Nuclear-Weapon-Free Zones and Contemporary Arms Control

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Abstract

Nuclear-weapon-free zones (NWFZ) can offer increased nuclear security and stability for the "second nuclear age." This article surveys existing NWFZs and describes their goals and the role of nuclear-armed states in creating and maintaining the zones. Finally, it evaluates the prospects for creating three new NWFZs as a productive contribution to disarmament and nonproliferation including nuclear zero.

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Whether the "second nuclear age" is more dangerous than the Cold War is a hotly contested topic among scholars and practitioners of nuclear security. On one hand, a recent issue of the *Bulletin of the Atomic Scientists* warns of a new nuclear arms race as all nuclear states except North Korea actively modernize and upgrade their existing arsenals in competing efforts to alter the balance of military power.[1] The strategic situation is complicated by investments in new nonnuclear strategic weapons such as offensive cyber weapons, precision-strike missiles, antiballistic missile systems, anti-satellite weapons, and artificial intelligence technologies. Regional security environments are deteriorating, especially in and around the Asian continent, as opponents of the United States use "gray zone" strategies to push back against US influence and extended deterrence.[2] In the United States, the 2018 *Nuclear Posture Review* is clear in recommending investment in submarine-launched cruise missiles and low-yield nuclear weapons. These modernization efforts feed on one another as investments in the nuclear forces of one state spur adjustments and investments by others, connecting global and regional nuclear rivalries in a single dangerous dynamic.[3] Two dark predictions of the second nuclear age—increased proliferation and intensification of rivalries—seem to be coming true.

On the other hand, several objective metrics suggest that the second nuclear age has actually been more stable and secure than the first in terms of the risk of nuclear use. Political scientist Christopher Fettweis argues

that the current nuclear era is "better in most ways" and that this fact is "plain and irrefutable."[4] In addition to reductions in the frequency and intensity of many forms of violence, he points to the lack of leakage from nuclear weapon states—both intentional and as a result of theft—and the prevalence of "reverse nuclear proliferation." Anxiety about the supposedly heightened risks of the current nuclear era, he explains, is largely the result of golden age thinking and imperfect memories of the Cold War—as well as overhyped concern about a nuclear North Korea that he argues has generally been rational and restrained. The number of nuclear actors is the same as at the end of the Cold War (swapping South Africa for North Korea) and the number of warheads drastically lower. From this perspective, the nuclear security situation is better than before.[5]

These sharply differing assessments of the contemporary nuclear era suggest the importance of a renewed push for arms control. Arms control refers to any efforts to "limit the numbers, types, or dispositions of weapons."[6] International arms control agreements typically involve reciprocal, mutual constraints on weapons capabilities by at least two states. Nuclear-weapon-free zones (NWFZ) formalize this mutual constraint on a regional basis. They serve the purposes of nonproliferation and disarmament, thereby achieving security from nuclear weapons through institutionalized mutual restraint. A reassessment of regional NWFZs is especially warranted at this time because the current outlook for arms control is considered bleak, in part because of credibility issues with the Nuclear Non-Proliferation Treaty (NPT).[7] This article surveys existing NWFZs, with a special focus on their goals and the role of nuclear weapon states in creating and maintaining them. Finally, the article evaluates proposals for three new NWFZs as a productive contribution to disarmament and nonproliferation. New or expanded NWFZs can make a productive contribution to nuclear security and stability, but they may be most useful and feasible in a modified form.

Existing Nuclear-Weapon-Free Zones

Nuclear-weapon-free zones are a core part of the larger nuclear control regime. The concept of NWFZs pre-dates the NPT but is explicitly endorsed by it. Article VII formally defines the right for states to create regional NWFZs "to assure the total absence of nuclear weapons in their respective territories."[8] The idea of NWFZs received significant support at NPT review conferences throughout the 1970s and 1980s.[9] In its most basic version, a full *nuclear-weapon-free zone* is defined in United Nations General Assembly (UNGA) Resolution 3472 B (1975) as "any zone, rec-

ognized as such by the General Assembly of the United Nations, which any group of states, in the free exercise of their sovereignty, has established by virtue of a treaty or convention whereby: (a) The statute of total absence of nuclear weapons to which the zone shall be subject, including the procedure for the delimitation of the zone, is defined; [and] (b) An international system of verification and control is established to guarantee compliance with the obligations deriving from that statute."[10]

The same resolution also defines the "principal obligations" that nuclear weapon states have toward NWFZs and the states included in those zones. Nuclear states are required ("shall undertake") to participate in a treaty, convention, or protocol that obligates them to respect the "total absence of nuclear weapons in the zone," refrain from supporting any violations of the NWFZ, and "refrain from using or threatening to use nuclear weapons against the States included in the zone."[11] In other words, the nuclear weapon states are technically obligated to provide formal negative security assurances to the members of a NWFZ. Most NWFZs contain protocols for this purpose.

The creation of NWFZs has been generally supported by United Nations agencies and processes, although most individual NWFZs have been negotiated through regional initiatives and institutions.[12] A basic model for regional NWFZs emerged during the Cold War, so most extant agreements share similar design features. Depending on how one counts, nine NWFZs exist today. The zones share a core requirement of banning the deployment and use of nuclear weapons in a particular zone, but they vary significantly among other metrics: what activities they ban, how they calculate the covered zone, verification mechanisms, connection to international bodies like the International Atomic Energy Agency (IAEA) and NPT, and buy-in from extrazonal states—especially nuclear weapon states. There are two basic types of NWFZs: agreements covering the global commons and those covering groups of sovereign territorial states. Several states have declared a unilateral NWFZ within their territories, most notably Mongolia, but the prototypical NWFZ—and the one defined by the UNGA in 1975—involves groups of states.

The first NWFZs were established in global commons: Antarctica, outer space, and the international seabed (table 1). In each of these cases, the nuclear superpowers sought to cooperatively restrain themselves to avoid the expansion of the Cold War arms race into new parts of the planet, which could lead to dangerous and expensive new forms of competition.[13] At the times of negotiation, neither the United States nor the Soviet Union was strategically or financially committed to new nuclear

deployment configurations in these spaces. The Antarctic, Seabed Arms, and Outer Space Treaties were "agreements to maintain the status quo."[14] These three agreements are different than the archetypical regional NWFZ because their zones are coextensive with global commons, negotiations were initiated by the nuclear superpowers, and the treaties cover broader content and enjoy wider participation by the international community.

Table 1. Current nuclear-weapon-free zone agreements (in force)

				What is prohibited for nuclear weapons?					
Year in force	**Agreement**	**Zone**	**Type**	**Manufacturing**	**Testing**	**Storage/Basing**	**Transit**	**Waste**	**Peaceful Explosions**
1961	Antarctic Treaty	South of 60 degrees	Commons		X	X		X	X
1967	Outer Space Treaty	Global	Commons		X	X			
1968	Latin America NWFZ	Member territories and ocean areas	NWFZ	X	X	X			
1971	Seabed Arms Limitation	Seabed beyond 12 nm	Commons		X	X			
1986	South Pacific NWFZ	Member territories and ocean areas	NWFZ	X	X	X		X	X
1997	Southeast Asia NWFZ	Member territories and ocean areas	NWFZ	X	X	X		X	X
2009	African NWFZ	Member territories	NWFZ	X	X	X		X	X
2009	Central Asia NWFZ	Member territories	NWFZ	X	X	X		X	X

Regional NWFZs cover member state territories, including territorial seas and airspace (see table 1). Almost two-thirds of UN member states are also members of a regional NWFZ. The first regional NWFZ in Latin America "served as both a call and a blueprint" for additional NWFZs, and subsequent agreements explicitly worked from the model it created.[15] Later agreements added new features, such as prohibiting nuclear waste and peaceful explosions and requiring cooperation in environmental remediation of nuclear waste areas.[16] These agreements too were praised for their "strong message" and "demonstration effect" for other regions to establish their own NWFZs.[17] Proponents of arms control hoped that

NWFZs could grow incrementally and network together to create a zone of peace that would cover most or all of the planet.

Goals of Nuclear-Weapon-Free Zones

NWFZs are explicitly intended to contribute to the larger project of total global disarmament. The first regional NWFZ, the Treaty of Tlatelolco, was more strongly motivated by disarmament than nonproliferation as an objective.[18] The establishment of a NWFZ is a gradual, incremental approach to disarmament by slowly and painstakingly ruling out portions of the planet for nuclear deployment and use and by locking in the status quo after disarmament by regional states.[19] In the case of the Central Asia NWFZ, the agreement made permanent (indefinite) the prior relinquishment of Soviet nuclear weapons systems and infrastructure. Other former proto-nuclear states that are current members of the NWFZ include Brazil, Argentina, South Africa, and Libya. The protocols attached to the NWFZ also represent a formal request for negative security assurance from the five recognized nuclear powers, which, when acceded to, restrain the possibilities for nuclear use. Such legally binding negative security assurances are intended to provide more certainty and reliability than unilateral security assurances. Beyond the practical goal of reducing scenarios for nuclear use, the formal and public commitment to the goal of nuclear disarmament may provide a degree of prestige to nonnuclear states, which through their endorsement of and participation in the NWFZ are taking a principled stance against the deployment and use of nuclear weapons. This formal position also strengthens the norms against nuclear weapons possession and use both globally and regionally.

NWFZs are also intended to enhance regional security. In many cases, the pursuit of a NWFZ is described as a matter of urgency to stave off emerging tensions or risks.[20] Most basically, NWFZs promote dialog and enhance confidence among member states. But they are also designed to regulate the deployment of nuclear weapons.[21] The NPT did not prohibit the nuclear powers from stationing weapons in the territories of otherwise nonnuclear states, meaning that a region without a nuclear weapon state could still contain nuclear weapons.[22] Historically, when one nuclear weapon state establishes a military presence in a region, this invites competition from other nuclear weapon states, "thereby turning the region into a zone of tension and confrontation."[23] Even if tensions are low, the mere existence of a nuclear weapon in a region could be considered dangerous because of the risk of accidents or theft (although this risk may be overestimated). NWFZs are a way for member states to prevent nuclear

risks from spilling into their region by prohibiting basing, stationing, or installations managed by nuclear powers.

Verification mechanisms vary between NWFZ agreements, including "national technical means," special bilateral or regional organizations, reliance on IAEA safeguards, and combinations of all of these. The system created by the Tlatelolco Treaty—which relies on the IAEA, a new regional organization, and a bilateral commission between Argentina and Brazil—is often identified as a successful and useful model.[24] The addition of new mechanisms for monitoring and verification is a key advantage of NWFZs compared to simply relying on existing global nonproliferation regimes. In general, NWFZ agreements expand the set of potential violations, add functions associated with information sharing and consultation, and create procedures for complaints or potential violations.[25] Verification mechanisms are especially important for ensuring the durability of a NWFZ in the context of mistrust or conflict between regional actors.[26] In some cases, there are separate provisions for verification of the dismantling and destruction of existing nuclear devices and the conversion of nuclear production facilities. No regional NWFZ includes a mechanism for verifying the activities of extrazonal states. But NWFZs can place formal conditions on the relationship between nuclear weapon states and their nonnuclear regional allies. Even when states are formally under the "nuclear umbrella" of a nuclear ally, they can prohibit the basing of that ally's weapons in their territory through participation in the NWFZ agreement.

NWFZs also, somewhat obviously, serve the goals of nonproliferation by prohibiting the emergence of nuclear states in the regions they cover. Participation in NWFZs has been described as "one of the most practical steps that non-nuclear weapon states can take to help bolster the nonproliferation regime."[27] Arguably, NWFZs represent an alternate track from the NPT, a means to create a nonproliferation regime through bottom-up agreements originating in and largely covering the Global South.[28] Many proponents of the NWFZ envision a set of expanding and interlocking regional NWFZs that will cover progressively larger parts of the planet.[29] Because the knowledge of nuclear weapons technology is widespread, the main obstacle to horizontal proliferation is lack of motive as opposed to lack of means. There exists a substantial, and increasing, "nuclear overhang"—the gap between the number of states that could acquire versus have acquired nuclear weapons.[30] This overhang also represents the possibility of rapid horizontal proliferation. Although most states that do not have nuclear weapons also do not want them, it is possible that in the future this situation may shift due to changes in leadership or the regional

security environment. The establishment of the NWFZ is an attempt to formally and legally solidify the nonnuclear status of particular regions. Although a NWFZ cannot physically prevent any given state from acquiring nuclear weapons, it can raise the reputation costs of doing so and also—through verification mechanisms—help ensure that other regional actors are aware of any new horizontal proliferation.

Every part of the planet is physically vulnerable; "geography provides little protection in the nuclear age."[31] This reality is the basis of criticisms of NWFZs as "politically vacuous" and "worse than mere scraps of paper" because a "nuclear-free zone" on paper is not the same as a "nuclear-safe zone" in practice.[32] NWFZs can be understood as an attempt to rewrite the geography of nuclear strategy and risk by adopting a regional form of co-binding, or mutual institutional restraint, that constructs social and legal limits to the geography of nuclear weapons.[33] And at the very least, NWFZs can reduce potential nuclear risks emanating from the region itself. Successfully imposing a geographic barrier to nuclear threats and risks requires the participation of the nuclear weapon states. The basic challenge is that the geographic reach of nuclear technology is global, so prohibiting the basing of nuclear weapons in a region does not reduce, let alone eliminate, the region's vulnerability to nuclear use. The design of all regional NWFZs includes protocols to garner participation, and require a commitment, of the five recognized nuclear powers (United States, Russia, China, France, United Kingdom). Like the NPT, however, existing regional NWFZs do not formally include the nuclear outlier states—India, Pakistan, Israel, and North Korea. Thus, NWFZs cannot fully achieve regional security from nuclear weapons without the participation of nuclear-weapon states.

Role of Nuclear Weapon States

The role and participation of nuclear weapon states in NWFZs are varied, with decreasing support over time. The Antarctic, Outer Space, and Seabed Arms Limitation Treaties have been extremely successful in limiting the scope of nuclear deployment without generating significant controversy and concern related to possible violations. This accomplishment is largely because the nuclear weapon states were centrally involved from the beginning, and they willingly accepted limitations on their military forces to avoid a costly and strategically bereft arms race. The Seabed Arms Limitation and Outer Space Treaties also allowed for considerable leeway in terms of transit of nuclear weapons and militarization in general. Traditional NWFZs face a bigger challenge—getting extrazonal nuclear

weapon states to commit to restrictions on transit, deployment, and use of their existing nuclear weapons. The nuclear weapon states initially supported the creation of regional NWFZs, as evidenced by their formal encouragement, participation in protocols, and inputs during the negotiation phase. But in general, their support and participation have weakened over time as NWFZs cover larger portions of the planet and get closer to areas of strategic interest.[34] Additionally, the four nuclear outlier states have not been invited or attempted to participate in NWFZs. While the recognized nuclear weapon states often express support for NWFZs, their rhetoric usually exceeds their practical and formal commitments.[35]

As regional actors attempt to apply the NWFZ model to more challenging political and security environments, the required commitment from nuclear-armed states becomes greater. Regions uncovered by existing NWFZs include the territory of many nuclear and ally states under the umbrella of extended nuclear deterrence. NWFZs represent a fundamental challenge to the "very legitimacy of nuclear possession" and are therefore apparently incompatible with nuclear deterrence strategies.[36] Indeed, NWFZs are understood as a "fundamentally different security alternative" to nuclear deterrence.[37] Although the reliability and utility of nuclear deterrence theory and strategy have been increasingly questioned in the second nuclear age, it remains a lodestar for the military and grand strategy of existing nuclear weapon states and their allies.[38]

Current participation by nuclear weapon states in NWFZs centers on the ratification of protocols to each agreement (table 2). None of the NWFZs cover the central sovereign territory (the metropole) of an existing nuclear weapon state. But several NWFZ negotiations were motivated in part by a history of harmful and damaging nuclear weapons activity by nuclear-armed states, especially testing.[39] All the regional NWFZs include a protocol for nuclear weapon states, and some include another protocol for extrazonal states that control a territory in the region. The negative security assurance protocols commit the five recognized nuclear weapon states to abide by the dictates of the NWFZs, including not helping any member state to violate the agreement, not stationing or storing nuclear weapons in the zone, and not using or threatening to use nuclear weapons against states in the zone. When these protocols are not signed or ratified by the nuclear weapon states, the lack of buy-in undermines the effectiveness of NWFZs as regional security frameworks.[40]

Table 2. Ratifications of security assurance protocols

			Countries ratifying security assurance protocols				
Year in force	**Treaty name**	**Zone**	**United States**	**Russia**	**China**	**United Kingdom**	**France**
1968	Tlatelolco Treaty	Latin America NWFZ	X	X	X	X	X
1986	Rarotonga Treaty	South Pacific NWFZ		X	X	X	X
1997	Bangkok Treaty	Southeast Asia NWFZ					
2009	Pelindaba Treaty	African NWFZ		X	X	X	X
2009	Semipalatinsk Treaty	Central Asia NWFZ		X	X	X	X

Negative security assurances are a primary way that NWFZs contribute to disarmament, as opposed to just nonproliferation, and thereby enhance regional security. But ultimately, the granting of a negative security assurance is done at the discretion of the nuclear weapon state. The first regional NWFZ, Latin America, is the only one with full participation in its protocols. The South Pacific and African NWFZ protocols also prohibit use or threatened use against territories within the region that extrazonal states are internationally responsible for, such as Diego Garcia in the Indian Ocean (the location of a US/UK military base). The Bangkok Treaty protocol goes even further and commits nuclear weapon states not to use or threaten to use nuclear weapons "within the Southeast Asia Nuclear Weapon-Free Zone," which includes the continental shelves and exclusive economic zones (EEZ) of member countries. This added detail is one of the main reasons that none of the nuclear weapon states have ratified the Bangkok protocol.[41] When nuclear weapon states do ratify protocols, they often include interpretative declarations to clarify what they believe they are still able to do.

The United States has been particularly reticent to participate in protocols, although it has assisted in negotiation of this aspect of NWFZs.[42] Its only ratification of a NWFZ security assurance protocol, in Tlatelolco, was significant in part because the United States committed to denuclearize its territories in Puerto Rico, Guantanamo, and the US Virgin Islands.[43] By the time of the next agreement, Rarotonga, the United States had decided that it did not want to set a precedent of participation, as the number of NWFZs was apparently growing and participation "would po-

tentially undermine its policy of deterrence, and . . . limit its future ability to meet its security commitments worldwide."[44] Negative security assurances are also incompatible with the concept of extended deterrence, or nuclear umbrellas, a global strategy used by the United States to cement its network of alliances.[45] Although some countries under the US nuclear umbrella, such as Australia, have participated in NWFZs, in general these states are more hesitant to endorse strong calls for disarmament and the withdrawal of extended deterrence commitments.[46] This situation presents major obstacles to the effective functioning of existing NWFZs and raises serious doubts about the creation of new ones.

Nuclear weapon states—especially the United States and Russia—are particularly sensitive about potential barriers to transit of nuclear weapons through or across particular regions. Indeed, as the amount of the planet covered by NWFZs expands, nuclear weapon states have tended to lose enthusiasm over possible new restrictions on the movement of nuclear-armed delivery vehicles.[47] But four of the five regional NWFZs explicitly grant member states discretion over the transit of nuclear-armed ships and aircraft through their territories, and the other—Tlatelolco—has generated an informal consensus interpretation that member states also have this right. And since there is no verification mechanism for extrazonal states, and nuclear states rarely disclose whether their vessels are armed with nuclear weapons, it is unlikely that member states of NWFZs could effectively prohibit nuclear transit through all regional waters. Despite these practical realities, nuclear weapon states are unlikely to accept any agreement that would draw attention to or delegitimize the transit of nuclear-armed vehicles such as submarines.

This sensitivity about restrictions on nuclear transit is connected to broader concerns about maritime navigation. The Pelindaba, Bangkok, and Rarotonga agreements do include a formal provision stating that nothing in the treaties will "prejudice" the rights or exercise of the rights granted to states by the UN Convention on the Law of the Sea, including the principle of freedom of the seas and rights of innocent passage. But there are long-standing disagreements about the meaning of innocent passage, including about vessels transporting nuclear material.[48] So any reach of a NWFZ into maritime territory raises questions and concerns. Russian signature of the African NWFZ Protocol was delayed by uncertainty about whether the agreement would fully apply to the US base on the UK's Diego Garcia. The Southeast Asia agreement formally covers the EEZ and continental shelf ocean territory. The United States has also expressed concern about the coverage of the South Pacific NWFZ, which

includes large portions of the EEZ and high seas. Although this provision is understood as only an indication of "the optimal area of application," as opposed to a formally binding provision on ocean users, even the suggestion that such an outcome is desirable raises concerns for maritime nuclear weapon states.[49]

An Uncertain Future: Proposed Nuclear-Weapon-Free Zones

The existing NWFZs have a mixed, but positive, track record of helping to achieve nonproliferation and disarmament goals, especially those agreements that cover the global commons. Given the bleak outlook for unilateral, bilateral, or multilateral arms control among the nuclear weapon states, can geography-based prohibitions on nuclear weapons contribute productively to the arms control agenda? If the ultimate goal is coverage of the entire planet, the NWFZ model—in terms of the approach to negotiation and design of the instrument—will have to adjust to more challenging circumstances. New agreements may have to address currently deployed nuclear weapons by states that would prefer to maintain their nuclear forces and force structure, often as part of a nuclear deterrence strategy. Many experts suggest more tailored and limited NWFZs, moving away from the rigid twentieth-century idea of a "pristinely pure" NWFZ without any nuclear weapons–related activities.[50] The zonal element can be maintained and applied to other types of prohibitions and requirements, with the goal of increasing transparency and trust, limiting nuclear assets, and developing monitoring and verification practices. NWFZ territories could also be drawn creatively, such as within subzones of a country or countries.[51] Three potential NWFZs are currently on the table, with support from stakeholders and other proponents and varying levels of interest from the regional parties—the Middle East, the Arctic, and Northeast Asia.[52]

Each of these regions is subject to long-standing, ongoing, and/or emerging tensions among great and middle powers. These tensions are a central impediment to the negotiation of additional NWFZs, along with the power and prestige that incentivize nuclear weapon states to maintain their arsenals.[53] Historically, NWFZs have been established only after the "resolution of outstanding political and security issues."[54] These complicated regional security environments suggest that any successful NWFZ will probably need to be negotiated gradually and adopted incrementally, and its final design may need to depart from the dominant model of NWFZs in innovative ways. A NWFZ that achieves the goals outlined above will also require a robust and engaged monitoring, verification, and

compliance mechanism that can reliably make judgements about nuclear status, despite the many ways that states subject to inspection can delay or deny access, destroy evidence, conceal facilities, or provide incomplete or inaccurate reports.[55] These are challenges for the institutional design of new NWFZs, but the most proximate issue may be how to get the incremental and region-specific process started.

The Middle East NWFZ

The proposal with the most international attention is that of a Middle East weapon-of-mass-destruction-free zone (WMDFZ). The basic goal is to prevent a catastrophic regional war that uses WMDs. The proposed scope of the zone includes Iran, Israel, and all or most members of the Arab League.[56] The idea for a Middle East NWFZ was first proposed by Iran in the early 1970s and quickly taken up by Egypt.[57] There was little progress until a renewal of interest at NPT review conferences in the 1990s and 2000s. At the 2010 NPT Review Conference, participants endorsed a proposal to convene a conference in 2012 to move forward on the WMDFZ idea, with Finland appointed as the facilitator. The conference was cancelled, however, because states could not agree on preconditions for the meeting and because of a general decay of regional security conditions. The topic of a Middle East WMDFZ was again a focus of the 2015 NPT Review Conference, with strong support from Iran, among others. But no final document was adopted, and annual work meetings have failed to produce meaningful progress, in part because Israel and the United States did not attend. A key disagreement concerns the conditions of Israeli participation.

The Middle East is a challenging case for regional disarmament because it contains at least one nuclear power with strong incentives to retain nuclear forces and must also confront deep-seated animosities, mistrust, and tensions between regional actors. Support for a NWFZ in the region is broad but shallow; each regional actor imagines a version of the agreement that includes its preferred preconditions.[58] The main challenge is Israel; it has nuclear weapons but does not publically admit to having them, and it sees those weapons as an important power equalizer given its small population and territory and threatening regional security environment. Iran and Arab states pushing for a WMDFZ insist that as part of the process, Israel must accede to the NPT, submit to IAEA safeguards, and ultimately relinquish its nuclear weapons. These countries blame Israel's lack of meaningful participation in the WMDFZ project on the United States, which they accuse of applying a double standard and

shielding Israel from the nonproliferation regime.[59] They argue that Israel's nuclear weapons are bad for regional security and stability and that the real reason Israel perceives a need for nuclear weapons is to enforce its occupation of Palestine.[60]

In contrast, Israeli leaders believe that their nuclear weapons have had a stabilizing effect on the region, encouraging negotiated settlements and discouraging all-out war. Israel has also undertaken coercive counterproliferation measures against Syria, Iraq, and Iran. These counterproliferation measures, which include bombing and assassinations, seem to have had mixed, and sometimes definitively negative, results.[61] They certainly have not endeared regional states to Israel as a partner in nonproliferation. From Israel's perspective, its nuclear weapons serve as an insurance policy for the survival of the state and a deterrent against Iranian aggression. For Israel to even participate in a WMDFZ process would require holding a conference dealing with all regional security issues and establishing a "comprehensive peace" between Israel and its regional rivals.[62] Reaching this stage would entail normalization of diplomatic relations and the growth of commercial ties between Israel and states that do not currently recognize its existence.

The Middle East WMDFZ therefore seems to be stuck in a chicken-and-egg problem. Israel argues that regional security must come before a WMDFZ is possible, while the Arab countries and Iran argue that regional security is impossible without a WMDFZ.[63] Israel's preconditions—the achievement of regional peace and its own security—are viewed as a serious and shifting obstacle to the creation of a NWFZ.[64] If Israel were to meet the preconditions set by the Arab countries and Iran, namely joining the NPT and submitting to IAEA inspections, it would resolve a significant barrier to regional agreement: Israel's outlier status as an unrecognized nuclear weapon state.[65] But it is extremely unlikely that Israel would agree to modify its security strategy without substantial changes in the regional security environment that incentivize it to do so. And it is also highly unlikely that the United States would be willing to pressure Israel to relinquish its arsenal. Another complication is Iran's potential nuclear program. Although Iran has never produced a nuclear weapon, it has operated advanced fissile material production facilities and could arguably nuclearize in the future. The recent withdrawal of the United States from the Joint Comprehensive Plan of Action, and subsequent violations of the agreement by Iran, does not bode well for establishing the kind of regional security environment Israel insists is a necessary precondition.

The prospects of a Middle East WMDFZ are primarily impeded by the lack of two "crucial criteria": a common understanding of regional history and a productive relationship with the recognized nuclear weapon states.[66] Furthermore, the existence of an adjacent nuclear state—Pakistan—raises concerns about the possibility of rapid and facilitated proliferation.[67] In other words, the prevailing strategic landscape is difficult, complex, and durable. Israel does not have the option of swapping its own nuclear deterrent for the nuclear umbrella of the United States because the protocols of any WMDFZ or NWFZ would require the United States to formally agree not to use nuclear weapons in the region. Given its recent record of not participating in NWFZ protocols, there is no guarantee that the United States would agree to formal restraint in this historically volatile region. And other regional states, especially Iran, may not trust any commitments made by the United States. As a result, some commentators describe a Middle East WMDFZ as a "utopian dream" that will require "fundamental shifts in the basic positions of both sides."[68] The prospects of a WMDFZ therefore seem to depend on the success of the peace process as a whole.

In this situation progress is sure to be slow, but it may still be possible through an incremental approach. Although the prototypical NWFZ is negotiated and endorsed by all or most of the states in a given region, it is possible for regional proponents of a NWFZ to take steps toward that goal without regional consensus. Interested Middle Eastern states could perhaps join existing NWFZs, such as the African or Central Asian zones, as a demonstration of their commitment.[69] Informal, open-ended, and ongoing consultations (without preconditions) could also identify confidence-building steps that can be taken now, including information exchange, search and rescue exercises, communications network creation, and even coordinated accession to other multilateral frameworks.[70] Willing regional actors could draw on their past experiences with cooperative monitoring to construct bilateral or small multilateral monitoring and verification systems, which could be expanded or formally endorsed through a WMDFZ at a later date.[71] Each of these steps could improve the regional security environment in ways that make forming a Middle East NWFZ more possible.

A key component of any final WMDFZ agreement will be verification. Achieving transparency even incrementally will be challenging because the densely packed states of the region may fear that they are giving up information that could be used for targeting.[72] The IAEA has expressed support for the project, and Arab states have suggested using their inspection functions. Israel seems to prefer the creation of a regional verification

scheme. The model of the Tlatelolco Treaty has been identified as a useful precedent for establishing a regional-global linked verification system that puts special focus on the states that stoke the most concern about potential violations, while taking advantage of the resources, expertise, and credibility of the IAEA system.[73] A select group—comprising government officials and/or civilian experts—could begin determining the needs for regional verification and formulating options by drawing on the "rich menu of precedents" from existing NWFZ and other arms control agreements.[74] This effort could enhance the visibility of the WMDFZ project and get a "head start on the technical elements" of any final agreement.[75]

Given their connections to the region and technical expertise, the participation and support of the United States and other nuclear weapon states like Russia may be a key enabling condition for a Middle East NWFZ. Depending on assessments of feasibility and risk, the United States may determine that promoting institutionalized mutual restraint is a better option than, for example, formally extending the US nuclear umbrella to regional states. These nuclear weapon states, or other external powers such as the United Nations Security Council, could support the creation of a WMDFZ in several ways. For instance, they could offer incentives (economic or technological) for potential members, provide satellite and other data to support verification functions, or act as a mediator or arbitrator in cases of alleged noncompliance.[76] While it will be challenging to achieve the necessary level of trust and confidence between regional and external actors to make their participation effective, a good first step could include the offer of specific and practical forms of assistance.

The Arctic NWFZ

The idea of an Arctic NWFZ has been discussed by indigenous groups, academics, and civil society groups for several decades and has recently gained momentum as attention turns to the geopolitical implications of the melting ice cap. The Inuit Circumpolar Council passed a resolution calling for the creation of an Arctic NWFZ in 1986 and endorsed the idea again in 1998, and the Canadian Pugwash Group called for the same in 2007.[77] While the feasibility of an Arctic NWFZ is widely debated, many authors suggest that the idea is worth pursuing.[78] The clearest and most persuasive arguments for an Arctic NWFZ come from Adele Buckley, an active member of Canadian Pugwash. She argues that the presence of nuclear weapons in the Arctic is a "threat to global stability" and that an Arctic NWFZ can be part of an emerging cooperative security framework for the region.[79] Because the Arctic is currently experiencing major geo-

physical, ecological, and economic change, with an attendant increase in institution building, the near future may be an opportune time to invest in the idea of an Arctic NWFZ.

The main barriers to an Arctic NWFZ are the United States and Russia. The United States opposes any declaration of its own territory as nuclear free, while maintaining a ballistic missile defense system in subarctic Alaska. Russia operates an important naval base in the Arctic, and its nuclear-armed submarines regularly patrol in Arctic waters.[80] And although neither the US nor Russia bases intercontinental ballistic missiles or nuclear-armed bombers in the region, the Arctic represents an important potential route for both delivery systems. The nonnuclear Arctic littoral states of Canada, Denmark, and Norway are all members of the North Atlantic Treaty Organization (NATO); thus, they are technically committed to a collective defense strategy relying on nuclear weapons. The Arctic is therefore a very challenging case for a NWFZ, but proponents argue that now is the time to take "preventative measures" to reduce the risk of nuclear use as new scenarios for great power competition and conflict emerge along with the open water slowly replacing the multiyear ice cap.[81] Stakeholders are also interested in reducing the risk of nuclear pollution in environmentally sensitive ice-covered areas and preserving the rights of indigenous Arctic communities.

The prospects of an Arctic NWFZ depend almost entirely on the US-Russia relationship. Writing just before the Russian annexation of the Crimean Peninsula, Buckley argues that there is "room for change" in the positions of the United States and Russia—largely because the end of the Cold War has lessened the strategic imperatives for nuclear patrols in the Arctic.[82] Whether the end of the Cold War has softened the US-Russia rivalry sufficiently is a critical question for the prospects of an Arctic NWFZ. In the past several years, events such as Russia's invasion of Crimea and meddling in US elections have increased tension between the two nuclear superpowers. However, it has been noted that Arctic politics have been somewhat insulated from international politics as a whole.[83] Still, it is unlikely that either Russia or the United States would pursue the creation of a NWFZ in the Arctic, as their existing nuclear force structures and deployments include basing and transit through the region. However, Buckley argues that a NWFZ is possible through openness to a more limited version of the prototypical NWFZ and adoption of a gradual, incremental approach led by non-state actors and the nonnuclear weapon states of the region.

The final treaty design would likely encompass only a portion of the Arctic states' territories, perhaps only the regions within the Arctic Circle, because including the entire territory of member states would require complete disarmament on the parts of the United States and Russia. This plan would make the Arctic NWFZ unique among existing NWFZs because it would be the first to encompass only parts of the territories of member states. The Arctic Circle does include the Kola Peninsula, however, the location of the Russian Northern Fleet base. If the NWFZ included these facilities, the Arctic NWFZ would be unique for a second reason: it would be the first to "require the denuclearization of the Zone" as opposed to just prohibiting future nuclear basing or deployment or dismantling nuclear production facilities.[84] This is a major obstacle, as Russia has already expressed that its support for an Arctic NWFZ is contingent on such a zone not including the base on the Kola Peninsula, which hosts the majority of Russia's nuclear-armed submarines.[85] These delivery vehicles are especially critical for nuclear deterrence strategies. A reduction in the number, or shift in the basing, of Russia's nuclear-armed submarines would almost certainly require parallel and reciprocal cuts by the United States—unlikely in the medium term. A carved-out exception for the Kola Peninsula may be needed as a condition of possibility for an Arctic NWFZ.

A typical regional NWFZ would also require the US and Russia to provide one other negative security assurances and the three other recognized nuclear weapon states to provide these assurances for all regional member states. The idea of Russia and the United States issuing negative security assurances to one another is in complete contradiction to the prevailing strategy of nuclear deterrence—and therefore extremely difficult to achieve. But negative security assurances could be limited to the regions covered by the NWFZ, namely those north of the Arctic Circle.[86] They might also need to include a promise not to attack any remaining nuclear installations in the Arctic (that may be protected in carved-out exceptions) with conventional weapons, as doing so would have environmental and social impacts similar to using nuclear weapons against a conventional facility.[87] Although this approach would not completely denuclearize the Arctic or disarm member states in an Arctic NWFZ, it might still be a valuable check on the expansion of nuclear facilities and associated risks in the region.

Proponents of an Arctic NWFZ can move forward without waiting for the United States and Russia to agree to unilateral or bilateral disarmament. The lesson taken from previous NWFZs, especially in Central Asia, is that early efforts can eventually build momentum for an agree-

ment that would not have seemed possible during initial conversations.[88] Buckley argues that "the most likely successful path" to an Arctic NWFZ could be forged by the Arctic nonnuclear states, which could form the kernel of a NWFZ through multilateral agreement.[89] The basic idea is that initial cooperation among a limited regional group of nonnuclear states can contribute to confidence building, norm creation, and a learning process that eventually extends to nuclear weapons states. At the very least, an agreement among nonnuclear states can potentially restrict the deployment (and possibly the transit) of nuclear weapons in the region. Although only Denmark formally includes a NWFZ in its stated foreign policy objectives, many of the Arctic nonnuclear states have already fulfilled the typical requirements of a NWFZ agreement.[90] Denmark could initiate discussions and build consensus, with the goal of producing a formal agreement between willing states that could model cooperation, garner support within the UN General Assembly, and serve as a focal point for international pressure on the United States and Russia. Initiating these discussions with even a limited group of Arctic states could start to work out the relationship between NATO membership and future negative security assurances.[91] Such an agreement would lock in the nuclear-weapon-free status of much of the Arctic and could be designed to expand the zone covered as new members ratify. It could even create special protocol agreements for the United States and Russia to ratify one at a time, therefore bringing them incrementally into the fold of an Arctic NWFZ. A commitment by Denmark to a nuclear-weapon-free status could signal the US that it cannot base nuclear weapons in Greenland as it did during the early Cold War.[92]

Unilateral action by regional powers could assist in this process. Canada could unilaterally declare nuclear-weapon-free status, thereby outlawing the transit of radioactive material through its internal and territorial waters. Doing so may be contentious given the dispute over the status and ownership of the Northwest Passage, but arguably these narrow and ice-choked waterways are already a challenge for submarines and "very probably a de facto nuclear-weapon free zone" already.[93] Another Law of the Sea–related challenge concerns the Central Arctic Ocean, which retains a "high seas" status in international law. Although any collection of Arctic states cannot legally outlaw the deployment or transit of all nuclear weapons through this area, individual nuclear weapon states can agree to protocols prohibiting their own nuclear weapons in the Central Arctic Ocean.[94] However, verifying the cessation of typically clandestine nuclear-armed submarine patrols would present a special, perhaps insurmountable,

verification challenge. The US and Russia would likely reject any institutionalized restriction on nuclear transit through their own national waters and/or the high seas in the Arctic.

Despite the possibility of carve-outs and the leadership of nonnuclear states, the success of a potential Arctic NWFZ ultimately depends on the United States and Russia. The geographic advantage and sunk costs of existing Arctic nuclear facilities (including ballistic missile defense) makes any restructuring of nuclear forces a challenging endeavor. If a NWFZ and its protocols were to require any substantial changes, these would have to be worked out bilaterally so that the US and Russia could maintain their overall strategic postures relative to one another.[95] If either of the nuclear superpowers were willing to take unilateral measures to achieve at least partial compliance with the envisioned NWFZ, such actions could make an important contribution to the chances of reaching a final, binding, and meaningful NWFZ agreement.

The Northeast Asia NWFZ

Another potential NWFZ would be located in Northeast Asia, where several nuclear powers converge. At different times during the Cold War, the United States, the Soviet Union, and China all considered the possible utility of a regional NWFZ in Northeast Asia, especially centered on the Korean Peninsula.[96] The idea gained new momentum starting in the 1990s, when Track II diplomatic efforts got underway in Beijing, with guidance from Argentina. But optimism about the potential of a Northeast Asia NWFZ tends to wax and wane with saber-rattling and the resumption or failure of negotiations with North Korea over the status of its nuclear program. As a result, proposals for a Northeast Asia NWFZ often begin with an argument that current nonproliferation and disarmament strategies—including extended deterrence—are not working in this region.[97]

Shaped by more than a century of conflict and distrust among major actors, the regional nuclear security environment of Northeast Asia is complex. As the newest member of the nuclear weapons club, North Korea has strong incentives—including regional security, prestige, and domestic political control—to maintain its small nuclear weapons program. Nuclear powers Russia and China share borders with North Korea, while other regional powers like South Korea, Japan, and Taiwan are under the nuclear umbrella of the United States. A Northeast Asia NWFZ could serve various purposes, including nonproliferation for Japan and South Korea; disarmament of North Korea; and restraint of the deployment and/or use of nuclear weapons by China, the United States, and other nuclear

powers. Advocates of a Northeast Asia NWFZ describe the project as "an essential circuit-breaker in the downward spiral of mistrust in Northeast Asia."[98] Engines of this dangerous cycle could include the rise of China making the extended deterrence position of the United States increasingly untenable, the risk of North Korean nuclear weapons leakage or use, and the possibility of rapid proliferation by Japan and/or South Korea.

Most advocates of a Northeast Asia NWFZ assume that the full version is impossible in the current political environment and therefore propose more limited versions. The first type of limitation concerns membership. The 3 + 3 approach would include North Korea, South Korea, and Japan as nonnuclear powers making up the NWFZ, while China, Russia, and the United States would ratify protocols providing negative security assurances to NWFZ states.[99] The 2 + 3 approach would start with South Korea and Japan as nonnuclear states, with China, Russia, and the United States providing negative security assurances. The idea is that eventually North Korea would join at a later time as a nonnuclear state, a decision that would presumably be easier to make because of increased confidence in Japan's durability and South Korea's nonnuclear status.[100]

The second type of limitation concerns the territorial or technological scope of a potential NWFZ, found in proposals that include China and/or Russia as full member states. Track II negotiations throughout the 1990s and early 2000s downgraded their consensus proposal to minimize disruption to China's nuclear force structure and strategy and to protect the Russian nuclear bastion in the Sea of Okhotsk.[101] They also called for a limited NWFZ that only controlled tactical nuclear weapons and would give member states substantial flexibility to determine the overall number of weapons deployed.[102] Newer proposals tend to set aside the notion of full regional membership with limited scope in favor of blueprints that begin with an agreement between South Korea and Japan. In particular, it is suggested that South Korea and Japan design and implement a verification mechanism similar to the one adopted by Brazil and Argentina as part of their participation in the Latin America NWFZ. In so doing, South Korea and Japan could form the basis of an agreement that would expand in scope and membership over time.[103]

Current advocates of a Northeast Asia NWFZ recognize that the proposal may seem "excessively idealistic" but note that the history of stalled and failed negotiations do not suggest a more feasible alternative.[104] Like the proposed Arctic and Middle East NWFZs, the Northeast Asia zone concept relies on an incremental, confidence-building approach that creates the conditions of possibility for a full regional NWFZ. The hope is

that "embryonic security institutions" involving information exchange, communication networks, and administrative responsibilities would eventually generate trust and investment in the idea of collective regional security.[105] Ongoing diplomatic engagement between the US and North Korea as well as Japan and South Korea improves the prospects for reducing insecurity. At least one recent author believes that there is a real opportunity for the evolutionary emergence of a tacit regional settlement that includes a NWFZ.[106]

Although North Korea is a particularly recalcitrant, isolated, and entrenched nuclear weapon state, a regional NWFZ could provide two things the Kim regime has long demanded: "equal treatment under international law" and legally binding negative security guarantees.[107] These provisions would require the United States to pledge not to station or store nuclear weapons in South Korea and Japan but would not require total US disarmament. In exchange, North Korea would relinquish its nuclear weapons and materials and submit to inspections. But even if North Korea were willing to accept these terms, the United States is likely to balk at the request for a negative security guarantee, a retraction of its nuclear umbrella from key allies, and potential restrictions on the transit of nuclear-armed vehicles.[108] Unfortunately, US participation in the negative security assurance protocol is "indispensable" to the success of a Northeast Asia NWFZ.[109]

One option that would allow the United States to maintain its nuclear umbrella over South Korea and Japan involves the extension of a nuclear umbrella by China. Essentially, North Korea would participate in the NWFZ by replacing its domestic nuclear capacity with a nuclear security guarantee from China, thereby replicating the nuclear relationship between the United States and its regional allies.[110] Although this shift would require "radical reform" to Chinese nuclear doctrine, including the abandonment of its "no first use" nuclear pledge, it could serve Chinese interests by enhancing regional stability and promoting regional nonproliferation.[111] This approach—wherein China extends its nuclear umbrella over North Korea while North Korea dismantles its nuclear weapons program—may facilitate the inclusion of North Korea in a NWFZ. However, it would also be antithetical to the overall goal of a NWFZ by legitimating the use or threat of use of nuclear weapons by China and actually expanding the scenarios wherein nuclear use by China might occur.

At this stage, the United States can support a Northeast Asia NWFZ by continuing outreach to North Korea, managing alliance relationships, and dialoging with China about expectations for a future settlement.[112] Even-

tually, the United States can offer sanctions relief and incremental security guarantees in exchange for steps toward denuclearization and participation in the verification regime. Ideally, these incremental and iterative processes will shape the regional security environment in positive directions, thereby making the issuance of a negative security assurance to North Korea more thinkable. This movement can be facilitated by China, whose leverage and influence over North Korea is a key part of most proposals for a Northeast Asia NWFZ. A nonnuclear North Korea would remain a client state of China, which will have the same incentives for peace and restraint in its sphere of influence but fewer external threats to deal with.[113]

Whether a Northeast Asia NWFZ is feasible very much depends on domestic politics in South Korea and Japan. Both states are technologically and financially capable of rapid proliferation, and each has domestic constituencies who support proliferation as a response to the challenging regional security environment. The nonnuclear status of Japan and South Korea is in large part explained by the extension of the US nuclear umbrella, or positive security guarantees. The protocols of the Northeast Asia NWFZ would require the United States to remove the nuclear umbrella. The idea is that Japan and South Korea would accept the retraction of the nuclear umbrella and commit not to proliferate in exchange for negative security assurances from the US, China, and Russia. Confidence in these assurances would have to be high to garner domestic support in Japan and South Korea and to convince key stakeholders in government and industry.[114] It has been suggested that the buildup of conventional forces by South Korea and Japan could serve many of the same deterrence functions of the US nuclear umbrella, thereby making its retraction more palatable to the South Korean and Japanese defense establishments.[115]

Even proponents of a Northeast Asia NWFZ describe its prospects in restrained terms.[116] The NWFZ project reflects a liberal internationalism that has not taken root in the security policies of Northeast Asia; "all the regional players prefer the realist approach."[117] Continued missile testing by North Korea, and mixed messages about Japanese and South Korean proliferation by the US president, complicates the security calculations of regional actors. In this environment, it would be challenging to actualize some of the components of a Northeast Asia NWFZ. The extended nuclear deterrent of the United States would have to be withdrawn without stoking abandonment anxieties on the part of its allies. And if Japan and South Korea do formally commit to nonproliferation, they would be taking a risk that China would then lose interest in pressuring North Korea to relinquish its nuclear weapons.[118] Like the proposed Middle East and

Arctic NWFZs, the possibilities for a regional NWFZ seem closely tied to more general improvements in the regional security environment.

Conclusion

NWFZs have contributed positively to the overall arms control agenda, based in part on a learning process that accompanies incremental, progressive, institutionalized mutual restraint. Even when NWFZ agreements simply formalize the strongly held preferences of member states, they provide an accountability mechanism for states that may want to pursue proliferation in the future. And they have served to reorient the strategies and policies of nuclear weapon states. The Central Asia NWFZ created a "disarmament 'pocket' in a volatile region" and a historical break with the era of Soviet nuclear testing.[119] The African NWFZ formalizes and internationalizes the nonnuclear status of former proliferators Libya and South Africa. The Tlatelolco Treaty ensured that the Western Hemisphere would not be under the nuclear umbrella of the United States. But there has been a limit to how much existing NWFZs affect the strategies, policies, and force structures of nuclear weapon states, none of which have participated as members of a NWFZ. The negative security assurance protocols have been a central feature of existing NWFZs, yet the four other recognized nuclear powers were willing to ratify negative security assurance protocols when the United States has not, and will not. This suggests that these nuclear weapon states may not have perceived the protocols as a significant commitment or one that affects their ability to use nuclear weapons. Of course, the unrecognized nuclear powers of India, Pakistan, Israel, and North Korea are not asked or obligated to ratify the protocols. Consequently, existing NWFZs have made a limited contribution to the overall arms control agenda.

The prospects for near-term, full versions of NWFZs in the regions considered are not promising. Although regional stability can be a consequence of successful NWFZs, it is also an important precondition to their establishment. The Middle East zone is impeded primarily by longstanding disagreements about the causes of insecurity in the region and deep mistrust between Israel and Iran. The Arctic zone would require concerted (and coordinated) force structure and deployment changes by the US and Russia. The prospects of a Northeast Asia zone depend on fundamental shifts in the security strategies of a number of regional actors, including four nuclear weapon states. Although full versions of these proposed NWFZs are unlikely in the near term, the goal remains a valuable one. Incremental, gradual efforts toward a NWFZ can at least keep

the arms control agenda moving in the direction of progress. What is needed are "reasonable and practical ways to short-circuit the new, self-reinforcing worldwide nuclear arms race."[120] Regional-scale efforts may be more feasible because diplomats and policy makers can tailor and reshape the NWFZ to fit a regional security dynamic "with a familiarity and commitment unmatched by globally oriented institutions."[121] In a time when the international security environment discourages pursuit of arms control agreements, the interpersonal relationships between officials can be a crucial component of success.[122]

This approach to arms control also harnesses the leadership potential of nonnuclear democracies such as South Korea, Japan, Norway, Denmark, and Canada. The executives of these states could score domestic political points via the prestige associated with principled nonproliferation, which might also have the positive effect of increasing public concern about nuclear weapons. Another piece of low-hanging fruit in terms of moving the arms control agenda forward is US ratification of the remaining protocols, especially for the Africa, South Pacific, and Central Asia NWFZs.[123] Although ratification is highly unlikely during the Trump administration, it would bolster US credibility and the norms against nuclear use, with little strategic effect on the United States.[124]

After supporting the creation of NWFZs in the early decades of the Cold War (especially for global commons), the US strategic community cooled and then hardened its opinion toward NWFZs by the end of the twentieth century.[125] Although the establishment of new NWFZs may or may not serve US strategic interests at any given time, the need exists for attentiveness to shifting regional and international conditions that may alter the incentives and costs of pursuing institutionalized mutual restraint at the regional level. In the event problems with the theory and strategy of nuclear deterrence emerge or worsen, the extension of NWFZs could support an alternative route to strategic stability. Potential modifications in the design of new NWFZs suggest they could ensure, or even enhance, nuclear deterrence while still contributing to disarmament and nonproliferation.

The overall vision remains expanding the NWFZ system to include an interlocking set of zones covering progressively larger areas of the planet. The proposals for new NWFZs in the Arctic, Middle East, and Northeast Asia will be much more challenging, however, because they would directly impact nuclear weapon states—restricting their basing, deployment, and transit of nuclear weapons—and the terms of their security alliance relationships. To make the NWFZ idea more palatable for nuclear weapon states, many of the proposed designs use modified or limited versions of the

classic NWFZ model of Tlatelolco, with carve-outs and exceptions to accommodate existing nuclear force structures and to achieve compatibility with the strategy of nuclear deterrence. It is worth asking whether this departure from the NWFZ model would be important enough to undermine the utility of potential future NWFZs by diluting their overall meaning and effect.[126] Although flexibility in the NWFZ model can increase its usefulness for nonproliferation and limited disarmament in challenging regional security environments, too much flexibility may guarantee that NWFZs will never be an effective means of reaching global zero. SSQ

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