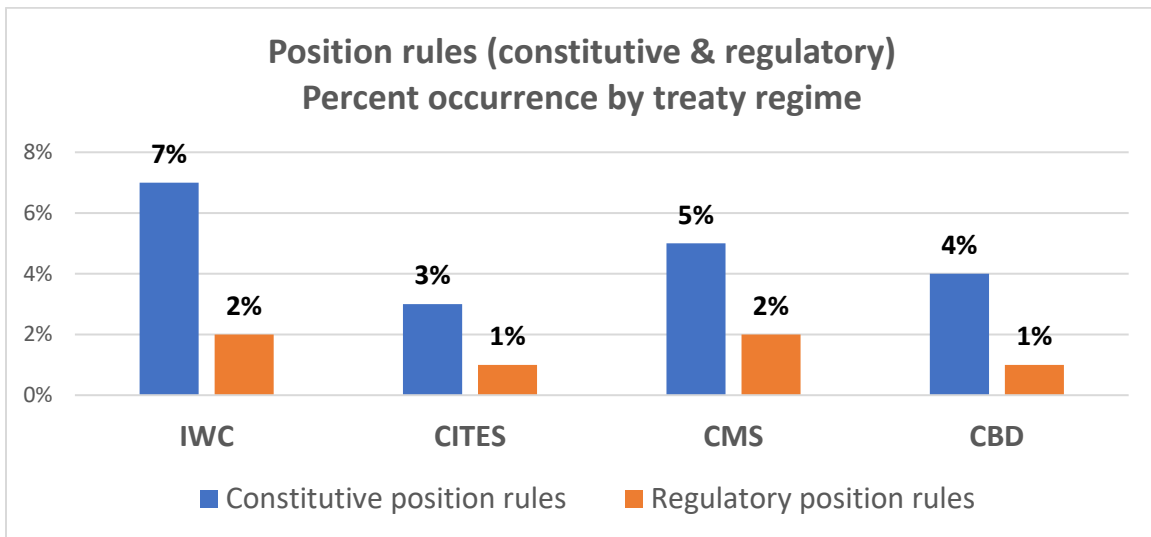


Figure 6: Percent (rounded) distribution of regulatory and constitutive position rules by treaty regime. The two “regulatory” treaty regimes, CITES and IWC, present again at opposing sides of the spectrum with the IWC including the highest percentage of both kinds of position rules across all four treaties, and CITES reflecting the lowest percent distribution.

Rule linkages: Comparing the coded constitutive and regulatory position rules across the treaty regimes (Tables 1, Appendix E; and Table 6, Appendix J) reveals that it is often the case that the same document will include both types of position rules. In instances where both occur, the position rules aim to address different structural components of the governance system. For example, they may require or permit existing behavior related to the establishment of a position, such as when Parties in a dispute may request the creation of a conciliation commission (see example from the CBD treaty below). This is in contrast to constitutive position rules which establish new entities/positions and the number of individuals to occupy those entities/positions, such as the requirement that the CBD’s SBSTTA shall consist of “government representatives

competent in the relevant field of expertise” (CBD, 1992) (see also example below).

Examples might be useful to illustrate this further:

Regulatory position rule in the CBD treaty:

A conciliation commission shall be created upon the request of one of the parties to the dispute.

(CBD, 1992).

Coded as:

Any Parties to the dispute [ATTRIBUTE] [may] [DEONTIC] request [AIM] the creation of a conciliation commission [WHAT CONDITION].

Constitutive position rule in the CBD treaty:

It [SBSTTA] shall comprise government representatives competent in the relevant field of expertise.

(CBD, 1992).

Coded as:

[A subsidiary body for the provision of scientific, technical and technological advice [SBSTTA]] [TOKEN X] shall be comprised [COUNTS AS] of government representatives competent in the relevant field of expertise [TYPE Y] [within the context of the CBD Convention] [implied CONTEXT C].

Sometimes the distinction between regulatory and constitutive position rules was more muddled. In those instances, the presence of a “shall be” coupled with a difficulty to rephrase the passive statement into an active one was the deciding factor in assigning a constitutive value to the position rule statement since it indicated the creation of a new entity or establishment of new behavior more so than the regulation of existing behavior.

Position rules create and structure the composition of key entities/positions within each treaty regime. These entities are often unique to a particular forum, such as the IWC. The number of individuals and composition of those individuals can drive equitable decision-making contexts within the forums. For example, the CBD's position rule that requires its Subsidiary Body for the Provision of Scientific, Technical and Technological Advice (SBSTTA) to be composed of "government representatives competent in the relevant field of expertise" does not account for disparities between wealthy and developing nations and potential associated difficulties for poorer nations to have adequate representation in this body.

Position rules also provide specific details as to new positions/entities created within a regime and the composition of the same. They function as slots for actors to enter the regime action situation, and for subsequent actions and authority to be assigned to those entities and the persons who will occupy them. Ideally, these new entities are designed to enhance the treaty regime's ability to reach its specific goals, aims, and aspirations. As such, they need to be paired with boundary rules that clearly establish the qualifications of eligible individuals to access the position, as well as entry and exit rules. Position rules should also be accompanied by sufficient instructions in the form of choice, aggregation, and information rules that will guide the future behavior and provide the situational context and choices under which individuals in these positions will operate.

In the ICRW Convention text, constitutive position rules are paired with ethical value constitutive rules—matching foundational and idealistic goals together by deciding to conclude the treaty for conservation of whales (constitutive position rule) to make possible the orderly development of the whaling industry (ethical value). They are also coupled with aggregation rules outlining voting authority (i.e., one member, one vote) (ICRW, 1946). In its resolutions, position rules are additionally paired with information rules outlining reporting requirements of working groups that were established through the position rule, as well as boundary rules illustrating the requirements for qualified individuals to access the working group (IWC, 2016 Res. 2016-2).

A similar pattern holds true in CITES where position rules are paired with boundary and aggregation rules. Additionally, the creation of the Bureau which handles intersessional decision-making is paired with a scope rule which outlines the general duty of the Bureau as a desired outcome: “the general duty of ensuring the effective enforcement of the Rules of Procedure and forwarding the business of the meeting” (CITES, 2016 Rules of Procedure). The creation of International Consortium on Combating Wildlife Crime (ICCWC) in CITES Res. Conf. 11.3 is loosely supported by information, choice, and aggregation rules outlining reporting requirements and collaboration/cooperation between CITES Secretariat and various other ICCWC entities, and to recommend the Parties make use of ICCWC tools to track forest and wildlife crimes (CITES, 2000 (Rev. 2019)).

In the CMS treaty, position rules establish the Secretariat and Depositary which are accompanied by choice rules outlining the functions and duties of those entities. CMS Res. 12.09 establishes both the review mechanism and the national legislation programme. Here, the entire resolution consisting of choice, information, aggregation, and boundary rules create the regulatory support network for these two newly created entities ((CMS, 2017e).

The CBD treaty utilizes constitutive position rules to establish a host of entities, including its COP, Secretariat, a financial mechanism, the SBSTTA, and an arbitral tribunal (it is the only treaty that does so). These entities are supported by a network of related regulatory rules. The same is true with the position rule in Dec. XII/26 *Improving the efficiency of structures and processes of the Convention Subsidiary Body on Implementation* where the entire decision sets out the regulatory framework for this particular implementation body (CBD, 2014).

Party-to-the-Law rules | Counts As: shall be/represents/has the mandate

Definition: Party-to-the-Law (hereinafter “PTL”) constitutive rules assign new functions, authority, and responsibilities to existing entities or processes within the treaty regimes (Ceci et al., 2018). These assignments outline new decision-making parameters that give the existing position/actor the ability to affect and be affected by regulatory rules previously not under their purview. For example: “The Conference of the Parties shall be the decision-making organ of this Convention” (CMS, 1979). Here, the Conference of the Parties, which was previously created, receives a new function

imbuing it with new authority and the ability to affect and be affected by regulatory rules differently than before.

Syntax: The syntax of PTL statements outlines how an existing actor or position (TOKEN X) represents a new function/authority within the treaty regime (Table 3).

Literature: Ceci, et al. (2018) developed PTL rules as part of their research effort to classify constitutive statements in financial regulations and translate them into machine-readable language. This rule typology was adopted with modifications to fit the treaty context.

Data analysis: PTL rules occurred infrequently throughout the treaty formal documents occupying 2% of the total constitutive statements in CITES, and a mere 1% of coded constitutive statements in the other three forums (see Table 1, Appendix J). Their importance should, however, not be underestimated. By identifying ATTRIBUTES/actors and assigning new values to these positions/entities, PTL rules serve as key node identifiers in governance structures. This information can be usefully explored in network analyses of forum participant interactions.

For example in CITES, PTL rules:

- Assign the position of depositary government²⁴ to the Swiss Confederation (CITES, 1973 Article XX);

²⁴ The Vienna Convention established the position of Depositaries under international law which are to be designated as independent entities by negotiating states to a treaty regime “or in some other manner” (Vienna Convention, 1969 Article 76). The functions of a depositary include keeping custody of the original text of the treaty, preparing certified copies of the same, as well as “receiving and keeping custody

- Set out the Animals Committee as performing an “important advisory role in the determination of whether a quota set for a species included in Appendix I is non-detrimental to its survival” (CITES, 1994 (Rev. 2019) Res. Conf. 9.21; 2019b Res. Conf. 18.2);
- Assert that the Guide to CITES compliance procedures is non-legally binding (CITES, 2007 (Rev. 2019) Res. Conf. 14.3);
- Outline the responsibilities of the CITES Secretariat and the ICPO-INTERPOL position to assist in the enforcement process and to gather and disseminate all information and intelligence regarding illegal online trade to relevant Enforcement Authorities (CITES, 2000 (Rev. 2019) Res. Conf. 11.3); and
- Establish the Standing Committee as the senior Committee of the CITES Conference of the Parties along with assigning key functions to that role (CITES, 2019b Res. Conf. 18.2).

In the IWC, PTL rules confirm that the Bureau is not a decision-making forum but that its mandate is to “assist [the Commission] with process management” issues intersessionally (IWC, 2018b Rules of Procedure).

As mentioned above, in the CMS, PTL rules assign decision-making authority to the Conference of the Parties (CMS, 1979). Additionally, PTL rules outline

of any instruments, notifications and communications related to the treaty” (Vienna Convention, 1969 Article 77).

implementation responsibility to the Sessional Committee of the Scientific Council during intersessional periods (CMS, 2017d Res. 12.04).

Finally, the CBD utilizes PTL rules to assign authority to the Global Environment Facility as CBD's financial mechanism, and to the U.N. Environment Programme as the provider of the CBD Secretariat (CBD, 1992). Additionally, PTL rules elevate the *Ad Hoc Open-ended Working Group on Review of Implementation of the Convention* as the Subsidiary Body on Implementation, and assign the Bureau of the CBD COP the function of Bureau of the Subsidiary Body on Implementation (CBD, 2014 Dec. XII/26).

Rule linkages: PTL rules convey new responsibility and authority on existing entities/processes within the treaty regimes, and these new responsibilities ostensibly come with additional required, permitted, and prohibited actions/decision-making context. As such, one would assume that robust governance structures couple PTL rules with the necessary choice, aggregation, and information rules in order to further specify the new actions assigned to them; to address decision-making contexts that require joint decisions/collaboration efforts, as well as to provide reporting and oversight mechanisms to other entities within the system. And, indeed, that is the case. For example, the ICRW's PTL rule on the Bureau is paired with a choice and an aggregation rule that instructs the Bureau to "not deal with substantive or policy matters under the Convention" but that it "may consider issues related to financial or administrative tasks" (IWC, 2018b Rules of Procedure). In CITES, the Standing Committee's new role as senior committee comes with special reporting requirements (regulatory information

rules) according to the specific Terms of Reference outlined in the Resolution (CITES, 2019b Res. Conf. 18.2).

The absence of such linkages is also illuminating as it is a possible indicator of a structural weakness. For example, CMS Resolution 12.04 conveys to the Sessional Committee of the Scientific Council the responsibility for implementation of the Scientific Council's mandate during the intersessional period. However, there are no regulatory rules connected to this PTL rule specifying actions that need to be taken, whether decisions should be made in collaboration with other entities or require COP approval, and/or reporting requirements. Perhaps the duties of the Scientific Council are implicitly assigned to the Sessional Committee but, even so, for clarity purposes a regulatory rule stating as much would be useful guidance for the Sessional Committee as it assumes new responsibilities.

PTL rules in the CBD are linked to application constitutive rules that, e.g., outline the set of rules that apply to the Subsidiary Body on Implementation and the Bureau, i.e., the context under which they should be operating with regard to their new functions (the Terms of Reference in the Annex of the Decision, and the rules of procedure for the meetings of the Conference of the Parties, respectively) (CBD, 2014 Decision XII/26). Whether linking one type of constitutive rule (application) with PTL rules is an effective way of structuring action and decision-making in a governance system, instead of embedding these responsibilities in a set of regulatory rules, is something that requires further exploration and will be further discussed in a subsequent paper.

Existing contextual criteria group

Constitutive rules can also provide information on the existing contextual criteria or precedents under which a legal regime is operating (S. Siddiki, personal communication). Constitutive rules in this group report on work performed (statement of fact), represent how particular aspects of treaty governance are provided (status), and outline language and deposit requirements (constitutive-regulatory). These rules link with choice, information, aggregation and payoff rules. Additionally, status rules connect with several constitutive rules. Statement of fact rules do not link with any rules and operate in the background of an action situation similarly to aspirational constitutive rules but with a more limited influence. The linkages of this constitutive rule group with regulatory and other constitutive rules are visualized in Figure 7 and described in the next subsections.

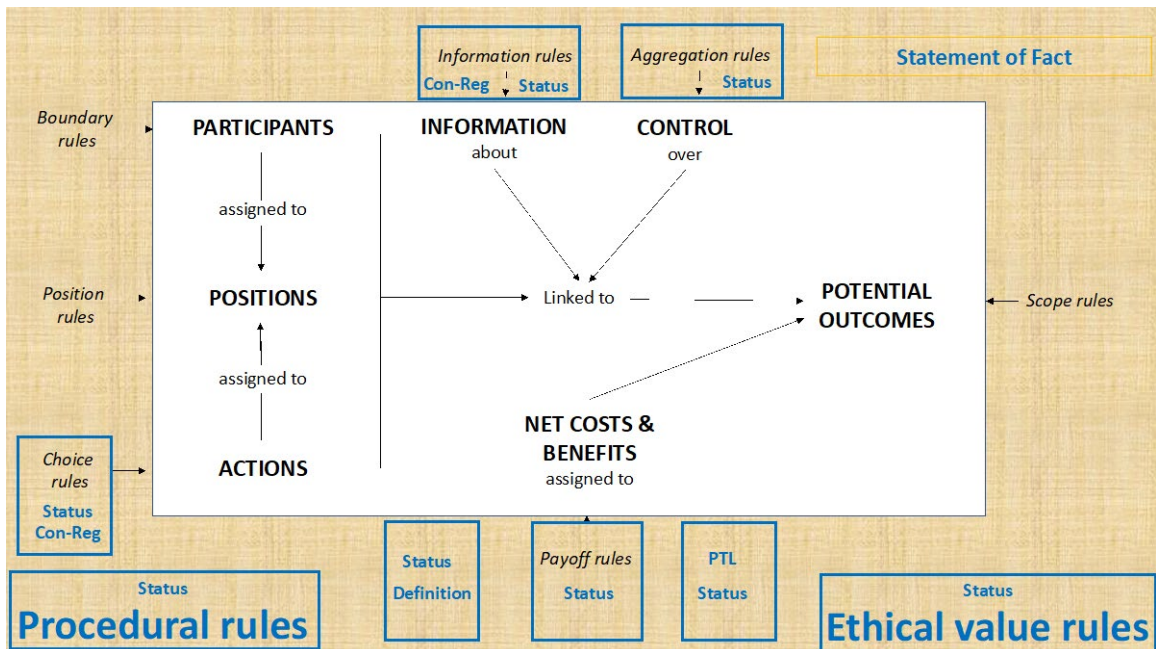


Figure 7: Action situation adapted from Ostrom (2005, p. 189) depicting the existing contextual criteria constitutive rule group and their linkage to the regulatory and constitutive rules in the treaty texts (based on sample coding data). Constitutive rules are depicted in blue letters. Black letters outside the action situation box represent regulatory rules and their impact on components within the action situation are depicted through black arrows. Blue boxes outline the indirect interactions between constitutive rules of the new contextual group and the regulatory rules that they are connected to. In addition to interacting with regulatory rules, status constitutive rules also interact with PTL (Party-to-the-Law), procedural, ethical value, and definition constitutive rules. Statement of fact rules do not have any linkages with constitutive or regulatory rules, as they provide background/"good to know" information. Accordingly, they are represented as operating in the background similarly to aspirational rules but with a more limited influence (and smaller font size to represent their limited influence). More details on these connections are described in the following sections.

Statement of Fact rules | Counts As: has reported/prepared/worked/received/made/is aware/concerned/directs

Definition: The statement of fact (hereinafter SOF) constitutive rule typology was created based on observations of certain linguistic structures within the coded treaty documents. SOF institutional statements represent generic operational treaty governance parameters which outline the completion of some work or project by one entity for or on behalf of another entity, or the reporting of future work that will soon be done.

Syntax: In the coded documents, SOF rules followed two syntax. Either a legal entity or object reported/completed/made, etc. some report/action/recommendation to another legal entity; or a rule/regulation/resolution directed an entity to take some action for or on behalf of another entity or within the context of the treaty (see Table 3).

Literature: This particular rule typology is not gleaned from the literature and, instead, is the result of careful observation of certain recurring linguistic patterns of constitutive institutional statements found across all four treaty regimes.

Data analysis: SOF rules occurred frequently in all four treaty regimes with CBD having the highest percentage (21%), followed by CITES and CMS with 16% each, and the IWC with 15% of all coded constitutive statements being of the SOF type (Table 1, Appendix J). Due to the fact that these are often “report back” statements that occur at the beginning of documents where the Conference of the Parties explain their decision-making reasoning, SOF are predominantly found in Resolutions/Decisions.

Rule linkages: Examples of SOF coded institutional statements and their linkages include:

Noting that the review panel submitted a final report on 8 April 2018...

Noting that a number of the panel’s recommendations are already underway;

(IWC, 2018a Res. 2018-1).

Coded as:

[Independent review panel] [TOKEN X] [has] submitted [COUNTS AS] its final report on 8 April 2018 [TYPE Y] [to the Commission] [implied CONTEXT C].

[Independent review panel] [TOKEN X] has noted [COUNTS AS] a number of the panel's recommendations are already underway [TYPE Y] [on behalf of the Commission] [implied CONTEXT C].

These statements do not directly link with regulatory rules, since they merely represent status reports. In the above example, the remainder of the IWC Resolution adopts the Working Group on Operational Effectiveness' report and directs it to develop a plan to implement reforms to improve the Commission's institutional and governance arrangements. In essence, SOF rules provide background information that is useful to know but not as critical as, e.g., definition rules.

In CITES, SOF rules outline existing conditions, such as:

RECOGNIZING that illegal trafficking in wild fauna and flora continues to be a major concern;
(CITES, 2000 (Rev. 2019) Res. Conf. 11.3).

Coded as:

[COP] [implied TOKEN X] recognizes [COUNTS AS] that illegal trafficking... continues to be a major concern [TYPE Y] [among CITES Parties [implied CONTEXT C].

Resolution 11.3 deals with compliance and enforcement issues and, again, the SOF provides context for the conception and adoption of this Resolution but no linkage to regulatory rules.

Similar patterns emerge in CMS and CBD:

Noting with thanks that the Council has now reported to the Conference of the Parties on these matters.

(CMS, 1991 (Rev 2017) Res. 3.01).

Coded as:

[Scientific] Council [TOKEN X] has now reported [COUNTS AS] on these matters [guidelines on terms used in the Convention and with regard to the species listed in the Appendices] [TYPE Y] to the Conference of the Parties [CONTEXT C].

CMS Resolution 3.01²⁵ provides guidance on the listing of species in its Appendices. These SOF rules again provide the contextual backdrop to the Parties on the reasons for proposing this Resolution for adoption. No direct link with regulatory rules is made.

Aware of the general lack of information and knowledge regarding biological diversity...

(CBD, 1992).

Coded as:

[Contracting Parties] [implied TOKEN X] are aware [COUNTS AS] of the general lack of information and knowledge regarding biological diversity [TYPE Y] [across public and policy spheres] [implied CONTEXT C].

²⁵ The data utilized in this study for the CMS was based on the 12th meeting of the Conference of the Parties in 2017. Unfortunately, at the time of writing this paper, another COP had taken place and this resolution was repealed.

Again, this particular SOF in the CBD Convention text provides contextual background information on certain aspects important to the conception of the treaty with no direct linkages to regulatory rules made.

Statement of Fact rules perform an informational function. While none of the SOF were directly linked to regulatory rules within the documents, they are embedded and part of the “story” that led to the development of the treaty text. Whether that is as a recognition of some report performed, a recognition of a particular issue, or past direction provided to another entity, the information provided is “good to know”, although likely not crucial to the overall structure and robustness of the treaty regime.

Status rules | Counts As: is recognized/recalled as providing/sets out/represents

Definition: Status rules represent contextual criteria that can serve two functions. First, they can reveal particular aspects of treaty governance that might not be captured elsewhere. For example: “it is the understanding and practice of a majority of CITES Parties that the establishment of quotas [for Appendix I species] satisfies the [requirement] that the export of a specimen will not be detrimental to that species’ survival” (CITES, 1994 (Rev. 2019)).

Second, status rules can also serve as reminders of existing decisions (precedents) that the proposed resolution either aims to modify or build upon. For example, three status rules outlined at the beginning of Resolution Conf. 8.21 (CITES, 1992 (Rev. 2013)) advise the Parties that the provisions of the Convention do not require prior

support from range States, but that previous Resolutions recommended Parties do so since such amendments may affect the interests of those range states.

Syntax: Based on their dual function, status rules can present themselves in two syntactic forms. In one form, TOKEN X represents, provides, or sets out a condition or state of affairs (TYPE Y) related to an Object or within the treaty context. In the other form, a law, rule, regulation, or object (TOKEN X) is recalled or recognized as providing or representing a particular status, condition, structure, or definition (TYPE Y) within the treaty context (Table 3).

Literature: This particular rule typology was inspired by a Italian publication (Biagioli, 2009; Ceci et al., 2018, p. 110 Table 2) and modified to fit the treaty context.

Data analysis: Table 1 (Appendix J) reflects, yet again, the two regulatory treaties, CITES and the ICRW, in opposite positions with regard to the occurrence of status rules in their respective documents. ICRW had the lowest percentage with status rules occurring 16% of the time among its constitutive rules. CMS had a 21% occurrence rate, CBD 22%, and 26% of CITES constitutive rules were status rules (Table 1, Appendix J). With few exceptions, status rules were found in both the foundational texts and resolutions/decisions in all four treaty regimes (Table 1, Appendix J).

Rule linkages: The coded data in the CBD treaty reveals an interesting connection between procedural aspirational and status rules which the following example will illustrate:

Status rule:

Recognizing also the vital role that women play in the conservation and sustainable use of biological diversity...
(CBD, 1992 Preamble).

Coded as:

Women [TOKEN X] are recognized as playing [COUNTS AS] a vital role... in the conservation and sustainable use of biological diversity [TYPE Y] [within the context of the CBD Convention] [implied CONTEXT C].

Which is followed and linked to the following procedural rule:

...and affirming the need for the full participation of women at all levels of policy-making and implementation for biological diversity conservation,
(CBD 1992, Preamble).

Coded as:

[Contracting Parties] [TOKEN X] [recognize] and affirm the need [COUNTS AS] for the full participation of women at all levels of policy-making and implementation for biological diversity conservation [TYPE Y] [as guidance for creating this Convention] [implied CONTEXT C].

This example shows how the CBD Preamble sets out to inform members of governments interested in joining the treaty that the treaty drafters recognize women as playing a vital role in conservation efforts. This representation is immediately followed by a procedural aspirational rule that affirms the need for women's full participation in implementation and policymaking at all levels of biodiversity conservation. One would expect such a recognition and procedural aspiration to be linked to regulatory rules mandating action or behavior that will facilitate its realization within the treaty forum and

in CBD member countries. Unfortunately, the words “woman/women/female” occur only twice in the CBD treaty—in the status and procedural rules quoted above. There are no regulatory rules to support these constitutive statements. This indicates a break in the consistency and completeness of the CBD rule structure (Crawford & Ostrom, 1995).

In contrast, the following status rule in the CBD treaty:

Noting in this regard the special conditions of the least developed countries and small island States,
(CBD 1992, Preamble).

Coded as:

[L]east developed countries and small island States [TOKEN X]
are noted as representing [COUNTS AS] special conditions
[requiring special consideration] [TYPE Y] [within the context
of the CBD Convention] [implied CONTEXT C].

...*is* supported by the following regulatory choice rule, albeit a vaguely worded one:

The Parties shall take full account of the specific needs and special situation of least developed countries in their actions with regard to funding and transfer of technology.
(CBD, 1992 Article 20(5)).

In CMS, Resolution 11.33 expands on the status/procedural coupling observed in the CBD by connecting it to a definition rule as follows:

Status rule:

Noting that in Resolution 5.3 the Conference of the Parties decided to interpret ‘endangered’ in Article 1 paragraph 1(e) of the Convention as meaning “facing a very high risk of extinction in the wild in the near future” ...
(CMS, 2017b Res. 11.33).

This statement is immediately followed by a constitutive procedural rule:

...and considering that this interpretation should be maintained...

(CMS, 2017b Res. 11.33).

And linked to the following constitutive definition rule:

The Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals: 1. Decides to interpret the term “endangered” in Article I, paragraph 1(e), of the Convention, as meaning: “facing a very high risk of extinction in the wild in the near future”;

(CMS, 2017b Res. 11.33).

Here, there is no direct linkage to a specific regulatory rule within Resolution 11.33 itself. However by reaffirming the existing definition of “endangered”, the definition rule links back to Article I, paragraph 1(e) of the Convention which the Parties are required to follow when determining listing proposals.

CITES Resolution 11.3 on *Compliance and Enforcement* provides further insight into the way that status rules can “light the path” from constitutive aspirations/procedures to regulatory guidance with the example of assigning the Secretariat as a supplemental enforcement body:

Resolution 11.3 first assigns a new function to the Secretariat through a Party-to-the-Law rule:

RECOGNIZING the important role the Secretariat can play in the enforcement process, and the means provided by Article XIII of the Convention;

(CITES, 2000 (Rev. 2019) Res. Conf. 11.3).

which is immediately followed by a status rule:

CONSCIOUS of the Secretariat's role in promoting enforcement of the Convention, as provided in Article XIII,
(CITES, 2000 (Rev. 2019) Res. Conf. 11.3).

The section “*Regarding enforcement activities of the Secretariat*” of Resolution 11.3 then provides ten related choice, aggregation, information, and payoff regulatory rules outlining required and recommended actions by the Parties, IGOs, NGOs, and the Secretariat to support and realize the Secretariat’s new enforcement assistance position, including financial support, liaison within and outside of CITES, collaborations with partner agencies, and reporting requirements. This is another example as to how status rules can provide markers to trace constitutive aspirations/foundations to their realization in regulatory rules.

The “marker” function of status rules also exists within the IWC’s Rules of Procedure where 16 out of 18 status rules set out the administrative details of certain funding measures. For example:

The details of the Research Fund are given under Scientific Committee Rules of Procedure G and in the Handbook of the Scientific Committee.
(IWC, 2018b Rules of Procedure, Financial Regulations (C)).

Except here, status rules serve more as a bookmark or table of contents in that they direct the reader to a different section within the rules of procedure.

In the IWC's Resolution 2014-4 on the Scientific Committee, status rules are paired with ethical value and regulatory rules as follows, beginning with the expression of an ethical value:

NOTING reiterated concerns expressed in relation to the conservation status and the increasing threats that various cetacean stocks are facing;

(IWC, 2014b Res. 2014-4).

Followed by three status rules:

RECALLING resolution 2003-1 on The Berlin Initiative on Strengthening the Conservation Agenda of the International Whaling Commission;

FURTHER RECALLING more than fifty resolutions of the International Whaling Commission addressing the work of the Scientific Committee, particularly regarding the increasing and evolving work over decades on conservation aspects, including small cetaceans;

RECOGNISING the value of the Scientific Committee's work on these conservation issues for the Commission and the Conservation Committee;

(IWC, 2014b Res. 2014-4).

These constitutive rule structures are supported by eleven regulatory choice, aggregation, and information rules directing the Scientific Committee to continue to improve its work on conservation-related matters and to improve reporting efficiency, among others.

Status rules represent important markers in treaty documents that often occur in groupings with other constitutive rules which then link to regulatory rules within the

same document. This facilitates the tracing of decision-making contexts from problem statement/aspiration/ethical concern to recognition of a particular status or condition (status rule) to action/regulation (choice, aggregation, information rules, etc.), or lack thereof (as was the case in the CBD example above). Such institutional statement tracing allows policy analysts to explore the completeness and consistency of formal documents and move from syntax to meaning and policy coherence. Furthermore, status rules can be explored in interviews to determine whether a given stated position is indeed shared by a majority of Parties, and how this assertion may be viewed by various observer groups.

Constitutive-Regulatory (Con-Reg) rules

Definition: Con-Reg rules represent *hybrid* constitutive rules which include a DEONTIC operator implying regulation of existing forms of behavior indicative of a regulatory rule syntax. However, the linguistic structure of these documents (passive voice, no specific actor performing an action) makes coding them as regulatory challenging. Instead, Con-Reg rules seem to operate in a space that is neither fully constitutive nor regulatory.

It should be noted that when this constitutive rule typology was originally conceived, everything seemed to apply to it. This was particularly the case in instances where resolutions included guidelines on listing species, such as CMS' Article V "Guidelines for AGREEMENTS" (CMS, 1979) This resulted in an artificially inflated number of Con-Reg rules. Upon further research and refinement of the syntax and its definition, most statements originally coded as Con-Reg were modified to regulatory

statements with implied ATTRIBUTES. For example, the institutional statements in the CMS Guidelines for AGREEMENTS (CMS, 1979 Article V) were all recoded as regulatory statements with the implied ATTRIBUTE “[Agreement drafters]”.

The institutional statements that remained coded as Con-Reg rules describe institutional statements that address the official language requirements within a given treaty forum and/or the deposit requirements for the original treaty Convention text.

Syntax: In Con-Reg institutional statements, TOKEN X can be an object/information/condition that shall be something in TYPE Y within the treaty context (Table 3).

Literature: Ostrom (2005) outlined that statements “often specify the official language for communication in a situation” (p. 207) and that these were examples of regulatory *information* rules. In the syntax of Con-Reg rules outlining language requirements, there is the information rule aspect—how is communication generally to occur within the treaty forum—but without the attempt to regulate existing forms of behavior. Instead, Con-Reg rules outlining language requirements indicate generic operational parameters, like “English shall be the official language of the Commission” (IWC, 2018b Rules of Procedure, Rule N). Additionally, the treaty texts also contained other statements that did not seem to neatly map onto regulatory or constitutive rule syntaxes. For example, institutional statements outlining deposit requirements for the original treaty Convention text. In discussions with other scholars exploring the grammar of regulatory and constitutive institutional statements, it seemed that hybrid Con-Reg

rules may occur in other policy action situations as well (S. Siddiki and C. Frantz, personal communication, 24 April 2020). Accordingly, a decision was made to leave the Con-Reg category “as is” pending further application and testing in future research.

Data analysis: Con-Reg rules were infrequently coded and occurred only 1% of the time in the constitutive institutional statements of CMS, CITES, and the CBD. In the ICRW, Con-Reg rules occurred 3% of the time. These rules were featured mainly in the foundational treaty documents (Convention text and rules of procedure) in all four regimes (see Table 1, Appendix J). A representative example of the “deposit” Con-Reg rule is as follows:

...the original of which shall be deposited in the archives of the Government of the United States of America.
(ICRW, 1946 Article III(4)).

Coded as:

The original [of the Convention] [TOKEN X] shall be deposited [COUNTS AS] in the archives of the Government of the United States of America [TYPE Y] [within the ICRW treaty context].

And here is an example of a Con-Reg constitutive information rule:

The authentic text of any such decision shall be the English version.
(IWC, 2018b Rules of Procedure, Rule E).

Coded as:

The authentic text of any such decision [TOKEN X] shall be [COUNTS AS] the English version [TYPE Y] [within the ICRW Convention [CONTEXT C]].

Rule linkages: Under the treaty context, Con-Reg rules outline two specific contextual criteria under which a regime operates, such as what the official treaty languages are or where the original of the Convention is to be deposited.

The necessary regulatory linkages would, ideally, be found in information rules that outline how the original deposited documents shall be shared with all the Parties, as well as in choice rules that outline procedures that Parties who choose to speak or provide reports in other languages need to adhere to. This is indeed the case.

In the IWC Convention text, the two coded Con-Reg statements outline that the original of the Convention text and its Protocol shall be deposited in the archives of the U.S. government. These Con-Reg rules are matched with two regulatory information rules mandating that the U.S. government transmit certified copies of the Convention and the Protocol to “all the other signatory and adhering Governments” (ICRW, 1946 Article XI; Protocol). The IWC’s rules of procedure include five Con-Reg information rules of which two are matched with choice rules outlining that Commissioners may speak in other than official languages but, in those instances, will provide their own interpreters. All official written communications shall be in English (Con-Reg rule). This rule is matched with choice rules advising that translation services will be available at meetings and certain documents will be provided in French and Spanish (IWC, 2018b).

In the CITES rules of procedure, there is one Con-Reg rule outlining the three working languages requirement. This rule is paired with four information rules describing the obligations of the Secretariat to provide interpretation (translation) services at

meetings, as well as to distribute all official working documents in the three working languages (CITES, 2016 Rule 10). A pattern that is repeated in CMS and CBD. It should be noted that all documents on the IWC's and CITES' websites are only in English, while the CBD and CMS websites also provide them in French and Spanish. This means that non-anglophone observers or members of the public will have trouble gathering information from the websites of CITES and the IWC. Ensuring access to documents in more than one language would be beneficial to overall transparency which is key to "the success of [environmental] regimes" and is dependent on continuous access to the "cognitive domains where issues are framed, agendas set... and solutions or standards formulated" (Jasanoff, 1998, pp. 85-86). Having treaty documents available in multiple languages would also make it easier for domestic non-governmental organizations and others in non-English speaking countries to gain knowledge and get involved, which can improve voluntary oversight mechanisms (Chayes et al., 1998).

Constitutive boundary conditions group

Constitutive rules can also outline the generic parameters or boundaries under which decisions are to be made (S. Siddiki, personal communication) by describing the start and end dates for regulations (commencement rules), the means to add or remove existing legal status from rules (amendment), the partitioning of the applicability of certain rules (application), and the preconditions that have to be met for certain conditions/processes to apply (relative necessity). These rules link with boundary,

information, and choice rules. Additionally, application and amendment rules connect with each other. These linkages are visualized in Figure 8 and described in the following subsections.

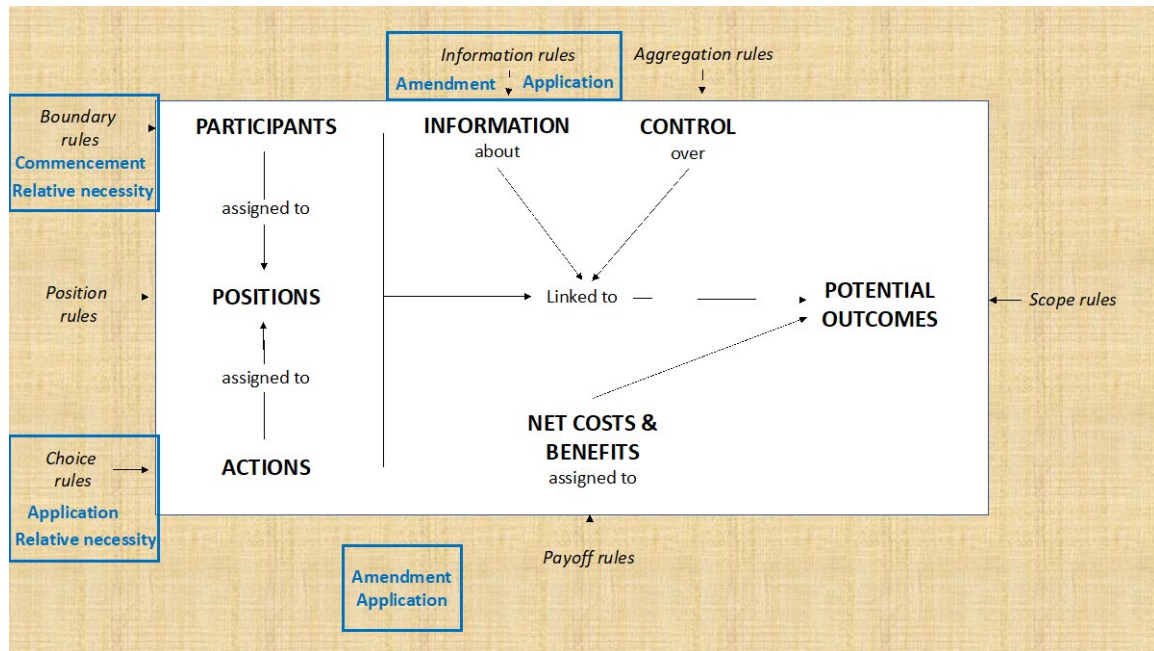


Figure 8: Action situation adapted from Ostrom (2005, p. 189) depicting the constitutive boundary conditions rule group and their linkage to the regulatory and constitutive rules in the treaty texts (based on sample coding data). Constitutive rules are depicted in blue letters. Black letters outside the action situation box represent regulatory rules and their impact on components within the action situation are depicted through black arrows. Blue boxes outline the indirect interactions between constitutive rules of the boundary conditions group and the regulatory rules that they are connected to. In addition to interacting with regulatory rules, amendment and application constitutive rules in this group also interact with each other. More details on these linkages are described in the following sections.

Commencement rules | Counts As: shall enter (into force)/shall cease (to be in force)/shall remain (open for signature/accession)/shall take effect/is adopted

Definition: Commencement rules outline the beginning or end time parameters at which a particular law or legislative document enters into effect or ceases to be legally effective (Ceci et al., 2018). For example: “Amendments adopted at a meeting shall enter

into force 90 days after that meeting for all Parties” (CITES, 1973 Article XV(1)(c)).

They provide the generic parameters under which legal instruments and rules come into or cease to be in effect.

Syntax: Commencement rules can take on three different syntactic forms; two of which are identical but for the absence of the “Context C” element of the syntax which makes one form a declaratory speech act. The third syntactic form is a special case of commencement rule that often occurs in Resolutions where the date the resolution was adopted by the Conference of the Parties is included as an institutional statement (Table 3). In all three forms, TYPE Y is either a specific date or the description of a starting/ending condition.

Literature: Ceci, et al. (2018) developed the commencement rules as part of their research effort to classify constitutive statements and translate them into machine-readable language. The rule typology was adopted with modifications.

Data analysis: CMS contained the highest percentage of commencement rules (11%) followed by the ICRW (9%) and the CBD (7%). At 5%, the CITES formal constitutive rules included the lowest percentage of commencement rules.

Commencement rules were found both in the foundational documents, but also in resolutions/decisions in all treaty regimes where they serve to outline the time parameters for the legal applicability of amendments to the Appendices and other key components of the rule structure. In the case of the CMS, they also outline the adoption date of the resolution itself which is a trigger for the 90-day time period after which all

recommendations listed in the resolution come into effect (which is a separate commencement rule in CMS Resolution 11.06).

Rule linkages: Commencement rules provide specific details as to when a particular legal instrument, rule, or law will come into effect or expire. They perform a *boundary* function in that they outline the enter and exit deadlines for individuals and entities, as well as the begin/end dates on which certain rules within the treaty context become effective. As such, commencement rules often link with regulatory boundary rules. For example, if an amendment to an Appendix enters into force on a particular date, the linked boundary rule outlines the Parties that are covered by that amendment and any opt-out procedures. The CMS treaty text provides two good examples of such constitutive/regulatory rule matches:

5. An amendment to the Appendices shall enter into force for all Parties ninety days after the meeting of the Conference of the Parties at which it was adopted, except for those Parties which make a reservation in accordance with paragraph 6 of this Article.

(CMS 1979, Article XI (5)).

Constitutive commencement

6. During the period of ninety days provided for in paragraph 5 of this Article, any Party may by notification in writing to the Depositary make a reservation with respect to the amendment.

(CMS 1979, Article XI (6)).

Regulatory boundary-procedural (optional exit strategy for Parties unwilling to accept species listing)

A reservation to an amendment may be withdrawn by written notification to the Depositary

(CMS 1979, Article XI (6)).

Regulatory boundary-procedural (opt-in strategy)

and thereupon the amendment shall enter into force for that Party ninety days after the reservation is withdrawn.

(CMS 1979, Article XI (6)).

Constitutive commencement

Amendment rules | Counts As: shall (shall not) become (effective)/repeals

Definition: Amendment rules provide the parameters under which new forms of behavior are defined by adding, removing, or modifying existing legal effects/state of affairs. In doing so, amendment rules immediately create new legal effects/state of affairs (Ceci et al., 2018).

Syntax: In amendment rules TOKEN X is a new text or rule that deletes/substitutes/repeals an old text or rule within the treaty context (Table 3).

Literature: This rule typology was developed by Ceci, et al. (2018) and adopted with modifications.

Data analysis: In the treaty context, amendment rules occurred only in select CMS and CITES Resolutions where they made up 2% of all constitutive statements and were used to repeal decisions made in prior resolutions relating to the same topic (see Table 1, Appendix J). Despite their infrequent usage, amendment rules perform an important administrative task by communicating which resolutions the Parties now need, or no longer need, to follow. For example, in CITES:

REPEALS Resolution Conf. 8.9 (Rev.) (Kyoto, 1992, as amended at Gigiri, 2000) – Trade in specimens of Appendix-II species taken from the wild.

(CITES, 2002 (Rev. 2018) Res. Conf. 12.8).

Coded as follows based on the Amendment rule typology (Table 2):

Resolution Conf. 12.8 (Rev. CoP18) [TOKEN X] repeals [COUNTS AS] Resolution Conf. 8.9 (Rev.) (Kyoto, 1992, as amended at Gigiri, 2000) – Trade in specimens of Appendix-II species taken from the wild [TYPE Y] [within the context of the CMS Convention] [implied CONTEXT C].

The CBD does not have such an administrative feature and instead all Decisions that were ever adopted remain active on the website with notes added at the beginning of individual Decisions indicating which sections within it have been “RETIRED”. In some instances, the entire Decision was retired (see, e.g., CBD, 1996 Decision III/3), yet it remains listed on the website. In contrast, repealed Resolutions in CITES and CMS are archived and removed from the web.

While the CBD has a clumsily organized repeal (“retire”) process for its Decisions, the IWC has no process whatsoever. All resolutions within its seventy plus years of existence remain active (though fortunately only those from 1976 onward remain on the website) (IWC, 2020). Not having a resolution amendment process makes it difficult to know which guidance to follow with regard to a particular issue. For example, Annex I of Resolution 2014-4 outlines a total of nine separate resolutions regarding small cetaceans that Parties would have to consult if they are dealing with, e.g., dolphin harvests in their coastal areas (IWC, 2014c Res. 2014-4, Annex I). Furthermore, all the

resolutions passed at a Commission meeting are saved in one document labeled, e.g., “2018-All Resolutions” which makes it difficult to search for resolutions related to a particular conservation issue. While the organization of decisions and resolutions by the CBD and ICRW may seem like minor administrative issues, it is imperative to good governance for delegates and other participants in the conservation forums to be able to easily discern what guidance is currently active and needs to be followed in order to avoid confusion and ineffective, if not outright incorrect, decision-making (Ostrom, 2005).

Rule linkages: As mentioned, only CITES and CMS utilize amendment rules at about 2% of all coded constitutive statements (Table 1, Appendix J). Those institutional statements all repealed older resolutions and did not link with any specific regulatory rule. This makes sense since the act of repealing is providing notice which resolutions are in effect and which are not. In two instances (one in CITES and one in CMS), amendment rules were paired with constitutive rules of the application type in order to signal that parts of the older document remained in effect. For example, in CMS:

*Resolution 12.02 repeals Resolution 11.1 [amendment rule]
however assessed contributions of Parties to fund 2015-2017
budget as set out in the Annex II of the Resolution remain on the
record [application rule]*

(CMS, 2017c Res. 12.02)

This means that Resolution 11.1 was repealed but for statements that outlined the assessed contribution of the Parties to fund the 2015-2017 budget which remain in effect for those Parties who have not paid their contributions. Without the linked application

rule, repealing Resolution 11.1 might have had the effect of cancelling the debt owed by Parties in arrears. A similar amendment-application rule pairing in CITES Resolution 18.1 mirrors CMS' in that it repeals the prior financing resolution, Res. Conf. 17.2 but for the “expected levels of annual contributions for Parties that have not paid these amounts” (CITES, 2019a Res. Conf. 18.1).

Accordingly, amendment rules perform an *informational* function in that they organize existing rule structures into those that are in effect and need to be followed, and those that are no longer applicable. As such, they would best be linked with supplemental information rules to ensure that the Parties are informed and/or can easily determine when and which rules have been amended. To a certain extent that is happening, since the rules of procedure for each of the treaty regimes assign this information task to their Secretariats who, under these rules, are required to either make these reports available on the treaty website (CITES), provide them upon request and post them on the website (ICRW), publish and circulate them (CBD), or simply distribute them (CMS). This means the linkages between amendment rules and information rules theoretically exist, and Party delegates should receive such information. Additionally, the public can access these records on the treaty websites where they are available in a more (CMS website) or less (ICRW website) user-friendly manner.

Application rules | Counts As: includes/does not include/applies/does not apply

Definition: Application rules represent constitutive rules that, without constituting new entities, create necessary conditions for an event to occur (Ceci et al., 2018, p. 110 Table 2). As such, application rules outline the specific parameters within which new forms of behavior are to be applied.

Syntax: There are two syntactic forms that application rules can take on. They can (a) partition the applicability of an action/mechanism (TYPE Y) operating under the TOKEN (X) to a specifically defined legal entity (CONTEXT C); or (b) define a governance tool (TYPE Y) that is included/excluded under TOKEN X and the inclusion/exclusion of which affects a specifically defined legal entity (CONTEXT C) (Table 3).

Literature: The concept of application rules as a meta-rule that partitions arguments was inspired by a Italian publication (Biagioli, 2009; Ceci et al., 2018, p. 110 Table 2) and modified to fit the treaty context.

Data analysis: The ICRW is the treaty with the highest percentage of application rules (8%) followed by CITES and CBD with 6% of all coded statements; only 3% of the CMS' constitutive rules are application rules. Reviewing the coded data across the treaty documents (Table 1, Appendix J) reveals no particular pattern for the occurrence of application rules. They occur in the foundational documents, as well as in resolutions/decisions.

Drilling into details reveals that in the ICRW, application rules predominantly occur in the rules of procedure where they expand the applicability of document confidentiality requirements to both member governments and observers, apply certain regulations to the financial administration of the IWC; and apply the Commission's voting rights procedures and general terms of reference to the Scientific Committee (IWC, 2018b Rules of Procedure).

In CITES, the majority of application rules (12 statements) are located in the treaty text. Here they provide guidance as to the handling of species' listings in the Appendices, like what provisions of which treaty articles apply or "shall not" apply to certain actions or mechanisms. For example:

The provisions of Articles III, IV and V shall not apply to specimens that are personal or household effects.
(CITES, 1973 Article VII(3)).

In contrast to the ICRW which utilizes application rules to target behavior internationally—i.e., to standardize behavior/action within the Commission meetings—CITES uses application rules to partition/clarify the applicability of certain rule structures for Parties' domestic action situations, i.e., to standardize implementation action/behavior. Of course, this distinction is likely related to the document type as well, since rules of procedure are meant to provide guidance on action/behavior during meetings, whereas the constitutive rules within a Convention text are meant to provide information on the contextual and aspirational governance structure.

Such a pattern of distribution is confirmed by application rules found in the CBD and CMS rules of procedure; the latter of which outline that they [rules of procedure] “apply *mutatis mutandis*²⁶ to the proceedings of [its] committees and working groups” (CMS, 2017f Rules of Procedure, Rule 23). In the CBD, three application rules outline where the rules of procedure apply, that they apply *mutatis mutandis* to the subsidiary bodies, and that in instances of conflict between the rules of procedure and the treaty rules, the treaty rules prevail (CBD, 2008 Rules of Procedure). Application rules in the CBD Convention partition the applicability of treaty provisions within domestic action situations, and they also include CBD protocols and annexes as integral parts of the Convention text.

Rule linkages: As such, application rules perform an *informational* function in that they advise as to the applicability of certain rule provisions thus improving governance clarity. They also outline governance tools or legal provisions that are specifically to be included/excluded from consideration within treaty-specific or domestic action situations. Such rules will need to link to choice rules that outline how this partitioning should/shall/may affect actors’ behavior and decision-making context. Ideally, application rules will also link to information rules (specifically monitoring mechanisms) to ensure that domestic and international implementation/compliance with these provisions is occurring.

²⁶ *Mutatis mutandis* means “with the necessary changes having been made” (Merriam-Webster, 2020).

Generally this is the case. For example, in the CITES Convention text, application rules applying trade in Appendix I, II, and III specimens to particular provisions are broadly coupled with two information and one choice rule mandating the maintenance of trade records in those species, the preparation of trade reports, and submission of the same to the Secretariat. However, CITES also provides an illuminating case in on the non-applicability of Articles III, IV, and V to specimens that are personal or household effects. This means that CITES regulations related to trade in species in Appendices I, II, and III *do not* apply to species acquired under these conditions (CITES, 1973). In this instance, however, there is no matching regulatory rule in the treaty to provide guidance on how this is accomplished, and institutional analysts will need to look elsewhere (within CITES or in domestic legislation) to determine what actions are being taken to ensure compliance and whether appropriate monitoring mechanisms exist.

Relative necessity rules | shall be deemed/is regarded as/is understood as

Definition: Relative necessity rules represent preconditions that need to be present in order to trigger the application of another rule which then restricts or expands the jurisdictional reach of the actor/legal entity. In doing so, they outline a particular context which needs to be present for a certain set of decision-making authority to apply.

Syntax: In relative necessity rules an Object or legal entity (TOKEN X) must/shall be deemed or understood to restrict or expand the jurisdictional reach of a particular condition/criteria/addressee/Object (TYPE Y) for a target regulatory statement or rule to apply (Table 3).

Literature: Ceci, et al. (2018) developed this rule typology as part of their research effort to classify constitutive statements and translate them into machine-readable language. Relative necessity rules were adopted with modifications to fit the treaty context.

Data analysis: Although not frequently used in the treaty documents (28 institutional statements total), relative necessity rules were useful to identify certain critical preconditions. There was no evidence of relative necessity rules in the CBD. However, their distribution across the other three treaties was similar with a 3% occurrence rate in the ICRW and CMS, and 4% in CITES (Table 1; Appendix J).

Rule linkages: Representative examples of relative necessity rules in the ICRW include:

A decision of the Commission taken at a meeting, whether by consensus or by vote, is not deemed adopted until the text has either been provided to all Members of the Commission, or presented to them by electronic means, and then approved by the Commission.

(IWC, 2018b Rules of Procedure).

Coded as:

A decision of the Commission taken at a meeting, whether by consensus or by vote [TOKEN X] is not deemed adopted [COUNTS AS] until the text has either been provided to all Members of the Commission, or presented to them by electronic means, and then approved by the Commission [TYPE Y] [within the ICRW treaty context] [implied CONTEXT C].

Reports of intersessional Workshops or Special Committee Meetings are confidential until they have been dispatched by the

Secretary to the full Committee, Commissioners and Contracting Governments.

(IWC, 2018b Rules of Procedure).

Coded as:

Reports of intersessional Workshops or Special Committee Meetings [TOKEN X] are [deemed] confidential [COUNTS AS] until they have been dispatched by the Secretary to the full Committee, Commissioners and Contracting Governments [TYPE Y] [within the ICRW treaty context] [implied CONTEXT C].

Neither of the relative necessity rules above link to regulatory rules within the ICRW Rules of Procedure. This is because TYPE Y represents the trigger condition that outlines when the counts as status of TOKEN X occurs, i.e., the reports have been dispatched and the decision has been provided to all members and approved by the Commission. Indeed, an important distinction of relative necessity constitutive rules is that the “action” is outlined in the trigger event.

In CITES, relative necessity rules outline, among others:

Specimens of an animal species included in Appendix I bred in captivity for commercial purposes, or of a plant species included in Appendix I artificially propagated for commercial purposes, shall be deemed to be specimens of species included in Appendix II.

(CITES, 1973 Article VII(4)).

Here the relative necessity rule requires regulatory support to, at minimum, outline the entity that will make the determination of “captive bred.” And, indeed, the relative necessity rule is paired with a choice rule that implicitly shifts this responsibility

to the Management Authority of the State of export which, if satisfied, can then issue a certificate to that effect that will be accepted by other importing Parties (CITES, 1973 Article VII(5)).

Other well-linked examples of relative necessity rules come from CITES

Resolution 4.25 on reservations:

BELIEVING that the transfer of a species from one Appendix of the Convention to another must be viewed as a deletion from one Appendix and its simultaneous inclusion in the other;
(CITES, 2019 (1983) Res. Conf. 4.25).

Coded as:

Species transferred from one Appendix of the Convention to another [TOKEN X] must be viewed [deemed] as delet[ed] [COUNTS AS] from one Appendix and its simultaneous inclusion in the other [TYPE Y] [within the context of the CITES Convention] [implied CONTEXT C].

And:

CONSIDERING that, if a species is deleted from the Appendices, any reservation entered in relation to that species ceases to be valid;
(CITES, 2019 (1983) Res. Conf. 4.25).

Coded as:

Any reservation entered in relation to [a] species [TOKEN X] [is deemed to be invalid] [implied COUNTS AS] if [that] species is deleted from the Appendices [TYPE Y] [within the context of the CITES Convention] [implied CONTEXT C].

These relative necessity rules are paired with the following boundary rules:

AGREES that, if a species is deleted from one Appendix of the Convention and simultaneously included in another, the deletion shall render invalid any reservation that was in effect in relation to the species...

...and, consequently, any Party that wishes to maintain a reservation in relation to the species must enter a new reservation in accordance with Article XV, paragraph 3, or Article XVI, paragraph 2;

(CITES, 2019 (1983) Res. Conf. 4.25).

In CMS resolution 11.33 (2014), there are several relative necessity rules that outline trigger events for listing of species in certain Appendices based on their taxonomic assessment by the International Union for the Conservation of Nature (IUCN); a global intergovernmental organization. Much like in the ICRW, the relative necessity rules include within the trigger event the action that must be taken, i.e., listing in a particular Appendix, and there are no direct linkages to other regulatory rules within the Resolution.

In the coded treaty texts, relative necessity rules contained quasi regulatory rules that outlined the “action” as part of TYPE Y element of the constitutive rule syntax (see ICRW and CMS examples above). In CITES, relative necessity rules were linked with specific regulatory boundary and choice rules (see example above). Whether the self-contained constitutive rules represent a better fit than the rule division observed in CITES will be explored in the next paper. What does seem clear though is that relative necessity rules perform a *boundary* function; not in the sense of regulatory boundary rules that delineate requirements to enter/exit positions within an action situation, but by

delineating the jurisdictional applicability of a specific condition/criteria/addressee within the treaty context. As such, they perform an important function within the treaty by refining and outlining the context within which certain criteria are embedded or should be considered.

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APPENDIX M

CONSTITUTIVE RULES: LEVELS OF ANALYSIS

Levels of analysis (vertical rule structure)

The IAD framework organizes decision-making by action situations which are conceptual areas “where policy choices are made” (McGinnis, 2011). Action situations can take place at three different levels of action (or analysis): Operational, collective choice, or constitutional choice. Each level represents a different authoritative relationship. The *operational level* governs day-to-day activities. Here, the rules outline choices that shall or should be made, decisions result in actions, and those actions are the output (Carter, 2017 Table 2). The operational level can also be thought of as the implementation level where individuals authorized or allowed to take actions by collective choice processes make practical decisions (McGinnis, 2011). The *collective choice level* of action/analysis authorizes rule making, rule changing, monitoring and enforcement activities. Here the rules outline authoritative decisions that influence the choices of those acting at the operational level (Carter, 2017). Individuals making decisions at the collective choice level are authorized to do so by constitutional choice processes (McGinnis, 2011). Finally, the *constitutional choice* level represents a supra-authority that sets the overarching framework of rules that govern the collective choice level. Here is where the entities that will operate at the collective choice and operational level are established and collective choice procedures are defined (McGinnis, 2011).

Coding rules *vertically* by governance levels facilitates an analysis of the hierarchical decision-making processes and rule nestedness within a governance system which can then be cross-linked with the rule typology and institutional design principles

(Ostrom, 1990, 2005; Carter et al., 2015) to provide further information on the internal fit and robustness of the rule structure (Controller K_t). For instance, one can explore the types of information rules that are created at the collective choice level and then compare them to the operational level information rules to determine the way information flows through the system. Analyzing the rule structure *vertically* can also help determine how actors are connected with each other across levels of analysis, and how those connections might affect governance robustness.

Paper one comparatively explored the regulatory monitoring mechanisms in each regime. This section will build upon those findings by briefly overviewing the constitutive rules that occur at each analysis level within each treaty regime before analyzing how constitutive rules link to regulatory rules in the context of treaty monitoring mechanisms. To avoid confusion, it is worth emphasizing that *constitutional-choice* level rules are distinct from *constitutive* rules. *Constitutive* rules represent a specific linguistic form that an institutional statement can take (as opposed to a regulatory rule) (Searle, 1995, 2010). In contrast, a *constitutional-choice* rule is a rule classification that places the rule within a hierarchical structure (Ostrom, 2005). An institutional statement can be either regulatory or constitutive, and it can operate at one of three levels of analysis. These categories are mutually exclusive. A regulatory rule cannot be constitutive, and a rule at the collective choice level does not occur at any other level.

Finally, it should be noted that *only* the constitutive institutional statements in the treaties addressed the constitutional level of analysis (see Table 6, Appendix J), therefore, all institutional statements coded at the constitutional level are constitutive rules.

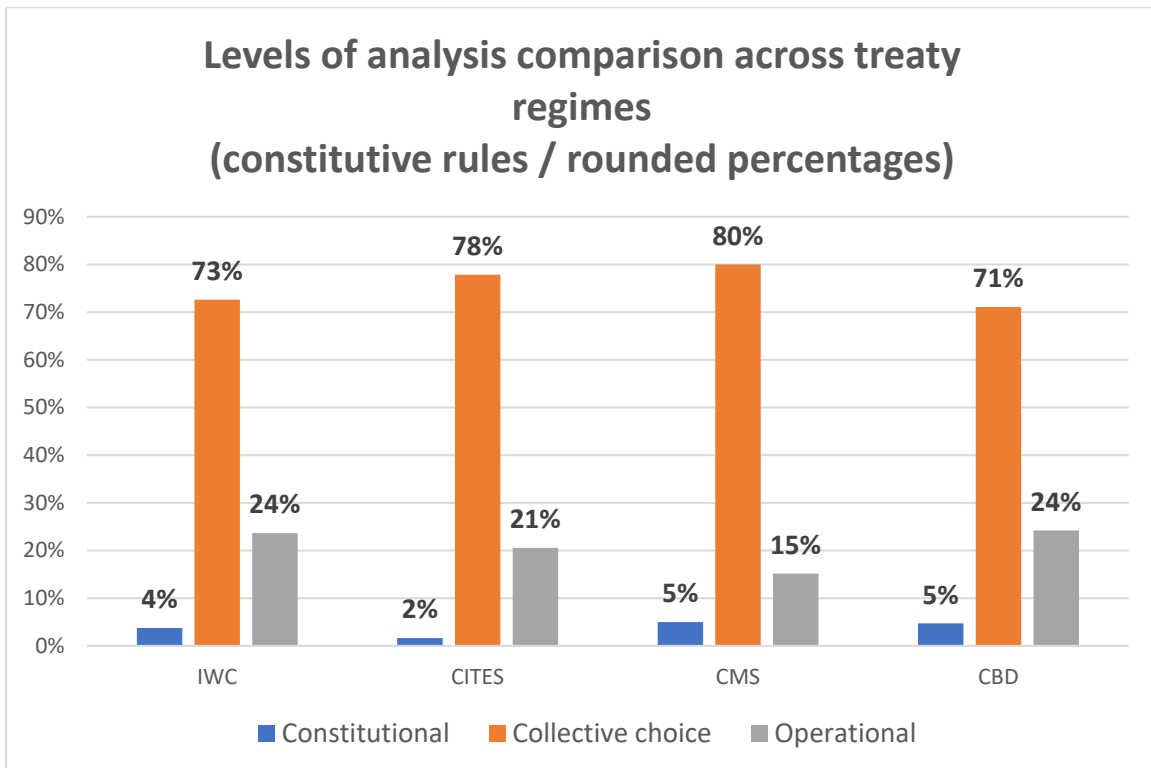


Figure 9: Graph depicting the distribution of constitutive institutional statements across the four treaty regimes by rounded percent total. Graph reveals most constitutive rules occurred at the collective choice level of analysis across regimes followed by operational and constitutional choice level. (Data taken from Table 1, Appendix J).

Constitutional choice level

Figure 9 outlines the distribution of constitutive institutional statements by levels of analysis and treaty regime based on rounded percentage totals (see Table 1, Appendix J, column S, rows 90-101 for raw data). The CBD and CMS had the highest percentage

of constitutional choice level statements in their constitutive rules (5% each), followed by the IWC (4%), and CITES (2%).

The ethical values, procedural aspirations, and power rules that comprise the aspirational group of constitutive rules and provide the background tapestry for a given treaty action situation are also the rules that were coded at the constitutional choice level. For example, in the CBD, power rules reaffirmed a variety of contracting States' sovereign rights; procedural rules expressed a desire for the treaty to complement and enhance existing international conservation instruments and to pursue its core objectives; while ethical values, e.g., affirmed that the conservation of biological diversity is a common concern of humankind (CBD, 1992). The ICRW also included a constitutive position rule that established the treaty convention. CMS included a status rule that recalled a 1972 U.N. Conference on the Human Environment recommendation to enact international treaties to protect migratory species as the impetus to establish CMS (United Nations, 1972 Recommendation 32).

Constitutional choice level constitutive rules were mainly found in the treaty texts with two exceptions. The IWC's Resolution 2014-1 on aboriginal subsistence whaling included an ethical value rule that restated the objective for aboriginal subsistence whaling as "ensuring that risks of extinction to individual stocks are not seriously increased by subsistence whaling" (IWC, 2014). In the CBD's Decision IV/10, a statement of fact constitutive rule referred back to a United Nations Commission on Sustainable Development decision to enhance sustainable development goals through

transfer of environmentally sound technology, capacity-building, etc. (CBD, 1998). In both instances, the institutional statements outlined overarching policy objectives intended to indirectly guide decision-making by the Commission and the CBD COP at the collective choice level with regard to aboriginal whaling quotas and biodiversity management.

Collective choice level

The collective choice level of analysis is the working level at which treaty governance operates, as is evidenced by the fact that a majority of all constitutive institutional statements were coded here (Fig. 9) (see also Table 1, Appendix J, column T, rows 90-101). CMS included the highest percentage of constitutive statements at this level (80%), followed by CITES (78%), the IWC (73%), and the CBD (71%). All 13 rule typologies were utilized and constitutive rules at the collective choice level were found in nearly every document.

Operational level

Constitutive rules also aimed to provide context at the operational level of analysis. Here, CBD and the IWC included the highest percentage of constitutive statements (24% each), followed by CITES (21%), and CMS (15%). Reviewing the coded data for the Convention texts at this level outlines, e.g., application rules applying the convention rules to factory ships and whale catchers in the IWC, language requirements in the CITES and the CMS. They also included acknowledging concerns

that must be addressed by Parties at the national level in the CBD, e.g., lack of information and knowledge of biological diversity among the public, as well as the need for the Parties to “anticipat[e], prevent and attack the causes of significant [biodiversity loss or reduction] at the source” (CBD, 1992).

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APPENDIX N
ROBUST DESIGN FEATURES CALCULATIONS

	Design principle 1 (boundaries)		Design principle 2 (congruence)		Design principle 3 (collective choice arrangements)		Design principle 4 (monitoring)		Design principle 5 (enforcement)		Design principle 6 (conflict resolution)		Design principle 7 (minimal rights)		Polycentricity					
	DPA User	DPA Resource	DPA (environment)	DPB (cost/benefit)	DPX (culture)	DPY (collective choice)	DWA (resource)	DPB (appropriation)	DPK (monitor accountability)	DP5 (enforcement)	DP6 (conflict resolution)	DP7 (minimal rights)	Autonomous decision-making (individual/govt)	Alignment (territoria (-)/ non-territoria (0))		Information				
IGW	Formal rules	1	1	1	1	1	1	1	1	1	0	0	0.5	1	1	0.5	1	1	1	
	Informal rules	0.5	0.5	1	0.5	1	0.5	0.5	0.5	0	1	1								
	Assessment (avg)	0.75	0.75	1	0.75	1	0.75	0.75	0.75	0.5	0.5	0.5								
GTS	Formal rules	1	1	1	1	1	1	1	1	1	1	0	0.5	1	1	0.5	1	1	1	1
	Informal rules	1	1	0.5	0.5	0.5	1	0.5	1	1	1	0.5								
	Assessment	1	1	0.75	0.75	0.75	1	0.75	1	1	1	0.25								
CMS	Formal rules	1	1	1	0.5	0	1	0.5	0.5	0	1	0	0.5	1	1	0.5	1	1	1	1
	Informal rules	1	0.5	1	0.5	0	0.5	0.5	0.5	0	0	0								
	Assessment	1	0.75	1	0.5	0	0.75	0.5	0.5	0	1	0								
CBD	Formal rules	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0	1	1	1	1	1	1	1	1	1	1
	Informal rules	1	0.5	0.5	0.5	1	1	0.5	0.5	0	0	0.5								
	Assessment	0.75	0.5	0.5	0.5	0.75	1	0.5	0.5	0	1	0.75								

External fit & DP	ICRW	CITES	CMS	CBD
DP1A	0.75	1.00	1.00	0.75
DP1B	0.75	1.00	0.75	0.50
DP2A	1.00	0.75	1.00	0.50
DP2B	0.75	0.75	0.50	0.50
DP2C	1.00	0.75	0.00	0.75
DP3	0.75	1.00	0.75	1.00
DP4A	0.75	0.75	0.50	0.50
DP4B	0.75	0.75	0.50	0.50
DP4C	0.75	1.00	0.50	0.50
DP5	0.50	1.00	0.00	0.00
DP6	0.50	1.00	1.00	1.00
DP7	0.50	0.25	0.00	0.75
	8.75	10.00	6.50	7.25
Percentage	0.73	0.83	0.54	0.60
Total possible	12			
Polycentricity	ICRW	CITES	CMS	CBD
Diverse	0.5	0.5	0.5	1
Autonomous	1	1	1	1
Goals	0.5	0.5	0.5	1
Alignment	0.5	0.5	0.5	1
Jurisdiction	1	1	1	1
Rule design	1	1	1	1
Collective choice	0.5	0.5	0.5	1
Entry	1	1	1	1
Exit	1	1	1	1
Information	0.5	0.5	0.5	0.5
	7.5	7.5	7.5	9.5
Percentage	0.75	0.75	0.75	0.95
Total possible	10			
Fit	ICRW	CITES	CMS	CBD
Internal (monitoring)	0.5	1	0.5	0.5
Internal (opt out)	0.5	1	0.5	
Levels of analysis (monitoring)	0.5	1	1	0.5
Levels of analysis (enforcement)	1	0.5	0.5	0.5
Levels of analysis (info/reporting)	0.5	1	0	0
	3	4.5	2.5	1.5
Percentage	0.6	0.9	0.5	0.3
Total possible	5			
Other criteria	ICRW	CITES	CMS	CBD
Anthropocentrism (High (0)		Medium (0.5)	Low (1)	High (0)
Formal repeal process No (0)		Yes (1)	Yes (1)	No (0)
Legal commitment Strong (1)		High (1)	Medium (0.5)	Low (0)
	1	2.5	2.5	0
Percentage	0.33	0.83	0.83	0.00
Total possible	3			