POLICY BRIEF

Adjacency: How legal precedent, ecological connectivity, and Traditional Knowledge inform our understanding of proximity

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Executive Summary

Pursuant to the United Nations Convention on the Law of the Sea (UNCLOS), all States have customary and treaty obligations to protect and preserve the marine environment and its resources.[1] *Several countries have expressed an interest in the question of whether States could properly assert priority over the conservation of areas beyond national jurisdiction (ABNJ) adjacent to their Exclusive Economic Zones (EEZs). The term "adjacency", with respect to maritime coastal boundaries, refers to a State's spatial proximity with the open ocean and deep sea in ABNJ. Thus, the term "adjacency" is used here in the context of the rights and duties of coastal States to enforce conservation measures in waters where "conditional" freedoms (UNCLOS, Article 87) to all States are applied, as well as in relation to "the Area" (UNCLOS, PART XI). However, it has also been argued that prioritization of a coastal State's interests in adjacent areas is not compatible with UNCLOS, and that such a challenge to the principle of the "freedom of the High Seas" would only generate further conflicts between coastal States and distant water fishing States (Birnie and Boyle 1994).* **Any new international agreement that addresses governance of the High Seas/ ABNJ should address the balance between (1) recognizing coastal States' sovereign rights and duties and (2) protecting High Seas freedoms.**

The overarching duty of all States under UNCLOS is to protect and preserve the marine environment both inside their EEZs and in ABNJ (see, e.g., Articles 192, 61-64). On the basis of the expressed provisions of UNCLOS and the manner in which it has been interpreted and applied by international tribunals and State practice, it can be argued that coastal States have a special interest in adjacent High Seas areas, but only in relation to the overarching obligations of UNCLOS to protect and preserve the marine environment, including its marine resources. **Therefore, in developing a new international legally binding instrument under UNCLOS, it can be strongly suggested that the overarching conservation mandate of UNCLOS would support granting coastal States greater influence over management of those ABNJ resources to which they lie adjacent.** *Under this approach, those qualified adjacent states would*

1 UNCLOS PART II, V, VI, VII, XI; Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, Case No. 17, International Tribunal for the Law of the Sea, Advisory Opinion of Feb. 1, 2011.

be recognized as having the primary responsibility to coordinate with existing sectoral and regional organizations to become the leading architects of new regional conservation agreements.

In contrast, any attempt to exert jurisdiction over adjacent areas for the purposes of resource extraction, is plainly contrary to the UNCLOS regime.

While the legal definition of adjacency addresses geographic proximity, the ecological implications of adjacency involve oceanographic and ecological connectivity. An area adjacent to a national jurisdiction may be equally ecologically or biologically connected to areas on the other side of an ocean basin through oceanographic or migratory connectivity. Similarly, anthropogenic impacts in ABNJ will not disperse evenly in all directions from the area of origin but, rather, may have highly directed flows due to ocean currents or long-distance animal movements that crisscross our oceans. **In certain circumstances, oceanographic flows will directly support claims for prioritization of a coastal State's interest. However, any attempt to address adjacency should provide for how such prioritization of a State's interest will improve the status of highly migratory species that may be affected.**

Migratory connectivity does not simply tie wide-ranging species to opposite ends of an ocean, it also ties Indigenous Peoples and local communities (IPLCs) across ocean basins and to the High Seas. Coastal communities are custodians of many globally-significant migratory species and straddling fish stocks, and are also often the first to suffer if these species face declines due to inadequate management within or beyond national jurisdiction. These losses may decrease food security, as is the case with fisheries, and also income, for example where ecotourism takes place on community-managed sea turtle nesting beaches. In addition, IPLCs on the coast attach cultural and social significance to a number of highly-migratory marine species that range over coasts and the High Seas. **Cultural connectivity between IPLCs and ABNJ should be taken into account when applying the concept of adjacency, and the concerns of connected IPLCs should be prioritized in parallel with those of adjacent coastal States.**

Based on the plain language and interpretation of UNCLOS, as well as on provisions in other international agreements such as the UN Fish Stocks Agreement (UNFSA), the appropriate response to the issue of adjacency is that any such enhanced influence for a coastal State should prioritize conservation of biodiversity, address oceanographic and migratory connectivity, and consult with IPLCs. The balance of this paper will review the various sources that support this conclusion.

The legal and policy context for adjacency

The fundamental principle that the oceans must be governed in a manner that conserves and protects their resources for sustainable use infuses the entirety of the UNCLOS. This principle is found not only in the general duties imposed upon all States, but also is imbedded within the duties and obligations handed down to States within their EEZs, and within duties specific to ABNJ. It is highlighted beginning with the UNCLOS Preamble, which emphasizes that the Convention is designed to promote the "efficient utilization" of the resources of the oceans and seas, the "conservation of their living resources," and the "protection and preservation of the marine environment." The Preamble also recognizes the strong connectivity inherent in the sea, being "[c]onscious that the problems of ocean space are closely interrelated and need to be considered as a whole."

General duties of conservation

In furtherance of the design announced in its Preamble, UNCLOS devotes the entirety of its Part XII to the "Protection and Preservation of the Marine Environment." To that end, Part XII begins by setting out the following "General Obligation" in Article 192: "States have the obligation to protect and preserve the marine environment." Further, while acknowledging that States "have the sovereign right to exploit their natural resources," Article 193 states clearly that such a right must be exercised "in accordance with their duty to protect and preserve the marine environment." Article 194 continues the theme, requiring States to "prevent, reduce, *and control pollution of the marine environment from any source", adding that such measures "include those necessary to protect and preserve rare or fragile ecosystems, as well as the habitat of depleted, threatened or endangered species and other forms of marine life." Since such measures would be ineffective if only taken unilaterally, Article 197 requires States to cooperate on both a global and regional basis "in formulating and elaborating international rules, standards and recommended practices and procedures" designed to protect and preserve the marine environment.*

A number of Part XII provisions impose general duties on States to prevent and control pollution of the marine environment. Article 206 requires States to assess the potential effects of activities under their jurisdiction or control wherever they occur that may cause substantial pollution of or significant and harmful changes to the marine environment. Further, Articles 208 & 209 require States to establish rules and practices to prevent pollution from seabed activities taking place within their respective jurisdictions and in ABNJ by "vessels, installations, structures and other devices flying their flag or of their registry or operating under their authority." Article 210 directs States to prevent, reduce, and control pollution of the marine environment through dumping; while Article 211 mandates the same for pollution from vessels.

Finally, UNCLOS underscores the general, fundamental, conservation duty of States at the end of Part XII. Specifically, Article 235 cautions that States are responsible for fulfilling "their international obligations concerning the protection and preservation of the marine environment" and, further, that "They shall be liable in accordance with international law."

Conservation duties within and beyond Exclusive Economic Zones

Under Part V, UNCLOS also makes clear that States have a duty to conserve living resources in areas subject to their jurisdiction (within EEZs). Specifically, Article 61 requires States to establish "proper conservation and management measures" necessary to ensure that living resources in the State's exclusive economic zone are not over-exploited, including the directive that "the coastal State and competent international organizations, whether subregional, regional or global, shall cooperate to this end." Recognizing the transboundary nature of many important marine species, Article 63(2) directs coastal States and States fishing in the High Seas to agree upon measures necessary to conserve fish stocks found both in the EEZs and in areas beyond their EEZs. Similarly, Article 64 directs coastal and other States fishing for highly migratory species to ensure conservation of such species "both within and beyond" the coastal State EEZs.

An important example of the management of migratory stocks under UNCLOS are Articles 66 and 67 under Part V, which establish the management and conservation responsibilities for anadromous and catadromous stocks respectively. For anadromous stocks, such as sturgeon and salmon, the Convention acknowledges that the States in which the stocks originate have a special interest and are therefore granted the primary responsibility for their management, which extends to the High Seas. Similarly, the UNCLOS provisions for catadromous stocks, such as eels, grants the primary responsibility for their management to those coastal States where the species "spend the greatest part of their life cycle".

Read together, several additional UNCLOS provisions underscore both the duty and the ability of coastal States collectively to implement conservation measures not only within, but beyond, their EEZs. In particular, the combination of Articles 87 and 116 expressly make "freedom of fishing" on the High Seas subject to "the rights and duties as well as the interests of coastal States" provided in Articles 63 to 67. *These provisions encourage States to cooperate toward these ends, either directly or as part of regional or sub-regional organizations.*

The obligations UNCLOS imposes on States in Part XI with respect to the mineral resources of the seabed in ABNJ include the duty of environmental protection. Thus, Article 145 requires that any activities that are aimed at exploiting these resources must also include the measures necessary "to ensure effective protection for the marine environment from harmful effects of activities in the Area." Article 145 additionally requires the International Seabed Authority to adopt rules, regulations and procedures to prevent "interference with the ecological balance of the marine environment," as well as to protect and conserve natural resources in connection with mining activities in ABNJ. The International Tribunal for the Law of the Sea (ITLOS) has made clear that States must act with due diligence to ensure faithful compliance with all requirements of UNCLOS Part

XI.[2] *ITLOS has further opined that States must follow the precautionary principle in connection with mining activities in the Area.*[3]

It should be noted, however, that coastal States' rights with respect to "superadjacent waters" above their Extended Continental Shelf are bounded by Article 78, according to which "the rights of the coastal State over the continental shelf do not affect the legal status of the superjacent waters" and limit the rights of the coastal State such that they "not infringe or result in any unjustifiable interference with navigation and other rights and freedoms of other States as provided for in this Convention."

The plain text of UNCLOS, and the interpretation of that text by ITLOS, make clear that States are obliged to pursue conservation and environmental protection in both EEZs and ABNJ.

International Agreements other than UNCLOS highlight the duty to conserve ABNJ resources

In addition to UNCLOS, other international instruments address the rights and obligations of coastal States with regard to the conservation of ocean resources in ABNJ. The principle of aligning national with international conservation measures is reflected in the Rio Declaration, which provides to States "…the sovereign right to exploit their own resources pursuant to their own environmental and development policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction"[4].

Specific examples abound. For instance, Article 5 on the Convention on Biological Diversity (CBD) requires that States "cooperate with other Contracting Parties, directly or, where appropriate, through competent international organizations, in respect of areas beyond national jurisdiction and on other matters of mutual interest, for the conservation and sustainable use of biological diversity." The 1995 United Nations Agreement on the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks requires coastal States and all States fishing in adjacent High Seas areas to conserve fish stocks in those areas. The new agreement encouraged a more holistic approach to fisheries management. Article 5(d) of the UNFSA calls for an assessment of the impacts of fishing not only on target stocks but also on "species belonging to the same ecosystem or associated with or dependent upon target stocks"; calling, in article 5(e), for the implementation of conservation and management measures for those species where deemed necessary to avoid threats to their reproductive success. While the UNFSA was primarily designed to manage and conserve fish stocks, the agreement also calls for the protection of non-fish species [Article 5(g)], as well as biodiversity in the marine environment [Article 5(f)]. To this end, Article 6 of the UNFSA invokes the use of the precautionary approach where "the status of target stocks or non-target or associated or dependent species is of concern". These measures are set to ensure conservation of biodiversity in the High Seas.

Building on these principles, Article 7 of the UNFSA asks for international cooperation in the management of straddling and migratory fish stocks across jurisdictional boundaries "[w]ithout prejudice to the sovereign rights of coastal States for the purpose of exploring and exploiting, conserving and managing the living marine resources within areas under national jurisdiction". Accordingly, coastal States and States fishing in the High Seas shall "take into account the biological unity of the stocks and the relationships between the distribution of the stocks, the fisheries and the geographical particularities of the region concerned, including the extent to which the stocks occur and are fished in areas under national jurisdiction" [Article 7.2(d)]. Moreover, States shall also "take into consideration the relative dependence of the coastal States and the States fishing on the High Seas on the stocks concerned" [Article 7.2 (e)].

Existing Conservation Agreements Between Adjacent and Non-Adjacent States

In terms of living resources, there are a number of Regional Agreements between coastal States that deal with the conservation of fish stocks in the High Seas. A first example of regional cooperation is the 1994 Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea, ("Bering Sea Donut Hole Agreement") where no cooperative management of the straddling stocks was previously in place. The Agreement was

2 See Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, Case No. 17, Advisory Opinion of February 1, 2011, 50 I.L.M. 455, paragraphs 76, 107-135 (2011) (Seabed Disputes Chamber of ITLOS).

3 See ITLOS Advisory Opinion at paragraphs 131-135.

4 UN Doc. A/CONF.151/26, (1992) 311 *International materials* 874.

signed based on Article 63 (2) which obliges States to "seek, either directly or through appropriate sub-regional or regional organizations, to agree upon the measures necessary for the conservation of these stocks in the adjacent area." The Agreement was signed between four countries, including the Russian Federation and the United States, to control unregulated fishing activities from distant water fishing nations, which undermined coastal States' efforts to conserve Pollock fisheries.

A key advancement of the Bering Sea Donut Hole Agreement is that it recognized the need to apply compatible measures between EEZs and High Seas. In this respect, the Agreement foreshadowed language found in the UNFSA. Specifically, UNFSA Article 7 provides that "conservation and management established for the High Seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of the straddling fish stocks and highly migratory fish stocks in their entirety."

The Agreement is also consistent with Article XII of the Convention, which applied a series of stringent regulations regarding illegal activities occurring in coastal States' EEZs adjacent to High Seas (Article XII), for instance allowing on-board inspections and giving the right only to coastal States to maintain fisheries enforcement vessels [Article XI (6)], but only in case of flag State's consent.

However, the Agreement has a number of limitations including, inter alia, the lack of an ecosystem-based approach to regulate fish stocks as dictated in the Preamble of the UNFSA and Articles 5(d) and (e). As such, it failed to establish cooperation related to conserving other species associated with pollock. The only provisions related to conserving other species are included in the Record of Discussions A.9 and 14 – and thus they are non-binding. The dependence of protected species, such as pinnipeds and seabirds, on pollock in coastal North America demonstrates how coastal States adjacent to the Bering Sea donut hole have a higher interest in the conservation of the stock than distant water fishing nations, whose national biological resources were not affected by historical overfishing of the resource.

A second example of bilateral cooperation is the Sea of Okhotsk Agreement between Russia (the only State surrounding the affected High Seas area) and the United States. Since no regional organization was in place, the Agreement recognized exclusive rights in the Russian Federation to all fishing for straddling stocks (Sea of Okhotsk Agreement, Article 1).

Both examples show the utility of establishing a direct framework to deal with imminent environmental threats and to minimize disputes at the regional level in cases where countries, which have the primary role, geographically and in terms of economic interests, are also members of the treaty. However, such approaches do not include distant State parties in the design and implementation of the agreements, and are not legally binding on third party States. **A more comprehensive and holistic approach to adjacency under the new international legally-binding instrument is necessary to ensure compliance of all States with conservation measures implemented in ABNJ.**

Despite the general freedoms of the High Seas, and the designation of the Area and its mineral resources as "the common heritage of mankind" (Article 136), those rights are bounded by a number of international agreements that in some cases render coastal State jurisdictional rights and duties in High Seas waters unclear. Regional and international cooperation provide the legal, institutional and financial baseline to coastal States seeking to protect and preserve the marine environment, both within national jurisdiction and beyond, given the straddling and migratory nature of some resources and biodiversity and the dynamic nature of marine ecosystems in general. International cooperation is the only means to ensure regional efforts are sufficient and that general conservation principles[5] are implemented (e.g., IUCN 2008 or Freestone 2009). **Nonetheless, so long as adjacent States can prove that their management measures conserve marine biodiversity within or beyond their national jurisdiction, the over-arching conservation mandate of UNCLOS would support granting to those States greater influence over management of those ABNJ resources to which they lie adjacent. Under this approach, those qualified adjacent States would be allocated the primary responsibility to coordinate with existing sectoral and regional organizations to become the leading architects of new regional conservation agreements.**

5 See 10 Principles of High Seas governance, IUCN (15 Sept. 2008); David Freestone "Modern Principles of High Seas Governance: The Legal Underpinnings" (2009) 39/1 International Environmental Policy and Law pp. 44-49.

Adjacency and ecological connectivity

The underlying ecological basis for applying the principle of adjacency pivots on the fact that the ocean's resources transcend jurisdictional boundaries; this requires management and conservation measures to be coherent with the movements and distributions of the managed resource across jurisdictional boundaries. A similar logic informs the UNCLOS provisions on anadromous and catadromous species (Articles 66 & 67), where a special interest on behalf of the coastal States of origin of the stock is acknowledged and the management responsibilities are granted accordingly both within the EEZ and High Seas. For these stocks and other marine life which straddle jurisdictional boundaries, understanding the timing and strength of their connectivity and movements across boundaries is essential to their management; this is consistent with the provisions under UNCLOS and the UNFSA on the management of straddling species. However, the same connectivity that bridges jurisdictional boundaries can also bridge ocean basins, and a closer look at how various types of adjacency will impact the management of various types of ecological connectivity is necessary.

Ecological connectivity can be broadly categorized into two types: passive and active forms of movement. Oceanographic connectivity is the main form of passive connectivity and relies on ocean currents that drive larval or planktonic dispersal and which can also transport anthropogenic impacts, such as pollutants, into and out of coastal State waters. Active dispersal, on the other hand, arises from directed movement by, inter alia, seabirds, sea turtles, marine mammals and fish. This form of dispersal can lead to different types of transboundary movements, from transoceanic migrations straddling multiple EEZs and the High Seas, to smaller-scale straddling behavior into the High Seas, as is the case of the pollock managed under the Bering Sea Donut Hole Agreement. Many of the animals that engage in this type of straddling movement rely on different parts of the ocean to fulfill different life-history stages (e.g. from nesting to foraging). Understanding how areas are connected in space and time and through what types of interactions among species is essential for the implementation of transboundary management strategies. **Ecological connectivity can directly support claims for prioritization of a coastal State's interest in the conservation of biodiversity, but such prioritization should account for how larger-scale connectivity will be impacted.**

Oceanographic connectivity

For many marine species, population connectivity is determined largely by ocean currents transporting larvae and juveniles between distant patches of suitable habitat. Because the passive movements of larvae or juvenile animals are principally controlled by physical ocean currents, they can connect distant ocean basins. These long-distance connections often contribute to the genetic stability of species metapopulations and stocks by periodically providing recruits from distant populations. The strength of the connections between sites may change seasonally or between years according to major climate cycles such as el Niño or la Niña oscillations (Treml et al. 2008). Regional analyses have been conducted in the South Pacific (Treml et al. 2012) as well as the Caribbean (Schill et al. 2015) and have helped to better define the long-distance interdependence of marine ecosystems within these regions. These analyses demonstrate the importance of direct adjacency between near shore (EEZ) areas and offshore (ABNJ) areas as well as more complicated, multi-path connections that may span multiple sites and jurisdictions.

In addition to organisms, nutrients and heat, ocean currents and oceanographic features also transport and redistribute pollutants including marine debris. Marine debris, such as plastics, transported across ocean boundaries by currents, can impact biological diversity due to entanglement or ingestion. Plastics can also act as vectors for the transport of harmful chemicals, which can have ecological impacts in regions as isolated as the Arctic (Zarfl and Matthies 2010). Further, other pollutants that make their way into the marine environment, such as oil, can be transported across wide regions by surface currents (Ozgokmen et al., 2016).

Migratory connectivity

Animal migration has been broadly defined as persistent, large spatial scale movements to connect discrete home ranges that help fulfill a species' life-history objectives (Milner-Gulland et al., 2011). Migration is fundamental to marine ecosystem structure given the strong ecological imperative for animal movements to evade predation, to access spatially distributed and seasonal resources, or to access suitable habitats for different life-history purposes. Migratory connectivity emerges from persistent movement between habitat patches and frequently straddles jurisdictional boundaries. Understanding and accounting for the transboundary connectivity of migratory species is essential for their conservation and management.

Migration is common among marine species. For example, a 2006 FAO report identified over 200 straddling, migratory or High Seas fish species/stocks which are fished within and beyond national jurisdictional waters (Maguire 2006). Lascelles et al. (2014) identified a total of 829 marine migratory species of fish, seabirds, marine mammals and sea turtles occurring in ABNJ and frequently straddling jurisdictional boundaries. Of these four major marine migratory/straddling taxonomic groups, Annex I of the UNCLOS (on highly migratory species) only makes partial reference to two of them (fish and marine mammals). Since the establishment of the UNCLOS there has been a tremendous increase in the volume of scientific research and literature demonstrating the migratory and transboundary connectivity of marine highly-mobile biodiversity around the world. Satellite technologies have revealed, inter alia, the straddling behaviors of important target species such as bigeye tuna (Schaefer et al., 2010) or yellowfin tuna (Schaefer et al., 2007), as well as the transoceanic movements of non-target species such as basking sharks (Skomal et al., 2009), white sharks (Bonfil et al., 2005), leatherback sea turtles (Benson et al., 2011) or wandering albatross (Weimerskirch et al., 2014). However, our understanding of marine migratory movements is still poor across taxonomic groups and geographic regions. A review of shark satellite tagging studies in the primary literature revealed that only 15 species of migratory sharks have been studied using this technology, with most of the studies having been conducted in the Pacific Ocean (50%) (Hammerschlag et al., 2011). This illustrates that the remaining ~80 species (or 84%) of migratory sharks lack specific information on their migratory/straddling movement patterns (Fowler 2014).

Harrison (2012) quantified some of these straddling behaviors for 18 species of marine predator in the Pacific Ocean and found that these migratory/straddling taxa visited 94% of the EEZs in the Pacific Ocean and spent 14-33% of their annual cycle in these waters and 53 to 76% of the time in the High Seas. These findings highlight the importance of protecting migratory and straddling species within EEZs and the High Seas and the special interests that certain coastal States will have in this process. We summarize two examples of how ecological connectivity may influence our understanding of adjacency in case studies below.

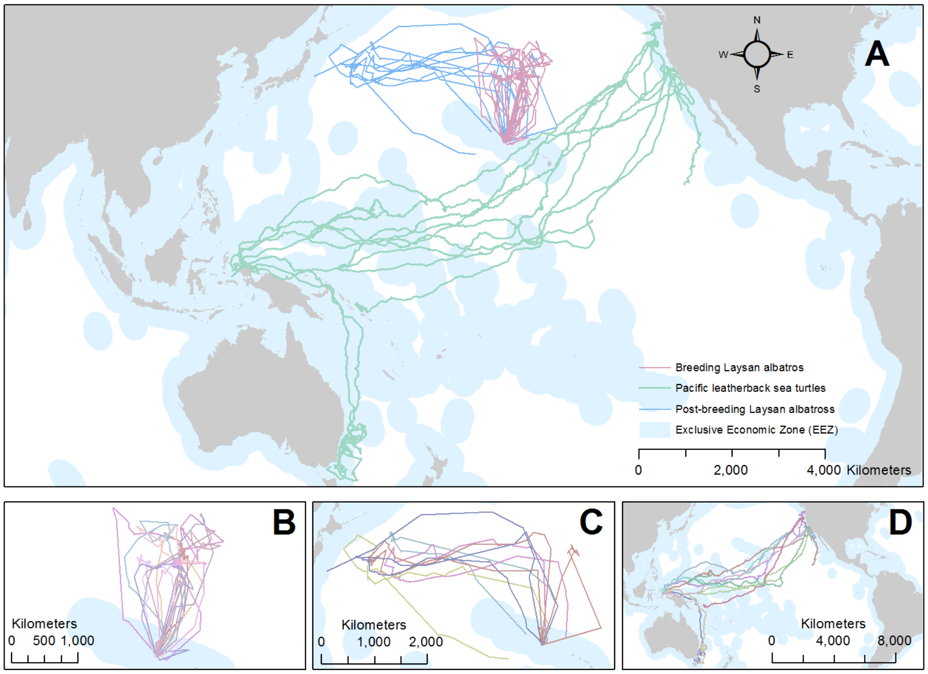

Figure 1: **A.** *Migratory movement patterns of leatherback sea turtles (Dermochelys coriacea), and breeding (red) and post-breeding (blue) Laysan albatross (Phoebastria immutabilis) across the Pacific Ocean basin derived from bio-logging data.* **B.** *Breeding Laysan albatross (n=10) foraging in ABNJ waters adjacent to the U.S. EEZ.* **C.** *Post-breeding Laysan albatross (n=5) migrating to feeding grounds adjacent to the EEZ of Japan & the Russian Federation.* **D.** *Leatherback sea turtle (n=10) horizontal and vertical trans-Pacific migrations across multiple EEZs.*

Case Study 1: Laysan albatross
(Phoebastria immutabilis)

One of the great wanderers of the North Pacific Ocean, Laysan Albatross (Phoebastria immutabilis) connect subtropical breeding islands in Hawaii, Mexico (Guadalupe Island), and Japan (Ogasawara Islands) to temperate and sub-Arctic oceanic habitats, including areas beyond national jurisdiction where they are predicted to spend three quarters of their annual cycle (Harrison 2012). This long-lived species is considered near threatened due to impacts of the feather trade in the 1800s, military development and longline and gill-net fishing in the 1900s, and long-line fishing and plastic ingestion in the 2000s. Laysan albatross have different types of migrations during the year. When they are brooding chicks, the length of their foraging migrations are constrained by the need to return to the colony and feed chicks. Foraging trips during brooding last only 1-3 days and albatrosses are thus unable to exploit distant habitats during this time (Figure 1B). Foraging destinations in ABNJ during brooding thus exhibit greater adjacency to EEZs in which breeding colonies are located, than do foraging destinations during the much longer post-breeding migrations (Figure 1C). Post-breeding migrations last about 8 months and include use of Japanese, Russian, Alaskan, and California waters, as well as the High Seas. The movement patterns of this species exemplify the difficulties of applying the principle of adjacency to migratory species, which not only use the adjacent EEZ of the coastal State where they nest (Figure 1A) but also use the High Seas waters adjacent to other States in other parts of their life history (Figure 1B).

Case Study 2: Leatherback sea turtle
(Dermochelys coriacea)

Leatherback turtles may be one of the most connected marine species in the world. In the Pacific Ocean, adult leatherback turtles with satellite tags attached (Benson et al. 2011) visited 49 EEZs sovereign to 33 States during their migrations (Harrison 2012), traveled through "donut holes", and made trans-Pacific migrations through areas beyond national jurisdiction (Figure 1D). Their migrations to distant foraging grounds can last multiple years. Adult turtles nest in Indonesia, Papua New Guinea, or Solomon Islands and migrate to the waters of Asia, California and Mexico, or Australia. The different migrations may be determined in the turtles' earliest stages of life, and driven by ocean currents. It is thought that the ocean currents that are encountered by hatchlings ultimately determine the great foraging migrations of adults many years later (Gaspar et al. 2012), and directly affects the trajectories of different nesting populations. Because they travel long distances, through both EEZs and ABNJ, and within many regions of the ocean, these turtles are exposed to many threats. Four of the seven leatherback turtle populations are classified as critically endangered under the IUCN Red List. The wide transboundary distribution of leatherbacks demonstrates how multiple States can have an interest in the conservation of a highly migratory species and how management decisions made in adjacent areas can affect multiple coastal States.

Conservation Status of Straddling or Highly Migratory Species

The management and conservation of straddling and highly migratory species is a serious challenge given the large spatiotemporal distributions of the species, the cost of sampling in distant and or deep locations, and the complexities of coordination among multiple parties across jurisdictional boundaries. In 2011, the FAO estimated that straddling stocks were overfished or experiencing overfishing at a rate twice that of stocks within national jurisdictions (64% vs 28.8%). Similarly, an assessment of the 48 migratory fish stocks managed by the world's tuna Regional Fisheries Management Organizations (RFMOs) concluded that 67% of these were either overfished or depleted. Chondricthyans, the most threatened vertebrate group (Dulvy et al., 2014), show a similar pattern. Only 14% of non-migratory sharks were threatened (Vulnerable, Endangered or Critically Endangered under IUCN Red List) whereas 46% of the 95 migratory sharks are threatened, with a further 21% assessed as Near Threatened (Fowler, 2014).

In the last decade, there have been tangible improvements by RFMOs towards the protection and better management of several straddling and migratory shark species, including species-specific measures for: thresher sharks (WCPFC, ICCAT, IOTC), hammerhead sharks (ICCAT), Oceanic whitetip shark (IATTC, WCPFC, ICCAT), Basking shark (NEAFC) and Porbeagle shark (NEAFC, ICCAT) among others (Dulvy et al., 2014); as well as broader *measures across many RFMOs, such as bans on shark 'finning' (Fowler and Séret, 2010). While some RFMOs are starting to develop management frameworks for the most commonly caught non-target species (e.g. key shark species in the WCPFC), the taxonomic representativity of management plans for groups such as Chondrichthyans is still very low.* **Any prioritization of Coastal State's interests in adjacent areas should define the duties and responsibilities of adjacent States in designing management plans for highly migratory species not managed under a RFB including, *inter alia*, implementing Area Based Management approaches and requirements for the development of Environmental Impact Assessments.**

Ecological connectivity and adjacency

Protecting and managing marine migratory and straddling biodiversity requires an international commitment to understanding not only the distribution of catch of these target and non-target taxa (through improvement of catch and bycatch records), but also their movement patterns, transboundary straddling connectivity and ecological role across ecosystems. This may only be accomplished through a deeper understanding of these movement dynamics at the species or population-level; efforts which individual States and regional fisheries bodies have already begun for some taxonomic groups through the establishment of animal tagging programs (Block et al., 2011); and animal movement models (Phillips et al., 2016). While there are management schemes for many migratory and straddling species of commercial or conservation interest, most High Seas straddling and migratory biodiversity still remain largely unprotected. The coastal States to which migratory species in ABNJ are connected via their migrations will be the most vulnerable to experiencing ecological and cultural impacts if those species are not managed properly beyond their EEZ boundaries. Likewise, the ecosystems and biodiversity in the High Seas will be impacted if the management of straddling and migratory species is not adequate within national jurisdictions. **While the freedom of the High Seas should not be undermined, extending the rights of coastal States to have the primary responsibility in the conservation of their migratory and straddling biodiversity in ABNJ is not only consistent with existing principles in international law (e.g. UNCLOS Articles 66 & 67; UNFSA Article 7) but would likely result in better stewardship of those resources given their interest in protecting the biodiversity and ecosystems within their EEZ.**

Adjacency and cultural connectivity

In addition to state-level dependencies, many coastal Indigenous Peoples have, through millennia, developed innovative and well-functioning systems of marine resources management that rely on a cultural context, and tradition as well as an intimate, dynamic and long-term knowledge of local ecosystems from the tropics to the Arctic (Hickey, 2006; Hoffman, 2002; Berkes et al, 2000; Huntington; 2000; Johannes, 1978; Ruddle, 1985). With the total seafood consumption of these Indigenous Peoples estimated at over 2 million metric tonnes per year (equal to about 2% of global fisheries catch; Cisneros-Montemayor et al. 2016), the high dependency specifically of these communities on stocks must taken into account. The cultural, social and economic significance of marine resources for Indigenous Peoples notably includes species that migrate long distances throughout the High Seas and local coasts, including sea turtles, whales and other cetaceans, salmon, sharks, and tunas. With over 27 million Indigenous peoples distributed across the world's marine coasts (Cisneros-Montemayor et al., 2016), the connections between marine species in ABNJ and Indigenous Peoples are extensive. Thus, for Indigenous Garifuna, Haida, Tsimshian, Inuit, Maori, Polynesian, and Seri communities, among many others, highly migratory species hold economic and social value and are also deeply important for cultural identities.

Coastal communities are custodians of many globally-significant migratory and fisheries species straddling between coastal waters and the High Seas, and are also often the first to suffer if these species are overexploited or face declines due to inadequate management in areas beyond national jurisdiction. These losses may negatively impact food security, as is the case with fisheries, but also income, for example where ecotourism takes place on community-managed sea turtle nesting beaches, as well as cultural identity. Case study 3 below highlights this connectivity of migratory species to Indigenous communities in particular.

The role of Traditional Knowledge in informing the application of adjacency

As defined by the CBD, traditional knowledge refers to the knowledge, innovations and practices of indigenous and local communities around the world. Traditional ecological knowledge in coastal regions is gained through generations of intimate, first-hand experience in observing and caring for marine species and environments (Drew, 2005; Berkes et

Case study 3: Pacific salmon

For millennia Indigenous Peoples have relied on the harvest of wild salmon populations, enabling food security and the development of indigenous culture and settlements along the Pacific coast of North America (Ames 2003; Lepofsky et al., 2005). Today, Indigenous Peoples have modernized some of their harvesting techniques, yet their reliance on salmon populations remains unaltered. Indigenous communities on the west coast of North America, including those on connected river basins hundreds of kilometers inland, rely strongly on the diversity and abundance of North Pacific salmon (Nesbit & Moore 2016), which is in turn are highly affected by the management measures taken across their life histories and distributions.

Migrations of Pacific salmon (Oncorhynchus spp) link the High Seas with coastal ecosystems and indigenous communities. The native range of Pacific salmon encompasses the North Pacific Ocean and coastal ecosystems of eastern Asia and western North America. Salmon reproduce in rivers and lakes, sometimes at distances over 1000 km inland. They rear in freshwater for up to several years then undergo migrations to feed in the ocean. Ocean migrations are extensive, sometimes exceeding 10000 km between natal streams, the High Seas, and back. Asian and North American salmon populations mingle in the High Seas. After feeding and growing for up to several years in the ocean, salmon complete their life cycle by returning to natal streams and lakes to spawn and die.

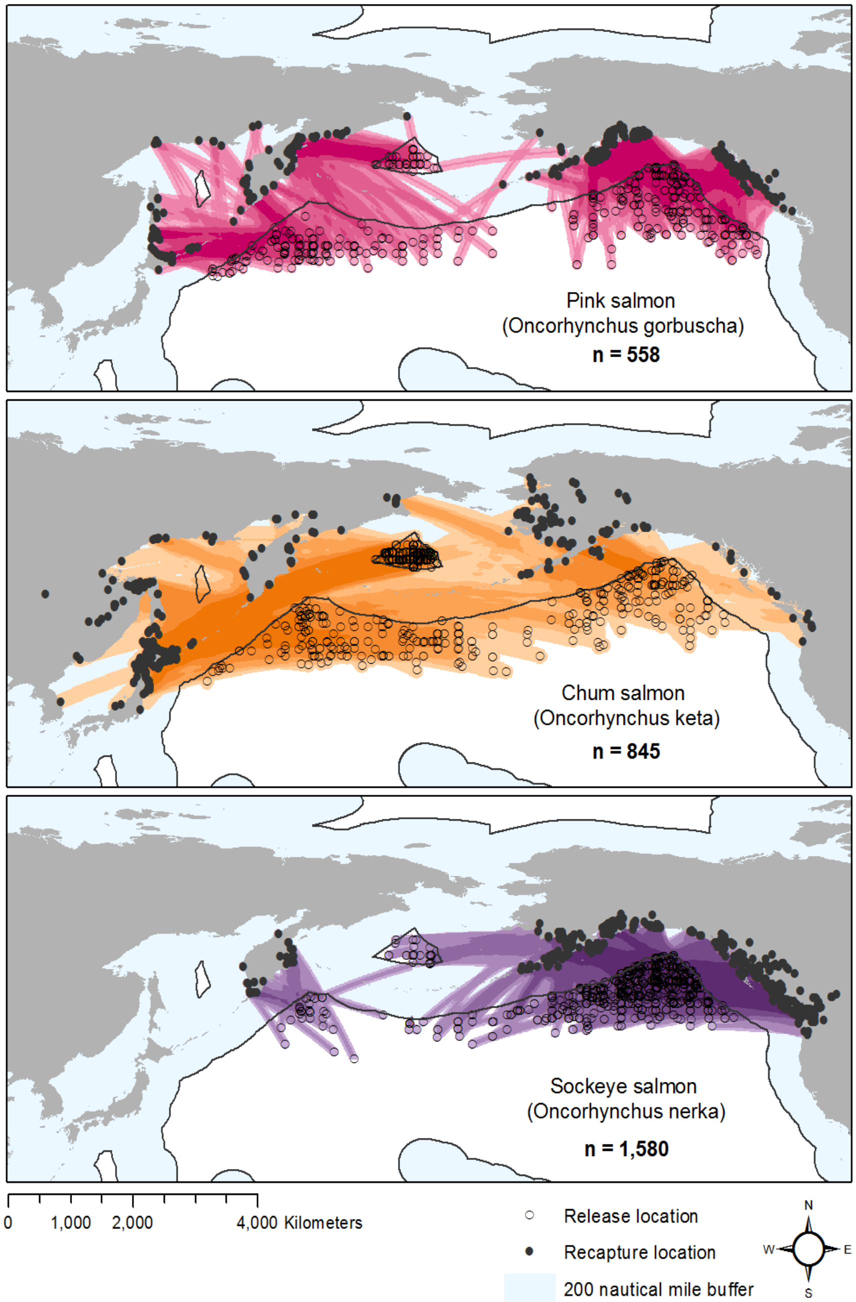

Figure 2: Migratory movement patterns of three species of salmon across the North Pacific Ocean tagged in ABNJ and recaptured within the EEZs of the U.S., Canada, the Russian Federation, Japan & South Korea, where they are harvested by different coastal Indigenous Communities. A. Pink salmon (Oncorhynchus gorbuscha). B. Chum salmon (Oncorhynchus keta). C. Sockeye salmon (Oncorhynchus nerka).

The long-distance migrations of salmon expose them to capture in diverse fisheries, including in-river, coastal, and High Seas fisheries. High Seas fisheries are governed by the North Pacific Anadromous Fisheries Commission (NPAFC) whose member nations include Canada, Japan, Republic of Korea, Russian Federation, and USA. Since 1992, directed fishing on salmon in the High Seas has been prohibited. However, enforcement over the vast North Pacific convention area is difficult. Beyond monitoring, there is a need for cooperative governance of other aspects of fisheries management (e.g., release of hatchery salmon) that influence feedbacks between the productivity of the High Seas commons and indigenous salmon fisheries (Peterman et al. 2012).

This conception of the prioritization of coastal States' interest in the management and conservation of anadromous species in adjacent areas is in line with how we view adjacency from a legal and ecological standpoint. However, lack of consultation with IPLCs weakens the claim by coastal States for priority in the management of the Bering Sea Donut Hole and other adjacent areas.

al., 2000; Huntington, 2000). The long time-series associated with traditional knowledge are important for assessment, monitoring and, most directly related to the topic of adjacency, studies relating to the ecology and behavior of animals, as well as anticipated impacts from climate change (Drew, 2005; Alexander et al., 2010). Importantly, traditional knowledge is inseparable from its cultural context, and indigenous cultures in their entirety can also provide us with valuable lessons on how to improve governance and management of the global ocean commons, including when and how to prioritize the perspectives of coastal States.

The major advantages of incorporating traditional knowledge into the application of adjacency, and in governance of areas beyond national jurisdiction, include (as detailed in Drew, 2005):

1. *Location-specific knowledge. In remote or poorly studied areas, traditional and local knowledge are a vital source of biological and ecological information. Traditional Knowledge can also be used to validate global models of species distribution or climate change, and is particularly useful providing information about specific areas such as juvenile habitats or spawning aggregations, as well as information about climate-related phenomena.*

2. *Increased knowledge of ecological connectivity and linkages. Many Indigenous Peoples view their environment in a holistic fashion and may be aware of various ecological processes, multiple species and abiotic factors that influence species biology. Examples include knowledge of trophic structures and migration movements of fishes and other marine species, as well as the behavior of species, that has been accumulated due to a long association with a particular place.*

3. *Local capacity-building and power sharing. For cultural reasons, the discourse of management is predominantly a one-way transfer of knowledge and power from the manager to the user or community. Developing local capacity through training, education and cultural empowerment can help reduce these inequities. Creating a governance regime where indigenous peoples and/or community members are equal partners with managers is critical to the overall intellectual development within the host country, and results in more durable management solutions.*

Traditional Knowledge about migratory species and their behavior exists in many coastal communities, and this knowledge, either alone or combined with science, can improve our understanding about migratory routes throughout the entire life cycle of a species; oceanic areas that are important for a specific species; and areas that should receive a higher degree of protection. For example, Traditional Knowledge has contributed to the collection of information about habitats used by, inter alia, whales (Huntington, 2000), and sea turtles (Jit, 2007), as well as the location of fish spawning aggregations, some of which have subsequently gained protected area status in countries such as Belize (Heyman et al, 2001), Palau (Johannes et al, 1999) and the Solomon Islands (Aswani and Hamilton, 2004). The importance of Traditional Knowledge for the identification and description of Ecologically or Biologically Significant Marine Areas (EBSAs), both in areas within and beyond national jurisdiction, has been recognized by the CBD.

Thus, the incorporation of the best available knowledge into the governance of marine areas beyond the limits of national jurisdiction would also include the incorporation of Traditional Knowledge in areas where such knowledge systems are still in use. Traditional Knowledge can be combined with science for best results, as is already routinely done by the Arctic Council (e.g. Arctic Biodiversity Assessment, Arctic Marine Shipping Assessment and Arctic Climate Impact Assessment) and by the CBD and the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES). It would then follow that capacity building would also take into account strengthening the use of Traditional Knowledge, innovations and practices in areas where they have an important role to play in ocean governance. To that end, capacity building efforts by the CBD Sustainable Ocean Initiative have sought to incorporate Traditional Knowledge and IPLC experts.

Indigenous Peoples and local coastal communities need to be involved in considerations of adjacency, and ABNJ governance more broadly, for three key reasons: (i) Communities value and depend on highly migratory species culturally, socially and economically, including for their food security; (ii) The life histories of these species span entire oceans and are subject to threats and pressures beyond the control of any one entity; and (iii) The knowledge, innovations and practices of Indigenous Peoples and local coastal communities can enrich the diversity of available approaches and solutions, and elaborate on principles that are of direct relevance for governance of marine areas beyond national jurisdiction.

Acknowledgements

We kindly acknowledge the extremely constructive and timely feedback on this brief from Robin Warner, David Johnson, Kristina Gjerde and Dana Baker. This policy brief is part of the Nereus Scientific & Technical Briefs on ABNJ series. The series includes policy briefs on 1) Area-based management tools, 2) Climate change in oceans beyond national jurisdictions, 3) Open data, 4) Tech transfer, 5) AIS data as a tool to monitor ABMTs and identify governance gaps in ABNJ fisheries, and 6) Impacts of fisheries on open-ocean ecosystems. All briefs are available at nereusprogram.org/briefs. The briefs were organized by Dr. Daniel Dunn, Nippon Foundation Nereus Program Senior Fellow & Assistant Research Professor in the Duke University Marine Geospatial Ecology Lab. Please contact daniel.dunn at duke.edu for any further inquiries. This brief was produced under the auspices of the Nereus Program, of which the Nippon Foundation is a collaborating partner. However, the Nippon Foundation is not responsible or liable for the content, accuracy, completeness, legality, or reliability of the information contained within the brief. All briefs are the product of the specified authors, not the organiser or Nereus. We thank them for their incredible generosity with their time and effort to inform this important process.

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