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2018 Guidance on Using the Mitigation Hierarchy to Avoid Impacts of Projects and Activities

Summary

The "Mitigation Hierarchy" is a decision-making process that can help reduce negative impacts to the CNMI's coastal resources and sensitive habitats including shorelines, wetlands, seagrass, and coral reefs. The Bureau of Environmental and Coastal Quality's Division of Coastal Resources Management (DCRM) regulates these high-value ecosystems as "areas of particular concern" and works to ensure conservation and enhancement of these essential coastal systems alongside wise development.

As DCRM's permitting program recognizes that development activities will have some environmental impacts, the emphasis of this framework lies in the scoping and planning phases. The steps of the mitigation hierarchy are intended to help projects achieve "no net loss" of coastal resources, a core management standard, in a way that is well-organized, cost-effective, and beneficial to both the environment and the project itself.

When following the hierarchy, project planners are first asked to identify and consider the potential environmental impacts of their proposed actions and then seek alternatives that would *avoid* some or most of the negative effects. Avoidance is often the easiest and cheapest way of reducing potential negative impacts, but it requires early attention. Avoidance measures include changing the timing of particularly disturbing activities (avoid groundbreaking during a resident bird's breeding season) or relocating portions of the project (avoid building a road through an on-site wetland).

After all feasible avoidance measures are incorporated into the plan, the next step of the mitigation hierarchy is to seek alternatives that would *minimize* remaining impacts. In this context, minimizing means reducing the duration, intensity and/or extent of impacts that cannot be completely avoided. Examples include reducing noise and pollution, establishing buffer areas, and recycling captured water.

The final stage of the hierarchy involves assessing the impacts that absolutely cannot be avoided or minimized by strategic changes in design or work plans and determining *offset* measures that adequately compensate for the lost resources. As a last resort, a project could propose to restore a degraded habitat (re-vegetate a cleared area after underground construction) or contribute to an off-site effort or campaign involving the same type of resource (sponsor a research project to determine drivers of shoreline change).

This publication is specifically intended to support discussions of impact avoidance and minimization in the project planning process, as well as to provide mitigation options for unavoidable impacts or for impacts that have already occurred. This paper highlights opportunities to mitigate or offset unavoidable impacts in order ensure no net loss of essential coastal resources. While compensatory mitigation is the last step in applying the mitigation hierarchy, developers and consultants have indicated that agency-supported alternatives could help inform project planning and offset dialogs. Thus, this report concludes with a list of potential projects highlighting opportunities for compensatory mitigation projects for coral reefs, seagrass, wetlands, and shorelines in CNMI.

Introduction

Application of the mitigation hierarchy and offsets are two relatively new tools used for cost-effective reduction of impacts from development on coastal resource values including biodiversity and ecosystem services. Globally, there are a growing number of mitigation hierarchy and offsets policies which are starting to have a wide influence on business practice in some sectors. The mitigation hierarchy emphasizes project planning that avoids, minimizes, and then offsets residual environmental impacts (see Figure 1). In August 2016, the Biodiversity Consultancy released a draft report, commissioned by SPC and SPREP, reviewing national policies and practices relating to the mitigation hierarchy and offsets across all Pacific Island Countries and Territories (PICTs), based on interviews and desk-research. This study found a wide range of mitigation hierarchy and offsets policies and practices across PICTs. While these policies vary significantly between PICTs, the report concluded that, overall, there are opportunities to improve practice in all PICTs and to improve policy in most PICTs.

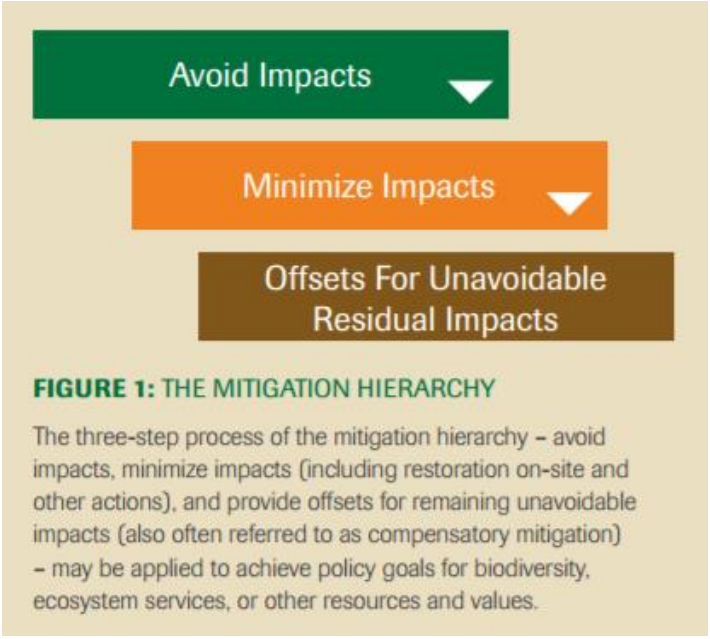

FIGURE 1: THE MITIGATION HIERARCHY

The three-step process of the mitigation hierarchy – avoid impacts, minimize impacts (including restoration on-site and other actions), and provide offsets for remaining unavoidable impacts (also often referred to as compensatory mitigation) – may be applied to achieve policy goals for biodiversity, ecosystem services, or other resources and values.

Source: TNC, 2015. See Appendix 1 for Summary of Principles.

In this report, the Commonwealth of the Northern Mariana Islands (CNMI) was found to have "high capacity, conditions, and status" as well as high risk of future impacts, and therefore, high need for implementation of a mitigation hierarchy framework. However, it is important to acknowledge that mitigation policy is already enshrined in Public Law 3-47's mandates to manage coastal resource development and mitigate significant adverse impacts as well as permit application review standards in implementing rules and regulations (NMIAC 15-10). While mitigation hierarchies have the potential to achieve multiple management objectives, the Bureau of Environmental and Coastal Quality's Division of Coastal Resources Management (BECQ-DCRM) is committed to beginning this management dialog by (1) adopting initial mitigation guidance for key coastal resources of concern and (2) supporting interagency and multi-stakeholder management dialogs moving forward. This policy primer serves to offer initial guidance for application of the mitigation hierarchy to environmentally sensitive coastal resources, including wetlands, sea grass, and coral reef habitats in the CNMI.

The Mitigation Hierarchy and Protection of Ecosystems and Ecosystem Services

Ecosystem services are the benefits accruing to human communities from the existence of natural systems. Ecosystem services include "provisioning services" such as the production of food and water, "regulating services" such as the control of climate, "supporting services" such as nutrient cycles and crop pollination, and "cultural services" such as spiritual and recreational benefits. Ecosystem services form the connection between habitats and people.[1] This is particularly important in PICTs where a high proportion of livelihoods depend on coastal ecosystem services.[2] In the TBC report, "biodiversity" is used

[1] See Barbier et al., 2011.
[2] TBC, *publication pending*.

as a shorthand term for "biodiversity and ecosystem services", however, for DCRM's purposes, the focus of the application of the mitigation hierarchy is specifically applied to coastal ecosystems. The Mitigation Hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services when planning and implementing development projects (CSBI & TBC 2015). It provides a logical and effective means for protecting and conserving biodiversity and maintaining important ecosystem services, and a mechanism for explicit decisions that balance conservation needs and development priorities.

The "Mitigation Hierarchy" can be defined as the sequence of actions to anticipate and avoid impacts on biodiversity, ecosystem services and coastal resources; a progression where, if avoidance is not possible, minimize; and, when impacts occur, rehabilitate or restore; and where significant residual impacts remain, offset (CSBI & TBC 2015). Similar guidance is reflected at the Federal level; for example, the Council on Environmental Quality (CEQ) defined mitigation in its regulations at 40 CFR 1508.20 to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing or eliminating impacts over time, and compensating for remaining unavoidable impacts. Applying the mitigation hierarchy is crucial for all development projects aiming for No Net Loss on ecosystem functions. Restoration and offset projects are also at times referred to as "Net Positive Impacts" or a "Net Positive Approach" in order to ensure that, at minimum, projects achieve no net loss objectives.

A "no net loss" policy has been in place for wetland systems in the U.S. since its articulation in the 1987 National Wetlands Forum, adoption by President George Bush Sr. in 1989. Its application in CNMI is reflected in the 1991 Saipan Comprehensive Wetlands Management Plan. As information regarding the benefits of and the threats to seagrass and coral reefs continues to grow, it is logical to work with key resource management partners and stakeholders to extend this "no net loss" or "net gain" policy to these fragile coastal systems as well in order to minimize impacts and ensure their long-term sustainable management. Until more concrete guidance and policies can be articulated in the CNMI, when entertaining major siting proposals, DCRM shall assess the application of the mitigation hierarchy to ensure that impacts to ecosystems of high concern – wetlands, shorelines, seagrass systems, and coral reefs – are first avoided and minimized and then mitigated. Mitigation activities shall prioritize in-kind restoration but may also include compensatory programs or offsets with appropriate replacement ratios as well as long-term monitoring and adaptive management are proposed. Off-site or out-of-kind projects may be considered if on-site mitigation is not available. Until Marianas-specific guidance is developed, mitigation proposals including offsets and compensatory projects shall be reviewed on a case by case basis with the goal to achieve no loss to system functions and values, in compliance with the application of the mitigation hierarchy and its implementing principles.[3]

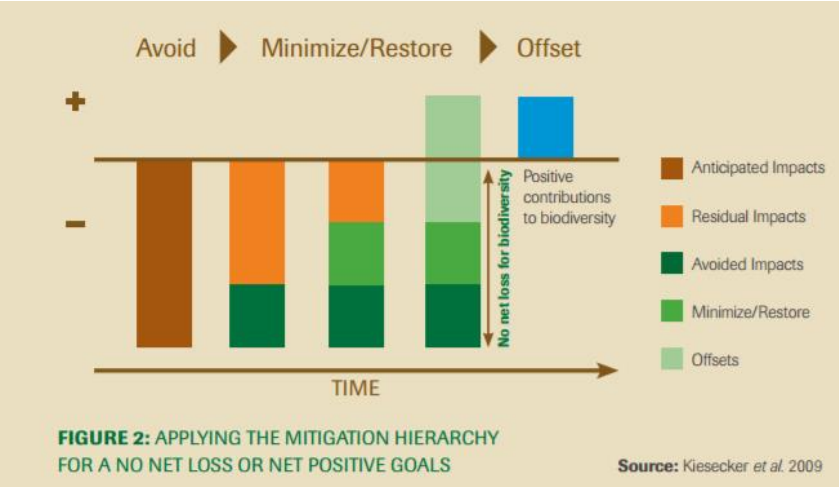

FIGURE 2: APPLYING THE MITIGATION HIERARCHY FOR A NO NET LOSS OR NET POSITIVE GOALS **Source:** Kiesecker *et al.* 2009

Source: TNC 2015, citing Kiesecker et al, 2009.

[3] See TNC 2015, Achieving Conservation and Development: 10 Principles for Applying the Mitigation Hierarchy.

As described in the Biodiversity Consultancy report, the mitigation hierarchy is a decision-making framework that parallels avoidance and minimization considerations of the National Environmental Policy Act and other environment impact assessment and decision making tools. This framework prioritizes avoidance, then minimization, then restoration, and lastly, allows for offsets to ensure proposed actions do in fact result in "no net loss", to maintain and, where possible enhance critical ecosystems and functions. This process is also intended to support more efficient project planning, enabling more expeditious agency review of permits and more cost-effective project execution in the long-run (see Figure 2). Additional details and opportunities of the application of the planning steps in the mitigation hierarchy are detailed further below.

1. *Avoidance*: the first step of the mitigation hierarchy involves measures taken to avoid creating impacts from the outset, such as careful spatial placement of infrastructure or timing of disturbance. For example, placement of roads outside of sensitive habitats or key species' breeding grounds, or timing of seismic operations when aggregations of sensitive species are not present. When feasible, avoidance is often the easiest, cheapest and most effective way of reducing potential negative impacts, but it requires resource values to be considered in the early stages of a project.

2. *Minimization*: measures taken to reduce the duration, intensity and/or extent of impacts that cannot be completely avoided. Examples include such measures as reducing noise and pollution, or capturing, recycling and treating water.

3. *Restoration*: measures taken to improve degraded or removed ecosystems following exposure to impacts that cannot be completely avoided or minimized. Restoration aims to bring back at least some elements of the original ecosystem that was present before impacts. In many ecosystems, restoration can be costly and slow and uncertain. More commonly undertaken is rehabilitation, which aims to restore basic ecological functions and/or ecosystem services (e.g. through planting trees to stabilize bare soil). Restoration and rehabilitation are frequently needed towards the end of a project's lifecycle, but sometimes can be undertaken during operation (e.g. after temporary borrow pits have fulfilled their use).

4. *Offset*: measures taken to compensate for any residual, adverse impacts after full implementation of the previous three steps of the mitigation hierarchy. Offsets are of two main types. "Restoration offsets" aim to restore degraded habitat or ecosystem functions or values, while "averted loss offsets" aim to stop anticipated loss of resources (e.g. future habitat degradation for biodiversity and function loss) in areas where such impacts are predicted to occur. Definitions differ, but herein the term "offset" is restricted to cases that deliver measurable gains that are at least as large as the residual losses for the targeted components of biodiversity, ecosystem services, or other values of coastal resources.[4]

5. *Compensatory mitigation*: The broader term "compensation" generally covers other types of actions for which there is no demonstrable quantified equivalence between the gains and the residual losses. Compensatory mitigation may be required for certain actions with unavoidable impacts under the Federal Clean Water Act Section 404 or the Endangered Species Act. For example, under Section 404, there are three mechanisms for providing compensatory mitigation, listed in order of preference as established by the regulations: mitigation banks, in-lieu fee programs, and permittee-responsible mitigation.[5]

Currently, in-lieu fee programs are not established in CNMI, and mitigation banking is limited to the Saipan Upland Mitigation Bank for the Nightingale Reed Warbler on Saipan, however, reassessment of the viability of these programs would be a timely interagency discussion. In the meantime, permittee-

[4] Maron et al. (2012).
[5] TBC (2016), citing US EPA & Army Corps of Engineers, (2008).

responsible mitigation is the only option for otherwise un-permittable loss of wetland systems under the federal Clean Water Act program. Mitigation is also prescribed for other resources under federal laws. For example, under the Endangered Species Act Section 10(a), a private landowner, county, state, or corporation — any non-federal entity— may obtain an "incidental take permit" (ITP) from the Services to engage in an activity that may cause incidental harm to a listed species, if the permittee agrees to follow a pre-approved habitat conservation plan (HCP) that is designed to minimize or mitigate the impact.

According to the US FWS and NMFS HCP/ITP Processing Handbook, mitigation actions generally fall into one or more of the following categories. Like the mitigation hierarchy discussed above, when possible, the agencies prefer to see the plans address impacts in the following order:

- Avoid the impact (such as changing the timing of the project, relocating the project, or restricting access);
- Minimize the impact (such as modifying land use practices, creating buffer areas, or reducing project size);
- Rectify the impact (such as enhancement, restoration, or revegetation of degraded or former habitat);
- Reduce or eliminate the impact over time (through proper management, monitoring, and adaptive management); or, finally,
- Compensate for the impact (such as habitat restoration or protection on- or off-site).[6]

While compensatory mitigation does have value in helping to reduce otherwise unacceptable impacts to important resources, due to the uncertainty of the success of these interventions, it is BECQ-DCRM's policy that offsets and compensatory mitigation are considered a last resort. Through the application of the mitigation hierarchy, avoidance, minimization, and restoration must be applied in the planning process, iteratively if necessary, to reduce, as much as possible, the residual impacts that a project has on critical coastal resources such as wetlands, seagrass, coral reefs, and shoreline areas. After the effective application of these planning principles, additional steps of offsets or compensatory mitigation may be required to deliver No Net Loss or a Net Positive Impact to ensure maintenance, and where possible, enhancement, of ecosystem values, functions, or services.

When Offsets and Compensatory Mitigation Are Appropriate

Offsets and compensatory mitigation are a last resort. However, these steps in the mitigation hierarchy may be necessary to reduce residual impacts of a project to acceptable levels and further "no net loss" or "net gain" objectives. Similar to federal compensatory mitigation guidance, appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain after the initial steps in the mitigation hierarchy have been applied.[7] Numerous case studies and research papers highlight that restoring or creating lost ecosystem values is a risk laden undertaking – there are often no guarantees that complex ecological functions can be replicated to replace lost ecosystem functions and values. In addition, evaluating mitigation performance and adaptive management of projects where necessary can

[6] U.S.FWS AND NMFS, (1996). See also U.S. FWS, supra note 139; and 65 Fed. Reg. 35,242 (June 1, 2000) (an addendum to the Handbook). The addendum, known as the "five-point policy," provides additional guidance on HCPs regarding: (1) establishment of biological goals and objectives for HCPs, (2) adaptive management, (3) monitoring, (4) determination of permit duration, and (5) the use of public participation. See also USDOI Mitigation Guidance, Nov. 2016.

[7] See e.g. NOAA-NMFS, 2008; DOI, 2016.

require considerable pre- and post-construction monitoring and assessment, can be time consuming and costly. Thus, multipliers are often added to offset projects in order to further ensure that the costs of a proposed action do not outweigh the sum of the benefits of the project and its mitigation plan.

Offsets and Quantifying Replacement Ratios

Offsets are not well-documented in the CNMI, and are thus, applications are somewhat uncertain in terms of potential project success. Thus, it is a best management approach that when offsets are proposed as mitigation, proposals must include appropriate replacement ratios as well as long-term monitoring and adaptive management measures to increase the likelihood of project success.

Appropriate replacement ratios must be based on lost resource area and services. Computation of lost resource services requires three assessments, (1) area of habitat lost; (2) the length of time needed for the functions associated with that area (and lost to the ecosystem at large during the period of the injury) to recover to their pre-impact levels; and (3) the shape of that recovery function.[8] Both the current benefits of restoration and any capitalized land values must be adjusted if there is a risk of restoration failure.[9] Due to the uncertain nature of offsets and need for additional research in this area, and in alignment with nationally and internationally recognized best practices in environmental planning and resource management, avoidance, minimization, and restoration, including compensatory mitigation projects, are prioritized over offsets at this time.

Potential Compensatory Mitigation Projects in CNMI

By engaging in development planning that assesses, avoids, and minimizes potentially significant impacts to coastal resources, DCRM can help to ensure that projects are implemented in ways that are both more beneficial to the environment and less likely to increase environmental risks to people or the proposed project itself. The mitigation hierarchy is a valuable decision-making tool that can and should be applied to project planning in order to create better outcomes for developers and the community of the CNMI as a whole.

The project list that follows highlights opportunities for compensatory mitigation projects in CNMI. This list is neither pre-approved nor exhaustive. Projects that will result in negative impacts to coastal ecosystems or ecosystem functions are encouraged to enter early dialogs with BECQ-DCRM to ensure avoidance and minimization are implemented and proposed mitigation will effectively address losses.

[8] M.S. Fonseca et al. / Ecological Engineering 15 (2000) 227–237.
[9] Barbier, E.B. Environ Resource Econ (2016) 64: 37.

Project Description	***Impact Category***	***Ecosystem Type and estimated enhancement value*** (✓✓✓ - High)				***Estimated Project Cost/Range***
		Coral Reefs	***Seagrass***	***Wetlands***	***Shorelines***	($ Low, $$ Mid, $$$ High)
Wetland & buffer restoration / conservation / protection	Water Quality	✓	✓	✓ ✓ ✓	✓	$ - $$
Rain garden installation & maintenance	Water Quality	✓	✓	✓ ✓ ✓	✓	$
Stormwater improvement projects – small or large-scale; in coordination w/ DPW	Water Quality	✓✓	✓✓	✓ ✓ ✓	✓✓	$$ - $$$
Watershed revegetation – Ex. Talakaya / Laolao	Water Quality	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓✓	$ - $$$
Erosion control projects – Ex. Gapgap Road	Water Quality	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	✓✓	$$ - $$$
Permeable parking lot installation	Water Quality	✓✓	✓✓	✓ ✓ ✓	✓	$ - $$
Research on sources / tracking / impacts of point / nonpoint source pollution	Water Quality	✓✓	✓✓	✓ ✓	✓	$$
Shoreline vegetation restoration	Water Quality / Habitat loss	✓	✓	✓	✓✓✓	$ - $$
Installation and maintenance of recreational mooring buoys / Aids to navigation	Habitat loss / degradation	✓✓	✓			$$
Aids to recreation – Ex. Installation of approved diving trails	Habitat loss / degradation	✓✓				$ - $$
Citizen science / community habitat establishment & support programs	Habitat loss / degradation	✓✓	✓✓	✓✓	✓✓	$$ - $$$
Biodiversity / Resilience support programs – Ex. establishment of coral / seagrass / wetland / shoreline plant nursery and/or restoration projects	Habitat loss / degradation	✓✓	✓✓	✓✓	✓✓	$$ - $$$
Research projects to improve effort / success of restoration projects	Habitat loss / degradation	✓✓	✓✓	✓✓	✓✓	$$
Establish / support community based conservation areas	Habitat loss / degradation; Ecosystem health / function	✓✓✓	✓✓✓	✓✓	✓✓	$$
Education & outreach (E&O) for Marine Sports Operators	Habitat loss / degradation	✓✓	✓✓			$ - $$
Marine debris removal	Habitat loss / degradation	✓✓	✓✓		✓✓	$ - $$

- Ex. Tasi Ranger support or MINA bin adoption						
Support for enforcement of MPAs w/ MINA / DFW	Ecosystem health / function	✓✓	✓✓		✓✓	$ - $$
E&O on the role of herbivores in ecosystem health and function	Ecosystem health / function	✓✓				$$
E&O on best fishing practices to support healthy and sustainable fish populations	Ecosystem health / function	✓✓	✓			$$
E&O on current conservation projects / ecosystem services education	Ecosystem health / function	✓✓	✓	✓✓	✓✓	$$-$$$
Research projects geared towards understanding ecosystem resilience to climate change / specific stressors	Ecosystem health / function	✓✓	✓✓	✓✓	✓✓	$$ - $$$
Research on sediment transport rates and/or pollutant removal values of wetland buffers in CNMI	Ecosystem health / function	✓		✓✓		$$
Research on shoreline change or biochemical properties of sand for beach nourishment proposals	Ecosystem health / function	✓	✓		✓✓✓	$$-$$$
Implementation of low impact access project(s) or "living shoreline" demonstration project(s) in documented highly dynamic shoreline area(s)	Habitat loss / degradation; Ecosystem health / function	✓	✓		✓✓✓	$$-$$$

For additional consultation and discussion, please contact BECQ-DCRM at (670) 664-8500.

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Appendix 1 – Mitigation Hierarchy Principles, TNC Summary

Summary Of Principles

Principles	Why is this principle important?
Principle 1. Landscape Context **The mitigation hierarchy should be applied in a landscape context.** Landscape-level assessments of conservation priorities and development scenarios should inform application of the mitigation hierarchy. They should be conducted as far in advance of project decisions and investments as possible and should identify important conservation values and potential direct, indirect, and cumulative impacts to these values.	• Mitigation is informed by an understanding of conservation priorities and potential direct, indirect, and cumulative impacts. • Potential conflicts, risks, and trade-offs between conservation and development goals are identified in advance of decisions and investments. • Important places and values for meeting landscape conservation goals, including areas where impacts should be avoided altogether, are clearly identified. • Offset actions are designed and implemented to make a meaningful contribution to landscape conservation goals.
Principle 2. Goals **Mitigation policy goals should support conservation objectives and drive accountability in applying the mitigation hierarchy.** Mitigation policy goals should provide a clear driver for avoiding and minimizing impacts, and guide offset requirements. Offsets should fully address residual project impacts to achieve, at a minimum, a "no net loss" outcome for conservation.	• The mitigation hierarchy is applied with a focus on supporting broader conservation objectives. • Application of the mitigation hierarchy is supported by a structured, transparent, and science-based foundation that drives impact avoidance and minimization and guides offset requirements. • Accountability is strengthened so that, at minimum, offsets fully address a project's unavoidable residual impacts.
Principle 3. Mitigation Hierarchy Steps **The mitigation hierarchy should be followed sequentially - avoid, minimize, and then offset impacts.** Avoidance is the first and most important step for supporting landscape-level conservation goals. Efforts to avoid and minimize impacts should be made to the maximum extent practicable – taking into account existing technology, available science, costs relative to ecological benefits, and the likelihood of success for offset actions – before offsets are considered. Offsets are then applied to address residual impacts.	• Options for impact avoidance and minimization are fully considered, including avoiding projects altogether, before offsets are considered. • Offsets are applied for residual impacts only, not used as a justification to approve projects where impacts should have been avoided or minimized.
Principle 4. Limits to Offsets **There are limits to what can be offset.** The mitigation hierarchy should be applied with clear recognition that many impacts to biodiversity, ecosystem services, and other resources and values cannot be offset. These impacts need to be avoided, as this may be the only means to prevent irreplaceable loss.	• When it is not possible to offset the impacts (e.g., due to the rarity of the resources, lack of offset opportunities, poor likelihood of offset success, etc.), project impacts are not approved, precluding the need for offsets.
Principle 5. Sustainable Outcomes **Mitigation should support long-term, durable outcomes.** Minimization and offset actions should be required to meet ecological performance standards and adhere to provisions for adaptive management, monitoring, and enforcement measures to ensure long-term and sustainable outcomes for conservation. Durability of offsets should be secured through designation mechanisms, management, and funding.	• Mitigation actions focus on maintaining key ecological functions and meeting ecological targets rather than only administrative standards. • Requirements for meeting performance standards, monitoring, and adaptive management, with regulatory oversight and enforcement, support the sustainability of minimization and offset actions. • Offset agreements include a long-term management plan that outlines necessary management measures and funding for the measures. • Offsets are sited and designed to be self-sustaining and durable.

Principles	Why is this principle important?
Principle 6. Stakeholder Engagement Practices **Mitigation should follow best practices for stakeholder engagement.** Principles for meaningful stakeholder engagement in the decision making process, including transparency, rights-based approaches, and use of science and traditional knowledge, are essential in applying the mitigation hierarchy.	• Application of the mitigation hierarchy meets generally accepted best practices for stakeholder engagement. • Meaningful stakeholder participation in decision-making processes supports better, more sustainable outcomes.
Principle 7. Additionality **Offsets should provide a new contribution to conservation, additional to what would have occurred without the offset.** Offset actions that restore, enhance, manage, and/or protect values and functions should be a genuinely new contribution to conservation with a strong probability of success. The amount and types of offsets required should be measured against project impacts to assess progress toward the mitigation policy goal.	• Offsets contribute a measurable new benefit to conservation values and functions; they do not take the place of existing or mandated conservation actions that would have been implemented without the offset. • Offsets take into account risks, uncertainties, and other factors in design and implementation in order to deliver additional conservation benefits consistent with the mitigation policy goal.
Principle 8. Equivalence **Offsets should provide ecologically equivalent values as those lost to project impacts.** Offsets should preferably be "in kind" in terms of habitat type, functions, values, and other attributes. "Out-of-kind" offsets may be appropriate in some cases where they better meet landscape-level conservation priorities and/or address past disproportional losses to other habitat types.	• Offsets either provide conservation benefits similar to those lost due to the project, or are a "trade up" to provide benefits that better meet conservation priorities.
Principle 9. Location **Offset benefits should accrue in the project-affected landscape.** Offsets should be implemented to maximize conservation benefits within a defined spatial extent or unit (e.g., watershed, ecoregion), supporting the accrual of offset benefits in the same landscape as project impacts.	• Offsets are located in the project-affected ecoregion, increasing opportunities for ecological equivalence and reducing the potential for conservation "winners and losers" (i.e., benefits not accruing to those affected). • Important ecosystem functions (e.g., flood control benefits) remain supported within the project-affected region.
Principle 10. Temporal Considerations **Offsets should protect against temporal losses.** Offsets should be designed and implemented to safeguard against temporal losses of conservation values that can occur due to the different timing of project impacts and offset benefits. At a minimum, offsets should provide a high level of confidence of protection for at least as long as the direct, indirect, and cumulative project impacts.	• Offsets are implemented in advance or concurrent with project impacts where possible and appropriate. • Temporal losses (e.g., years before offset conservation values reach maturity) are compensated for in the design and/or size of the offset. • Offsets are maintained and effective for the duration of a project's direct, indirect, and cumulative impacts on the species and ecological communities.