

***DRAFT STANDARDS FOR  
RESPONSIBLE SHRIMP AQUACULTURE***

Created by the Shrimp Aquaculture Dialogue

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Version 2.0 for Public Comment

**Note: This document does not reflect final agreement by the Shrimp Aquaculture Dialogue Global Steering Committee. Steering Committee members retain the right to debate outstanding issues and develop alternatives based on public comments, proactive outreach, and further research. Final agreement on the ShAD standards is expected in March or April 2011.**

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**Other Appendices (available at: [www.worldwildlife.org/shrimpdialogue](http://www.worldwildlife.org/shrimpdialogue))**

- Appendix IV: Escapes and Exotic Species White Paper (Principle 6)
- Appendix V: Issues Associated with Genetically Modified Ingredients in Shrimp Feed (Criterion 7.4)
- Appendix VI: Shad Steering Committee Responses to Comments Received during the 1<sup>st</sup> Public Comment Period (March 1 – April 29, 2010)
- Appendix VII: Shrimp Aquaculture Dialogue Process Document



This flag icon and textbox is used throughout the document to indicate a specific issue where public feedback would be particularly helpful in formulating an effective standard although public comment is encouraged on any part of the document.

## Introduction

Seafood is one of the most popular sources of protein worldwide. By volume, almost half of the seafood we eat is wild caught, while the other half comes from aquaculture—the fastest growing food production system in the world. Aquaculture’s contribution is expected to continue to rise while the wild caught supply of seafood is expected to diminish or remain stable as fisheries have reached their maximum production limits.

As with any rapidly growing activity, the growth in aquaculture production has raised concerns about negative social and environmental impacts related to farming, such as water pollution, the enhancement and spread of disease, escapes, habitat impacts, and social impacts to surrounding communities.

Within the aquaculture industry, some operators are better than others at mitigating the negative environmental and social impacts that result from their production. It is important that we face the challenge of identifying the key areas where production can be improved and reduce or, ultimately eliminate negative impacts while developing market mechanisms to reward and finance the improvements. One solution to this challenge is creating standards for responsible aquaculture products that reward best practice and finance improvements. Certification standards for social and environmental responsibility, when adopted and compliance appropriately verified, can help reassure retailers and consumers that the impacts related to aquaculture are minimized and mitigated to acceptable levels<sup>1</sup>. Standards can also provide aquaculture industry stakeholders with the tools to show consumers and major buyers the real cost of production, which could help to ensure that farmers are appropriately compensated for their products.

The Shrimp Aquaculture Dialogue (ShAD) seeks to develop performance-based standards for shrimp farming that define acceptable performance levels for the major negative social and environmental impacts of shrimp farming<sup>2</sup>. Every action that has an impact on natural resources could be perceived as limiting the resilience of those resources. Conversely, many human actions could be perceived as necessary for survival. The ShAD standards attempt to reduce the ambiguity between these extremes and clarify what is an acceptable level of impact. The final standards will differ from Better Management Practices in that they will define acceptable impacts rather than prescribe a specific production method. The core philosophy, in practice, is that farmers as the production experts, should be given the freedom to innovate around a collectively-defined environmental or social benchmark.

Each standard will be based on an impact which is addressed via the principles, criteria and indicators, as defined below:

Impact: The problem to be addressed

Principle: The high-level goal for addressing the impact

Criteria: The area on which to focus in order to address the impact

Indicator: What to measure in order to determine the extent of the impact

Standard: The specific metric to ensure sufficient mitigation of the negative impact

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<sup>1</sup> As defined by the stakeholders who created the standards

<sup>2</sup> A numerical result is not necessary when an indicator cannot be quantified. For example, the indicator for the principle “Obey the law,” is “Documentation of compliance with national and local regulations.” Thus, evidence of the necessary documentation satisfies the requirement.

The ShAD seeks to set performance standards at the farm-level<sup>3</sup> that are ambitious, yet practical for approximately the top 20 percent of farms to achieve – whether those farms are large or small. At the same time, the standards are intended to help protect and maintain large-scale ecosystem function and ecosystem services in shrimp producing areas, with the recognition that aquaculture operations are not solely responsible for total ecosystem health.

Created in 2007 by World Wildlife Fund (WWF), ShAD meetings have been attended by more than 400 people from a wide spectrum of stakeholders including: shrimp producers, environmental and social non-governmental organizations (NGOs), development organizations, retailers, wholesalers, aquaculture associations, academics, researchers, government representatives and independent consultants.

The ShAD's 14-person Global Steering Committee (GSC) is a voluntary group responsible for managing the ShAD process, drafting and finalizing standards based on public input and their own expertise. The GSC was formed in February 2009 and began using the input received at the regional dialogue meetings to develop global standards. The process sought to have balanced representation on the GSC from mainly NGO's and industry members; however, the process could only work with those individuals who were willing to volunteer their time and commit to the goals of the process.<sup>4</sup> This group includes shrimp aquaculture producers, representatives from environmental and social NGOs, academics and certifiers that seek to represent constituent groups larger than themselves. GSC members were committed to the aim of developing a diverse and balanced decision-making body.

The basics of the ShAD process<sup>5</sup> and the second public draft of the ShAD standards are presented in this document, along with the underlying rationales for why a particular standard was developed, how it is intended to address the identified impact, and what (if any) are the plans for continuous improvement. This document also provides initial guidance on how to audit against the standards, which is important for assessing the quality of the standard.<sup>6</sup>

Auditor checklists and guidance documents will be developed after the shrimp standards are finalized and will better explain the methodologies used to determine if the standards are being met. A The manual, geared toward producers, will explain specific suggested steps that can be taken to meet the standards. The BMP manual will be particularly useful to those producers who do not have the capability to test new and innovative techniques that could be used to meet or exceed the standards. Particular attention will be given to the challenge of small holders in this document.

The draft standards document is posted for two 60-day public comment periods before being finalized. The first public comment period was from March 1 – April 29, 2010. The second comment period will be from December 1, 2010 to January 29, 2011. All input received during the second public comment period will be considered in the final revision of the standards. Final standards are expected in the second quarter of 2011.

For complete information about the ShAD, including meeting summaries and presentations, go to [www.worldwildlife.org/shrimpdialogue](http://www.worldwildlife.org/shrimpdialogue)

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<sup>3</sup> Auditors will have to ask for verification of off farm inputs based on official invoices/receipts and other methods auditable at the farm level

<sup>4</sup> See the ShAD process document for more information on the GSC and the history of the ShAD

<sup>5</sup> See the ShAD process document for more information on the GSC and the history of the ShAD

<sup>6</sup> The ShAD recognizes that there may challenges with auditing some of these standards. However, it is expected that stakeholders will work to further develop auditing guidelines that will better ensure that the social and environmental impacts are mitigated in a practical and efficient way. The ShAD welcomes comments on auditing guidance for challenging standards.

## Understanding standard-setting, certification and a accreditation

Recognizing the link between certification, standard-setting, and accreditation is important for understanding the ShAD process.

Certification is the validation that standards have been achieved by producers. Certification may also refer to the labeling of companies, practices, operations or products that conform to the standards.

Certification schemes encompass the processes, systems, procedures and activities related to three primary functions: standard-setting, accreditation and certification (i.e., verification of compliance, also known as “conformity assessment”). Aquaculture certification schemes must be consistent with rigorous procedures for standard-setting, accreditation and certification to ensure that certification schemes are credible. With this in mind, a goal of the ShAD is to follow the International Social and Environmental Accreditation and Labeling (ISEAL) Alliance’s “Code of Good Practice for Setting Social and Environmental Standards<sup>7</sup>” when creating the standards.

For *standard-setting* (i.e., the process of creating the acceptable tolerance levels or limits of impacts), it is essential that the process is not dominated by one, or a few, stakeholder groups. The standards will be more credible and effective if they are based on the expertise and experiences of a broad and diverse group of people who are interested in and/ or affected by aquaculture (e.g., producers who use different management practices, conservationists from international and local organizations, and scientists who specialize in different fields related to aquaculture).

For *accreditation* (i.e., the process of authorizing entities to verify compliance with the standards), it is important that there is no conflict of interest between the entities that participated in the standard-setting process (in this case, the ShAD global steering committee), the entity that manages the standards (the standards holder, ASC), the entity that accredits third party certification bodies (Accreditation Services International), and the entity that undertakes the third party certification (various ASI-accredited certification bodies). Firewalls<sup>8</sup> are required between these various entities to assure that independence and credibility are maintained.

For *certification* (i.e., the process of verifying compliance with the standards), the organization that generates revenue from the labeling of products and distribution of certificates must not have any connections with the standard-setting body, as this could create an incentive to increase revenues by weakening standards. For the same reasons, the auditors determining compliance of a farm must not have a conflict of interest with the standards development body..Auditors need to be accredited to assure that audits are conducted consistently and robustly amongst different auditors. This an important element of the governance structure as there would otherwise be an incentive for auditors to audit poorly or interpret the standards loosely. For these reasons, third party certification are the most robust and credible process.

## Scope of the Shrimp Aquaculture Dialogue standards

The shrimp standards address the most significant environmental and social aspects and impacts<sup>9</sup> of shrimp aquaculture, which primarily originate from the production systems and the immediate inputs to production, such as feed, seed, chemicals and water. Social aspects and impacts related to on-farm labor and community relations are also addressed.

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<sup>7</sup> [www.iseal.org](http://www.iseal.org)

<sup>8</sup> Firewalls: to be further defined and explained

<sup>9</sup> Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services. Environment is defined as surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation (ISO).

The ShAD standards apply to the planning, development and operation of shrimp farming (grow-out) systems.

Planning: addresses farm siting, resource use or extraction; and assessment of environmental, social and cumulative impacts.

Development: addresses construction, habitat alteration and access to public areas by other resource users.

Operation: addresses effluent discharge, working conditions, continued monitoring towards avoiding or minimizing risks to people and the environment, stocking of live animals, use of antibiotics, and other chemicals as well as feed composition and use.

#### *Geographic scope to which the standards apply*

The shrimp standards apply to all locations and scales of shrimp farm-based aquaculture production systems in the world. The shrimp standards are intended for internationally traded shrimp, as it is expected that shrimp production in less-developed countries will continue to be promoted in an effort to bolster food security in those regions.

#### *Species Covered by the ShAD Standard*

The current draft covers species under the genus *Litopenaeus* and *Penaeus* but is not limited to *monodon*, *vannamei*, *indicus* and *stylirostris* species. It is important to note that the ShAD designed the standards based on the production for *L. vannamei* and *P. monodon* and will more specifically address the standards to other species in future versions. For now, where species-specific differences are made in a standard, the most stringent standard will apply to any other species not indicated.

#### *Unit of certification to which the standards apply*

In the case of the ShAD standards, the unit of certification is the farming operation. Given that the focus of the shrimp standards is on production, the unit of certification will typically consist of a single farm or some other type of collective grouping. The unit of certification could be a group or cluster of independently-owned facilities or operations that can, for a number of reasons, be considered collectively as the aquaculture operation under consideration. For example, they may share resources or infrastructure (e.g., water sources or an effluent discharge system), share a landscape unit (e.g., a watershed), have the same production system, and/or have a common market outlet. Regardless of the specific situation, farms and other users can often have cumulative effects on the environment and society. As a result, some of the ShAD standards are independent of what a producer can achieve at the farm level and rely on the efforts of the producer to act as an advocate and steward of their environment.

Under the compliance assessment of the ShAD standards, part of the unit of certification determination will include the geographic and/or receiving water body delineations in which the farm cultures or discharges. In this context, a company that owns multiple grow-out sites will be subject to compliance at the particular site or sites that are to undergo certification. Certifications will not be transferable to other farms or production systems that do not undergo auditing.

The GSC recognizes that the cost of an audit under the ShAD standards may be significant as it may require four-five days auditing with two auditors who have knowledge and understanding of both social and ecological issues. In fact, auditors with these qualifications may not exist in sufficient numbers cover all the issues noted below. The GSC is committed to working on solutions to this problem and began its work from the perspective of defining socially and environmentally

The ShAD GSC focused on developing standards that can be audited through farm records and traced through the supply chain. The GSC recognizes the auditing challenge associated with some of the proposed standards (e.g. feed sourcing), particularly in non-vertically integrated operations. Farm input issues such as feed were identified as critical issues to be addressed to ensure the credibility of the ShAD standard. The ShAD is, therefore, committed to finding solutions for these challenges.



One of the most important debates for the GSC is the issue of farm level vs. pond level certification for the ShAD standards. There is concern from some GSC members about the need for full traceability down to the pond level in order to ensure that what has been produced by a certified farm is not mixed with other non certified sources.

The GSC is considering how to address the issue of non compliant ponds in a certified farm and welcomes comments and suggestions on the following questions:

- A) Should compliant and non-compliant ponds be allowed on the same farm?
- B) Should the farm lose its certification if one pond becomes non-compliant, or should those ponds be discarded from the products that will have the right to carry the ASC logo?
- C) Should there be exceptions? If so, what should they be?
- D) Who will decide and what is the process for evaluating those exceptions?

## Consumption and Sustainability

The ShAD also recognizes that addressing the global consumption of farmed shrimp is an important issue for many stakeholders. However, addressing consumption is not directly part of the ShAD mandate and is thus not directly addressed by the ShAD standards, although many members of the GSC recognize it as an important issue. The transparency required of farms by certification will assist this discussion by more rigorously accounting for the environmental and social costs associated with shrimp aquaculture, while also allowing shrimp aquaculture to be fairly evaluated in the context of other seafood and terrestrial protein production.

## Process for creating the standards

The process for setting standards is critical, as it is foundational to standards' credibility, viability, practicality, and acceptance. The process for the ShAD standards has been – and will continue to be – multi-stakeholder, open, and transparent. Levels of participation are determined by the interest and resources of the stakeholder (for time and travel), as well as the timing of the standard setting process.

### Timeline and Key Events for the Shrimp Aquaculture Dialogue Standards

- The Consortium on Shrimp Farming and the Environment was created in 1999. The consortium included representatives from WWF, Food and Agriculture Organization of the United Nations (FAO), World Bank, Network of Aquaculture Centers of Asia-Pacific and the United Nations Environment Program. Members of the consortium identified the key negative environmental and social impacts associated with shrimp aquaculture and developed principles that address the impacts. The consortium's work was based on discussions at 140 meetings with more than 8,000 people and the publication of 40 case studies by 120 researchers.
- The final principles produced by the consortium were adopted in 2006 by FAO. Under the leadership of WWF USA, the ShAD was created in 2007. The impacts and principles identified by the consortium were the foundation for the ShAD's future work in creating criteria, indicators and standards. Although the Consortium Principles were the starting point, the

ShAD was not bound to them in any way and the final ShAD principles reflect an adaptation of the Consortium Principles.

- In 2007, ShAD participants agreed on the goals and objectives for the ShAD.
- In 2007, WWF USA notified ISEAL of the intent to apply the “Code of Good Practice for Setting Social and Environmental Standards” to the ShAD. ISEAL accepted WWF USA as an associate member on behalf of all of the Aquaculture Dialogues.
- In 2007 and 2008, three Regional Steering Committees were formed, representing people from Asia, the Americas and East Africa.
- In 2009, the GSC was made up mainly of members of the regional committees (Table 1) and no one was prevented from participating on the GSC early in the process.
- In 2010, after the first public comment there were a few requests made to the GSC for membership. The GSC evaluated this requests and determined membership by a group vote.

**Table 1 – Names and Affiliations of GSC members**

|                          | <b>Name</b>                     | <b>Organization</b>                      | <b>Sector</b>             | <b>Country</b>    |
|--------------------------|---------------------------------|--|---------------------------|-------------------|
| 1                        | Eric Bernard                    | OSO, R&O Seafood<br>Gastronomy           | Producer &<br>Distributor | Madagascar,<br>EU |
| 2                        | Michael Bowen                   | Belize Aquaculture Ltd                   | Producer                  | Belize            |
| 3                        | Pete Bridson                    | Monterey Bay Aquarium                    | NGO                       | USA               |
| 4                        | Flavio Corsin/ Pham<br>Anh Tuan | ICAFIS/ MARD <sup>10</sup>               | Producer/<br>Government   | Vietnam           |
| 5                        | Laurent Galloux                 | Bureau VERITAS                           | Certification             | France            |
| 6                        | Dominique Gautier               | Aqua Star                                | Distributor               | UK                |
| 7                        | Marc Le Groumellec              | Groupe UNIMA                             | Producer                  | Madagascar        |
| 8                        | Teresa Ish                      | Fish Choice                              | NGO                       | USA               |
| 9                        | S.Jahangir Hasan<br>Masum       | Coastal Development<br>Partnership (CDP) | NGO                       | Bangladesh        |
| 10                       | Ernesto Jack Morales            | Sustainable Fisheries<br>Partnerships    | NGO                       | Philippines       |
| 11                       | Sian Morgan                     | FishWise                                 | NGO                       | USA               |
| 12                       | Leo van Mulekom                 | OXFAM Novib                              | NGO                       | Netherlands       |
| 13                       | Mathew Parr                     | IUCN NL                                  | NGO                       | Netherlands       |
| 14                       | Jose Villalon                   | World Wildlife Fund USA                  | NGO                       | USA               |
| <b>Coordination Team</b> |                                 |  |                           |                   |
|                          | Merrick Hoben                   | Consensus Building Institute             |                           | USA               |
|                          | Corey Peet                      | Coordinator                              |                           | Canada            |

In 2009, the GSC created a process document for the ShAD (based on the general process document for the Aquaculture Dialogues) that includes criteria for decision making, commitments of GSC members, criteria for membership, etc.<sup>11</sup> From April 2007 to March 2010, six ShAD Dialogue meetings (Table 2) were held to discuss potential criteria, indicators and standards.

**Table 2 – Dates and Locations of Shrimp Aquaculture Dialogue Public Meetings**

| <b>Date</b>       | <b>Location</b>          | <b>Participants</b> |
|-------------------|--------------------------|---------------------|
| April 2007        | Antananarivo, Madagascar | 65                  |
| April 1 - 2, 2008 | Belize City, Belize      | 54                  |

<sup>10</sup> NOTE: this is a shared GSC seat that only has 1 vote

<sup>11</sup> See Appendix VII ([www.worldwildlife.org/shrimpdialogue](http://www.worldwildlife.org/shrimpdialogue))

|                     |                          |     |
|---------------------|--------------------------|-----|
| June 3 - 4, 2008    | Antananarivo, Madagascar | 62  |
| October 9–10, 2008  | Guayaquil, Ecuador       | 55  |
| November 17-18 2008 | Bangkok, Thailand        | 158 |
| March 9-10, 2010    | Jakarta, Indonesia       | 110 |

From April 2009 to November 2010, the GSC held five multi-day meetings (2-4 days each) to develop and refine the ShAD’s agreement building approach; develop draft criteria, indicators and standards; and develop and refine the ShAD’s outreach strategy. Additional GSC meetings will be held prior to the completion of the ShAD process.

**Table 3 – Dates and Locations of Global Steering Committee Meetings**

| #  | Date           | Location               | Days |
|----|----------------|------------------------|------|
| 1  | April 2009     | Brussels, Belgium      | 2    |
| 2  | June 2009      | Paris, France          | 3    |
| 3  | September 2009 | Paris, France          | 3    |
| 4  | November 2009  | Bangkok, Thailand      | 3    |
| 5  | February 2010  | Paris, France          | 3    |
| 6  | March 2010     | Jakarta, Indonesia     | 1    |
| 7  | June 2010      | Washington (DC), USA   | 3    |
| 8  | September 2010 | Paris, France          | 4    |
| 9  | February 2011  | Vancouver, Canada      | 1    |
| 10 | March 2011     | Amsterdam, Netherlands | 3    |

The ShAD began outreach with key stakeholders and regions in April 2009 and has done its best to communicate the process to all interested stakeholders. Further efforts will be made in the second public comment period.

Throughout the process, WWF US disseminated press releases, and developed/updated the ShAD website, to keep people informed of upcoming meetings and progress within the ShAD. Draft principles, criteria, indicators and standards were posted for the first of two 60-day public comment periods on March 1, 2010. Feedback received during the public comment periods will be used by the GSC to revise and finalize the standards document. All general and specific comments received, as well as the GSC’s responses to the feedback, will be posted on the ShAD website<sup>12</sup>. The intent is that final standards will be given to a new entity, the Aquaculture Stewardship Council (ASC), which will be responsible for working with independent, third party auditors to certify farms that are in compliance with the standards for responsible aquaculture being created by participants of the Aquaculture Dialogues. The ASC is expected to begin officially certifying farms in 2011.

### **Continuous improvement of the Shrimp Aquaculture Dialogue standards**

As stated in the ISEAL “Code of Good Practices for Setting Social and Environmental Standards,” standards shall be reviewed on a periodic basis for continued relevance and effectiveness in meeting their stated objectives and, if necessary, revised in a timely manner.” It is implicit in the development of the ShAD standards that the numerical values, or tolerance levels, will be raised or lowered over time to reflect new data, improved practices and new technology. These changes will correspond to a lessening of impacts rather than an increase. Changes to other components of the ShAD standards are also recognized as a way to reward better performance. It is the expectation of the GSC that the ASC will implement the proper mechanism to review and continuously improve the standards.

<sup>12</sup> [www.worldwildlife.org/shrimpdialogue](http://www.worldwildlife.org/shrimpdialogue)

## **Expectations of the Shrimp Aquaculture Dialogue GSC for standards implementation by the ASC**

The mechanism for setting the ShAD standards includes some assumptions that the spirit and vision that the ShAD GSC used to create the standards is upheld and respected by the governance mechanism of the ASC. The mechanisms for implementing the standards will not be in place by the time the ShAD is complete and the ShAD GSC will disband after the standards are finalized in mid-2011 and handed over to the ASC. Although two members of the GSC will serve on the ASC Technical Advisory Group (TAG) that will help the ASC implement the standards, members of the ShAD GSC reserve the right to publicly comment on the implementation of the ShAD standards by the ASC.

### **Information for reader: How to read this document**

The ShAD standards are divided up into seven principles as well as the introduction and appendices. Within each principle, there are tables that present the indicators and corresponding standards based on the identified Criteria. For each criterion, a rationale section explains to readers the conceptual framing behind the inclusion of the given content including the nature and evidence for the impacts. The rationale section also attempts to explain the GSC's thinking on how to address the issue either immediately, with the proposed standard or by articulating the path to continuous improvement.

The guidance section is presented after the rationale and provides further explanations of how each standard will be interpreted by auditors or implemented at the farm level. The GSC has included it in the standards document as it is a key part of judging the credibility of the standard.

When provided, the continuous improvement section explains how the members of the ShAD and the standards setting body would like to see the standards improved through time – as necessary infrastructure, information or science become available.

Definitions and additional information are provided in footnotes. Additional appendices that help clarify the scientific rationale for key issues (e.g. exotic species) are available on the ShAD website.

## Principle 1: Comply with all applicable national and local laws and regulations

*Impact: Farm operations that, intentionally or unintentionally, break the law and violate a fundamental benchmark of performance for certified farms.*

### Criterion 1.1: Documented Compliance with Local and National Legal Requirements

|       | Indicator  | Standards  |
|-------|--|--|
| 1.1.1 | Compliance with local and national laws or regulations | Proofs of permits relevant to developing, establishing, and operating a shrimp farm are available. |
| 1.1.2 | Transparency on legal compliance                       | Government issued operational permits and licenses are publicly available                          |

#### Rationale

In most countries around the world, government regulation has not been able to effectively regulate industrial activities due to the often paradoxical challenge of promoting economic growth while maintaining biodiversity conservation. This has resulted in significant environmental and social impacts in both developed and developing countries. The ShAD standards are designed to help mitigate these impacts with the suite of standards presented in this document.

Principle 1 requires certified shrimp producers to follow the national and local laws of the region in which their operations take place. It does not intend, nor is it desirable, to evaluate the quality or rigor of the legislative system of the producing country/region; rather, it ensures that the basic starting point for a shrimp farm seeking certification under these standards is compliance with national and local laws. In other words, the farm must be legal where it operates. Where necessary in subsequent principles, the ShAD goes beyond the minimum legal requirements to produce more rigorous standards. This is common practice among other certification programs.

Public transparency was included in the standards to ensure that communities that are potentially affected by the activities of the shrimp farm have access to information to ensure that the farm is operating responsibly within the country's legal system. The GSC believes that this increases the probability of them acting as a responsible neighbor.

The major challenge for the ShAD regarding Principle 1 is how auditors can effectively determine a farm's compliance with the law without the ShAD specifying which laws are important. In addition to auditor in-country experience and training, the ShAD intends for producers to present auditors with a basic outline of their country's regulatory system and provide evidence to demonstrate their compliance with the system. Cross-country comparisons of "adherence to the law" will not take place under this certification, as the other major issues of concern are addressed in subsequent ShAD Principles, thus rendering the need for legislative evaluations unnecessary. Because keeping abreast of regulatory reform on a per country basis is not feasible, the ShAD will not specify a definitive set of laws that must be in place for this certification. The core of this principle is simply that "the existing law must be followed" as the baseline entry point for certification under the ShAD standards.

#### Guidance for Implementation

**1.1.1** – The farmer must present evidence of all relevant permits including but not limited to the following: farm permits including date of issue, concessions and rights to land and/or water use, including lease agreement if relevant, information on any historical conflicts (e.g. legal actions

against the companies, etc), importation and movement of broodstock or post larvae, medicine or chemical use, waste disposal, wastewater discharge, labor, and predator control. A written assessment of all operational activities and applicable relevant legislation must be produced for the auditor, which must include all of the requirements that are listed in the guidance for 1.1.1. Documents must demonstrate that facilities were duly permitted prior to initiating construction work. The farmer is required to prevent evidence of compliance with any law required and does not need to have everything listed here if those laws do not exist in their production company. **1.1.2** – ‘Publicly available’ is defined as “in a manner accessible to or observable by the public,” which includes but is not limited to the following: consistently and reliably posted in a public place (e.g. farm signage, storefront window or on the wall of an office that is accessible to the public), or available by email, post upon request, or posted on internet websites.

**Principle 2: Site farms in environmentally suitable locations while conserving biodiversity and important natural habitats.**

*Impact: Inappropriate and unplanned siting of shrimp farms often results in production failures, environmental degradation, land use conflicts and social injustice. Thus, it is imperative that when shrimp farms are created, due consideration is given to the environment, ecologically sensitive habitats, other land use in the vicinity, and the sustainability of the shrimp farming operations.<sup>13</sup> Principle 2 covers the impacts associated with the initial siting as well as the construction and expansion of shrimp farms.*

**General Introduction**

Biological diversity - or biodiversity - is the term given to the variety of life on Earth and the natural patterns it forms. The ShAD considers the maintenance of biodiversity of critical importance, as it is a key to the preservation of healthy ecosystems. Within the ShAD there is clear recognition that ecological (i.e. biodiversity) and social (i.e. community impact/ displacement) considerations are both critical issues to consider when siting shrimp farms. One of the key challenges for the ShAD was to manage both issues in the development of the standards. The ShAD developed two principles to address these issues. Principle 2 focuses mainly on ecological considerations, while Principle 3 addresses the community impact issues. The ShAD hopes that these principles will sufficiently address both concerns and will closely consider their successes and failures in future versions.

Principle 2 attempts to adopt the approach and philosophy of international conventions such as the CBD. There is particular focus on conserving biodiversity at the ecosystem, habitat and species levels, conserving ecosystem functions, and attempting to reward ecosystem based siting and shrimp farm planning. Principle 2 also tries to approach the complexity and 'data deficiency' realities of biodiversity and ecosystems in tropical countries by focusing on single issues, such as mangroves and wetlands, as well as trying to direct the industry and relevant local governments towards a broader appreciation of biodiversity by incorporating planning tools that reflect ecosystem valuation.

**Criterion 2.1: Biodiversity Environmental Impact Assessment (BEIA)**

|              | <b>Indicator</b>   | <b>Standards</b>   |
|--------------|--|--|
| <b>2.1.1</b> | Farm owners shall commission or undertake a participatory Biodiversity-inclusive Environmental Impact Assessment (BEIA) <sup>14</sup> and disseminate results and outcomes openly in locally appropriate language. | The BEIA process and document comply with guidelines given in guidance. The participatory element (community input) is an integral part of the report. |

**Rationale**

Biodiversity inclusive Environmental Impact Assessments (BEIA) were originally developed as an effective tool by the Convention on Biodiversity<sup>15</sup>. BEIAs are mandated by the ShAD in order to ensure that existing impacts, and the risk of future impacts, are identified at the farm level and to

<sup>13</sup> As noted in the International Principles for Shrimp farming (FAO 2006), advantage should be taken of improved techniques that take into account not only the requirements of the cultured shrimp and the management of the farm, but also integrate the farm into the local environment whilst causing the minimum possible disturbance other surrounding ecosystem.

<sup>14</sup> See guidance

<sup>15</sup> <http://www.cbd.int/>

help farmers demonstrate compliance with the biodiversity and ecosystem components of the ShAD standards. BEIAs aim to ensure that biodiversity; ecosystem interests and ecosystem effects are identified and addressed in an impact assessment process. This includes related development planning and operations management. In practice, countries have different definitions and associated guidelines, although the basic process of Impact Assessment is remarkably similar.

Data availability (comprehensive maps of ecologically sensitive habitats, such as mangroves and other coastal ecosystems, and other land use in the vicinity important for local livelihoods) is currently one of the major information challenges facing standards implementation. Given the potential impact of shrimp farming on biodiversity due to farm siting<sup>16</sup> and the complexities of defining site-specific critical habitats and ecosystem impacts, the ShAD mandates the use of BEIAs for existing farms, as well as prior to the development of new shrimp farms or the expansion of existing ones. Transparency and public disclosure of Environmental Impacts Statements is also an effective method to ensure that an EIA process is relevant, fair and credible. BEIAs under the ShAD must involve some element of transparency.

The benefits of BEIAs to shrimp farmers, apart from complying with the standards in this document, is that they will obtain a deeper understanding of the importance of the local ecosystem to the sustainability and success of their operation, be able to identify which elements of their surrounding ecosystem are important for this, be able to determine which elements should be maintained in order to reduce risks of conflict with wider societal stakeholders, and be able to demonstrate good practice and overall shrimp farming responsibility. The ShAD recognizes that the costs associated with assessments could be a significant barrier for many farmers interested in ShAD certification. The ShAD is interested in comments on this aspect especially as it relates the ability to solve the cost issue. The ShAD considered many ideas to solve for the siting issues associated with shrimp farms and determined that BEIAs are the most practical way we can identify specific site level biodiversity and ecosystem impacts, allow the farm to demonstrate compliance with the ShAD standards, and account for local specificities. Depending on the size of the farm, implementation of the BEIA will require working with an NGO or an ecologist who is knowledgeable on the subject (e.g. carrying capacity, ecosystem function, etc.).

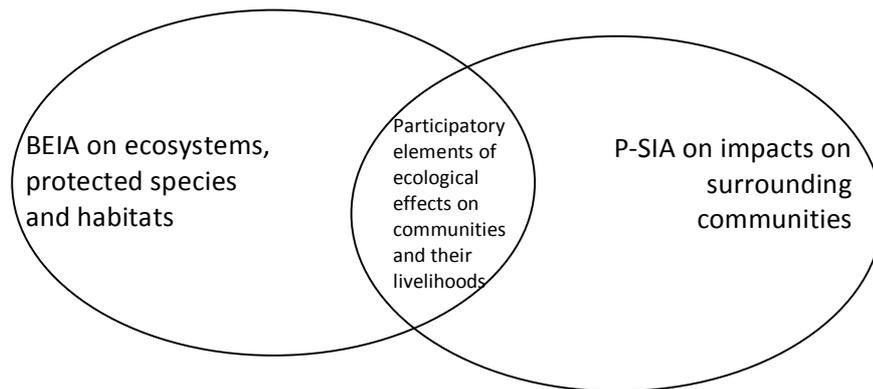
### **Continuous Improvement**

The period between now and the first standards revision should be used to develop methods to implement these best practices, with the aim of such tools being implemented after the first revision of the standards in 3-5 years.

The ShAD carefully considered the possibility of including High Conservation Value Area (HCVA) assessments and systematic conservation planning under the ShAD standards but determined that these tools are not sufficiently developed to currently work under these standards. Future versions of the standards will revisit these ideas and it is expected that HCVA and further aspects of spatial conservation planning will be incorporated. It is believed that HCVA and planning standards will improve data gathering and support governance mechanisms responsible for assuring responsible regional land/coastal zone use. Furthermore, these types of standards acknowledge that while the ShAD standards will be evaluated at the farm level, cumulative impacts can only be addressed at the landscape level. The major challenge is that these landscapes vary in different parts of the world, making it difficult to identify important areas/ habitat types that may be unsuitable for conversion. When properly implemented, these tools should result in non-prescriptive conservation planning that is ecologically sound and supported by regional stakeholders.

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<sup>16</sup> References being developed



**Figure 1** - BEIA done with assistance of an ecologist and the Participatory Social Impact Assessment (pSIA – see Principle 3) through facilitated discussions with stakeholders around the farms are brought together in consultations of farmers with the stakeholders on impacts, risks and ways to avoid, mitigate, compensate these

**Guidance for implementation**

**2.1.1:** Local government and at least one civil society organization chosen by the community shall receive a copy of this document. A peer review of environmental reports regarding biodiversity shall be undertaken by a specialist with appropriate expertise<sup>17</sup>, where biodiversity impacts are significant<sup>18</sup>. Existing farms with previous EIA’s that can demonstrate good ecological performance (e.g. demonstrate identification, mitigation and monitoring of ecological impacts based on previous studies) shall provide that information for the consideration of the auditor without need of a new BEIA. **See Appendix I for further details.**

**Criterion 2.2: Siting in protected areas or critical habitats**

|              | <b>Indicator</b>  | <b>Standards</b>   |
|--------------|---|--|
| <b>2.2.1</b> | Allowance for siting in Protected Areas <sup>19</sup> (PAs) | None, except within PAs with IUCN categories V if the farming system is regarded as traditional <sup>20</sup> land-use, or category VI if built prior to the designation of the PA. In both cases, the farm needs to be in compliance with the management objectives and plan of the PA. |

<sup>17</sup> Needs definition

<sup>18</sup> Needs definition

<sup>19</sup> **Protected Areas** : A protected area is “A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”. Source: Dudley, N. (Editor) (2008), Guidelines for Applying Protected Area Management Categories, Gland, Switzerland: IUCN. x + 86pp. PAs can be determined as National, state, provincial and local PAs.

<sup>20</sup> **Definition:** “Traditional aquaculture is an indigenous form of farming and a result of the coevolution of local social and environmental systems that exhibit a high level of ecological rationale expressed through the intensive use of local knowledge and natural resources, including the management of agro/aqua-biodiversity in the form of diversified agri and aquacultural systems.” (Miguel A. Altieri, Department of Environmental Science, Policy and Management, University of California, Berkeley)

|              |   |  |
|--------------|---|--|
| <b>2.2.2</b> | Allowance for siting in mangrove ecosystems, and other natural wetlands <sup>21</sup> of ecological importance as determined by the BEIA. | None for ponds built/ permitted after May 1999, except for pumping stations and inlet/outlet canals provided an equivalent area is rehabilitated as compensation.<br><br>For ponds built/ permitted before May 1999, farmers are required to compensate/offset impacts as determined by the BEIA |
|--------------|---|--|

### **Rationale**

This criterion focuses on areas that have protected status, are of ecological importance or have historically received inadequate protection when land has been converted into shrimp farms. Protected areas are internationally recognized as a major tool in conserving species and ecosystems. They also provide a range of goods and services essential to the sustainable use of natural resources.

Under the ShAD standards there is no allowance for siting farms in Protected Areas (PA), except within PAs with IUCN categories V<sup>22</sup>, if the farming system is regarded as traditional<sup>23</sup> land-use, or category VI, if built prior to the designation of the PA. In both cases, the farm needs to be in compliance with the management objectives of the PA. Any ponds built without permit need to be removed from the production area and the affected area restored.

For shrimp farm constructions completed with permit before the declaration of the PA, the impacts must be mitigated or compensated through restoration/conservation initiatives (as defined by the BEIA) in the PA based on its management plan. For constructions completed with permit after the declaration of the PA, any construction must comply with PA zoning and the management plan, with appropriate offsetting via restoration/conservation initiatives in the PA.

Coastal wetlands are very rich in biodiversity and are highly productive ecosystems. They are the grazing and breeding ground for many marine species and also provide habitat for a wide variety of resident and migratory birds. As such, they are considered to be critical habitats<sup>24</sup> and High Conservation Value Areas (HCVAs). HCVA methodologies are being developed rapidly in differing production contexts around the world<sup>25</sup>. However, these methodologies are not yet sufficiently developed for inclusion in the ShAD, although the GSC did carefully consider their inclusion.

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#### **<sup>21</sup> Mangrove Ecosystem**

Mangrove forests are among the world's most productive ecosystems. These are often called as 'tidal forests', 'coastal woodlands' or 'oceanic rainforests'. Mangroves are woody plants that grow in tropical and subtropical latitudes along the land-sea interface, bays, estuaries, lagoons, backwaters, and in the rivers, reaching upstream up to the point where the water still remains saline (Qasim, 1998). These plants and their associated organisms (microbes, fungi, other plants and animals), constitute the 'mangrove forest community' or 'mangal' (See Tomlinson PB (1986) *The Botany of Mangroves*. Cambridge, UK: Cambridge University Press. 413 p. for full list of true and associate mangrove plant species) The mangal and its associated abiotic factors constitute the mangrove ecosystem (Kathiresan and Bingham, 2001).

#### **Natural Wetland**

'For the purpose of this standard, natural wetlands are non-artificial (i.e. not human made) areas of marsh, fen, peatland or water, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres. They may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands'. (Appendix 7. Ramsar Wetland Definition (Ramsar, Iran, 1971), Classification and Criteria for Internationally Important Wetlands. Under the Convention on Wetlands 'wetlands' are defined by Articles 1.1 and 2.1).

<sup>22</sup>[http://www.unep-wcmc.org/protected\\_areas/categories/eng/index.html](http://www.unep-wcmc.org/protected_areas/categories/eng/index.html)

<sup>23</sup> **Definition:** "Traditional aquaculture is an indigenous form of farming and a result of the coevolution of local social and environmental systems that exhibit a high level of ecological rationale expressed through the intensive use of local knowledge and natural resources, including the management of agro/aqua-biodiversity in the form of diversified agri and aquacultural systems." Miguel A. Altieri, Department of Environmental Science, Policy and Management, University of California, Berkeley

<sup>24</sup> Critical Habitat Definition

<sup>25</sup> [www.hcvnetwork.org](http://www.hcvnetwork.org)

One of the most critical impacts of shrimp farming has been the deforestation and impact of farm siting on mangroves and other critical habitats. These habitats have been compromised by a variety of coastal development activities, including aquaculture. It is estimated that 10 percent of mangroves have been lost to shrimp aquaculture, with global losses on the order of 40-50 percent<sup>26</sup>, although these figures are extremely difficult to verify. Mangroves serve critical ecosystem functions including: stabilizing soil erosion, reducing wave energy and storm surges, diminishing the effect of high winds, filtering runoff entering coastal waters from rivers (sedimentation and biofiltering), maintaining water quality for inland aquaculture, providing habitat for many birds and marine organisms, performing a nursery function for marine and estuarine species, being used by humans for food gathering (e.g. fish, reptiles, shrimp, and crabs) and other uses (e.g. construction materials, fuel wood, employment), and carbon sequestration<sup>27</sup>.

Wetlands provide fundamental ecological services and are regulators of water regimes and sources of biodiversity at all levels - species, genetic and ecosystem. Wetlands constitute a resource of great economic, scientific, cultural and recreational value for the community. Wetlands play a vital role in climate change adaptation and mitigation. Progressive encroachment and loss of wetlands causes serious and sometimes irreparable environmental damage to the provision of ecosystem services. Wetlands need to be restored and rehabilitated, whenever possible, and conserved by ensuring their wise use. Under these standards, any farms built in these types of habitats prior to the 1999 Ramsar resolution are required to compensate/offset the habitat alterations by rehabilitating 50 percent of the area affected by the farm<sup>28</sup>.



The GSC is interested in ideas to formulate the compensation requirements for lost mangroves in an appropriate and justifiable way. The GSC's current thinking includes ideas around mandating replantation of mangroves both in and outside of the farm (such as 50% of affected areas or X% of total farm area, whichever is less). The GSC is very interested in whether a) the standards themselves should specify these requirements b) if the replantation area should be left up to findings of the BEIA or if c) the BEIA or another tool should be used to assess the ecosystem services lost and allow the farm to mitigate these in flexible ways

### **Guidance for implementation**

**2.2.1:** Although protected areas are easy to define as a conservation tool, in practice the precise purposes/ values for which protected areas are managed differ greatly. Human activities such as shrimp farms may occur within Protected Area categories V or VI according to the IUCN criteria. Certifying within PA IUCN category V or VI is only allowed with the approval of the PA management authority and stakeholders, only if there is no conflict with the management objective of the PA and is in accordance with IUCN guidelines. No new or expanded farms built after the publication of the ShAD standards will be considered for certification. Tools to be used for ensuring compliance include National Protected Area maps, EIA and HCV assessments (when available), and protected area management consent.

The location of a farm relative to protected areas will be determined via the farms geographical coordinates. These coordinates will be provided to the auditor (degrees and minutes latitude and

<sup>26</sup> Boyd, C.E. 2002. Mangrove and coastal aquaculture. Pp: 145-157. R.R. Stickney & J. P. McVey. *Responsible Marine Aquaculture*. Pp. 391.

<sup>27</sup> Twilley, R.R., Chen, R. H. & Hargis, T. 1992. Carbon sinks in mangroves and their implications to carbon budget of tropical coastal ecosystems. *Water, Air & Soil Pollution*. 64 (1-2) : 265-288

<sup>28</sup> See guidance for rehabilitation criteria

longitude) with an accuracy of two decimals in the geographical minutes (e.g. 15° 22,65' N ; 22° 43,78' E ) and shall refer to the center of the production site (smaller sites, <1 hectare.) or the corners of the contours of the larger production sites (> 1 hectare). All farms must give their designation relative to IUCN PA status in their operations manual. Ponds can be built in wetland areas previously modified for other human activity and now considered as artificial wetlands. Ponds can also be built in flood plains provided the hydrology of the area is maintained and a percentage of the natural land is not developed. This may require appropriate offsetting via restoration/conservation initiatives in the PA.

**2.2.2:** The Convention on Wetlands of International Importance, called the Ramsar Convention, provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources<sup>29</sup>. Under the text of the Convention (Article 1.1), wetlands are defined as: “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters”. In May 1999, the Ramsar Conference of the Parties declared their concern about the loss and degradation of intertidal wetlands, partly due to unsustainable aquaculture<sup>30</sup>. The Ramsar Convention urged governments to suspend the “expansion of unsustainable aquaculture activities harmful to coastal wetlands” and “identify measures aimed at establishing a sustainable system of aquaculture that is in harmony both with the environment and with local communities.” Therefore, based on the assumption that the level of awareness of governments and industry organizations was sufficient for taking effective measures to increase the protection of natural wetlands, the ShAD has used May 1999 as a reference point within the standards.

Cutting mangroves or altering natural wetlands is ONLY acceptable for building pumping stations and inlet/outlet canals. Farms sited prior to 1999 are required to reforest 50% of the area affected by the farm. Any mangrove removal must be compensated by allowing the natural re-growth or reforestation in an equivalent area, using indigenous species adapted to the specific hydrological conditions of the farm site. When reforesting, plantings shall be done to create forests with similar relative composition and must include 80percent of tree species that were in the original communities. Removal of natural wetlands must also be compensated by creating areas that possess similar ecological characteristics<sup>31</sup>. 100 percent of farms sited after 1999 are required to prove through aerial photography, satellite imagery, GIS, historical data or records, and community and non-owning farmer testaments that the current farm did not cause mangrove deforestation or natural wetland alteration. Farms sited prior to 1999 are required to reforest 50percent of the area affected by the farm. Farms shall monitor neighboring mangrove areas to ensure that negative impacts are not occurring. Factors to consider in mangrove assessments include: changes in the area of mangroves, changes in species diversity, presence of dead or dying trees, freshwater impoundment, saline water intrusion, sedimentation, hydrological changes and use of mangroves by local people<sup>32</sup>.

Mitigation and compensation measures will be identified through the BEIA process based on the level of impacts and the characteristics of the area. Compensation could be done by contributing to funding projects that restore habitats of similar characteristics.  
(similar species dominants in that community type) .

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<sup>29</sup> <http://www.ramsar.org/>

<sup>30</sup> Resolution VII.21 of the 7th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971), San José, Costa Rica, 10-18 May 1999.

<sup>31</sup> **Similar ecological characteristics:** environments with the same (not statistically significantly different at the p=0.05 level, based on at least three randomly sampled transects) density of the top five community-dominant species, species richness within 10% of the original and composition showing the same ordering of dominants. This will be determined through initial baseline monitoring during audits for established farms, or via EIAs, for new or expanding farms.

<sup>32</sup> Boyd, 2002

## Criterion 2.3: Consideration of habitats critical for endangered species

|       | Indicator   | Standards  |
|-------|---|--|
| 2.3.1 | Allowance for siting new farms <sup>33</sup> in critical habitats of endangered species <sup>34</sup> as defined by the IUCN Red List, national listing processes, <sup>35</sup> or other official lists. | None   |
| 2.3.2 | Maintaining habitats critical for endangered species within farm boundaries   | Farmers must identify habitats for endangered species remaining on their site and implement protection measures of such areas. |

### Rationale

These standards address habitat considerations for endangered species, recognizing that certain habitats serve essential functional uses for some or all of the key life stages of these species. The IUCN Red List of Threatened Species<sup>36</sup> is a global inventory of the conservation status of plant and animal species. A series of “Regional Red Lists” are produced by countries or organizations, which assess the risk of extinction to species within a political management unit. The IUCN Red List uses criteria that evaluate extinction risk which are relevant to all species and all regions of the world. ISRSP Standards refer to the four categories that confer the greatest risk (near threatened, vulnerable, endangered and critically endangered).

The ShAD standards seek to identify and protect critical habitats for species at risk in areas where shrimp farms are located. While mangrove forests<sup>37</sup> and wetlands are acknowledged as habitats that provide valuable human and ecological services and regularly overlap with shrimp farming regions, other habitats are also at risk. Such areas may be considered critical for a variety of reasons, which are broadly defined by the fact that they are necessary resources for species that use them for cover, reproduction, etc.

We acknowledge that critical habitat is ideally defined using life history information and population viability analyses to ascertain which life stages most influence population trajectories (as defined by the elasticity of population growth rates)<sup>38</sup>. Such information shows which life stages most influence population growth and, therefore, identifies which functional habitats with their corresponding behaviors deserve particular protection. For example, if a juvenile life stage is limiting, protecting foraging grounds for juveniles may be more important than protecting breeding grounds for adult life stages.

<sup>33</sup> Farms starting construction or expanding after the publication of these standards.

<sup>34</sup> **Species at risk:** Also known as an endangered species is a population of organisms which is at risk of becoming extinct because it is either few in numbers, or threatened by changing environmental or predation parameters.

<sup>35</sup> **National listing process:** Any process that occurs at the national, provincial, state, or other level within-country that evaluates species conservation status against a set of defined criteria recognized by relevant governance. Such listing processes may be legally binding (e.g. Endangered Species Act in the U.S.A. or the Species at Risk Act in Canada), or may not be legally binding. (e.g. species listings created by COSEWIC in Canada (Committee on the Status of Endangered Wildlife), or the Red Data Book in Vietnam).

<sup>36</sup> [www.iucnredlist.org](http://www.iucnredlist.org)

<sup>37</sup> **Mangrove Forest:** A mangrove forest is an association of halophytic trees, shrubs, palms, ferns and other plants growing in brackish to saline tidal waters on mudflats, riverbanks and coastlines in tropical and subtropical regions. This vegetation has the common characteristic of living in the zone inundated by the highest tides and exposed by the lowest tides. All mangrove species also share a common characteristic of salt tolerance. (Mitsch & Gosselink, 1993).

<sup>38</sup> Mangel, M. Levin, P. & Patil, A. 2006. Using life history and persistence criteria to prioritize habitats for management and conservation. *Ecological Applications*. 16(2): 797-806

However, the real costs of intensive science to determine such information are prohibitive in the context of certification, particularly for small-scale farmers. Recognizing its limitations, we here adopt a proxy-based approach that aims to protect the main component of critical habitat for species that are recorded in a national listing process.

**Guidance for implementation**

Under this standard, farmers are required to monitor what species are on their site and ensure that they do not currently and have not previously impacted these important species. Existing farms sited in habitats that are critical for red list species may not be certifiable if they cannot find ways to restore habitat or offset the impacts of their initial siting. The GSC recognizes the challenge of assessing the state of the farming site prior to its establishment; however, the standards require that farmers attempt to do so to the greatest extent possible..

**2.3.1:** A BEIA must identify critical habitats for all species at risk on the proposed site and design constructions such as protecting these areas. The first requirement is that farmers are aware of the different species on their farm. Big farms shall seek an expert opinion while small farms may consider including local stakeholders. The BEIA will allow the farmer to demonstrate compliance.

**Species at Risk:** Guidance interpreting application of the Red List Categories and criteria can be found here: [http://www.iucnredlist.org/apps/redlist/static/categories\\_criteria\\_3\\_1](http://www.iucnredlist.org/apps/redlist/static/categories_criteria_3_1)

**Critical habitat:** All criteria are from the 1984 US Fish and Wildlife Service criteria<sup>39</sup> for the designation of critical habitat under the Endangered Species Act. These criteria were updated in 2001 to include the National Marine Fisheries Service criteria. Critical habitat components are defined as:

1. Space: To allow for adequate population growth and normal behavior
2. Resources: Food water, air, light, minerals, or other nutritional or physiological requirements
3. Cover: or shelter
4. Reproduction: Sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal
5. Distribution: Habitats that are protected from disturbance or are representative of the historic geographical and ecological distribution of a species

**Criterion 2.4: Ecological buffers, barriers and corridors**

|              | <b>Indicators</b>   | <b>Standards</b>  |
|--------------|---|---|
| <b>2.4.1</b> | <b>Coastal barriers:</b> Minimum barrier (manmade or natural) between farm and aquatic or marine environments.            | As defined in national legislation or as determined is necessary by the BEIA at the time of construction, whichever is greater. The BEIA must assess risks associated with 25-year storm or flood risk,                       |
| <b>2.4.2</b> | <b>Riparian buffers:</b> Minimum width of undisturbed natural vegetation between farms and aquatic/brackish environments. | As defined in national legislation at the time of construction or as determined is necessary by the BEIA, whichever is greater. The BEIA must assess risks associated with existing pumping stations and inlet/outlet canals. |

<sup>39</sup> <http://www.epa.gov/lawsregs/laws/esa.html>

|              |   |   |
|--------------|---|---|
| <b>2.4.3</b> | <b>Corridors:</b> Minimum width of undisturbed natural vegetation through farms to provide human or native wildlife movement across agricultural landscapes | As defined in national legislation at the time of construction, or as determined necessary for wildlife by the BEIA, or access issues identified during p-SIA |
|--------------|---|---|

**Rationale**

Criterion 2.4 addresses the retention of biological features in relation to abiotic or landscape features. Coastal vegetation and mangroves in particular serve an important protective function for coastal communities by breaking onshore waves and winds at the land/sea interface especially during storm surges. The magnitude of energy absorption strongly depends on forest/soil attributes<sup>40</sup>. Analytical models show that 30 trees per 100 meters<sup>2</sup> in a 100-meter wide belt may reduce the maximum tsunami flow pressure by more than 90 percent<sup>41</sup>. Coastal mangrove buffers are regularly 100 meters - 2 kilometers in width<sup>42</sup> and may be much wider. Mangroves also stabilize soil against erosion and filter runoff entering coastal water from rivers<sup>43</sup>.

Consideration was given to the siting of barriers/buffers between farms and the surrounding landscape matrix. Three types of barriers/buffers were considered: 1) between farms and coastlines 2), between farms and aquatic ecosystems (rivers, surface waters) and 3) between farms and terrestrial ecosystems (wild, agricultural or developed land). One of the most important reasons for buffers between farms and agricultural land, is to eliminate the impact of salinization: these concerns are currently covered under standards preventing salinization (criterion 2.5) and therefore are not addressed through buffers.

**Coastal Barriers:** The ShAD standards require a minimum barrier (manmade or natural) between farm and aquatic or marine environments as defined in national legislation at the time of construction in order to mitigate concerns related to storm or flood risks identified in BEIA. The farm must demonstrate adequate protection from storm or flood events.

The ShAD acknowledges that farms generally have little control over the land practices between their own holdings and shorelines. Including a minimum buffer strip between farms and oceans assures that ponds cannot occupy the sea-water interface which is a high risk farming area where it is more difficult to control environmental events that are directly linked to escapement and disease transfer. A second benefit of coastal buffers is that they assure that communities have an area in which to access marine resources.

**Riparian Buffers:** Riparian habitats are considered important<sup>44</sup> in tropical agricultural countries; however, there is no “one-size-fits-all” description of an ideal riparian buffer strip<sup>45</sup>. While other ShAD standards address water quality and salinization, recommended widths for ecological concerns in buffer strips typically are much wider than those recommended for water quality concerns<sup>46</sup>. The

<sup>40</sup> Attributes include: tree density, tree size/age (stem and root diameter) species of trees, shore slope, bathymetry and the amount of undergrowth, the spectral characteristics of incident waves and tidal stage upon entering forests stem and root diameter, shore slope, bathymetry, spectral characteristics of incident waves, and tidal stage upon entering the forest (Alongi 2008<sup>40</sup>, Forbes & Broadhead, 2007).

<sup>41</sup> Hiraishi T. and Harada K. 2003:Greenbelt Tsunami Prevention in South-Pacific Region, Report of the Port and Harbour Research Institute, Vol.42

<sup>42</sup> Haylor, G. & Bland, S. 2001. Integrating aquaculture into rural development in coastal and inland areas, In R.P. Subasinghe, P. Bueno, M.J. Phillips, C. Hough, S.E. McGladdery & J.R. Arthur, eds. Aquaculture in the Third Millennium. Technical Proceedings of the Conference on Aquaculture in the Third Millennium, Bangkok, Thailand, 20-25 February 2000. pp.73.81. NACA, Bangkok and FAO, Rome.

<sup>43</sup> Boyd, 2002

<sup>44</sup> Reference being sought

<sup>45</sup> Fischer, R. A., and Fischenich, J.C. (2000). "Design recommendations for riparian corridors and vegetated buffer strips," EMRRP Technical Notes Collection (ERDC TN-EMRRP-SR-24), U.S. Army Engineer Research and Development Center, Vicksburg, MS. [www.wes.army.mil/el/emrrp](http://www.wes.army.mil/el/emrrp)

<sup>46</sup> Fischer, R. A., Martin, C. O., Barry, D. Q., Hoffman, K., Dickson, K. L., Zimmerman, E. G., and Elrod, D. A. (1999). "Corridors and vegetated buffer zones: A preliminary assessment and study design," Technical Report EL-99-3, U.S. Army Engineer Water ways Experiment Station,

ShAD recognizes that as the standards are currently written, buffers and barriers pertain to the perimeter of a farm/certification unit. Therefore there is potential for groups of farms to simply to build bigger clusters to avoid implementing these standards. The ShAD is working on options to prevent this as of the publication date of the ShAD standards.

**Corridors:** Corridors are essential ecological features that allow the movement and dispersal of organisms between suitable patches within a landscape. Maintaining the potential for organisms to move freely and within the safety of appropriate habitat is essential for the maintenance of essential functions such as foraging and breeding.

**Guidance for implementation**

**2.4.1:** For Riparian buffers, vegetation must be undisturbed and permanent, and must be dominated by tree/forest/vegetation cover consistent with undisturbed endemic riparian zones within < 5km of the farm in question. For open coastlines and adjacent natural water bodies, the zone of undisturbed vegetation must be 100 meters wide. For confined watercourses, such as rivers or streams that cross the farm area or man-made canals in forested habitats, the zone must be at least 25 meters wide on both sides.

**2.4.2:** BEIAs shall determine, both through national agency records and direct monitoring, the organisms present on farms including the largest organisms known to have occurred within 10 years and 50km of a farm. Corridors shall be designed to allow free passage of such organisms across at least two perpendicular farm axes.

**Continuous improvement:** Instead of using a discrete and generic coastal buffer recommendation, countries are strongly encouraged to use the most current numerical models available (e.g. Koh et al. 2009<sup>47</sup>) to examine how coastal buffers can vary along different sections of coastline. Such efforts are outside the scope of auditing or BEIAs, but are acknowledged as best practice and would make use of the best available science. Collaborative efforts by national agencies and local municipalities should make such recommendations public, then work to attain such buffers, potentially buying back developed land in areas that would be best used for coastal protection<sup>48</sup>.

**Criterion 2.5: Prevention of salinization of adjacent freshwater and soil resources**

|       | <b>Indicator</b>  | <b>Standards</b>   |
|-------|---|--|
| 2.5.1 | Allowable water loss through seepage in ponds located above freshwater <sup>49</sup> aquifers or in surface freshwater areas.   | < 0,7 cm/day   |
| 2.5.2 | Allowance for the use of fresh groundwater in ponds.  | None   |
| 2.5.3 | Water-specific conductance or chloride concentration in freshwater wells used by the farm or located on adjacent properties <sup>50</sup> and surface freshwater bodies <sup>51</sup> | Specific conductance <1,500 µmhos/cm or chloride concentration <300 mg/L |

Vicksburg, MS., Fischer, R. A. (2000). "Widths of riparian zones for birds," EMRRP Technical Note Series, TN-EMRRP-SI-09, U.S. Army Engineer Research and Development Center, Vicksburg, MS.

<sup>47</sup> Koh, H.L., Teh, S.Y., Llu, P.L., Ismail, A.I.M., Lee, H.L. 2009; Simulations of Andaman 2004 tsunami for assessing impact on Malaysia. *Journal of Asian Earth Science*.;36(1): 74-83

<sup>49</sup> Freshwater is defined as water with a specific conductance <1,500 µmhos/cm or a chloride concentration <300 mg/L (Boyd 2000).

<sup>50</sup> "Adjacent freshwater wells" are defined as wells located on the farm property or adjacent properties.

<sup>51</sup> Surface freshwater bodies adjacent to farm property or receiving waters discharged from the farm.

|       | <b>Indicator</b>   | <b>Standards</b>   |
|-------|--|--|
| 2.5.4 | Soil-specific conductance or chloride concentration in adjacent land ecosystems and agricultural fields. | No net increase of specific conductance or chloride concentration  |
| 2.5.5 | Specific conductance or chloride concentration of sediment prior to disposal outside the farm.           | The specific conductance or chloride concentration values must not exceed those of the soil in the disposal area |

### ***Rationale***

Shrimp ponds contain saline water and, if located above freshwater aquifers, infiltration may cause groundwater salinization (Boyd et al. 2006) by means of lateral seepage beneath or through pond embankments. Seepage can also cause soil and surface water salinization near farms. All ponds seep to a certain extent, however, some seep worse than others. A recent literature review found that normal seepage from aquaculture ponds did not exceed 20 centimeters per month (Boyd 2009).

The ShAD determined shrimp farms must not extract freshwater from subsurface sources to dilute salinity in ponds due to the important volumes of freshwater that would be used for such activities. In coastal areas, pumping fresh groundwater can depress the water table, allowing saltwater to intrude into aquifers (Anonymous 1993). Salinization of freshwater aquifers can interfere with water supplies and, in the case of shallow aquifers, cause crop root damage. Also, land subsidence can result from excessive pumping of groundwater (Chen 1990).

The release of effluents can cause salinization in surface freshwater bodies and non-saline soils near farms. Many shrimp farms, especially those using intensive culture methods, accumulate sediments in ponds and canals, which are mechanically removed at times. Sediment disposal sites can cause salinization of surface water if rainfall leaches salts from them and runoff enters freshwater bodies (Boyd et al. 1994). Saline runoff could also flow onto non-saline soil areas causing salinization of surface soil. Water from sediment disposal areas could infiltrate and lead to the salinization of freshwater aquifers. Dry sediments can be used for landfill or disposed of by spreading it in agricultural areas, provided the salt content of sediment is not higher than in the soil of the disposal site.

The ShAD requires monitoring of chloride concentration or specific conductance levels in soil (including sediment disposal sites), surface water and groundwater near shrimp farms, as an increase will indicate salinization has taken place. Historical data on either will often not be available, thus the first tests taken at the onset of the certification program will serve as the reference point for each site. The ShAD has set freshwater limits to 1,500 µmhos per centimeter specific conductance and 300 milligrams per liter of chloride. These levels are based on data presented by Boyd (2000) indicating that freshwater has <1,000 milligrams per liter total dissolved solids (TDS), and a TDS-specific conductance ratio of 0.65, while the chloride has a TDS ratio of around 0.30, also aligning with Benoit's (1988) position that effluents discharged into freshwater streams should not increase chloride concentration above 230 milligrams per liter.

### **Guidance for implementation**

**About the characterization of freshwater:** Hand-held refractometers are widely used to measure salinity in shrimp farms. These devices are appropriate for salinities of approximately 2 or 3 ppt, but they are not sensitive enough for use in determining if shrimp farms are causing the salinization of fresh water bodies. In this case, alternative methods may be employed. The quickest and easiest method for evaluating the salinity status of water is to measure specific conductance with a conductivity meter. However, this instrument costs about US\$ 1,000 and small-scale farmers may not

be able to afford it. An alternative is a chloride test kit. Several companies sell these kits for less than US\$ 100. Note: When purchasing kits, chloride kits must not be confused with chlorine kits. Farms that can demonstrate that surrounding waters and soils have a salinity of 2 and above using a hand-held salinometer will not be required to provide measures of conductance or chloride concentration.

**2.5.1:** The main practice for avoiding salinization is to construct farms on sites where soils are impermeable - effectively slowing the percolation rate. Farms should be constructed in soils that have a good range of particle sizes (but not rocks and gravel) and contain more than 10 percent clay. However, a clay content of 20 to 30 percent is recommended for pond soils (Yoo and Boyd 1994). Alternatively, ponds and canals can be lined with waterproof materials (commonly High Density Polyethylene liner) for preventing seepage.

The average ocean evaporation for the zone 20°N-20°S latitude is 0.41 centimeters per day (Baumgartner and Reichel 1975). Therefore, total losses of water in the case of excessive seepage (more than 0.7 cm/day) would be larger than 1 centimeter per day. Such water level decline can be measured during a 24-hour period without rainfall, but an adjustment can also be made for rainfall, provided there is no overflow during the period of measurement. The equation for estimating water loss is:

$$WL = ((H_{t=1}+P) - H_{t=2} - E) / ((t_1-t_2)/24)$$

where WL = water loss (cm/day);

H = water surface elevation in pond (cm);

E= evaporation (cm). Where no reliable data are available, a value 0.4 cm/day will be assumed.

P = precipitation during period of measurement (cm);

t<sub>2</sub>-t<sub>1</sub> = time (hour) between the beginning (t<sub>1</sub>) and the end of measurement (t<sub>2</sub>).

There is a simple way to measure water level (H) in ponds (Fig. 1). A plastic pipe (length of 5- to 10-centimeter) with a 0.5-centimeter diameter hole drilled in its midsection can be installed vertically in a pond by pounding one end of the pipe into the sediment or tying it to a fixed structure. The small hole will allow the water level in the pond to stand at the same level in the pipe as outside the pipe. The purpose of the pipe is to allow a still surface for measuring water level. A wooden or plastic measuring stick can be fitted with a horizontal cross piece that will prevent it from moving further into the pipe once the cross piece contacts the top of the pipe. The difference in the water readings marked on the measuring stick (between t = 1 and t = 2) will indicate how much the water level changed during the period of measurement. Note: A small rain gauge may be installed near the pond whose catch during the period of measurement can be used to adjust for rain falling into the ponds. It will also be necessary to install an extra dam board in the discharge structure during the period of water level measurement to provide storage volume and avoid overflow after rain events.

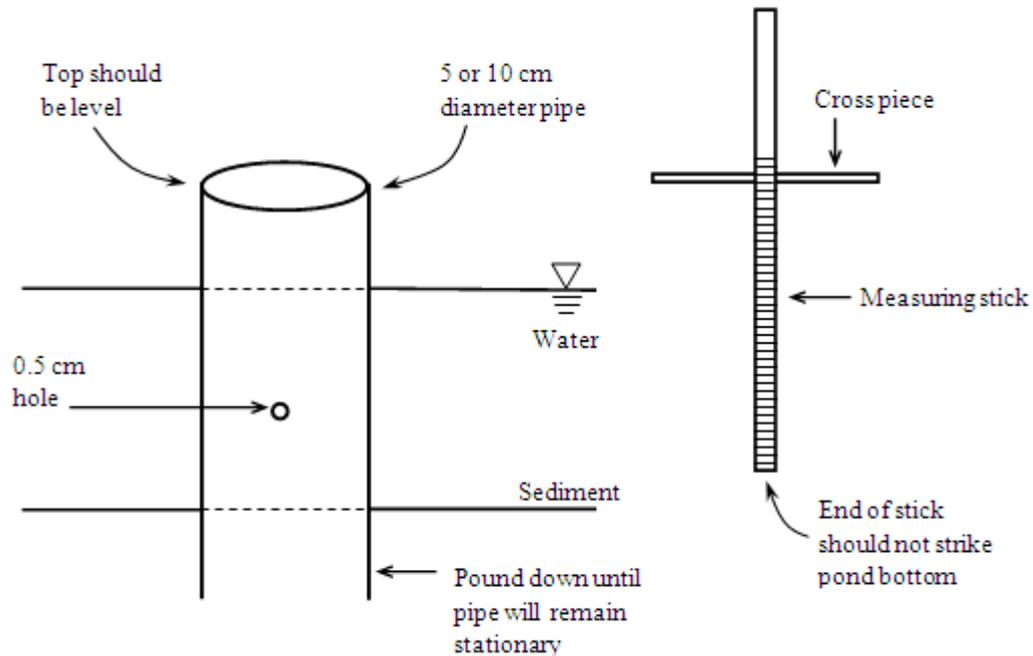


Fig. 1: Illustration of apparatus for measuring water level changes in an aquaculture pond.

**2.5.3:** Freshwater wells and surface freshwater bodies must be sampled monthly to track their salinity during the dry and rainy seasons for considering possible seasonal variations as a result of the precipitation regime and assure that water seepage or draining effluents are not causing salinization. The distance that salt could infiltrate through soil to reach more distant surface water bodies will depend upon time, soil properties, groundwater depth and movement, and slope (Boyd, personal communication).

**2.5.4:** Soil salinity in adjacent land ecosystems and agricultural fields should be sampled 100 meters from ponds or canals every six months. If salt contamination is detected at the 100-meter station, the monitoring could be extended further out as necessary.

**2.5.4 and 2.5.5:** The proposed procedure for measuring chloride or specific conductance in soils is derived from the method used by Boyd et al. (2006) for aquaculture pond soil. It involves taking a 20-gram sample of dry soil and placing it in a glass container, adding 40 milliliters of distilled water, and shaking the mixture by hand for five minutes. The specific conductance could be measured directly in the solution or the solution could be filtered and the chloride concentration measured. Multiply measurement specific conductance values by 2 to adjust for the dilution (40 milliliters of water for 20 grams of soil). Specific conductance values over 1,500  $\mu\text{mhos}$  per centimeter or chloride concentrations above 300 milligrams per liter would indicate soil is slightly saline. The greater the specific conductance or chloride concentration values, the more saline the soil.

## Principle 3: Develop and operate farms with consideration for surrounding communities<sup>52</sup>

*Impact: Although shrimp farms are often the economic backbone of local communities, they can also have a negative impact on local communities, such as reducing public access to land and water resources and jeopardizing livelihoods.<sup>53</sup>*

### Criterion 3.1: All impacts on surrounding communities, ecosystem users, and land owners are accounted for and are, or will be, negotiated in an open and accountable manner

|       | Indicator   | Standards   |
|-------|---|---|
| 3.1.1 | Farm owners shall commission or undertake a participatory Social Impact Assessment (p-SIA) <sup>54</sup> and disseminate results and outcome openly in locally appropriate language. Local government and at least one civil society organization chosen by community shall have a copy of this document. | The p-SIA process and document comply with guidelines given below. The participatory element (community input) is an integral part of the report. |

#### Rationale

Credible social sustainability standards must be able to respond to real human concerns that arise in communities located near the farm in addition to those within its overall operations. In particular, appropriate consultation must be undertaken within local communities so that potential conflicts are properly identified, avoided, minimized, and/or mitigated through open and transparent negotiations on the basis of an assessment toward risks and current impacts on the surrounding communities. Communities will have the opportunity to be part of the assessment process. The impacts of aquaculture operations on minorities and those prone to discrimination will be accounted for and opportunities for these groups of people should be identified, evaluated and addressed. Negative impacts may not always be avoidable; however, the process for addressing them must be open, fair and transparent. Therefore, these community standards focus on due diligence through dialogue and negotiation with surrounding communities. The p-SIA report forms the basis for assessing compliance to criterion 3.2 and 3.4. Where the UN agreement on ethnic minorities and

<sup>52</sup> **Community:** A group of people with possibly diverse characteristics who are linked by social ties, share common perspectives, and are joined by collective engagements within a geographically confined area. Four indicators:

- a state of organized society in small form (town, village, hamlet) that recognizes a single representative (leader, formal or informal)
- The people inside a confined geographical area; small enough to allow face-to-face interaction as the main form of contact between the individuals within the group

- having a common good or a common interest and recognizing that, and been recognized as having that.

- A sense of common identity and characteristics ('we' versus 'them' feeling) on either/or social, cultural, economic, ethnic grounds.

<sup>53</sup> This principle area seeks to minimize injustice or unrest in affected communities that may result for Shrimp farming activities. The standards recognize that it is only possible to be socially equitable to the point that legal frameworks and negotiated outcomes allow. Nonetheless, the GSC believes this standard represents a significant improvement from past and current social realities, and will seek to continuously strengthen them. Specifically, the GSC has benchmarked ShAD social sustainability standards against widely accepted international public covenants and agreements, such as UN declarations on Human Rights, the Right to Development, the UN Declaration on the Rights of Indigenous Peoples (IPRA), the Millennium Development Goals, and the ILO core conventions. Examples of covenants with the private sector include: OECD Guidelines for multinational corporations, the UN Global Compact on Corporate Social Responsibility and ISO 26000. A more detailed benchmark is set by existing and developing protocols in Multi-Stakeholder Initiatives such as the Roundtable on Sustainable Palm oil, Ethical Tea Partnership, Forest Stewardship Council and in standards such as SA8000 and ETI.

<sup>54</sup> **Participatory Social Impact Assessment (p-SIA):** An assessment of positive and negative consequences and risks of a planned or ongoing project (here: a farm or farm development) undertaken in such a manner that all stakeholder groups have input in process, results, and outcome of such an assessment, and that steps taken and information gathered is openly accessible to all. See guidance.

indigenous peoples (IPRA) applies, the concept of ‘free and prior informed consent’ shall form the basis of the dialogue and negotiations.

**Guidance for Implementation**

**3.1 Participatory Social Impact Assessments (p-SIAs)**

The focus of this criterion is on risks and impacts between (surrounding) communities and the farm. Information as to the farm’s technical operations that have no bearing on risks and impacts outside the farm need not be documented nor disclosed in the participatory processes. Documents and processes can be checked and verified through confidential conversations with participating stakeholders, local government and/or a civil society organization. This criterion and its underlying methodologies apply to both new farms as well as existing farms, with minor differences in the attention paid to risks and impacts. Methodologies can vary depending on farm-size or farm-group size. More detailed guidelines to farmers and auditors are provided below.

**NOTE: See APPENDIX II for more detailed guidance on p-SIA**

**Criterion 3.2: Complaints by affected stakeholders are being resolved**

|       | <b>Indicator</b>   | <b>Standards</b>  |
|-------|--|---|
| 3.2.1 | Farm owners shall draft and apply a verifiable conflict resolution policy for local communities. The policy shall state how conflicts and complaints will be tracked transparently, how third party mediation can be part of the process, and explain how to respond to all received complaints. Complaint boxes, complaint registers, and complaint acknowledgement receipts (in local language(s)) are used. | Areas of conflict or dispute are listed on paper and shared among farm, local government, and surrounding community representatives. At least 50 percent of the conflicts shall be resolved within six months from the date of being filed, and an additional 50% six months later (75% total within one year). |

***Rationale***

Mutually fair and open negotiations will help resolve conflicts. The farm must, therefore, have a conflict resolution policy in place that describes how to make/file complaints as well as an explanation of how the farm intends to address them. The contents of this policy must be known publicly (in surrounding communities) and the farm must allow verification of the progress it makes in resolving outstanding concerns. The standard allows for the eventuality that not all conflicts can be resolved easily and quickly and third-party mediation may sometimes be needed. It must also be noted that conflicts may not necessarily be caused by farm development and/or operations, but the farm shall exercise due diligence (i.e. actively seek to determine and solve) with regard to complaints, provide the utmost effort to avoid doing harm to the interests of surrounding communities, and provide evidence for this according to the standard.

**Guidance for Implementation**

**3.2 Conflict resolution**

Conflicts, for the purpose of this standard, are situations wherein one party perceives hindrance in legitimate interest as caused by the other party’s actions or absence of actions. One party is the farm owner or manager. The other party is either a surrounding community or group of stakeholders in the community. Conflicts, for the purpose of this standard, do exclude complaints made by single individuals unless verified/supported by a community leader or community organization. The farm may not necessarily be at fault if conflicts arise, but the farm shall exercise due diligence to avoid any harm done to the legitimate interests of people in the surrounding community. “Due diligence” is the effort made by an ordinarily prudent or reasonable party to avoid harm to another party.

The process of resolution is documented and meeting minutes are kept. Minutes include an agenda, the list of concerns raised, resolutions or agreements reached, a list of who shall take what action by when, and a list of participants. Local government and, if available, at least one civil society or customary organization chosen by the community shall have access to the conflict resolution process and the documentation. A conflict is deemed resolved if both parties in the negotiation process have agreed to take it off the agenda (in terms of this standard: if both parties accept external mediation and/or a legal verdict then the conflict is deemed resolved regardless of whether the mediator or legal decision has been made).

### **Criterion 3.3: Transparency in providing employment opportunities within local communities**

|       | <b>Indicator</b>  | <b>Standards</b>   |
|-------|---|--|
| 3.3.1 | Farm owners shall document evidence of advertising positions within local communities before hiring migrant workers   | Proof of job opening advertisements in surrounding villages, by means of either/or signposts, billboards, adds in local magazines or newspapers.   |
| 3.3.2 | Explanation on the reasons for employing each worker is available, and the explanation is based on merits (skills, experience or CV of hired migrant worker). | Written and dated records of application and interviews with applicants, including stating whether they are from an outside community, from the local area. Must also provide proof stating reasons for successful or unsuccessful application. Name and contact details of applicants make verification possible. |

#### ***Rationale***

Unskilled manual labor is common on many shrimp farms, therefore, shrimp aquaculture can be very beneficial to rural village economies as a major source of employment. However, shrimp farmers often resort to hiring migratory workers asking them to stay on, or close to, the farm. In doing so, the potential value shrimp farming could have brought to local rural economies is lessened. This criterion is formulated to ensure the local workforce is duly considered for jobs on the farm and that migratory workers are only hired when the local workforce does not meet necessary requirements. Migrant workers, in this context, are hired workers whose living quarters (at the moment of hiring) are further away from the farm than can be reasonably traveled on a daily basis.

#### **Guidance for Implementation**

##### **3.3 Providing employment within local communities**

Farms must be able to demonstrate that vacancies are first communicated to the surrounding community. The standard does not pre-determine local hiring, but seeks to exclude the possibility that farms avoid hiring people locally if and where suitable workers are available.

### Criterion 3.4: Contract farming<sup>55</sup> arrangements (if practiced) are fair and transparent to the contract farmer

|       | Indicator                                 | Standards   |
|-------|---|---|
| 3.4.1 | Written contract agreements               | The contracts are written in an appropriate language <sup>56</sup> and co-signed copies are kept by both parties  |
| 3.4.2 | Contract provisions                       | The contracts comply with the guidance on content of basic provisions to ensure that conditions of the agreement are mutually understood  |
| 3.4.3 | Transparency and openness of negotiations | Meetings between the purchaser and the contract farmers to discuss and negotiate agreements are held at least twice/year and documented. Meetings are attended by at least 3 representatives of the farm group or cooperative. All members contributing to the supply contract must sign their agreement to the negotiated terms. |

#### **Rationale**

Contract farming arrangements are increasingly part of the business practices in the aquaculture sector. However, these arrangements do differ from labor contract arrangements in that the contract does not revolve around labor in exchange for wages, but is rather an arrangement between two independent parties that both carry risks by committing to and implementing the contract. In the context of the scope of this standard, contract farming applies to the farm owner/operator either in out-sourcing (to another farm) or as a signatory party in a contract-farming arrangement with the receiver of the harvest. The concern that the standard is seeking to address is that contract farming arrangements are open to skewed, unequal and non-transparent arrangements. In short, often the less influential parties are not made fully aware of what they are committing to and sometimes compliance to mutual obligations is enforced by only one party. This should not be the case. Three specific indicators are set to ensure the contracting process itself is fair and transparent.

#### **Guidance for Implementation**

##### **3.4 Contract farming arrangements**

1. The contract should include, at a minimum, the following contents and clarifications:

- The date of entry, both signatures, and the date of signing
- The assurance that credit or input provisions are at a price that is not above prevailing market rates
- Changes in credit/input arrangement and prices thereof are communicated on paper and allow for the contractee to terminate the contract
- Payments for harvests are calculated on paper; these calculations are mutually signed and copies are made available to both parties. The maximum payment period is defined in the contract.

<sup>55</sup> **Contract farming:** Contract farming can be defined as an agreement between farmers and processing and/or marketing firms for the production and supply of agricultural products under forward agreements, frequently at predetermined prices. The arrangement also invariably involves the purchaser in providing a degree of production support through, for example, the supply of inputs and the provision of technical advice. The basis of such arrangements is a commitment on the part of the farmer to provide a specific commodity in quantities and at quality standards determined by the purchaser and a commitment on the part of the company to support the farmer's production and to purchase the commodity" (FAO)

<sup>56</sup> Language that is common to all signing parties. If necessary, contracts must be translated

- Provisions on price-quality parameters are described on paper in the contract or to the contract belonging annex
  - The contract clarifies in text what risk-sharing arrangements are provided or, as the case may be, states that risk-sharing is not part of the agreement
  - The contract provides clear arrangements on exit, termination, buy-out options, handing over of deeds of assets (if applicable) and compensation measures in case of bankruptcy of the purchaser
  - The contract includes mutual rights and obligations as to ensuring quality of inputs, production system, product, and a list of 'dos and don'ts' as to preventing diseases and/or damages to neighboring ponds
2. Sometimes the "purchase" is referred to as the "mother company," but in this document they are one in the same.
  3. Copies of signed contracts are kept by both parties and can be inspected.
  4. Meeting minutes between contractor and contractees are documented. Minutes include an agenda (the list of concerns), resolutions or agreements reached, and who shall take what action by when.

## Principle 4: Operate farms with responsible labor practices

*Impact: Aquaculture, as any agricultural production system, often requires intensive labor. Many countries have national laws that address labor issues, however, these laws are not consistent in a global context and sometimes fall below internationally agreed upon levels. The labor standards in this document are based on the core principles of the International Labour Organization (ILO) as well as other matters that are considered to be the fundamental right to individuals on which the UN has agreed. Particularly in developing countries, workers often live on or near the farm in a rural environment lacking good infrastructure and living conditions.<sup>57</sup> These standards apply to verbal or written contract employed workers. The criteria and indicators under this principle apply to all hired workers (temporary and/or permanent; with or without written contract). See guidance under Principle 3 for more details. Conditions for so-called ‘family-workers’ must be comparable to those for the formally employed, but the ShAD standards recognize the more flexible arrangement between employer and worker in this case.*

### Criterion 4.1: Child labor and young workers<sup>58</sup>

|  | Indicator   | Standards  |
|--|---|--|
| 4.1.1<br> | Minimum age of employees  | 15 years of age  |
| 4.1.2  | Restrictions to “young workers” between 15 and 17 years old (to be considered in case final standard 4.1.1 is set at a lower age than 18 - see flag box). | <ul style="list-style-type: none"> <li>- Employment does not jeopardize the opportunity to attend school</li> <li>- Employment does not make cumulated work and school hours more than 10 hours/day</li> <li>- Duties are restricted to non-hazardous work<sup>59</sup></li> </ul> |

#### **Rationale**

Adherence to the child labor codes and definitions included in this section indicates compliance with what the ILO and related international conventions generally recognize as the key areas for the protection of children<sup>60</sup> and young workers<sup>61</sup>. Children are particularly vulnerable to economic exploitation, due to their inherent age-related limitations in physical development, knowledge and experience. Children need adequate time for education, development and play and, therefore, shall never be exposed to work or working hours that are hazardous to their physical or mental well being.

<sup>57</sup> Please note that many countries have national laws that address labor issues rigorously and intensively, however this is not consistent in a global context. Addressing these key issues in aquaculture is critical, given the important human rights implications and proven societal benefits of labor standards related to poverty, sustainable economic growth, good governance and political stability. The labor standards in this document help ensure that all aquaculture operations certified against the ShAD standards have reduced or eliminated the potential impacts of key labor issues associated with production. Moreover, the ShAD labor standards are based on the core principles of the International Labor Organization (ILO): freedom of association, the right to collective bargaining, prohibition on forced labor, prohibition on child labor, and freedom from discrimination, as well as the other elements that are considered to be the fundamental rights at work: fair wages and working hours, decent health and safety conditions and non-abusive disciplinary practices. Social Accountability International (SAI), an international and renowned social standards/labor NGO, worked with the Dialogues to recommend ways to best align the standards with best practice labor standards, including ILO conventions.

<sup>58</sup> **Child Labor:** refers to any work by a child younger than the age specified in definition of a child, except for light work as provided for by ILO Convention 138, article 7. The conventions permit children between 15 and 17 to work on farms, provided that time for school and play is guaranteed and children are excluded from hazardous, abusive and physically hard work

<sup>59</sup> A hazard is defined as any situation, substance, activity, event, or environment that could potentially cause injury or ill health (<http://www.praxiom.com/ohsas-18001-definitions.htm>). Non-hazardous work may include but is limited to activities related to: feeding (handling of bags, application of feed in ponds), harvest, application of chemicals, driving, and security.

<sup>60</sup> **Child:** any person less than 15 years of age, unless local minimum age law stipulates a higher age for work or mandatory schooling, in which case the higher age would apply. If however, local minimum age law is set at 14 years of age in accordance with developing country exceptions under ILO Convention 138, the lower age will apply

<sup>61</sup> **Worker (Young worker):** Any worker or employee between the age of child as defined and under the age of 18

To this end, the standards related to what constitutes child labor will protect the interests of children and young workers in certified aquaculture operations.



The GSC is debating the age limit for workers on farms because of the hazardous work on a shrimp farm. The current proposal is for 15 but the GSC recognizes that it may be more responsible to set the minimum age at 18. We welcome feedback or alternative proposals on this issue.

### **Guidance for Implementation**

#### **4.1. Child Labor and young workers**

1. The minimum allowable age of permanent workers is 15 years old. If the legal minimum age allowed in the country is higher than 15, the legal minimum age of the country is followed. (Note: Employer is accountable for employee age documentation. In most countries, the law states that the general minimum age for employment is 15 years.)
2. Child workers above the age of 15 perform only light work.<sup>62</sup> According to the ILO convention 138, Article 7.1: light work is defined as work that is 1) not likely to be harmful to a child’s health or development and 2) not likely to prejudice their attendance at school, participation in vocational orientation or training programs, or diminish their capacity to benefit from instruction received (as long as it does not exceed 2 hours per day on school days or holidays). Also, the total number of hours spent on light work and on school shall not exceed 7 hours per day. (Note: Per ILO Convention 138, Article 7.4: Some developing countries may apply for an exception to the minimum age, thereby defining 12 as the minimum age for light work by children and 14 for the minimum age for young workers; however, few, if any countries still invoke this clause.)
3. For employees aged 15-17 (young workers), work shall not conflict with schooling. The combined daily transportation time, school time and work time shall not exceed 10 hours. Hazardous work<sup>63</sup> (e.g., heavy lifting disproportionate to a person’s body size, operating heavy machinery, working night shifts, and exposure to any toxic chemicals) is not performed by those under the age of 18.
4. The company shall ensure that young workers can meet their costs of education if they are concurrently working and in school.

### **Criterion 4.2: Forced, bonded compulsory labor<sup>64</sup>**

|       | <b>Indicator</b>                         | <b>Standards</b>   |
|-------|--|--|
| 4.2.1 | Right to full final payment and benefits | Employers will not withhold any part of employee salary, property or benefits upon the termination of employment   |
| 4.2.2 | Right to keep identity documents         | Employees are not required to surrender original identity documents with their employer upon commencing employment |

#### ***Rationale***

<sup>62</sup> **Light Work:** (ILO convention 138, article 7.1) Light work is work that is 1) not likely to be harmful to a child’s health or development and 2) not likely to prejudice their attendance at school, participation in vocational orientation or training programs, or diminish their capacity to benefit from instruction received

<sup>63</sup> **Hazardous work:** work which, by its nature or circumstances in which it is carried out, is likely to harm the health, safety or morals of workers

<sup>64</sup> **Bonded Labor:** when a person is forced by the employer or creditor to work to repay a financial debt to the crediting agency

Forced labor<sup>65</sup>—such as slavery, debt bondage and human trafficking – is a serious concern in many industries and regions of the world. Ensuring that contracts are clearly articulated and understood by employees<sup>66</sup> is critical to determining that labor is not forced. The inability of a worker to freely leave the workplace and/or an employer<sup>67</sup> withholding original identity documents of workers are indicators that employment may not be at-will. Employees shall always be permitted to leave the workplace and manage their own time. Employers are never permitted to withhold original worker identity documents. Adherence to these policies shall indicate an aquaculture operation is not using forced, bonded or compulsory labor forces.

**Guidance for Implementation**

**4.2.1: Forced, bonded or compulsory labor**

1. Contracts shall be clearly stated and understood by employees and never lead to an employee being indebted, such as employees paying for essential job training programs.
2. Employees shall be free to leave the workplace and manage their own time.
3. The employer shall never be permitted to withhold an employee’s original identity documents. (Note: Extra care shall be given to migrants and contractor/subcontractor situations, as they can be particularly vulnerable without their identity documents).

**Criterion 4.3: Discrimination<sup>68</sup> in the work environment**

|       | <b>Indicator</b>                         | <b>Standards</b>  |
|-------|--|---|
| 4.3.1 | Anti-discrimination policy.              | Evidence of proactive anti-discrimination policy in place, including, but not limited to, discrimination in the workplace and equal access to all jobs in relation to gender, age, origin (locals vs. migrants), race, or religion.   |
| 4.3.2 | Number of incidences of discrimination   | None  |
| 4.3.3 | Equality of salaries and opportunities.  | All employees, independently of their gender, origin, race or religion, receive equal pay, benefits, promotion opportunities, job security arrangements, and training opportunities for equal work at equal role and experience levels within the same hierarchical position. |
| 4.3.4 | Respect of maternity rights and benefits | Employers shall not demand a test for pregnancy and shall not sanction and/or dismiss on the basis of marital status and shall guarantee legal rights to pregnancy/maternity leave  |

<sup>65</sup> **Forced (Compulsory) Labor:** all work or service that is extracted from any person under the menace of any penalty for which a person has not offered him/ herself voluntarily or for which such work or service is demanded as a repayment of debt. “Penalty” can imply monetary sanctions, physical punishment, or the loss of rights and privileges or restriction of movement (withholding of identity documents)

<sup>66</sup> **Employee:** An employee is a person who enters an agreement, which may be formal or informal, with an enterprise to work for the enterprise in return for remuneration in cash or in kind.

<sup>67</sup> **Employer:** Employers are those workers who, working on their own account or with one or a few partners, hold the type of job defined as a self-employed job, and in this capacity, on a continuous basis (including the reference period) have engaged one or more persons to work for them in their business as employees.

<sup>68</sup> **Discrimination:** any distinction, exclusion, or preferences, which has the effect of nullifying or impairing equality of opportunity or treatment. Not all distinction, exclusion, or preference constitutes discrimination. For instance, a merit or performance based pay increase or bonus is not by itself discriminatory. Positive discrimination in favor of people from certain underrepresented groups may be legal in some countries

### ***Rationale***

Unequal treatment of employees, based on certain characteristics (such as sex or race), is a violation of workers' human rights. Additionally, widespread discrimination in the working environment can negatively affect overall poverty and economic development rates. Discrimination occurs in many work environments and takes many forms. In order to ensure that discrimination does not occur at certified aquaculture farms, employers must prove their commitment to equality with an official anti-discrimination policy, a policy of equal pay for equal work, as well as clearly outlined procedures to raise/file and respond to a discrimination complaint in an effective manner. Evidence, including worker testimony, of adherence to these policies and procedures will indicate a minimization of discrimination.

### ***Guidance for Implementation***

#### **4.3.1: Discrimination in the work environment**

##### Evidence of proactive anti-discrimination policies/practices

1. Employers shall have written anti-discrimination policies stating the company does not engage or support discrimination in hiring, remuneration, access to training, promotion, termination or retirement based on race, caste, national origin, religion, disability, gender, sexual orientation, union membership, political affiliation, age, or any other condition that may give rise to discrimination.
2. Clear and transparent company procedures are outlined to raise/file and respond to discrimination complaints.
3. Employers shall respect the principle of equal pay for equal work.

##### Evidence of discrimination incidence

Worker testimony shall be able to support that the company does not interfere with the rights of personnel to observe tenets or practices, or to meet needs related to race, caste, national origin, religion, disability, gender, sexual orientation, union membership, political affiliation, or any other condition that may give rise to discrimination.

### **Criterion 4.4: Work environment health and safety**

|       | <b>Indicator</b>  | <b>Standards</b>   |
|-------|---|--|
| 4.4.1 | Percentage of employees trained in health and safety practices, procedures and policies relevant to the job. Safety equipment provided and maintained and in use. Evidence that all farm employees have been trained and fully understand the training. | 100% in operations above five employees <sup>69</sup> and safety equipment in use by workers.  |
| 4.4.2 | Protection of young workers (to be considered in case final standard 4.1.1 is set at a lower age than 18 - see flag box).   | No employee under 18 can be involved in job-related accidents involving hazardous chemicals, heavy equipment and machinery, or drowning. |
| 4.4.3 | Monitoring of accidents and incidents and corrective actions.   | All job-related accidents and incidents must be recorded and corrective actions must be documented.                                      |
| 4.4.4 | Medical expenses coverage   | Employer must provide a proof of coverage of all expenses related to any accident/injury occurring under the responsibility of the       |

<sup>69</sup> Certificate of training issued by the relevant competent national or provincial authority or by such authority recognized training centre.

|  |  |  |
|--|--|--|
|  |  | employer when not covered under national law |
|--|--|--|

***Rationale***

A safe and healthy working environment is essential for protecting workers from harm. It is critical for a responsible aquaculture operation to minimize these risks. Some of the key risks to employees include workplace hazards<sup>70</sup> and accidents that can result in injury. Consistent and effective employee training in health and safety practices are an important preventative measure, as is providing employees proper equipment for the job. When an accident, injury or violation occurs, the company must record it and take corrective action to identify the root causes of the incident, remediate, and take steps to prevent future occurrences of similar incidents. These standards address violations as well as the long-term health and safety risks. Finally, while many national laws require that employers assume responsibility for job-related accidents/injuries, not all countries require this and not all employees (e.g., migrant and other workers) will be covered under such laws. When not covered under national law, employers must prove they are insured to cover 100% of employee costs in a job-related accident or injury.

**Guidance for Implementation**

**4.4.1: Work environment health and safety**

Workers trained in health and safety practices, procedures and policies

1. Minimization of hazards/risks in the working environment, including documented systemic procedures and policies to prevent workplace hazards and their risks, shall exist and the information shall be available to employees.
2. Emergency response procedures shall exist and be known by employees.
3. Offer regular health and safety training for employees (once a year and for all new employees), including training on potential hazards and risk minimization.
4. Offer regular health and safety training for employees (once a year and for all new employees), including training on potential hazards and risk minimization.  
(For numbers 4 and 5, relevant trainings are considered to be those of national/provincial authorities or training centers. Issued certificates to trainees can be used as evidence.)

Determining occurrences of health and safety related accidents and violations recorded and corrective actions taken

5. At a minimum, all job-related accidents that require some form of professional medical attention (nurse or doctor) shall be recorded. Documentation shall be generated with regards to occupational health and safety violations.
6. A corrective action plan shall be implemented in response to job-related accidents and violations of safety practices that have occurred. This needs to analyze and address the root causes and remediate and prevent future risks or accidents of a similar nature.

**4.4.4: Proof of accident insurance**

There shall be sufficient insurance to cover employees who suffer from accidents or injuries that take place in the work environment. Special consideration must be given to migrant or foreign workers who may fall outside of the law. The documents pertaining to worker insurance can be verified with the indicated insurance company.

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<sup>70</sup> **Hazard:** The inherent potential to cause injury or damage to people’s health—for instance unequipped to handle heavy machinery safely/ unprotected exposure to harmful chemicals

## Criterion 4.5: Fair wages<sup>71</sup>

|       | Indicator   | Standards  |
|-------|---|--|
| 4.5.1 | Fair wage level as applicable to their specific job/task description,   | Employees must receive pay in legal tender greater than or equal to (whichever is highest): <ul style="list-style-type: none"> <li>- legal minimum wage</li> <li>- 50% of median income in the country adjusted for average household size (see guidance)</li> </ul> |
| 4.5.2 | No punishment through infringement on rights or wages   | No allowance for withholding any part or all of employee salaries, benefits or rights acquired or stipulated by law. Not even in punishment of (alleged) wrongdoings on the part of the employee. (cf. ILO 29 and 105)   |
| 4.5.3 | Employees shall know the mechanism for setting wages and benefits (including, if applicable, the combination of pay and harvest sharing arrangements) | Decision making criteria and processes for adjustments known by all workers.   |

### **Rationale**

Workers shall be paid fair and equitable wages that, at a minimum, meet the legal minimum wage, but also meet the minimum basic needs of workers and provide some discretionary income. It is important that the wages do not go below a measure of current spending power for the country in which the farm is operating. Unfairly compensated workers can be subject to a life of sustained poverty. Certified aquaculture operations shall also demonstrate their commitment to fair and equitable wages by having and sharing a clear and transparent mechanism for wage setting and a labor conflict resolution policy that tracks wage-related complaints and responses. Company policies and practices shall also prohibit deductions in pay for disciplinary actions and ensure the payments are made in a manner that is convenient to workers. Having these policies outlined in a clear and transparent manner will empower workers to negotiate effectively for fair and equitable wages that will, at a minimum, satisfy basic needs. Revolving labor contract schemes designed to deny long-time workers full access to fair and equitable remuneration and other benefits are prohibited.

### **Guidance for Implementation**

#### **4.5.1: Fair and decent wages**

##### Percentage of employees who are paid fair and decent wages

1. Employers shall ensure that wages paid for a standard working week (no more than 48 hours), at a minimum, allows for a decent level of spending power as prevalent within the country of operation. They must also provide income to employees to ensure their basic needs are met. The OECD sets this level of income at 50 percent of the median wage level prevalent within the country, adjusted for the number of dependents for whom the income-earner has to provide (through equivalence scales). In many countries, legally defined minimum wage levels compare reasonably well to this OECD guideline and, in these cases, this criterion shall ensure that these wages are indeed paid to employees of the farm. In

<sup>71</sup> **Fair and decent wages:** a wage level that enables workers to support the average sized family above the poverty line. Basic needs include essential expenses such as food, clean water, clothes, shelter, transport, education, obligatory taxes, plus a discretionary income, as well as legally mandated social benefits (which may include health care medical insurance, unemployment insurance, retirement, etc). OECD countries define 50% of median-level income in a given country as the minimum income that provide such basic needs. In cases where harvest- or profit-sharing arrangements are used between those who own the farm and those who are employed to work on the farm, the financial value of legal minimum wage or 50% of median wage-level in country (whichever is highest) needs to be guaranteed income of the employee regardless of farm performance.

some countries, legally defined minimum wages are erratically defined, varying by geographic locations and/or whether the farm is owned by foreign companies or set at levels below 50 percent of median income levels. In these cases, this criterion shall ensure that the minimum wage paid to employees is set above the legally defined minimum levels.

2. No deductions in pay and/or benefits for disciplinary actions.
3. Wage and benefits are clearly articulated to employees and are rendered to employees in a convenient manner. Employees do not need to travel to collect benefits. Promissory notes, coupons or merchandise never replace cash/electronic/check payment methods. Employees are given wage payment slips on paper, indicating the actual amounts paid and clearly list any deductions or advances.
4. Labor-only contracting relationships<sup>72</sup> or false apprenticeship schemes<sup>73</sup> are not acceptable. This includes revolving/consecutive labor contracts to deny benefit accrual.  
 False Apprenticeship Scheme: The practice of hiring workers under apprenticeship terms without stipulating terms of the apprenticeship or wages under contract. It is a “false” apprenticeship if its purpose is to underpay people, avoid legal obligations, or employ children.  
 Labor-only contracting arrangement: The practice of hiring workers without establishing a formal employment relationship for the purpose of avoiding payment of regular wages or the provision of legally required benefits, such as health and safety protections.
5. A clear and transparent mechanism for wage setting shall be known to employees.
6. A labor conflict resolution policy shall be in place to track conflicts and complaints raised as well as responses to conflicts and complaints.

Calculation of 50 percent median income adjusted for household size

1. UN and IMF data for many countries include the actual median incomes per capita within a country. For countries where such statistics are not kept, an easy and straightforward ‘proxy’ can be calculated with UN data in the annual Human Development Reports (<http://hdr.undp.org/>). For all countries, except 3 (Maldives, Myanmar, North Korea), the mean GDP per capita is listed. Applying the Gini-coefficient (also listed) corrections as a deviation from a regular Fisk income-distribution curve (a common econometric technique) allows one to estimate the annual median income per person within a given country within a 5 percent error margin. 50 percent of that amount shall be the minimum wage level in this standard. National aquaculture associations, the ASC, and the CBs that perform audits can be expected to keep and (annually renew) such statistics.

**Criterion 4.6: Access to freedom of association and the right to collective bargaining**

|       | <b>Indicator</b>   | <b>Standards</b>                               |
|-------|--|--|
| 4.6.1 | Percentage of employees with access to trade unions, worker organizations, and/or the ability to self-organize as well as the ability to bargain collectively or worker access to representative(s) chosen by workers without management interference. | 100%   |
| 4.6.2 | Members of unions or worker organizations are not discriminated.   | Employers shall not interfere with or penalize |

<sup>72</sup> **Labor-only contracting arrangement:** the practice of hiring workers without establishing a formal employment relationship for the purpose of avoiding payment of regular wages or the provision of legally required benefits, such as health and safety protection

<sup>73</sup> **False Apprenticeship Scheme:** the practice of hiring workers under apprentice-ship terms without stipulating terms of the apprenticeship/ wages under contract. It is a “false” apprenticeship if its purpose is to underpay people, avoid legal obligations, or employ children

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|--|--|---|
|  |  | employees for exercising their right of representation. |
|--|--|---|

**Rationale**

Having the freedom to associate and bargain collectively<sup>74</sup> is a critical right of workers because it allows workers to have a more balanced power relationship with employers when doing such things as negotiating fair compensation. Although this does not mean all workers of a certified aquaculture operation must be in a trade union or similar organization, no workers will be prohibited from accessing such organizations when they exist. If they do not exist or are illegal, companies must make it clear that they are willing to engage in a collective dialogue through a representative structure freely elected by the workers.

**Guidance for Implementation**

**4.6.1: Freedom of association and collective bargaining**

Determining the percentage of employees with access to trade unions, the and ability to bargain collectively, and or worker access to the appropriate representative(s) chosen by workers without management interference.

- 1) Companies shall ensure workers interested in collective bargaining or joining a union or worker organization of their choice are not subjected to discrimination. When rights are restricted, the company should make it clear to workers that they are willing to engage workers in collective dialogue through representative structure and that they will allow workers to freely elect their own representatives.
- 2) Workers have the freedom to form and join any trade union or worker organization, free of any form of interference from employers or competing organizations set up or backed by the employer. The ILO specifically prohibits “acts which are designated to promote the establishment of worker organizations or to support worker organizations by financial or other means, with the object of placing such organizations under the control of employers or employers’ organizations.”
- 3) Evidence provided will be cross-checked with the indicated union or by the organization chosen by the worker.

**Criterion 4.7: Harassment and disciplinary practices in the working environment causing temporary or permanent physical and/or mental harm**

|       | Indicator  | Standards  |
|-------|--|--|
| 4.7.1 | Fairness of disciplinary measures                    | No instances of abuses <sup>75</sup>                           |
| 4.7.2 | Clear, fair and transparent disciplinary procedures. | Evidence of documentation and communication to all employees   |
| 4.7.3 | Prohibition of harassment                            | Evidences that any instances have been addressed and resolved. |

**Rationale**

The rationale for discipline in the workplace is to correct improper actions and maintain effective levels of employee conduct and performance. However, abusive disciplinary actions can violate workers’ human rights. The focus of disciplinary practices shall always be on the improvement of the worker. A certified aquaculture operation shall never employ threatening, humiliating or punishing

<sup>74</sup> **Bargain collectively:** voluntary negotiation between employers and organizations of workers in order to establish the terms and conditions of employment by means of collective (written) agreements

<sup>75</sup> Physically or mentally. **Mental Abuse:** characterized by the intentional use of power, including verbal abuse, isolation, sexual or racial harassment, intimidation, or threat of physical force

disciplinary practices that negatively impact a worker’s physical and/or mental health or dignity. Employers that support non-abusive disciplinary practices as described in the accompanying guidance, accompanied by evidence from worker testimony, shall indicate that a certified aquaculture operation is not employing abusive disciplinary practices. shall indicate that a certified aquaculture operation is not employing abusive disciplinary practices.

**Guidance for Implementation**

**4.7.1: Disciplinary actions in the work environment**

Determining incidences of abusive disciplinary actions

There shall be absolutely no engagement in or support of corporal punishment, mental or physical coercion, or verbal abuse. Fines or wage deductions shall not be acceptable as a method for disciplining workers, as indicated by policy statements and evidence from worker testimony.

Evidence of non-abusive disciplinary policies and procedures

If disciplinary action is required, progressive verbal and written warnings shall be engaged. Aim should always be on improving the worker before letting him/her go, as indicated by policy statements and evidence from worker testimony.

**Criterion 4.8: Overtime compensation and working hours**

|       | <b>Indicator</b>   | <b>Standards</b>  |
|-------|--|---|
| 4.8.1 | Maximum number of regular working hours  | 8 hours/day or 48 hours/week (maximum average over 17 week period) including ‘stand-by’ hours <sup>76</sup>   |
| 4.8.2 | Right to leave the farm after completion of daily work duties  | Evidence of freedom of movement for all employees   |
| 4.8.3 | Minimum time-off from work, with the right but not the obligation to leave farm premises if accommodated on the farm | Four full 24 hours periods per month, including at least 2 nights/week; with the exception of cases wherein employer can demonstrate he has clearly agreed with employee not being able to accommodate worker on farm during off-days |
| 4.8.4 | Overtime compensation is provided  | Voluntary, not longer than 12 hours/week, occasional (= not on a regular basis), and paid at a premium rate <sup>57</sup> of at least 25% above the wage for normal hours.  |
| 4.8.5 | Legal rights to maternity leave, including daily breaks or a reduction of hours of work to attend child care needs.  | Always granted without reduction in remunerations or benefits the worker is entitled to under normal conditions   |

***Rationale***

Abuse of overtime working hours is a widespread issue in many industries and regions. Workers subject to extensive overtime can suffer consequences in their work-life balance and are subject to higher fatigue-related accident rates. In accordance with better practices, employees in certified aquaculture operations are permitted to work—within defined guidelines—beyond normal work week hours but must be compensated at premium rates.<sup>77</sup> Requirements for time off, working hours

<sup>76</sup> None expressed in interviews

<sup>77</sup> **Premium rate:** a rate of pay higher than the regular workweek rate. Must comply with national laws/ regulations and/or fair wage standard. Must be 125% of normal rate or higher.

and compensation rates as described should reduce the impacts of overtime. With respect to women, ILO Convention 183, Article 11.2 (Criterion 4.8.5) shall be followed.

### **Guidance for Implementation**

#### **4.8.1: Overtime and working hours**

##### Determining incidences, violations and abuse of working hours and overtime

1. Hours actually worked include time spent at the workplace on productive activities and on other activities which are part of the tasks and duties of the jobs concerned (e.g., cleaning and preparing working tools). It also includes time spent at the workplace when the person is inactive for reasons linked to the production process or work organization (e.g., standby time), as paid workers remain at the disposal of their employer during these periods. Hours actually worked also include short rest periods spent at the workplace because they are difficult to distinguish separately, even if workers are not “at the disposal” of their employer during those periods. Explicitly excluded are lunch breaks, as they normally are sufficiently long to be easily distinguished from work periods.
2. Employer shall comply with applicable laws and industry standards related to working hours. A “normal workweek” can be defined by law but shall not, on a regular basis (constantly or majority of the time), exceed 48 hours. Variations based on seasonality may apply. Farms are encouraged to keep work-time records.
3. Personnel shall be provided with at least one full day or two nights off in every seven-day period.
4. Workers will not be discouraged from keeping work-time records (in cases when the farm does not do so itself).
5. All overtime shall not exceed 12 hours per week, for more than two consecutive weeks, and total work time (including overtime) shall not exceed 48 hours on average over a 17-week period. All overtime shall be paid at a premium of +25% over regular wage. Overtime work shall be voluntary. Exceptions to this last requirement can be made in cases where overtime is necessary in order to meet short-term business demands, as long as it is legal and there is a collective bargaining agreement in place that addresses this issue.

### **Criterion 4.9: Employee and worker contracts are fair and transparent**

|       | <b>Indicator</b>   | <b>Standards</b>   |
|-------|--|--|
| 4.9.1 | Workers have work permit   | All workers have the appropriate work-permit or permits. Employer has verified this and, when required, a list of permit numbers or copies of permits for all concerned employees shall be in the office.  |
| 4.9.2 | Employees are fully aware of their contracting conditions and confirmed their agreement. | Evidence of contract agreement for all employees.<br>Written contracts: a complete contract is filed in the office, mutually signed, and copies are available with employee.<br>Verbal contracts: employer and employee cite consistent contract conditions in independent interviews. |
| 4.9.3 | Probation period   | No longer than 30 workdays <sup>78</sup>   |

<sup>77</sup> **Light Work:** (ILO convention 138, article 7.1) Light work is work that is 1) not likely to be harmful to a child’sTBD

<sup>78</sup> If the law of the producing countries requires more, the law must be followed

|       |  |  |
|-------|--|--|
| 4.9.4 | In subcontracting or home-working arrangements, the farm owner shall assure that labour laws, social security laws, and ratified ILO provisions have been duly respected and complied with | Proof on paper that sub-contractors and/or intermediaries have updated knowledge on these laws and regulations, and have contracts with their workers that are in accordance with laws and regulations |
|-------|--|--|

**Rationale**

The key to a fair and transparent exchange (work for income) is an agreement that is clear to both parties and can be verified during the contract period. Signed documents (by both parties) that both parties have access to at will are important for verification to take place. This will also ensure that conflicts around misunderstandings can be avoided and, if they do occur, can be discussed in a mutually transparent manner. Where verbal contracts are practiced (e.g. remote rural locations, cases of illiteracy and small family farms), extra care must be taken to ensure that the contents of the agreement are fully agreed to and well-understood by both parties.

**Guidance for Implementation**

**4.9.2: Employees and worker contracts are fair and transparent**

1. Contracts include provisions on: date of entry, notice period, probation period, salary and salary policy, expected working hours, policies on overtime, farm safety protocols, terms of insurance, policies on disciplinary measures, list of obligatory expenses, other specific rights and obligations of both parties, both signatures (with clearly typed or written names and addresses), and date of signing. The general or collective provisions may be annexed to the signed contract, but the worker shall have a full printed copy of those.
2. Farms with more than five hired workers shall follow formalized paper-based contract and policy procedures. On farms with fewer workers, where farmer and workers engage in verbal contracting practices, confidential interviews with farm owner, worker(s), and the surrounding community (e.g., a local school teacher, in the event of children working on the farm) may be necessary to validate whether fair and transparent (i.e., verbal) contracting is taking place.
3. Cooperatives (groups of farms) amounting to in total more than five workers will comply with the paperwork that is specified in the indicators.

**Criterion 4.10: Fair and transparent worker management systems**

|        | Indicator  | Standards  |
|--------|--|--|
| 4.10.1 | The employer ensures all employees have access to appropriate channels of communication with employers on matters relating to labor rights and working conditions. | (for farms with more than one hired worker) Management and the full workforce meet at least twice per year on the basis of written agendas and written minutes of the meetings |
| 4.10.2 | Percentage of issues raised by employees which are registered, responded to, and monitored by employer   | 100%   |
| 4.10.3 | Percentage of complaints that are resolved within one month after being received   | 90%  |
| 4.10.4 | Clear plan, with process and timeframe, is developed on unresolved complaints, and complied with.  | List, plan, timeframe for resolution is available during audit   |

### **Rationale**

Besides a bilateral relationship between employer and employee, there is also a collective relationship between the farm management and the group of workers. Collective meetings should take place regularly to create a venue and time to discuss collective concerns. Such concerns can come from management to workers, but also from workers to management. Prepared meetings on the basis of a prepared and communicated agenda, with minutes and the outcome on paper, will allow a structured process of negotiation and group cohesion building. Regular collective meetings will improve the effectiveness and efficiency of the work done on the farm and will also ensure greater job satisfaction.

### **Guidance for Implementation**

#### **4.10 Fair and transparent mechanism to resolve collective conflicts**

Records of the meetings can be inspected and verified with management, workers, and the union or another organization of which a worker is a member. The minutes shall include the agenda, the resolution or action points upon which both parties agreed, and a list of participants to the meeting.

#### **Criterion 4.11: Living conditions for employees accommodated on the farm**

|        | <b>Indicator</b>                                    | <b>Standards</b>  |
|--------|---|---|
| 4.11.1 | Living conditions for employees housed on the farm  | All facilities are clean, sanitary, safe and suitable for habitation  |
| 4.11.2 | Women facilities (if women are among the workforce) | Separate sanitary and toilet facilities are available for men and women; with the possible exception of married couples working and accommodated together |

### **Rationale**

The protection of the workers that reside or live on the farm's property is an integral part of the employer's responsibility. To maintain the health and performance of workers, farms will provide clean, sanitary and safe living quarters with access to clean water and nutritious meals. Accommodation facilities must provide for the needs of those (presumably, but not exclusively, women) that can be considered at risk of sexual or privacy harassments.



#### **Guidance for implementation 4.11**

The GSC is interested in how sanitary, safe, and suitable for habitation is defined in different countries. It is difficult to identify objective specific criteria for evaluating these aspects because they are heavily dependent on cultural factors. The GSC would welcome suggestions based on country-specific criteria.

## Principle 5: Manage shrimp health and welfare in a responsible manner

*Impact: The culture of shrimp under stressful conditions can lead to the transfer of diseases or the amplification of diseases in the receiving waters. Additionally, heavy reliance on the use of therapeutic chemicals at shrimp aquaculture facilities can not only cause pollution but can also stimulate and/or introduce antibiotic resistant bacteria into the receiving waters, potentially having a negative effect on the local ecosystem.*

### Criterion 5.1: Disease prevention

|       | Indicator   | Standards  |
|-------|---|--|
| 5.1.1 | Use of therapeutants and chemicals (e.g. veterinary medicines and probiotics etc.)  | Only products authorized by national authorities are allowed   |
| 5.1.2 | Functional and operational health plan  | Demonstrated consideration of the following:<br>1) Diseases from the surrounding environment entering the farm (predator and vector control),<br>2) Diseases from the farm spreading to the surrounding environment, effluent filtration/sterilization),<br>3) the spreading of disease within the farm<br>Avoid cross contamination, detect and prevent emerging pathogen(s), and monitor external signs of pathologies and moribund animal |
| 5.1.3 | Filtration of inlet water for minimizing the entry of disease vectors.  | Net mesh, grills, screens, or barriers of appropriate <sup>79</sup> size are present on all farm or pond inlets  |
| 5.1.4 | Minimum dissolved oxygen concentration  | Aerated ponds: > 3ppm<br>Non-aerated ponds: no more than 3 days in a row of dissolved oxygen lower than 3ppm in 90% of the ponds   |
| 5.1.5 | Pond water pH   | >7   |
| 5.1.6 | Annual average farm survival rate <sup>80</sup> (SR) and relative standard deviation (RSD) for:<br><br>1) Unfed and non-aerated pond systems<br>2) Fed but non-aerated pond systems<br>3) Fed and permanently aerated <sup>81</sup> pond systems | SR >30-40% and RSD <15%<br>SR >50-65% and RSD <15%<br>SR >70-80% and RSD <15%<br>** Number based on field data but the GSC is interested in more information   |
| 5.1.7 | % of stocked post larvae (PL) that are SPF <sup>82</sup> or SPR <sup>83</sup>   | 100% based on commercial availability <sup>84</sup>  |

<sup>79</sup> Rationale for size choice that includes assessing the risks associated with your production system and selecting the right mesh size based on these risks

<sup>80</sup> NOTE: survival rate does not include hatchery survival

<sup>81</sup> Permanent aeration refers to aeration capacity installed during more than 90% of the grow-out period for sustaining a high biomass that exceeds the natural carrying capacity of the culture system and for feeding at the corresponding rate to ensure the best possible growth rate. Emergency aeration is not considered as permanent aeration.

<sup>82</sup> **Specific Pathogen Free:** a term used for animals that are guaranteed free of particular pathogens. The claim It is accompanied by a list of the absent pathogens



**5.1.6:** There is significant concern on the GSC that the survival targets are set too high and the suggested values do not represent GSC agreement. There is concern about setting a target that many good farms will be able to comply one year but potentially not the following year due to factors beyond their control such as the quality of postlarvae, climate phenomenon (e.g. higher or lower than normal temperatures) or other factors. The GSC is seeking ways to integrate industry data in order to objectively set this standard both for the final version of the ShAD standards and for continuous improvement. The current standards specify an acceptable survival range that will be narrowed down to specific numbers pending feedback and further work.

### **Rationale**

Prevention of disease is the absolute priority for this principle and the ShAD emphasizes the importance of implementing biosecurity measures to reduce the risk of disease at the farm, regional, national and international levels. At the farm level, biosecurity measures include controlling the inputs (e.g. water, feed and PLs) and disease vectors (e.g. birds and crabs), as well as taking action to reduce the stress levels of the farm animals (e.g. good pond condition and adequate feed). The ShAD standards mandate a health plan that ensures adequate identification of potential disease risks, appropriate screening and disease prevention measures, effective adaptive measures and pathways to continuous improvement.

To reduce the use of antibiotics and pesticides, the ShAD promotes the use of mechanical water filtration to eliminate pathogen carriers and competitors. Mechanical filtration can take place at different levels on the farm (e.g. pumping station, canal or pond), depending on the farm design, and by different means (e.g. drum filters and inlet filters). Mesh size must be determined based on the risks associated with the production system being used.

The ShAD considers the dissolved oxygen (DO) level on the pond bottom to be a key indicator. DO ensures a hospitable environment for animals and allows for the oxidization of organic matter, which further improves the conditions on the pond bottom. DO must be measured with a calibrated DO meter by a trained technician and taken near the outlet (if any) just above the pond bottom. The measure must be done one hour before sunrise.

Another important parameter to measure is pH, as shrimp farms are sometimes built in areas with acidic soils. Ponds built on potential acid-sulfate soils<sup>85</sup> could exhibit problems of water acidity when the soil is disturbed. Although it has been documented that ponds with acidic soils generally have low production output<sup>86</sup> and it can be observed that many shrimp ponds built on acid-sulfate soils have been abandoned over time worldwide, it is technically possible to prevent and remediate soil acidity and even reclaim acid-sulfate ponds<sup>87</sup>. Therefore, although these standards acknowledge that acid-sulfate soils are best avoided when siting a farm, the ShAD also recognizes that there are management tools available for preventing acidity issues when farms have already been located in such areas. In all cases, the acidification of pond water needs to be mitigated by the addition of liming materials in order to maintain water alkalinity at a level that will ensure that water pH remains

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<sup>83</sup> **Specific Pathogen Resistant** describes a genetic trait of a shrimp that confers some resistance against one specific pathogen. SPR shrimp usually result from a specific breeding program designed to increase resistance to a particular virus

<sup>84</sup> See Guidance for details on exceptions

<sup>85</sup> **Potential acid-sulfate soils:** soils containing pyrite (sulfur compound). When exposed to air (disturbed soil), pyrite oxidizes to yield acidity Boyd 1995.

<sup>86</sup> Boyd 1995

<sup>87</sup> Boyd 1995; Boyd and Tucker 1998

above seven, which is reported as being adequate for shrimp culture.<sup>88</sup>

Pond water pH can be measured with pH paper, a test kit or a calibrated probe using a water sample taken just above the pond bottom. DO and pH should be measured at the same time.

The survival rates proposed not only serve well as a performance-based indicator for successful disease prevention, but, as survival depends upon different factors (e.g. water quality, feeding and pond size), these indicators also indirectly address management practices, which, if followed, should result in fairly consistent survival rates among ponds.

The level of control over pond conditions, which partly determines the prevention of diseases, varies greatly depending on the culture system, especially when differences in feeding and aeration practices are considered. Therefore, the ShAD proposes three different standards for survival rates, depending on whether ponds are fed and aerated. Unfed and non-aerated ponds are normally low-density, very large (>50 hectares) ponds where farmers have limited means of controlling conditions and preventing mortalities. Fed but non-aerated ponds allow for a higher level of control, but are still susceptible to oxygen crises. Farmers that use continuous aeration usually operate small ponds (<5 hectares) that are more manageable for ensuring optimum conditions for mortality prevention.

One of the main biosecurity measures that can be taken by farm management is to ensure that animals stocked in ponds are free of disease. The ShAD supports the use of Specific Pathogen Free (SPF) and Specific Pathogen Resistant (SPR) post larvae to achieve this goal. In countries where SPF or SPR seed is not commercially available (less than 20 percent of the country's production uses SPF or SPR), seed that has been tested for a specific disease may be used. Breeding programs based on the local production of broodstock under natural environmental conditions (survivors to naturally occurring pathogens) is considered as equivalent to SPR even if resistance to specific pathogens is not scientifically demonstrated. The ShAD is seeking to create a standard that supports innovation and encourages ASC certified farms to be leaders in promoting good farming practices. The ShAD recognizes that this criterion does not adequately cover emerging diseases but expects this to be a short-term allowance under the standards. The testing must include country specific diseases of concern as well as any on national lists. The ShAD also recognizes that checking broodstock in Asia may be challenging, but expects to see continuous improvement of farmers certified under this standard and will monitor developments on this issue for future versions of the ShAD Standards.

The ShAD acknowledges that having a screened broodstock coming from the wild or unsecured ponds is not equivalent to SPF. Firstly, one screening regardless of the sensitivity of the test is not equivalent to repeated screenings over several generations for each pathogen considered. There are still several examples of infections developing via post-larvae produced by breeders who have only been tested once. An SPF source, when well managed, can be 100 % safe for preventing known pathogens. Secondly, all emerging pathogens can come from wild broodstock or unsecured ponds, as many do not have the necessary tools to detect these diseases. In other words, the probability of introducing a novel disease is much higher. Therefore, the ShAD acknowledges that a screened broodstock is clearly better than nothing, and is preferred to a non-checked broodstock.

### **Guidance for Implementation**

**5.1.1:** Copies of the national regulations must be available for the auditor upon request.

**5.1.2:** The auditor must be able to understand the rationale for the components of the health plan and understand the risks associated with the farming operation as well as how the farm plans to continuously improve production practices to address these measures. The auditor needs to be assured that the farm is not contaminating or spreading disease to the surrounding environment, has

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<sup>88</sup> Brock and Main 1994

enacted good prevention measures adapted to the localized risks, and has mechanisms to the spread of infections from one pond to another.

**5.1.3:** Screen size must be justified according to the local risk factors.

Dissolved oxygen (DO) concentration must be measured on a daily basis near the pond bottom one hour before sunrise. The average value of three measurements over any three consecutive days must be above 3ppm. An exception for this standard is granted for permanently aerated bacterial bioflocs ponds, which can remain at 2ppm instead of 3ppm.

**5.1.4:** Guidance under development, suggestions welcomed from public comment.

**5.1.5:** Water pH must be measured in all ponds at least once per week. All values must be higher than 7.

**5.1.6:** Survival Rate (SR) Calculation

**Step 1** - Individual Pond Survival Rate Calculation

*The estimated number of shrimp harvested is calculated by dividing the harvested biomass by the harvest average body weight and can be estimated for each pond using the following formula:*

$$\% \text{ Pond Survival Rate} = \left[ \frac{\text{Stocked PL Count} / (\text{Harvested Biomass} / \text{Average Body Weight})}{\text{Estimated number of animal harvested}} \right] \times 100$$

Farmers are responsible for all counts, including the stocked PL count and hatchery counts. The stocked PL count needs to be taken when PLs are transferred from the hatchery to the farm, whether they are stocked directly in grow-out ponds or in some intermediate, nursery raceway or pond.

**Step 2** - Annual Average Farm Survival Rate (SR) Calculation

*The Annual Average Survival Rate is the mean value for all ponds harvested during the last 12 months and can be estimated using the following formula:*

$$\text{SR in \%} = (\% \text{ Pond}_1 \text{ Survival Rate} + \% \text{ Pond}_2 \text{ Survival Rate} + \% \text{ Pond}_3 \text{ Survival Rate} + \dots + \text{Pond}_n \text{ Survival Rate}) / \text{Number of ponds harvested}$$

*The Standard Deviation (SD) is calculated as follows:*

$$\text{SD} = [(\% \text{ Pond}_1 \text{ Survival Rate} - \text{SR})^2 + (\% \text{ Pond}_2 \text{ Survival Rate} - \text{SR})^2 + (\% \text{ Pond}_3 \text{ Survival Rate} - \text{SR})^2 + \dots + (\% \text{ Pond}_n \text{ Survival Rate} - \text{SR})^2] / (\text{Number of ponds harvested} - 1)^{1/2}$$

*The Relative Standard Deviation (RSD) (also called coefficient of variation) is calculated as follows:*

$$\text{RSD in \%} = (\text{SD}/\text{SR}) \times 100$$

A counting system will be important for the ShAD to describe a method of counting PLs so that the SR measure is meaningful.

**5.1.7:** If more than 20 percent of a country's production uses SPF or SPR broodstock, farmers certified under this standard must do so as well. Non SPF or non-SPR seed must be tested against the OIE<sup>89</sup> official disease list and country specific diseases not specifically listed under OIE, where this is commercially and locally available for country specific diseases.

## Criterion 5.2: Predator<sup>90</sup> control

|       | Indicator  | Standard |
|-------|--|----------|
| 5.2.1 | Allowance for intentional lethal predator control of any protected, threatened or endangered species as defined by the International Union for Conservation of Nature (IUCN) Red List <sup>91</sup> national listing | None     |

<sup>89</sup> <http://www.oie.int>

<sup>90</sup> **Predator:** Any animal that lives by preying on other animals

<sup>91</sup> IUCN red lists can be accessed via ([www.iucnredlist.org](http://www.iucnredlist.org)).

|       |  |      |
|-------|--|------|
|       | processes, <sup>92</sup> or other official lists <sup>93</sup>           |      |
| 5.2.2 | Allowance for use of lead shot and select chemicals for predator control | None |

### ***Rationale***

The predation of cultured shrimp by fish, birds, amphibians, reptiles and other crustaceans can result in significant negative economic impacts to farmers by loss of stock or the introduction of disease. In some cases, farmers employ lethal control to deter or remove predators from their farms. The killing of predators can negatively impact predator populations and effect local biodiversity, especially when local predators (e.g. herons and egrets) become dependent on the reliable food source that shrimp farms provide. Although a consistent food supply is likely to enhance population numbers, it is also likely to change behavior and local dispersal patterns of affected species that may ultimately affect the health of the predator populations. The ShAD determined that the intentional killing or harassment of animals that prey on cultured shrimp is inappropriate for farms certified under these standards. The ShAD plans to allow for limited lethal control of predators in exceptional situations, which must be appropriately documented by the farmer and made available for the auditor to a maximum of a yet undetermined number of occurrences per year.

Any lethal control must be exercised without the use of lead shots, as this has been found to have negative trophic and environmental impacts. Furthermore, farmers are not permitted to kill any species that are defined as protected, threatened, or endangered by the IUCN Red List or state, local, or national governments.

Farms must demonstrate that they have exhausted non-lethal options before lethal control is employed (acceptable non-lethal methods will be included under the guidance section in the final version). Documentation must be provided to the auditor explaining the exceptional circumstances that led to the lethal control. This information must include the date, time, method of control, species killed and method of disposal.

### ***Guidance for Implementation***

**5.2.1:** This standard does not apply to pond water treatment. Intentional lethal predator control is defined as actively trying to kill an animal. The use of passive predator exclusion fences and devices is strongly encouraged. A basic monitoring program that documents the frequency of visits, variety of species, and number of animals interacting with the farm will likely be necessary to demonstrate compliance with this standard.

**5.2.2:** The ShAD standards ban the use and storage on site of pesticides that are banned, restricted or identified as extremely to moderately hazardous by the Rotterdam Convention on Prior Informed Consent (PIC)<sup>94</sup>, the Stockholm Convention on Persistent Organic Pollutants (POPs)<sup>95</sup>, the World Health Organization (WHO)<sup>96</sup>, or the European Commission<sup>97</sup>. Banned chemicals include: illegal chemicals in the country of production, FAO black list, Rotterdam, and Stockholm Conventions on pesticides.

<sup>92</sup> **National listing process:** Any process that occurs at the national, provincial, state, or other level within-country that evaluates species conservation status against a set of defined criteria recognized by relevant governance. Such listing processes may legally binding (e.g. Endangered Species Act in the U.S.A. or the Species at Risk Act in Canada), or may not be legally binding. (e.g. species listings created by COSEWIC in Canada (Committee on the Status of Endangered Wildlife), or the Red Data Book in Vietnam).

<sup>93</sup> Note: does not apply to pond water treatment and any aquatic animals that are contained within it

<sup>94</sup> <http://www.pic.int/home.php?type=s&id=77>

<sup>95</sup> <http://chm.pops.int/default.aspx>

<sup>96</sup> <http://www.who.int/en/>

<sup>97</sup> [http://ec.europa.eu/index\\_en.htm](http://ec.europa.eu/index_en.htm)

## Criterion 5.3: Disease management and treatment

|  | Indicator  | Standards  |
|--|--|--|
| 5.3.1<br> | Allowance for use of antibiotic and medicated feed on labeled products <sup>98</sup><br><br>OR<br><br>Allowance for use of antibiotics   | <b><u>Option 1</u></b><br>No allowance for use in any pond of certified farm<br><br><b><u>Option 2</u></b><br>Allowance for use in ponds not sold under the ASC label, provided product can be traced back to individual ponds |
| 5.3.2  | Control of chemical products stocked and used on the farm  | Records of stocks and usage are available for all products   |
| 5.3.3  | Proper use of chemical products  | Evidences of worker training and instructions available to farm workers  |
| 5.3.4  | Allowance for treating water with pesticides <sup>99</sup> that are banned, restricted or identified as extremely to moderately hazardous by the Rotterdam Convention on Prior Informed Consent (PIC), the Stockholm Convention on Persistent Organic Pollutants (POPs), the World Health Organization (WHO) or the European Commission. | None   |
| 5.3.5  | Allowance for discharge of all hazardous chemicals <sup>100</sup> without previous neutralization <sup>101</sup>   | None   |
| 5.3.6  | Use of probiotic bacterial strains   | Only strains deemed not harmful by the appropriate competent authorities <sup>102</sup> are allowed.   |

### Rationale

It is the responsibility of the farmer to reduce the risk of spreading pathogens by taking adequate measures to contain diseased shrimp and dispose of dead shrimp in a sanitary way. It is also the farmer's responsibility to avoid environmental side effects from the measures taken to mitigate disease (e.g. the adjustment of feed applications in the instance of pond mortality, the proper discarding of dead shrimp etc.). The major goal of this criterion is to encourage farmers to develop the skills necessary to address disease management.

<sup>98</sup> Option 1: All shrimp from certified farm. Option 2: Shrimp from ponds complying with the full set of standards within a certified farm. Smith P., T.E. Horsberg, A. LeBreton, F. Corsin (2008) Towards prudent and responsible use of antimicrobials in aquaculture. In: L. Guardabassi, L.B. Jensen, H. Kruse (eds.) "Guide to antimicrobial use in animals", Blackwell Scientific Publications.

<sup>99</sup> Any substance, or mixture of substances, or micro-organisms including viruses, intended for repelling, destroying or controlling any pest, including vectors of human or animal disease, nuisance pests, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport, or marketing of food, agricultural commodities, wood and wood products or animal feeding stuffs, or which may be administered to animals for the control of insects, arachnids or other pests in or on their bodies; Pesticide Specifications, Manual on Development and Use of FAO and WHO Specifications for Pesticides, 2002.

<sup>100</sup> Hazardous chemicals need to be identified through a risk analysis. Common hazardous products used in shrimp farming are lime, disinfectants, sodium metabisulfite, pesticides, including natural piscicides such as tea seed and rotenone (refer to Boyd and Massaut 1999 and Gräslund and Bengtsson 2001 for a review of risks with chemicals).

<sup>101</sup> This does not mean that the discharge must be pH neutral; but need to ensure that chemicals are broken down.

<sup>102</sup> Definitions being developed

### ***Use of antibiotics***

The shrimp industry has made progress to prevent disease outbreaks, especially with the development of selected stocks free of pathogens, such as SPF. Recent experience in many countries has shown that the use of veterinary medicines, especially antibiotics, is not effective for treating most diseases, particularly viral diseases, and is not justified when effective biosecurity measures are implemented. As the labeling of products treated with veterinary medicines is not possible, shrimp from treated ponds cannot be certified under the ShAD standards. Therefore, the ShAD encourages the use of alternative disease prevention measures before medicinal treatments.

In the event that veterinary medicines and chemicals<sup>103</sup> are used, they must be prescribed by an aquatic animal health specialist<sup>104</sup> based on a diagnostic test, and all labeled instructions must be precisely followed. The specialist shall also indicate how to apply, handle and store veterinary medicines and chemicals.

### ***Use of pesticides***

The ShAD standards ban the use and storage of pesticides that are banned, restricted or identified as extremely to moderately hazardous by the Rotterdam Convention on Prior Informed Consent (PIC), the Stockholm Convention on Persistent Organic Pollutants (POPs), the World Health Organization (WHO) or the European Commission. There is allowance for treating water in the absence of shrimp with Tea-seed-cake, Rotenone, and chlorine. There is concern on the GSC that even these allowable pesticides could have negative impacts, as they do kill fish. Therefore, the standards require that water treated with these pesticides must be held before release to ensure that fish in the receiving waters are not killed.

### ***Use of probiotics***

Probiotics, which are natural and beneficial bacteria, are increasingly used in shrimp farming in different forms and for different purposes. Probiotics are used to modify the microbial communities in the digestive tract of shrimp (as a feed additive) and in their aquatic environment (applied directly to the pond) with the objective of competing with and displacing pathogens and, as a result, improving shrimp growth and survival.<sup>105</sup> Probiotics are also used for improving pond water and soil quality.<sup>106</sup> There are concerns that some bacterial species or strains contained in commercial products or resulting from uncontrolled fermentation conducted on site may be inappropriate or even hazardous for shrimp and humans<sup>107</sup>. On this basis, the ShAD considers that the use of probiotics in shrimp culture needs to be restricted to microorganisms and only those approved by the appropriate authority.

### **Guidance for Implementation**

**5.3.1:** This standard applies to all antibiotics, all application methods as well as to both direct use and medicated feed.

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<sup>103</sup> All veterinary medicines and chemicals must

- Be approved for aquaculture by national authorities and by FDA list of drugs approved for aquaculture. and by the Council regulation EEC n°2377/90 Annex 1 and not listed on Annex 4
- Respect the withdrawal period or apply a period of 750 degree-days for those without documented withdrawal period times<sup>47</sup>;
- Never be used as growth promoters<sup>48</sup> or for preventive (prophylactic) treatment. This product will not be eligible for certification

<sup>104</sup> An aquatic animal health specialist

- follows government regulations, if such regulations exist in the producing country
- If the government does not regulate on this, the following people can be considered as specialists:
  - Veterinarians with at least three months of training on shrimp pathology
  - Aquaculturists (with university or vocational degree) who have completed at least three months of training on shrimp pathology. This training maybe included with the university or vocational degree.

<sup>105</sup> Moriarty and Decamp 2009

<sup>106</sup> Boyd and Gross 1998; Gatesoupe 1999

<sup>107</sup> Moriarty and Decamp 2009

- 5.3.2:** Guidance notes under development, suggestions welcome from public comment.
- 5.3.3:** Guidance notes under development, suggestions welcome from public comment.
- 5.3.4:** All chemicals must be neutralized before discharging them into the environment and there can be no evidence of impacts from chemicals in adjacent ecosystems
- 5.3.5:** Guidance notes under development, suggestions welcome from public comment.
- 5.3.6:** Only products authorized by competent authorities, disclosing the names of microorganisms included in the product, are allowed for use in shrimp ponds. Farmers are responsible for verifying that the products they use do not contain any pathogenic (either for shrimp or humans) species. The mass production of microorganisms on farms using fermentation is allowed, provided every batch is seeded with a compliant commercial product. The use of fermented product to seed further batches is strictly forbidden, as this can lead to the unintended selection of pathogens over time. On-site fermentation of probiotics, if practiced, must be done according to the protocol provided by the suppliers, including taking all required precautions to ensure they do not have contaminant strains.

## Principle 6: Manage broodstock origin, stock selection and effects of stock management

*Impact: Shrimp farming has been shown to have negative impacts on wild shrimp populations and on the environment due to the collection of wild post-larvae and broodstock; the introduction of non-native species and/or the escape of genetically-distinct native shrimp.*



The GSC acknowledges that many aspects of Principle 6 are out of the typical audit scope at the farm level. However, some of the issues that are contained within Principle 6 were identified as important impacts to be addressed for a credible eco-label by the ShAD and therefore need to be included in the standard despite the auditing challenges. There is debate among the GSC about how to handle this issue including the following considerations:

- 1) Some GSC members think that these standards can be audited through documentation provided by suppliers that may or may not be audited by an independent third party. Others are concerned that this will not be strong enough for a credible eco-label given that it will rely heavily on documentation for compliance.
- 2) Some GSC members are suggesting to take Principle 6 out of the standards in order to not bring confusion and to creating false expectations for consumers what issues have been adequately covered. As a consequence, they suggest waiting until a specific standard is designed for shrimp hatcheries, and independent ASC auditors are able to validate the practices at this level of the chain of custody before communicating on these issues towards the consumers.

The GSC welcomes opinions or suggestions on how to handle this issue

### Criterion 6.1: Presence of exotic or introduced shrimp species

|       | Indicator  | Standards  |
|-------|--|--|
| 6.1.1 | Conditions for stocking a non-indigenous species   | Non-indigenous shrimp species must be in commercial production locally by the date of the publication of the ShAD standards AND there must be no evidence of establishment or impact on adjacent ecosystems by non-indigenous culture shrimp species |
| 6.1.2 | Prevention of the introduction of invasive/exotic species  | Documentation provided demonstrating compliance with regional, national and international importation guidelines (e.g. OIE and ICES)   |
| 6.1.3 | Prevention measures to prevent escapes at harvest and during grow-out demonstrated through the following requirements: | A. Presence of effective screens or barriers of appropriate mesh size for the smallest animals present   |
|       |  | B. Evidence that pond banks or dykes are of adequate height and construction to prevent breaching in exceptional   |

|       |   |  |
|-------|---|--|
|       |   | flood events   |
|       |   | C. Regular, timely inspections are performed and recorded in a permanent register                            |
|       |   | D. Evidence of timely repairs to the system are recorded   |
|       |   | E. Installation and management of trapping devices to sample for the existence of escapes; data is recorded. |
|       |   | F. Traps on water outlets to catch/kill escapes  |
|       |   | G. Evidence of escape recovery protocols   |
|       |   | H. Harvested shrimp shall be killed or slaughtered on site   |
| 6.1.4 | Escapes and actions taken to prevent reoccurrence | Evidences of records are available   |

### **Rationale**

According to the FAO (FAO, 2005), introduced species are considered one of the major threats to global biodiversity and can also have significant social and economic impacts. Aquaculture has been one of the major pathways for introducing non-native aquatic plants and animals, which, in some cases, have become harmful invasive species<sup>108</sup>. Accidental or intentional introductions of non-native species have become an alarming global environmental problem.<sup>109</sup> The ShAD defines “exotic species” as non-native species living in areas outside their native boundaries and “established species” as an introduced population that is currently reproducing and sustaining in the wild without further introductions of any kind.

The principle aim of the ShAD with regard to introductions of non-native species is to discourage introductions of farmed shrimp species into waterways where they are not native or previously established. Worldwide transfers and introductions of *P.monodon* and *L. vannamei* were widespread in the early history of shrimp culture (Rönnbäck 2002). Introductions occurred from Asia to Latin America in the form of *P. monodon* and vice versa in the form of *L. vannamei* (Phillips, Kwei Lin and Beveridge 1993; Shrimp News International 2009). The International Council for the Exploration of the Sea’s Code of Practice on the Introduction and Transfer of Marine Organisms is one of the most comprehensive instruments to help in the responsible use of introduced species but is only voluntary. *L. vannamei* is thought to have been illegally imported to several Asian countries (Bondad-Reantaso 2004), despite efforts to outlaw the introduction of non-native species. First introductions of *L. vannamei* to Asian countries occurred as follows: Mainland China, 1988; Taiwan, 1995; Viet Nam, 2000; Indonesia, 2001; Thailand, 1998; Malaysia, 2001; India, 2001, Philippines, 1997; and Pacific Islands, 1972.

Such introductions and transfers have led to concerns that individuals can escape and compete with local fauna (Briggs et al., 2005; Naylor et al., 1997; Phillips, Kwei Lin and Beveridge 1993; Qing-Yin

<sup>108</sup> **Invasive species:** organism (usually transported by humans) which successfully establish themselves in, and then overcome, otherwise intact, pre-existing native ecosystems ([http://www.issg.org/about\\_is.htm](http://www.issg.org/about_is.htm)). Weigle, S.M., Smith, L.D., Carlton, J.T. & Pederson, J. 2005. Assessing the risk of introducing exotic species via the live marine species trade. *Cons. Biol.*, 19: 213–223. Casal, C.M.V. 2006. Global documentation of fish introductions: the growing crisis and recommendations for action. *Biol. Invasions*, 8: 3–11.

<sup>109</sup> Leung, K.M.Y. and Dudgeon, D. 2008. Ecological risk assessment and management of exotic organisms associated with aquaculture activities. In M.G. Bondad-Reantaso, J.R. Arthur and R.P. Subasinghe (eds). *Understanding and applying risk analysis in aquaculture*. FAO Fisheries and Aquaculture Technical Paper. No. 519. Rome, FAO. pp. 67–100.

and Cong-Hai 2005). However, although there appears to be some specific examples of escapes occurring, there are little or no hard data on their ecological impact<sup>110</sup> (Briggs et al. 2005). However, *L. vannamei* represents the vast majority of global farmed shrimp production and is an exotic species in most of the areas where it is grown. Although exotic species have been deemed a critical conservation concern globally, as they have the ability to significantly disrupt ecosystem function and species interactions, in the case of *L. vannamei*, there is currently no evidence<sup>111</sup> to suggest that the use of this species poses a significant risk to adjacent ecosystems in areas where it is exotic. Therefore, the current version of the ShAD standards allows for the culture of *L. vannamei* in areas outside its native range, but does not allow it to be introduced into a new area. Future revisions of the standards will respond to new research developments and the ShAD will change its position if the evidence suggests that there is a significant risk of impact to ecosystems due to the culture of *L. vannamei* in areas outside its native range<sup>112</sup>.

Enough evidence<sup>113</sup> exists to suggest that there is a risk of impact when *P. monodon* is cultured in areas outside of its native range, as there are reports from several regions of the world that demonstrate its ability to colonize foreign habitats.

As for the farming of native species, there is potential for escapes to breed with wild shrimp of the same species, which could cause changes to the wild population's genetic structure (e.g. genetic drift). There is also concern about the movement of geographically or genetically distinct populations of animals due to shrimp aquaculture activities. In both cases, new genes could be introduced into the wild population via escapes, which could affect the health of wild shrimp species. Currently, the

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<sup>110</sup> Despite documented escapes and concern about the impacts, there is no evidence of established populations in the wild. The last *L. vannamei* found in wild U.S. continental<sup>110</sup> waters was in 1998, and most records occurred in the early 1990s (Perry 2009); perhaps related to the transition between open flow through and largely contained systems in coastal ponds in the mid-1990s (Treece 2002). In South Carolina, two exotic occurrences of *L. vannamei* have been recorded for the North Edisto River mouth (Charleston County) and from coastal waters (Wenner and Knott 1992). In Texas, six individual non-native *L. vannamei* have been collected from the Gulf of Mexico off Brownsville (Cameron County), Matagorda Bay, Laguna Madre (north of Arroyo Colorado), Port Mansfield (Willacy County) and at Palacios (Matagorda County) (Balboa et al. 1991, Howells 2001). The last and only time an escape was identified in Hawaiian waters was 1994, and one escape was noted in a canal connecting commercial aquaculture operations to La Plata River in Puerto Rico (Perry 2009).

<sup>111</sup> Literature reviews conducted on *L. vannamei* escapes found no evidence of *L. vannamei* becoming established outside of its range, but a precautionary approach still should be taken when farming *L. vannamei* (Briggs et al. 2005). Anecdotal evidence indicates *L. vannamei* has been caught in fishing nets in Thailand and *P. monodon* in the U.S., though the numbers reported are not large and may have been soon after a large number of shrimp escaped. *P. monodon*, *L. vannamei*, *P. stylirostris* and *P. japonicus* are all known to have escaped from U.S. culture operations (Briggs et al. 2005). Farmed *P. japonicus* and *P. merguensis* have escaped facilities in the Pacific Islands, with the latter now known to be established off Fiji (Briggs et al. 2005). There is a *P. monodon* fishery off of the Western Coast of Africa that is attributed to farmed escapements (failures) and there are established populations off the northern Coast of Brazil, Guyana, and the coast of North Carolina (S. Newman pers. comm., March 17, 2008; from Seafood Watch Mexico farmed shrimp report)

*L. vannamei* has been farmed in Thailand for over 15 years, and now dominates production in Southeast Asia. While *P. vannamei* has been found in natural water bodies, Briggs et al. (2005) and Senanan et al. (2007) were unable to find evidence that the shrimp they found in the wild were a reproducing population. None of the shrimp sampled in the Gulf of Thailand or Bangkapong estuary had achieved the sizes needed to reproduce.

<sup>112</sup> For a more in depth discussion see the ShAD white paper on Escapes and Exotic Species (Appendix IV available on the ShAD website: [www.worldwildlife.org/shrimpdialogue](http://www.worldwildlife.org/shrimpdialogue))

<sup>113</sup> *P. monodon*, has been officially recorded 27 times in at least six US states including Alabama, (n=2), Hawaii (n=1), Florida (n=4), Louisiana (n=1), South Carolina (n=7), North Carolina (n=10) and Georgia (n=2) (Fuller 2009). However, at present, no *P. monodon* are reared on U.S. farms or in U.S. research facilities, and there are no known established populations in U.S. waters. Anecdotal evidence indicates that *P. monodon* may be spawning off the coast of Brazil in the Caribbean, based on the continued capture in the region with no active farms to continually supply individuals to the population.<sup>113</sup> In areas of West Africa, particularly in Cameroon and Nigeria, populations of escaped *P. monodon* have become sufficiently established to support a commercial fishery. Penaeid shrimp make up about 2% of Cameroon capture fisheries, and black tiger shrimp is a notable portion of this catch<sup>113</sup>. In Nigeria, tiger shrimp comprises as much as 10% of trawler catches since its arrival approximately 4 years ago. Interestingly, while Cameroon holds aquaculture in Nigeria responsible for the release, Nigeria has indicated that Gambia, Senegal or Cameroon may be responsible.<sup>113</sup> Recommendations to USAID have been to support aquaculture for *P. monodon* over white shrimp because of the availability of broodstock from the fishery and because "it forestalls the question of introduction of an exotic farm species to an existing economically important shrimp ecosystem - obviously, *P. monodon* is already in Nigerian waters."

ShAD standards do not have restrictions on the use of native species but hopes to manage this issue with continuously improving escape management standards.

Risk assessment is a key approach to determining whether shrimp in existing or proposed facilities are likely to escape and become established. However, risk assessment is controversial and some of the assessments are based on observation rather than in situ measurements of population structures. There are also knowledge gaps on the effects of escapes, as limited research has been conducted for both *L. vannamei* and *P. monodon*. This situation posed a significant challenge to the GSC, as the ShAD's mandate requires it to find the right balance between environmental sustainability, social protection and the economic viability of the industry. The ShAD GSC decided to initially allow the farming of non-indigenous shrimp species in countries where they are in commercial production locally by the date the ShAD standards are published, in the event that there is no evidence<sup>114</sup> of establishment or impact on adjacent ecosystems. This decision was combined with conditions to prevent escapes, promote containment and ensure the legality of broodstock movement. The ShAD will carefully monitor this situation and will make changes in future versions of the standards if growing evidence exists regarding the invasiveness of *L. vannamei*.

### ***Managing Escapes***

Globally, escapes from aquaculture facilities have been found to be a significant vector for the introduction of exotic species and, in some cases, the escape of native species has been found to have significant impacts on native wild species (e.g. salmon aquaculture). Escaped shrimp can also establish non-native (feral) populations in areas where they are being farmed and transfer disease from the farm to the wild environment, which, in some cases, could be an introduced or exotic disease.

The reality for shrimp farmers is that, in the absence of a system that is closed cycle or full recirculation, escapes are inevitable and complete prevention is impossible. The current ShAD standards address the issue of escapes via a series of BMPs (e.g. physical infrastructure to limit risks of potential escapes), data collection and record keeping. This will serve as a first step for these standards and will help the development of performance-based standards in the future versions of the ShAD standards. Percent recovery standards were also considered, but it is not currently feasible to accurately count the number of shrimp that enter a pond, which makes it impossible to estimate how many disappear due to escapes versus other causes (e.g. mortality and predators). This may be reconsidered for future versions of the standard, when escapes data is more available and counting technologies are further advanced.

Severe weather events are the most likely cause of catastrophic escapes from shrimp farms. The ShAD standards require that shrimp farms be designed to prevent catastrophic escapes due to human error and/or storms. This is an issue of risk reduction in relation to the fluctuation of weather patterns. Farms need to be built to withstand weather conditions based on regional norms for weather in the farming region.

### **Guidance for Implementation**

**6.1.1:** Farms must be able to provide evidence to demonstrate the start date of any non-native species being cultured.

**6.1.2:** Farmers must provide hatchery permits and import licenses. More information on ICES code of practice on the introductions and transfers of marine organisms can be found at ([www.ices.dk/reports/general/2004/icescop2004.pdf](http://www.ices.dk/reports/general/2004/icescop2004.pdf)). Farmers must demonstrate that they have a working knowledge of the guidelines and have complied with them for culturing a non-native

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<sup>114</sup> Evidence: defined as peer reviewed science published in the primary scientific literature that demonstrates species or ecosystem impacts due to the escape of cultured shrimp species

species. The ShAD considers demonstration of complete separation or closed containment as an acceptable measure against the effects of exotic species and supports certification of those systems in any region assuming they comply with the other standards. The introduction of new/exotic/non-indigenous species must also be in compliance with national law as specified in Principle 1.

**6.1.3:** Records and protocol documents must be made available for inspection during the audit.

**6.1.4:** Escapes records must be made available for inspection, as future versions of the standards may require third party validation. The ShAD recognizes the challenges of recording all escapes but expects farmers to do due diligence on this standard and record any observed escapees.

## Criterion 6.2: Origin of post larvae or broodstock

|  | Indicator  | Standards  |
|--|--|--|
| 6.2.1  | Prevention of disease introduction   | Documentation provided demonstrating compliance with regional, national and international importation guidelines (e.g. OIE and ICES)   |
|  6.2.2  | % of total post-larvae from closed loop hatchery (i.e. farm-raised broodstock) | <i>P. vannamei</i> , <i>P. indicus</i> , <i>P. stylirostris</i><br>100%<br><i>P. monodon</i> must be improved over time (100% within 6 years after the publication of the standards) |
|  6.2.3 | Origin of wild-caught broodstock   | Sourced from legal fisheries with an established fishery management plan   |
| 6.2.4  | Allowance for wild-caught PL   | None   |



**6.2.2:** The GSC has included standards for *P. indicus* and *P. stylirostris* and is interested in hearing from producers on the feasibility of standards that require 100% of postlarvae to be produced in closed loop hatcheries.

**6.2.3:** There is disagreement among the GSC as to whether or not this standard is necessary and auditable. Some are not sure that broodstock fisheries have significant impacts on wild populations.

The GSC would appreciate feedback on both of these issues.

### Rationale

Disease problems within the shrimp aquaculture industry have been catastrophic in the past, resulting primarily from poor biosecurity and the transboundary movements of non-indigenous species, in particular. The movement of shrimp across borders brought new threats of disease transmission and reduced biodiversity to shrimp farming areas around the globe. The ShAD standards mandate compliance with international importation guidelines for the prevention of disease and the use of SPF and PL (see Principle 5).

The wild collection of PL added to the disease problems that the shrimp aquaculture industry experienced in addition to causing high by-catch of untargeted marine species and impacts to the health of wild shrimp populations. The ShAD does not allow the collection of wild PL, employs strict indicators and standards for what species and stocks can be collected for broodstock, and limits the amount of shrimp broodstock that can be collected overall. Wild stock monitoring systems must be

enforced via government methods, stock assessments or quota systems. The ShAD is willing to make an exception for natural influx systems that use wild PL, provided those systems are in compliance with all other parts of the ShAD standards.

Recently, the shrimp aquaculture industry has increased its capacity to produce *L. vannamei* via farm-raised broodstock and hatchery production, which has nearly eliminated the industry's reliance on wild stocks as a PL source. While hatchery production still necessitates the occasional collection of some wild-caught broodstock for genetic enhancement, the potential impact of this activity is far less significant than using wild-caught PL. The ShAD standards require that 100% of *L. vannamei* PL are from a closed loop hatchery, which is defined as a hatchery relying predominately on hatchery-raised broodstock to produce PL.

For *P. monodon*, hatchery production is less developed and the standards currently allow for the wild capture of broodstock. However, a reduction in the use of wild-caught broodstock must be demonstrated over time and the ShAD standards will require 100% to be hatchery-sourced within six years after the publication of the standards. It is expected that this will allow enough time for commercial hatchery and domestication<sup>115</sup> technology for *P. monodon* to become established. Wild-caught broodstock will still be permitted for genetic enhancement purposes without time limitation for both *P. monodon* and *L. vannamei*. The only exception to this is for extensive culture where producers are allowed to grow the shrimp that are trapped in ponds after having entered into the culture area with natural water flows.

In future versions of the standards, it is likely that the use of certified broodstock fisheries as the source will be required. Defining the sustainability of wild fisheries is very challenging and there is a strong need to certify the source in order to ensure that the standards are sufficiently robust. The ShAD recognizes the challenges for the auditing of this standard, as not all countries will have fisheries management plans. However, the ShAD views this as an opportunity to create incentives for producers to ensure strong management of the fisheries they use for broodstock.

### **Guidance for Implementation**

The GSC recognizes that auditing these standards is based on documentary evidence supplied by the hatchery and that this may be a challenge for non-vertically integrated operations. It is expected that the ASC will develop mechanisms to address this situation.

**6.2.1:** Compliance shall be demonstrated by hatchery permits and import licenses. Farmers must also demonstrate that they have a working knowledge of the guidelines and are in compliance.

**6.2.2:** Continuous improvement must be demonstrated with the goal of 100% within six years of the date of ShAD publication.

**6.2.3:** Legal fisheries status can be demonstrated by an official document from the government demonstrating the source of the broodstock.

**6.2.4:** Farms must be able to demonstrate the source of their post larvae. The ShAD is willing to make an exception for natural influx systems provided they are compliant with all other aspects of the standard.

### **Criterion 6.3: Transgenic shrimp<sup>116</sup>**

|       | <b>Indicator</b>  | <b>Standards</b> |
|-------|---|------------------|
| 6.3.1 | Allowance for the culture of transgenic shrimp (including the offspring of genetically engineered shrimp) | None             |

<sup>115</sup> **Domestication:** Altering the behaviors, size and genetics of animals and plants ([http://archaeology.about.com/od/domestications/Domestications\\_of\\_Animals\\_and\\_Plants.htm](http://archaeology.about.com/od/domestications/Domestications_of_Animals_and_Plants.htm))

<sup>116</sup> **Transgenic Shrimp:** a subset of GMOs, are organisms which have inserted DNA that originated in a different species. Some GMOs contain no DNA from other species and are therefore not transgenic but cisgenic.

***Rationale***

The culture of transgenic or genetically enhanced<sup>117</sup> shrimp is prohibited under the ShAD standards. The ShAD is concerned about the uncertainty surrounding the potential impacts of escaped transgenic shrimp breeding with wild shrimp and the potential for transgenic shrimp to establish feral populations in the wild environment. Invoking the precautionary principle, the ShAD cannot allow for these species to be cultured until there is conclusive evidence that demonstrates that they pose an acceptable risk to adjacent ecosystems.

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<sup>117</sup> **Genetic enhancement:** the process of genetic improvement via selective breeding that can result in better growth performance and domestication but does not involve the insertion of any foreign genes into the genome of the animal.

## Principle 7: Use resources in an environmentally efficient and responsible manner

*Impact: The culture of shrimp often requires the intensive use of resources. The use of wild-caught (e.g. pelagic fish) and terrestrial farmed ingredients (e.g. soy, etc.) in shrimp feeds has a potentially negative impact on marine and terrestrial ecosystems. Energy use also requires specific attention. This principle not only addresses the origin of those resources but also seeks to improve the overall efficiency of the production system and ensure that effluent has a limited impact, as wastes are treated properly.*



The GSC acknowledges that many aspects of Principle 7 are out of the typical audit scope at the farm level. However, some of the issues that are contained within Principle 7 were identified as important impacts to be addressed for a credible eco-label by the ShAD and therefore need to be included in the standard despite the auditing challenges. There is debate among the GSC about how to handle this issue including the following considerations:

- 1) Some GSC members think that these standards can be audited through documentation provided by suppliers that may or may not be audited by an independent third party. Others are concerned that this will not be strong enough for a credible eco-label given that it will rely heavily on documentation for compliance.
- 2) Some GSC members are suggesting to take Principle 7 out of the standards in order to not bring confusion and to creating false expectations for consumers what issues have been adequately covered. As a consequence, they suggest waiting until a specific standard is designed for shrimp feed plants, and independent ASC auditors are able to validate the practices at this level of the chain of custody before communicating on these issues towards the consumers.

The GSC welcomes opinions or suggestions on how to handle this issue

### Criterion 7.1 - Traceability of raw materials in feed

|       | Indicator   | Standards   |
|-------|---|---|
| 7.1.1 | Presence and evidence of traceability of raw feed ingredients > 1% with regard to country and species of origin, as demonstrated by the feed manufacturer | <5 years of the date of ShAD publication  |
| 7.1.2 | Disclosure of all major feed ingredients  | list of feed ingredients present in a proportion of >1%, including all marine, terrestrial plant, and terrestrial animal ingredients  |
| 7.1.3 | Responsible sourcing of feed ingredients  | the feed manufacturer must provide evidence of policies to source only feed ingredients which comply with internationally recognized moratoriums and local laws, including vegetable ingredients or products derived from vegetable ingredients. The ingredients must not come from the Amazon Biome, as geographically defined by the Brazilian Soya Moratorium. |

### ***Rationale***

Marine ingredient sourcing for feed is a key off-farm issue that was identified by the ShAD as requiring special consideration. However, traceability and fisheries certification are still in their infancy, which makes the process of creating auditable standards very challenging. The mislabeling or fraudulent labeling of fisheries products is also a major problem in the seafood industry that can undermine sustainability initiatives for proper sourcing. The goal of the current standards is to mandate continuous improvement with the expectation that the ShAD will mandate fully sustainable and traceable sources of feed in future versions of the standard.

Traceability is fundamental to credible feed sourcing. As such, the current standards mandate steps to enhance the traceability of raw feed materials. This standard intends to make raw material sourcing more transparent down to the level of the feed manufacturer, requiring that they specify the sources of their feed ingredients. The ShAD standards will require that after five years, the entire chain of custody must be traceable.

Transparency of major feed ingredients is also important to ensuring the credibility of feed sourcing. The current plan for implementation calls for the producer to declare all sources of fishmeal, fish oil and other major ingredients above a 1% inclusion rate. Proprietary arguments against the full traceability and transparency of ingredients are not an acceptable argument for non-compliance, as the standards require innovations on behalf of producers and full traceability of feed ingredients to ensure the long-term sustainability of feed sources. Furthermore, the disclosure of only significant ingredients, and not the micronutrients, allows a higher probability of compliance with this standard.

### **Guidance for Implementation**

**7.1.1:** Traceability options must be available to the feed companies for evaluation by the auditor and be able to demonstrate the source, species, and harvest method.

**7.1.2:** A document from the feed supplier (on company letterhead) must be provided to the auditor that lists the ingredients above 1%, states personal accountability for the veracity of the claim by the top QA/management staff, and gives permission for the content of auditor reports to be disclosed to purchasing retailers. The source of ingredients must be specified to the auditor. Also required are the date of production or harvest, the location of production or harvest, the method of production or harvest and the species produced. Initially, the farmer is required to provide all the information that they have available in order to help clarify where improvement is required.

**7.1.3:** The farmer or feed company must demonstrate that ingredients are not coming from the Amazon biome or other regions of globally significant biodiversity.

## **Criterion 7.2 - Origin of aquatic ingredients**

|       | <b>Indicator</b>   | <b>Standards</b>                                     |
|-------|--|--|
| 7.2.1 | Timeframe for at least 90% fishmeal and fish oil used in feed to come from fisheries <sup>118</sup> certified under an ISEAL member's accredited certification whose primary goal is to promote ecological sustainability AND the certification scheme is compliant with all FAO Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries. | <5 years following the date of standards publication |
| 7.2.2 | Allowance of feed ingredients from <i>Penaeid</i> shrimp   | None   |

<sup>118</sup> This standard applies to fishmeal and oil from forage fisheries and not to by-products or trimmings used in feed.

### Interim Plan for 7.2.1

|        | Indicator  | Standards  |
|--------|--|--|
| 7.2.1a | Demonstration of chain of custody and traceability for fisheries products in feed through an ISEAL accredited or ISO 65 compliant certification scheme that also incorporates the FAO <sup>119</sup> Code of Conduct for Responsible Fisheries.  | Yes  |
| 7.2.1b | FishSource score <sup>120</sup> for the fishery(ies) from which a minimum of 80% <sup>121</sup> of the fishmeal and fish oil is derived.<br>(See Appendix IV, subsection 3 for explanation of FishSource scoring.)   | <ul style="list-style-type: none"> <li>• 6 or higher</li> <li>• <u>Score 2</u> (do managers follow scientific advice) and <u>Score 4</u> (stock assessment) must not have an N/A (not available)</li> <li>• N/A in no more than 1 other score</li> </ul> |
| 7.2.1c | Allowance for the use of fishmeal and fish oil in shrimp feed (including those made from fisheries by-products) containing products from either a) target fisheries that are on CITES Appendix I, on the IUCN's Red List in categories: Near Threatened, Vulnerable, Endangered, and Critically Endangered, or b) from the use of byproducts that come from a target fishery that has bycatch listed on CITES Appendix I, on the IUCN's Red Listed species (categories as above) above x amount by volume, upon landing, on an annual basis or c) from bycatch that contains CITES/IUCN listed species | None   |



#### Interim Plan for 7.2.1 (7.2.1a and 7.2.1b):

There is a suggestion among the GSC that a time allowance will be necessary for compliance with these standards as there is concern about their feasibility at this time. Furthermore, as noted earlier, the auditability of these standards at the farm level and the mechanisms for farmers to demonstrate their compliance have yet to be developed.

**7.2.1c:** The GSC is interested on suggestions for x in item b (...above x amount by volume)

The GSC is interested in ideas and opinions on these issues.

#### Rationale

Currently, more than 75% of the world's fisheries are at or over capacity<sup>122</sup>. Aquaculture is touted to relieve pressure on wild fisheries by generating an alternative seafood supply. However, this will only

<sup>119</sup> Food and Agricultural Organization of the United Nations (FAO)

<sup>120</sup> Or equivalent score using the same methodology

<sup>121</sup> By volume

<sup>122</sup> THE STATE OF WORLD FISHERIES AND AQUACULTURE 2006-FAO

be true if aquaculture operations make efficient use of wild fish ingredients<sup>123</sup>. Although it is difficult to audit at the farm level, the use of wild fisheries for fishmeal and fish oil for shrimp feed was identified as a major impact that needed to be addressed by the ShAD. Defining sustainable sourcing for marine feed ingredients is one of the most difficult challenges for the ShAD. This criterion is aimed at using wild fish, a finite global resource, in a responsible and efficient manner that maximizes human benefits.

The key issue related to feed sourcing is that the existing fisheries science and management models do not fully understand nor account for the impacts of removing forage fish in large quantities from the base of the marine food chain. Such removals may have effects on higher order predators and associated human livelihoods for those who may depend on smaller fish for feed or to support other economically important fisheries. Furthermore, there is considerable uncertainty inherent in fisheries management arising from unpredictable variation in ocean systems and poor capacity to monitor the true take from oceans (e.g. IUU, unrecorded artisanal and recreational catches). Climate change is also altering fish behavior and distribution, which makes it difficult to ensure that management is able to set harvest levels appropriately and creates further uncertainty in sustainability assessments.

In the face of these challenges, ecosystem-based modeling is espoused as a leading fisheries management tool. The world's leading ecosystem modelers agree that current ecosystem models have poor capacity for predictive modeling and, until such a time that we have strong, predictive science-based tools, it is not possible to ensure sustainable harvests of forage fisheries. It is therefore precautionary to continue to reduce the use of wild fish in aquafeeds. The GSC intends for the ShAD standards to be continuously improved as new scientific findings become available. The standards will evolve and adapt based on findings from research groups including the Lenfest Fish Research Group.

The key goal of this principle is to ensure that fisheries that are clearly unmanaged or mismanaged are not used in feeds for certified farmed shrimp. Noting the uncertainty stated above, the Marine Stewardship Council (MSC) represents a viable tool that encourages positive steps towards promoting the sustainability of capture fisheries. The ShAD standards mandate that all marine derived ingredients be sourced from fisheries certified under an ISEAL member's accredited certification whose primary goal is to promote ecological sustainability. The ShAD recognizes that a non-ISEAL compliant scheme could be available and will evaluate this possibility if necessary.

In the interim period, until certified sources of feed are available, the ShAD seeks to mandate the best possible use of sustainable and traceable fisheries. The GSC has identified three interim measures for immediate implementation. Producers must use FishSource<sup>124</sup> to identify fisheries that score 6 or higher in all FishSource scoring categories<sup>125</sup>. Additional requirements include no "N/A" in Score 2 (do managers follow scientific advice) and Score 4 (stock assessment) along with "N/A" in no more than one other score. FishSource reports that 88% of global fishmeal and fish oil are available using a FishSource score of 6. The GSC recognizes the challenges that this may create for Southeast Asian farmers whose fisheries may not have a FishSource score. The Sustainable Fisheries Partnership is working on populating FishSource with regional fisheries in Asia as soon as possible. The GSC recognizes that international fishmeal and fish oil trade goes through multiple value-chain levels of manipulation (i.e. transport, mixing and storage). The GSC notes the challenges related to sourcing meals and oils from a single and traceable fishery due to the commercial dynamics of the

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<sup>123</sup> Naylor 2009

<sup>124</sup> <http://www.fishsource.org/>

<sup>125</sup> See Appendix III for more information on Fishsource Scoring

industry. Therefore, the GSC allows for 80% of compliant meal and oil to be traceable to a specific fishery, provided that identified fishery also complies with 7.2.1a, 7.2.1b, and 7.2.1c.

The interim standards also require demonstration of chain of custody and traceability for fisheries products in feed through an ISEAL accredited or ISO 65 compliant certification scheme that also incorporates the FAO Code of Conduct for Responsible Fisheries<sup>126</sup>. The International Fishmeal and Fish Oil Organization (IFFO) offers a traceability certification in addition to some elements of sustainability built into the system, including ecosystem components<sup>127</sup>. The third interim measure seeks to avoid the use of marine ingredients from IUU fisheries, unmanaged/mismanaged fisheries, fisheries with unknown stock status and unsustainable fisheries.

The ShAD GSC recognizes that the interim ShAD standards do not define an acceptable fishery stock status and may be insufficient to fully address the impact of removing forage fish in large quantities from the base of the marine food chain. The standards that the GSC has proposed will need to evolve with new developments in and the ShAD (and the Aquaculture Dialogues as a whole) is committed to staying abreast of this knowledge as it emerges.

The ShAD supports the use of human food filleting waste from environmentally-preferable fisheries or aquaculture facilities. IFFO reports that 25% of fishmeal currently being used for aquaculture is coming from fish processing by-products and this amount is expected to increase. While the ShAD encourages the use of by-products, it recognizes that this can result in higher feed conversion ratios (FCRs), which results in tradeoffs between effluent concentration and efficient use of marine resources. The ShAD has attempted to address this tradeoff by also creating an FCR standard and effluent standards (see Criteria 7.6). The ShAD allows the use of by-products from fish processing, provided they do not come from *Penaeid* shrimp.

### ***Social responsibility***

Forage fisheries serve multiple purposes, including being both ingredients for aquafeeds as well as direct food items for humans. Forage fisheries are a sustainable source of food for direct human consumption due to their biology (e.g. rapid life cycles, early age at maturity, highly fecund, etc.) and that they can be harvested by low impact gears. Forage fisheries are also particularly important in developing countries as they offer a primary source of EPA/DHA, which is necessary for human development. Inefficient conversion of wild fish, used for subsistence, into farmed fish, used for discretionary consumption, represents a meaningful issue of equity and food security. Assuring continually more efficient conversion of wild fish to farmed seafood is one way that the aquaculture industry can affirm its commitment to global food security. The ShAD recognizes that there are social impacts of using forage fisheries for aquaculture that will ultimately need to be addressed by these standards; however, this issue presented too great a challenge for the ShAD to address it at this time.

### **Guidance for Implementation**

**7.2.1:** ISEAL is a global association for social and environmental standards systems. More information can be found at [www.isealalliance.org](http://www.isealalliance.org). The Aquaculture Dialogues strive to meet the guidelines for standard setting that have been set by ISEAL. Fisheries ingredients must be certified by a process that conforms to the ISEAL guidelines within five years of the publication date of the ShAD standards. Information on the FAO Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries is available at <ftp://ftp.fao.org/docrep/fao/008/a0116t/a0116t00.pdf>.

**7.2.2:** The company must have a document that proves the source of their fisheries by-products, which must demonstrate that they are not suitable for human consumption.

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<sup>126</sup> Food and Agricultural Organization of the United Nations (FAO)

<sup>127</sup> <http://www.iffi.net/default.asp?contentID=636>

**7.2.1a, 7.2.1b, 7.2.1c:** Fishery status information may be accessed through FishSource (<http://www.fishsource.org/>) and the IFFO Responsible Fisheries (<http://www.iffonet/default.asp?fname=1&sWebIdiomas=1&url=368>).

### Criterion 7.3– Origin and content of terrestrial feed ingredients

|       | Indicator  | Standards  |
|-------|--|--|
| 7.3.1 | Percentage of non-marine ingredients from sources certified by an ISEAL member’s certification scheme that addresses environmental and social sustainability | 100% within 5 years of the date of ShAD standards publication for soy and 3 years for palm oil |
| 7.3.2 | Evidence that all other vegetable feed ingredients are not sourced from internationally recognized moratoriums such as the Amazon biome                      | Yes  |

#### **Rationale**

The ShAD standards recognize that the production of terrestrial feed ingredients also has significant environmental and social impacts and intends to avoid replacing unsustainable marine feed ingredients with equally damaging or unsustainable non-marine alternatives. For non-marine feed ingredients, the conversion of important biodiversity areas (e.g. the Amazon rainforest) for ingredients used in aquaculture production (e.g. soy) and the use of pesticides and other chemicals were identified by the ShAD as environmental impacts of concern.

The ShAD will require that ingredients of non-marine origin (e.g. terrestrial proteins and oils) are certified using standards that were developed by a multi-stakeholder process conforming to ISEAL guidelines for standard setting ([www.isealliance.org](http://www.isealliance.org)) within five years of the ShAD standards publication date. Currently, there are such standards for palm oil<sup>128</sup> and soy<sup>129</sup>. While the ShAD does not formally endorse these standards, it recognizes that they are currently the best available to address these issues of concern and, therefore, encourages their use in the ShAD standards. If better standards for these ingredients become available in the future, the ShAD may encourage those as well.

#### **Guidance for Implementation**

**7.3.1:** Soy must originate from sources certified under an ISEAL membership scheme. It is expected that this can include the Sustainable Agriculture Network (SAN) protocol for soy and/or the Roundtable for Responsible Soy Production (RTRS) within 5 years of the publication of the ShAD standards. Palm oil must originate from sourcing certified by the standards created by the Roundtable on Sustainable Palm oil within 3 years. Other ingredients must originate from certified sources within 5 years of the standards.

**7.3.2:** Guidance notes under development, suggestions welcome from public comment

<sup>128</sup> <http://www.rspo.org/>

<sup>129</sup> <http://www.responsiblesoy.org/>, <http://wwf.panda.org/?16872/The-Basel-Criteria-for-Responsible-Soy-Production>

## Criterion 7.4: Use of Genetically Modified (GM) ingredients in feed



**IMPORTANT NOTE:** Since the first public comment period, the GSC has decided to not ban nor allow GM feed ingredients in order to accommodate the main markets for ASC shrimp in America and Europe. There remains significant debate in the ShAD about how to consider GM feed ingredients in a way that is acceptable for all of the stakeholders. Below are the options currently being discussed by the GSC but in no way represent agreement by the GSC. The GSC welcomes feedback on all of them or alternative proposals.

|  | <i>Indicator</i>  | <i>Standards</i>   |
|--|---|--|
| 7.4.1<br>   | Use of feed that contains ingredients that are genetically modified | Allowed with product label that specifies inclusion<br><br>Full disclosure by Auditor on compliance report and accessible to retailer on demand.   |
| 7.4.2<br>  | Transparency requirements for use of GM ingredients                 | GM-transparent audits accessible to buyers<br><br>Database for consumers on ASC website<br><br>Mandatory claim on label (with liability falling to label-user vs. accreditation body)                                  |
| 7.4.2<br> | Price feasibility for sourcing non-GM ingredients                   | If a 20% difference exists for non- GM ingredients costs then ok to use GM feed ingredients in the interim<br><br>When the price of non-GM inputs approaches within X% of GM-free inputs, GM-free will become mandated |

### **Rationale**

The allowance of Genetically Modified<sup>130</sup> (GM) feed ingredients, versus the exclusion of GMs, is an issue that the ShAD GSC has debated extensively during the standards development. The GSC identified the following as the problem statement:

*In a science-based and culturally sensitive context, how do we satisfy the needs of opposing market forces and expectations of European vs. US consumers regarding the allowance of GM ingredients for shrimp feeds, while preserving our mandate to develop socially and environmentally responsible performance metrics for the top 20% of global shrimp producers?*

<sup>130</sup> Genetically Modified Organism: refers to the introduction of foreign genes into the genome of the organism or alteration of the genome in ways that does not occur naturally by mating and/or combination. This is not the same as selective breeding for genetic improvement.

Overall, there is agreement on the GSC that the ShAD is working towards a goal where there are no significant environmental and social impacts associated with the use of GM feed ingredients, as these circumstances define acceptable GM ingredients in shrimp feed. Furthermore, there is agreement that a complete ban of GM ingredients is not appropriate at this time nor is the allowance of GM ingredients without any labeling or form of transparency. There is recognition among the GSC members that GM ingredients could be allowed on a case-by-case without restriction in the future if the use of the technology ultimately proves to be environmentally and socially benign. However, many believe there is not currently enough scientific evidence to support this case.

The core GSC concerns articulated on this issue include (in no particular order):

- The standard must be precautionary regarding environmental and social concerns, while still being considerate of the limitations for producers
- The feasibility of reliably verifying non-GM sources
- The necessity of creating an accountable market system with full-cost accounting, including risks and externalities, in order to get the big picture
- The importance of label integrity, transparency and avoiding “green washing”
- The creation of market benefits for technologies that could end up impeding fair/equal access to food
- The importance of maintaining biodiversity
- The price feasibility and access to non-GM ingredients, especially for producers in the Americas
- As the ASC/ShAD standards aspire to promote a world where there are no significant social and environmental impacts of GM feed ingredients, the ShAD standards must create incentives to reach this goal

Current science does not provide a comprehensive understanding of the environmental, health or social risks and benefits associated with the production of GMs, yet decisions with real market consequences need to be considered in the absence of conclusive scientific information on this issue. The literature concerning the GM issue has compelling arguments on both the risks and benefits of GM crops. Some of the documented impacts of GM crop production on ecosystems, human and animal welfare, and social justice are presented and discussed in the ShAD GM White Paper<sup>131</sup>. The ShAD standards are not opposed to genetic modification in general, which has demonstrable benefits and minimal risks in a variety of situations (e.g. fields of medicine, pharmaceuticals, etc.). However, demonstrated risks currently associated with introgressive hybridization, selection for pest resistance and chemical resistance of crop competitive weeds are considerable. Furthermore, as GM crops are grown in open ecological systems, they may have potentially serious consequences for human food security (see white paper). For these reasons, the ShAD standards will continue to move towards precautionary<sup>132</sup> preclusion of open-grown GM-plant ingredients until there is strong evidence that such risks can be reliably mitigated or do not exist. The ShAD will carefully monitor this issue so that future versions of the standards respond fairly and rapidly to emerging information.

The current ShAD standards mandate that information on the inclusion of GM feed ingredients shall be available upon request for buyers (e.g. retailers) and consumers who would like to consider this information when purchasing their products. If the feed contains genetically modified raw plant material or raw materials derived from genetically modified plants, shrimp producers must be able to

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<sup>131</sup> See Appendix V available at: [www.worldwildlife.org/shrimpdialogue](http://www.worldwildlife.org/shrimpdialogue)

<sup>132</sup> Defined As: when an activity raises threats of harm to the environment or human health, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically ([takingprecaution.org](http://takingprecaution.org))

provide information to the buyer documenting their use. Shrimp producers will need to collect information regarding raw materials that are derived from genetically modified material from their feed producer.

The ShAD concurrently acknowledges that excluding the use of genetically modified feed ingredients could affect both the current and future use of the standards. Inclusion/exclusion of GM plant proteins has regional implications in terms of availability opportunities for feed manufacturers and market access for shrimp farmers. For shrimp producers in the Americas and some areas in Asia, non-GM feed ingredients, particularly soy protein, are not readily available and may come at a significantly higher cost or diminished quality than GM ingredients. This could negatively affect the global uptake of the ShAD standards. European and North American consumers also have different perceptions of the human health and ecological risks relating to GMOs. North American markets depend more heavily on GMOs than European markets and North American consumers are less risk averse to GMOs than are European consumers.

Due consideration was also given to the fact that there may be long-term environmental and social consequences from shifting global demand for GM versus non-GM plants proteins for aquafeeds. The current availability of GM soy could support present levels of aquaculture, whereas increasing demand for GM-free plant protein has the potential to cause further deforestation in important biodiversity areas (e.g. the Amazon rainforest). The benefits of promoting non-GM plant proteins for feed on certified farms is that it generates additional demand for industrial agriculture to maintain the biodiversity of heirloom crop strains and to increase the farming of plant proteins known to present low genetic risks to terrestrial ecosystems.

For the above reasons, the ShAD GSC has included a series of standards that aims to simultaneously minimize the unknown risks of GMs, while allowing for the use of GM plant ingredients only where current market realities would otherwise compromise the ability of the label to penetrate markets as a tool for change. This compromise was achieved by including a set of standards that mandate transparency on the part of feed producers and allow purchasers in different regions to respond to the needs of their customers or in-house purchasing policies. The standards allow for the market realities of price difference in GM feed ingredients by allowing for their inclusion where there is a 20% or greater price difference for non-GM ingredients. This must be carefully documented and presented to the auditor. Finally, the ShAD GSC strongly recommends that the end product and/or packaging be clearly marked “Fed with GM ingredients” in order to maintain full transparency and to respect freedom of information for the end consumer.

The ShAD is committed to review the standards within 5 years and assess the availability, utilization cost difference, market penetration, and the credibility risk for GM ingredients and update the standards accordingly.

#### **Guidance for Implementation**

**7.4.1 – 7.4.3:** Guidance notes under development, suggestions welcome from public comment

## Use of land animal by products in feed (formerly 7.4)



There remains debate on the GSC as to whether or not standards that mandate labelling for the inclusion of Land Animal Byproducts should be included. The key question is whether or not it is important for the use of land animal byproducts to be expressed down to the consumer level. Some GSC members think this it is important to be transparent for people buying eco-certified product. Furthermore, shrimp do not eat these kinds' of nutrients in nature which is also a concern for some GSC members. There is a further concern about what industries the ShAD should be promoting with the standards as some GSC members believe that land animal byproducts should be promoted while others feel that they should not be promoted over alternatives such as insects, algae's, etc. Finally, the issue of whether or not the production of these feed ingredients creates enough environmental or social impact for consideration under the ShAD has yet to be resolved.

The GSC welcomes opinions or suggestions on all of these issues.

### **Rationale for Land Animal Byproducts**

The ShAD also considered the use of land animal by-products (offal and other process wastes) for farms certified under the standards. The ShAD GSC considers the human health risks associated with the use of these by-products in production to be negligible, but recognizes the increasing awareness of the overall life cycle costs of producing these ingredients. The ShAD standards acknowledge that the most comprehensive method of accounting for the use of land animal by-products would be to conduct comprehensive life cycle analyses (LCA) for all resources that make up land animal by-products. Currently, these methods are not sufficiently developed to apply in a standardized and cost-effective way for aquaculture certification. Continuous improvement efforts should target research that finds ways to affect pragmatic LCA considerations in the standards, particularly around energy use, water use, land use and trophic considerations related to feed inputs. Standards that monitor energy use are the first steps toward developing more holistic methods in the ShAD standards. Therefore, the potential use of land animal by-products is currently neither encouraged nor discouraged in the standards, but may be reconsidered in future standards revisions. However, producers must be aware that products made with terrestrial by-products are not allowed in certain markets.

### **Criterion 7.5: Use of wild fish for fishmeal and oil**

|       | <b>Indicator</b>                                     | <b>Standards</b>  |
|-------|--|---|
| 7.5.1 | Feed Fish Equivalence Ratio (FFER) <sup>133</sup>    | <i>L. vannamei</i> : 1.1:1<br><i>P. monodon</i> : 1.5:1   |
| 7.5.2 | Economic Feed Conversion Ratio (eFCR) <sup>134</sup> | <i>L. vannamei</i> : 1.7<br><i>P. monodon</i> : 1.5 - 2.1 |

<sup>133</sup> Feed Fish Equivalency Ratio (FFER): the quantity of wild fish used per quantity of cultured fish produced.

<sup>134</sup> Economic Feed Conversion Ratio (eFCR): the quantity of feed used to produce the quantity of fish harvested



### 7.5.2: FCR

There remains significant debate on the GSC as to whether or not FCR should stay in the standards and at what level it should be set for each species. In this version the ShAD has provided a range from 1.5 to 2.1 for monodon but there is debate among the GSC that 2.1 is too high given numbers published for some countries. Other GSC members are concerned that a low FCR will result in more pressure on high quality fishmeal because fishmeal that comes from fisheries byproducts is higher in ash and has a lower digestibility. This tradeoff between having a higher FCR and allowing the use of byproducts from local fisheries (that meet the criteria for 7.2) or encouraging the use of fishmeal and oil from other parts of the planet which will have a higher carbon footprint and may increase the pressure on fisheries that are already strained due to demand is the core of the debate on this issue. As with survival rates, the GSC is interested in finding ways to more objectively set this standard.

The GSC welcomes feedback on this issue as well as inputs on where the bar should be set for these species as well as *P. indicus* and *P. stylirostris*.

### **Rationale**

In theory, the use of only sustainable fisheries ingredients should assure the ongoing supply of wild fish inputs for aquaculture. However, at least two other considerations suggest that it will be both precautionary and socially responsible (see below) to minimize the use of wild fish in feed. Furthermore, minimizing wild fish in feeds is consistent with market trends, as the aquafeed industry has already made significant strides to reduce wild fishmeal and fish oil inclusion rates. Increasing demand on finite global forage fisheries suggests that the trend to find efficient (economically and metabolically) alternatives to wild fish as crude protein in shrimp feeds will continue.

The ShAD standards mandate an FFER that measures the efficiency of marine inputs used for production. While sustainable sources of feed ingredients are one important criterion for sustainable production, the efficiency of use is another. Efficient use of resources will likely grow in importance as global resources become more limited. Use of forage fish and other marine ingredients (e.g. squid, krill, etc.) as feed inputs for shrimp is a great concern, given that aquaculture production is rapidly growing and there is a finite supply of forage fish and other marine resources. In the interest of providing the greatest social and nutritional benefits from such resources, marine ingredients must be harvested sustainably and, subsequently, used efficiently. The ShAD standards mandate that *L. vannamei* have an FFER equal to 1.1 and that *P. monodon* have an FFER equal to 1.5. This difference is based on different nutritional requirements between the two species of shrimp and may be harmonized over time.

The eFCR standard is included to help guard against wasteful feeding rates that could still achieve FFER performance thresholds when using feeds with particularly low inclusion rates of whole wild fish. Such low inclusion rate feeds can be achieved by increasing the proportion of fisheries byproducts or plant proteins in formulations. Both represent valuable resources in their own right that may also have their own environmental and social impacts (e.g. deforestation, pesticide use, etc.). As such, both must be used efficiently. Asking farmers to achieve threshold eFCRs aligns incentives around the following: accurate tracking of shrimp weight/biomass, good feed management to keep feed fresh and assure no waste prior to use, careful tracking of parameters to optimize feed uptake by shrimp (DO, presentation, frequency of offering, correct pellet size, time of feeding, etc.), and adjusting feeding rations based on feeding activity.

While eFCR varies with the size of shrimp harvested, the GSC has decided to set a threshold eFCR, as opposed to scaling eFCR with shrimp size. The GSC recognizes that this approach will challenge the producers of large size-class shrimp more than producers of smaller size-class shrimp. However, this is in keeping with the spirit of the Aquaculture Dialogues, whose objective is to minimize the key environmental and social impacts of aquaculture, where minimizing the use of wild forage fish needs to be a priority. In this respect, farmers that use more marine resources (harvesting large shrimp) will need to prioritize alternative feed formulations and highly efficient feeding more so than farmers who use fewer marine resources (harvesting smaller size classes).

### ***Use of fisheries byproducts in feed***

Feed ingredients made from processing wastes or by-products of other food production systems are typically considered 'free' and are not included when assessing the environmental impacts of aquaculture feed production. Recent Life Cycle Assessment studies<sup>135</sup> argue that the division between 'food' and 'by-product' is arbitrary and both co-product streams must share the overall impact of production (e.g. a similar amount of the feed provided to a chicken is used to produce meat as offal, feathers, bones and so on, and some of the environmental cost of producing the feed must therefore be borne by the by-products that humans consider 'waste').

The ShAD's goal is to minimize the key impacts of shrimp production, and in the case of feed, this is the use of unsustainable marine ingredients such as fishmeal and oil. Penalizing the use of by-products was considered by the GSC to be counter to this goal, and therefore terrestrial feed ingredients and by-products from marine or terrestrial food production systems will continue to be discounted in the ISRSA feed standards.

### ***Continuous improvement***

We would like to see future FFER calculations include weighting factors that account for the relative trophic level of species used in feeds.

### ***Guidance for Implementation***

**7.5.1:** This measure can be weighted for fish meal or fish oil, whichever component creates a larger burden of wild fish in feed. In the case of shrimp, the fish meal will be the determining factor for the FFER, thus  $FFER_m$  is the equation used in the ShAD. Please note that fisheries byproducts that meet the sustainability and traceability criteria in 7.1 and 7.2 do not count in these calculations.

$$FFER_m = (\% \text{fishmeal in feed} \times \text{eFCR}) / 22.2$$

$$FFER_o = (\% \text{fishoil in feed} \times \text{eFCR}) / 5.0$$

In case a farm uses different feeds, a weighted average fishmeal/fish oil content must be calculated as follows:

$$\% \text{fishmeal/fish oil in feed} = (\% \text{fishmeal/fish oil Feed A} \times \text{quantity Feed A used}) + (\% \text{fishmeal/fish oil Feed B} \times \text{quantity Feed B used}) + \dots / \text{Total quantity of Feeds A, B+,...}$$

**7.5.2:** The eFCR is calculated for all harvests over the last 12-month period.

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<sup>135</sup> Pelletier N., Tyedmers P. 2007. Feeding farmed salmon: Is organic better? *Aquaculture* 272 (2007) 399–416. Pelletier N., Pirog R., Rasmussen R. 2010. Comparative life cycle environmental impacts of three beef production strategies in the Upper Midwestern United States. *Agricultural Systems*, in press.

eFCR = Feed, Kg or MT / Net aquacultural production, Kg or MT (wet weight). Official invoices for feed purchases must be made available to the auditor by the farmer. Farmers must also show records of production and quantities of feed used for all harvests.

### Criterion 7.6: Effluent contaminant load

|       | Indicator  | Standards   |
|-------|--|---|
| 7.6.1 | Amount of nitrogen released from the culture system per ton of shrimp produced (see formula below)   | <53 kg/tonne of shrimp for <i>L. vannamei</i><br><97 kg/tonne of shrimp for <i>P. monodon</i>   |
| 7.6.2 | Amount of phosphorus released from the culture system per ton of shrimp produced (see formula below)   | <14 Kg/tonne of shrimp for <i>L. vannamei</i><br><29 kg/tonne of shrimp for <i>P. monodon</i>   |
| 7.6.3 | Responsible handling and disposal of sludge and sediments removed from ponds and canals  | No discharge or disposal of sludge and sediments to natural waterways and wetlands  |
| 7.6.4 | Treatment of effluent water from aerated ponds   | Evidence that all discharged water goes through a treatment system, and concentration of settleable solids in effluent water < 3.3 mL/L |
| 7.6.5 | Percentage change in diurnal dissolved oxygen (DO) relative to DO at saturation in receiving water body <sup>136</sup> for the water's specific salinity and temperature | ≤ 65%   |

#### Rationale

This criterion addresses the issues regarding the contaminants emissions from shrimp farms and their effects on receiving water bodies.

#### Nitrogen and phosphorus release

The ShAD believes that standards should be ecologically meaningful and equally accessible to all producers no matter their size. Therefore, the ShAD standards use a mass balance approach in which the overall nutrient discharge loads into receiving waters are minimized by reducing both inputs and outputs simultaneously. Nitrogen (N) and phosphorus (P) are the key nutrients to control in order to reduce the risk of eutrophication of receiving water bodies. Water discharged from shrimp farms cannot be expected to have equal or better quality than receiving water bodies. Thus, there must be an allowance in certification standards for the discharge of a portion of the N/P applied to ponds. Maximum allowable quantities of N/P released from the culture system were established based on the performance of a well-operated semi-intensive shrimp farms, which use feeds with a relatively low protein (source of nitrogen) and fishmeal (main source of phosphorus) content.

**Table 1. Assumptions used for determining standards on nitrogen (N) and phosphorous (P) release.**

|  | Feed composition    |               |                              | FCR |
|--|---------------------|---------------|------------------------------|-----|
|  | Protein content (%) | N content (%) | P content <sup>137</sup> (%) |     |
|  |                     |               |                              |     |

<sup>136</sup> measured at a station at least 200 m down current from the farm outfall

|                    |    |     |     |       |
|--------------------|----|-----|-----|-------|
| <i>L. vannamei</i> | 30 | 4.8 | 1   | 1.7:1 |
| <i>P. monodon</i>  | 38 | 6.1 | 1.5 | 2.1:1 |

To meet these standards, intensive shrimp farms that use feeds with a high protein and fishmeal content would have to achieve a very low FCR and/or remove nutrients from the aquatic system through the extraction of sludge from ponds and wastewater treatment system, a secondary crop or water recirculation.

#### Sludge disposal

Intensive culture ponds and wastewater treatment systems usually accumulate sludge that needs to be removed periodically. The best way to dispose of saline sediment is to place it on the insides and tops of pond embankments. Alternatively, the best disposal sites have saline soil and, especially, are in areas without surface or underground freshwater bodies. Sediment disposal sites should be surrounded by embankments to avoid runoff and, if they are in areas with highly permeable soil or in freshwater zone, they should be lined with clay or plastic to avoid infiltration. Embankments should be 0.75 meters high and twice as large as the area needed for the volume of sediment to be stored so that at least half (0.375 meters) of storage height for rainfall would be available. This amount of extra storage volume would capture the rainfall from the 100-year rainfall event in most areas and prevent runoff from the stockpiled sediment.

#### Effluent treatment

Shrimp ponds, like ponds for most other aquaculture species, are drained for harvest. The usual method employed by large, extensive and semi-intensive ponds is to release water through a gate with the water level established by dam boards. The ponds are drained by removing dam boards, which allows the water level to fall as water flows out from the surface of the pond. Thus, effluent quality is identical to pond water quality for most of the drawdown period.

Soil particles and organic matter accumulate in the bottom of aerated ponds. This results from the erosion of pond bottoms by aerator-generated water currents and sedimentation of these particles in areas of the pond where water currents are weaker. Plastic-lined ponds are a special case. The aerators do not erode the bottom, but they force the coarser particles of uneaten feed, dead plankton, etc. to settle in the center of ponds. When ponds are drained, the recently-accumulated wastes are relatively fluid and tend to be lost in out-flowing water (Boyd 1995; Boyd and Tucker 1998). There is less erosion of the bottoms of semi-intensive and extensive ponds because aerators are not used. Particles settle over the entire pond bottom rather than being concentrated in small areas by aerator action. Thus, the sediment from intensive ponds is of lower density (more fluid) and more enriched in organic matter than sediment in semi-intensive and extensive ponds. Pond water from intensive culture usually carries a high load in nutrients and suspended solids. Workers also enter the pond with nets or seines, which further disturbs the sediment. Moreover, intensive ponds are often drained using pumps. These are the reasons the ShAD standards require wastewater treatment for intensive ponds but not for semi-intensive and extensive ponds.

A settling basin can improve the quality of effluents from intensive farms. Although settling basins are not effective in removing plankton, detritus, or colloidal clay particles from water, they are effective in removing larger particles (Boyd and Queiroz 2001; Ozbay and Boyd 2004). About 100% of SS, 90% of TSS, 60% of BOD, 50% of phosphorus and 30% of nitrogen in draining effluent can be removed by sedimentation in a basin with a hydraulic retention time (HRT) of 6 hr or more (Teichert-Coddington et al. 1999). There is probably little benefit to increasing HRT beyond 6 hours for removal

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<sup>137</sup> These values are indicative of typical shrimp feeds but for a same total protein content, the phosphorous content would vary depending on the feed formulation and the sources of ingredients used.

of solids, however, a greater retention time might enhance water quality (e.g. a longer sedimentation period of 12 hours would allow more time for re-oxygenation of the water, ammonia volatilization, nitrification, and phosphate uptake by bottom soil). Moreover, the settling basin should have a volume of at least 1.5 times larger than the minimum 6-hr HRT volume in order to have the sediment storage capacity necessary to maintain the 6-hr HRT over time.

The use of Settleable Solids (SS) rather than Total Sedimentable Solids (TSS) in effluent water quality monitoring is recommended because SS can be measured easily and represents the fraction of the TSS that will settle out fairly rapidly. SS are the environmentally harmful fraction of the TSS, as most of the turbidity and sediment results from SS, and a lot of organic matter and phosphorus are associated with the solids (Boyd 1978). Removal of SS from water will lessen the Biological Oxygen Demand (BOD) and total phosphorus concentration.

#### Effect on receiving water bodies

The ShAD proposes a surrogate variable to address the cumulative impact of shrimp farms on receiving water bodies. The most characteristic feature of eutrophication is wide, daily, excursions in dissolved oxygen concentration resulting from the large abundance of algae and other microorganisms. Therefore, the ShAD chose the diurnal dissolved oxygen fluctuation as a practical parameter for determining the effects of eutrophication on a particular water body. Oxygen levels in water fluctuate over a 24-hour cycle in relation to the level of photosynthesis and respiration taking place. As nutrients are added to a water body, primary productivity increases. This increase causes more oxygen to be released into the water body as a byproduct of photosynthesis during daylight hours. Concurrently, during the day, oxygen is consumed by primary producers and other aquatic life forms as they respire. In the absence of light, however, photosynthesis ceases but respiration continues. Thus, during the night, oxygen is consumed, which results in a decrease in dissolved oxygen. The larger the population of primary producers, the more oxygen is consumed. The level or effects of eutrophication can thereby be expressed in the difference between peak daytime oxygen levels and the reduced oxygen levels during the night. Minimizing excessive fluctuations between daytime and nighttime dissolved oxygen levels is of critical importance to aquaculture operations to maintain fish health and productivity.

#### Guidance for implementation

**7.6.1 and 7.6.2:** Annual nutrient balances are calculated for an entire farm (harvested ponds) over a period of 12 months to take into account seasonal and between-pond variations, using the following formula:

Amount of nitrogen or phosphorous released from the culture system per ton of shrimp produced (kg/ton of shrimp) = Quantity of N/P inputs from feeds and fertilizers – Quantity of N/P removed through shrimp harvest – Quantity of N/P removed through sludge or biomass extraction – Quantity of N/P recycled through water recirculation.

Where:

- Feed N/P (kg) = (kg Feed 1 applied) x (% N/P Feed 1 content) + (kg Feed 2 applied) x (% N/P Feed 2 content) + etc.
- Fertilizer N/P (kg) = (kg Fertilizer 1 applied) x (% N/P Fertilizer 1 content) + (kg Fertilizer 2 applied) x (% N/P Fertilizer 2 content) + etc.
- Shrimp N/P (kg) = (kg Shrimp harvested) x (% N/P Shrimp content)
- Sludge or biomass N/P = kg dry material x (% N/P content)
- Water N/P recycled = Total N/P concentration x volume of water reused.
- Shrimp production = annual production of farm in tons

**7.7.3:** Settling basins should be constructed according to the following specifications:

- (1) Hydraulic retention time (HRT) = 9 hr; (This will avoid the settling basin from having to be cleaned out frequently in order to maintain a minimum HRT of 6 hr.)
- (2) Design of basin must include seepage and erosion reduction control features (e.g. proper soil texture, good compaction, and grass cover);
- (3) Water enters at surface of basin through a weir;
- (4) Water exits surface of basin through a weir on opposite side;
- (5) If basin is square or nearly so, a baffle must be provided to avoid the short-circuiting of flow;
- (6) A drain structure should be provided so that the basin can be emptied;
- (7) Posts must be placed at five places in the basin. These posts will extend to the height of the full-basin water level. They will be used to estimate average depth of sediment accumulation. Sediment depth cannot exceed one-fourth (25%) of the original basin depth, as measured by the distance from the top of the post to the sediment surface.

Farms that do not have enough space for a settling basin can use production ponds adjacent to the pond being harvested as settling basins. Another alternative is to use discharge canals as settling basins, where sills can be installed at intervals in the bottoms to trap sediment. The use of production ponds and discharge canals as settling basins allows for the treating and recycling of 100% of the water from harvested ponds is a practice that the ShAD standards would encourage. Alternatively, grassed strips or vegetated ditches and mangrove areas or other wetlands have been used for treating freshwater effluents. Suspended solids and other wastes are removed as the effluent passes over or through the vegetation.

The settleable solids concentration at the outlet of the effluent treatment system must be measured at 4-hr intervals when shrimp ponds are being drained or whenever treated water is discharged. Settleable solids are measured as the volume of solids that settles to the bottom of a conical cone (Imhoff cone) in 1 hour. It is a simple analysis and is inexpensive to conduct. A limit of 3.3 milliliters per liter of settleable solids was defined for discharge permits in the United States after the first USEPA study of aquaculture facilities in the mid 1970s (USEPA 1974).

**7.6.4:** Dissolved oxygen (DO) concentration must be measured in the receiving water body 0.3 meters below the water surface 1 hour prior to sunrise and 2 hours prior to sunset (temperature and salinity must also be recorded at the time of DO measurements). DO values must be expressed as a percentage of saturation and the difference between sunset and sunrise values (diurnal DO fluctuation) must be calculated. Measurements must be made twice a month. In the case of coastal waters influenced by tides, dates must be chosen such that measurement time (1 hour prior to sunrise and 2 hours prior to sunset) corresponds to high and low tides, in order to reflect variations related to the tidal regime. The annual mean diurnal DO fluctuation shall be less than 65%.

Shrimp farms may discharge into channels or streams connected to larger, open water areas of a river or estuary. The sampling site for DO concentration in the receiving water for a particular farm should be located in the segment of the water system into which effluent is directly discharged. Sampling stations should be outside of the zone where mixing is not yet complete and concentrations of some water quality variables would be elevated above ambient for the receiving water. There are several complicated methods for determining the area of the mixing zone, none of which were considered practical for use in an eco-label certification program (USEPA 2003). Thus, aside from making measurements at a site, there is no way of determining the extent of the mixing zone. Experience suggests that the mixing zones for shrimp farm effluents, in which the concentrations of some water quality variables may be higher than ambient concentrations, usually do not extend more than 100 or 200 meters into estuarine water bodies (Boyd personal communication). Of course, the mixing zone could be roughly delineated by a relatively simple procedure. Shrimp farm effluents are seldom of the same turbidity as receiving waters. Thus, Secchi disk visibility measurements could be made at 25-meter intervals downstream of the farm outfall and

points beyond the distance at which the Secchi disk readings become constant would be outside of the mixing zone.

On some farms where effluents are discharged directly into the sea, it would be difficult to sample offshore when waters are rough. In this case, the sample could be taken at some point at least 200 meters from the outfall, but near the shore to avoid a dangerous situation related to sample collection.

Farms that can demonstrate that concentrations of total nitrogen and total phosphorous in discharged water are lower than in the receiving water body, or have not discharged any water since the last audit (or for the last 12 months in the case of the first audit) through the use of water recirculation techniques, would be exempt from complying with this indicator.

### Criterion 7.7: Energy efficiency

|       | Indicator   | Standards   |
|-------|---|---|
| 7.7.1 | Energy consumption by sources <sup>138</sup><br>OR Record keeping of energy consumption by source | Records available for all activities                |
| 7.7.2 | Annual Cumulative Energy Demand (megajoules/tonne of shrimp produced)                             | Records available for verification of calculations. |

#### Rationale

Energy is consumed throughout the culturing, harvesting, processing and transportation stages of shrimp production. There are also many other energy drains to consider, such as energy consumed during the construction of facilities, while maintaining and updating facilities, during the production of those construction materials, and during the production of liming materials, fertilizers and other inputs. The ShAD acknowledges that, at this time, there is insufficient data available for setting energy use standards. Therefore, the ShAD standards require the collection of energy consumption data by audited farms in order to be able to set up energy standards in the future To be useful for addressing the issue of carbon emissions in the future, data collection needs to be as detailed as possible so that the conversion of energy consumption to carbon emission will be feasible.

**Guidance for Implementation 7.8.1:** Records of quantities of energy consumed must be kept by type of energy source: diesel, gasoline, natural gas, electricity, etc.

Only activities carried out on the farm site are considered. Transport of shrimp to and from farm site and transport of personnel to and from farm site are not included. For clarity, farms must list activities included in the records of energy consumption, including: water aeration, water pumping, offices, internal transportation, etc.

**7.8.2:** For calculating the annual CED, quantities of different energies cumulated over 12 months and expressed in different units must all be converted to megajoules. Refer to the tool available at: [http://www.eia.doe.gov/energyexplained/index.cfm?page=about\\_energy\\_conversion\\_calculator](http://www.eia.doe.gov/energyexplained/index.cfm?page=about_energy_conversion_calculator). The total amount from the different energy sources expressed in megajoules is then divided by the farm production over the same 12-month period.

### Criterion 7.8: Handling and disposal of hazardous materials and wastes

|       | Indicators   | Standards                       |
|-------|--|---------------------------------|
| 7.8.1 | Safe storage and handling of chemicals and hazardous materials | Evidence of procedures in place |
| 7.8.2 | Responsible handling and disposal of wastes based on risk      | Evidence of                     |

<sup>138</sup> Including fuel use and equipment (i.e. tractor, generator, boat, etc.); quantity of electricity purchased / consumed;

|  | Indicators                                | Standards           |
|--|---|---------------------|
|  | assessment and possibilities of recycling | procedures in place |

### ***Rationale***

The construction and operation of shrimp farms often involve the use of hazardous chemicals (e.g. combustibles, lubricants, fertilizers, etc.) and the generation of wastes, some of which are classified as hazardous. The storage, handling and disposal of such hazardous materials and wastes must be done responsibly, according to the relevant legislation and their respective potential impacts on the environment and human health. Farms must implement management plans for the storage, handling and disposal of hazardous materials and wastes based on the potential risks that they present and the location of their disposal.

### **Guidance for Implementation**

**7.8.1:** Bunds<sup>139</sup> must be built around combustible storage containers to contain any spills. Bunds must be waterproof, with a capacity of 110% of the volume of the stored combustible material, and must not have any drain (rainwater will need to be pumped or scooped out periodically). Dry chemicals must be protected from humidity inside buildings. All containers of liquid chemicals must close hermetically. Access to all chemicals should be restricted to authorized personnel.

### **7.8.2:**

Wastes must be managed in compliance with local regulations when they exist. In all cases, wastes must be managed in a way that is safe for human health and the surrounding environment (especially natural waters), in the best possible way depending on local facilities. When appropriate facilities for waste disposal in the area are absent, shrimp farms are allowed to bury non-hazardous solid wastes on site, provided all precautions have been taken to prevent the contamination of surrounding surface and ground waters. Non-organic wastes must not be burned on site due to their potential emissions of toxic gases.

Accredited waste management companies must be used where available. However, the ShAD appreciates that shrimp farms are generally located in areas where accredited waste management companies are not necessarily established or accessible. Farmers must demonstrate the use of the most responsible disposal solutions based on what is locally available. Where hazardous biological wastes exist, including shrimp offal and mortalities, it must be managed according to a plan based on potential risks and national and/or international guidelines, when they exist, and solutions must be identified for the disposal of hazardous non-biological wastes, including used lubricants and chemical containers.

Recyclable wastes need to be identified and separated at the point of generation. Some wastes (e.g. feed bags and plastic containers) can be reused, and their return to suppliers shall be encouraged. When selling recyclable wastes to a local collector, the final destination of wastes shall be specified. The income generated by the sales of recyclable wastes shall be used as a means of providing incentives for employees to separate wastes and to increase the amount of recycling done on the farm.

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<sup>139</sup> Waterproof wall and floor built around tanks of oil or other hazardous liquids to contain them in the event of a spillage.

## Appendix I – Suggested Guidance for a BEIA

### **Biodiversity-inclusive Environmental Impact Assessment**

This guidance is intended to explain what is meant by “biodiversity-inclusive” Environmental Impact Assessment (BEIA), the different types of BEIA that can be implemented, the benefits of BEIA to farmers, to clarify the role of BEIA in farm planning and management, and to outline the basic steps in a BEIA. The guidance also outlines a method for applying a BEIA relative to the scale or size of the farm. Finally, it suggests a key checklist for farmers to follow in order to help them complete the BEIA process, and to help auditors verify it.

Definition:

*The IAIA (1999) define an Environmental Impact Assessment as: “The process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made” (International Association for Impact Assessment, [www.iaia.org](http://www.iaia.org)).*

The BEIA process seeks to obtain the best possible biodiversity outcomes from land use changes. It is important that all interested parties understand the process by which the assessment has been made as well as how and by whom any actions needed to deliver biodiversity objectives will be implemented and monitored. Therefore, the BEIA must provide reliable information about, and interpretation of, the ecological implications of the project, from its inception to its operation and, where appropriate, its decommissioning. The BEIA process also seeks to add value and contribute to demonstrating compliance to other ShAD standards, while taking into account specific local conditions.

#### **BEIA assessment team**

The BEIA shall be carried out by a nationally accredited body. Where no accredited body exists, companies must ensure that the BEIA team consists of competent and qualified environmental scientists, biologists and ecologists.

The role of ecologists and practitioners in the BEIA team will be to:

- provide an objective and transparent assessment of the biodiversity and potential (in the case of new project) or known (in the case of existing operations) ecological effects of the farm to all interested parties, including the general public;
- facilitate objective and transparent determination of the consequences of the farming in terms of compliance with national, regional and local policies relevant to nature conservation and biodiversity; and
- set out what steps will be taken to adhere to legal requirements relating to designated sites and legally protected, and the related standards in this document

#### **BEIA Statement**

The BEIA must follow best practices as outlined by the IAIA and the Institute for Environmental Assessment.<sup>140</sup> The Espoo Convention, signed in 1991, lays down the minimum content of an EIA in its Appendix II<sup>141</sup> and the Convention on Biodiversity has outlined the main content and process for BEIAs<sup>142</sup>. The BEIA should be consistent with the criteria outlined in other related ShAD standards and carried out in conjunction with the Social Impact Assessment outlined in 3.1.

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<sup>140</sup> [http://www.iaia.org/publicdocuments/special-publications/Principles%20of%20IA\\_web.pdf](http://www.iaia.org/publicdocuments/special-publications/Principles%20of%20IA_web.pdf)

<sup>141</sup> <http://www.unece.org/env/eia/documents/legaltexts/conventiontextenglish.pdf>

<sup>142</sup> Guidelines on BEIA: <http://www.cbd.int/doc/reviews/impact/EIA-guidelines.pdf>

The BEIA process must be iterative and able to respond to increasing advancements in farming practices and relevant scientific knowledge evolve. It is also a 'partnership' process, which is most effective if all relevant ecologists and other specialists work in collaboration. The BEIA can be dovetailed with the p-SIA (Principle 3) by having one stakeholder meeting in beginning, and one close to the end of a BEIA process. An ecologist would organize a local stakeholder meeting in the beginning of a BEIA process and ask the question: what ecological and natural resources related effects should I watch for? What natural resources are vital to your community? Before writing the report of the ecologist should again organize such a stakeholder meeting and validate his/her findings with the community stakeholders asking questions such as: did I capture it all? Can you comment on my findings?

The product of a BEIA will provide the means of gaining an understanding of the findings and support for its proposals from non-specialists by clarifying the past and current impacts of any farming operation.

### **Basic BEIA methodology**

1. **Screening** - to determine whether or not a proposal should be subject to BEIA and, if so, at what level of detail.

Use biodiversity-inclusive screening criteria to determine whether important biodiversity resources may be affected.

Biodiversity screening "triggers" for an IA must include:

- Potential/actual impacts on protected areas and areas supporting protected or Red List species.
- Impacts on other areas that are not protected but are important for biodiversity and biodiversity services, including extractive reserves, indigenous people's territories, wetlands, fish breeding grounds, soils prone to erosion, relatively undisturbed or characteristic habitat, flood storage areas, groundwater recharge areas, etc. (i.e. HCVAs).
- Activities posing a particular threat to biodiversity (in terms of their type, magnitude, location, duration, timing and reversibility).

Encourage development of a biodiversity screening map, indicating important biodiversity values and ecosystem services. If possible, integrate this activity with the National Biodiversity Strategy and Action Plan (NBSAP) and/or biodiversity planning at sub-national levels (e.g. regions, local authorities, towns) to identify conservation priorities and targets.

2. **Scoping** - to identify the issues and impacts that are likely to be important and to establish terms of reference for the BEIA.

Scoping leads to the Terms of Reference for an IA, defining the issues to be studied and the methods that will be used. Scoping can be used as an opportunity to raise awareness of concerns relating to biodiversity and discuss alternatives to avoid or minimize negative impacts on it.

It is good practice to produce a scoping report for consultation. This shall address the following issues (on the basis of existing information and any preliminary surveys or discussions):

1. The type of farming used, possible alternative methods and a summary of activities likely to affect biodiversity.

2. An analysis of opportunities and constraints for biodiversity, including “no net biodiversity loss” or “biodiversity restoration” alternatives.
  3. Expected biophysical changes (in soil, water, air, flora, fauna) resulting from proposed activities or induced by any socioeconomic changes.
  4. Spatial and temporal scale of influence, identifying effects on connectivity between ecosystems, and potential cumulative effects.
  5. Available information on baseline conditions and any anticipated trends in biodiversity in the absence of the proposal.
  6. Likely biodiversity impacts associated with the proposal in terms of composition, structure and function.
  7. Biodiversity services and values identified in consultation with stakeholders and anticipated changes in these, highlighting any irreversible impacts.
  8. Possible measures to avoid, minimize, or compensate for significant biodiversity damage or loss, making reference to any legal requirements.
  9. Information required to support decision making and a summary of important gaps
  10. Proposed IA methodology and timescale.
3. **Impact study and preparation of Impact Statement (IS)** - to identify impacts and clearly document the proposed measures for mitigation, the significance of the effects, and the concerns of the interested public and the communities affected by the proposal.

Address biodiversity at all appropriate levels and allow for enough survey time to take seasonal features into account. Focus on processes and services that are critical to human well-being and the integrity of ecosystems. Explain the main risks and opportunities for biodiversity.

4. **Review for decision-making** - To approve or reject the proposal, to establish the terms and conditions for its implementation (in the case of a future project) or to determine necessary terms for mitigation and/or offsetting impacts. The auditor will verify that final decisions regarding the project’s development, mitigation and compensation measures are justified and coherent with the required outcomes of the BEIA.
5. **Mitigation and offsetting** - Remedial action can take several forms, including avoidance or prevention, mitigation (e.g. restoration and rehabilitation of sites – see separate guidance note) and compensation or offsetting. Apply the “positive planning approach,” where avoidance has priority and compensation is used as a last resort measure. Avoid “excuse”-type compensation<sup>143</sup>. Look for opportunities to positively enhance biodiversity. Acknowledge that compensation will not always be possible and there will still be cases where it is appropriate to say “no” to development proposals on the grounds of irreversible damage to biodiversity.
6. **Review and decision-making** – A peer review of environmental reports with regard to biodiversity shall be undertaken by a specialist with appropriate expertise, where biodiversity impacts are significant. Consideration shall be given to the involvement of affected groups and civil society. This is made possible by presenting the BEIA and the pSIA to the community for discussion. Avoid pitting conservation goals against development goals; balance conservation with sustainable use for economically viable as well as socially and ecologically sustainable solutions. For important biodiversity issues, apply the precautionary principle where information is insufficient and the no net loss principle in relation to irreversible losses associated with the proposal.

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<sup>143</sup> Needs definition

7. **Management, monitoring, evaluation and auditing** - It is important to recognize that predicting the effects of ecological perturbation on biodiversity is uncertain, especially over long time frames. Management systems and programs, including clear management targets (or Limits of Acceptable Change (LC)) and appropriate monitoring, shall be set in place to ensure that mitigation is effectively implemented, unforeseen negative effects are detected and addressed, and any negative trends are detected. Provision shall be made for regular auditing of impacts on biodiversity. Provision shall be made for emergency response measures and/or contingency plans where upset or accident conditions could threaten biodiversity.

### **Applying BEIA on existing and new farms**

It does not matter whether a BEIA is done around an existing farm, an expanding farm or a newly planned farm establishment. The methodology remains the same, and the recognition of dependencies and impacts (positive and negative) remains the same.

For new farms, the focus of this criterion lies in assessing future risks and impacts. This assessment must be done before the farm's establishment. For existing farms, the focus lies in assessing actual (previous and current) dependencies, risks and impacts. In both cases, the outcome is oriented towards identifying how to responsibly address these risks and impacts in accordance with the standards in this document. Avoiding unwanted impacts may be more difficult on existing farms, whereas a need to compensate affected stakeholders for negative impacts on biodiversity may be less when plans for a future operation can still be adjusted.

### **Applying BEIA relative to scale or size of farm**

All of the steps outlined above can be done by means. The extent of work and the depth of the analysis and data gathering depend largely on the surrounding ecosystem and size of the farm.

The following is guidance on how large and small farms may require different levels of support when performing a BEIA.

For cooperatives or groups of farms in the same area, the total number of ponds or total area covered by the cooperative/group determines what structure and resources a BEIA will require. The group or cooperative must be bound on a legal basis (e.g. a registration of membership or a documented commitment to work together under a common set of rules or contract) and share a geographic location or geophysical resource (e.g. a water system).

Large farms or groups of farms (more than 15 ponds or 25 hectares in total production area) will need professional expertise to undertake a BEIA, largely due to the size of area and number of operations, impacts of conversion or operation on ecosystems, and resource use and disposal. Hiring a small team (e.g. senior ecologist coordinator and junior researcher(s)) with relevant academic expertise will be required.

Medium-scale farms or groups of small farmers (6-15 ponds but no larger than 25 hectares in total area) or individual small farms (maximum 5 ponds and 5 hectares) may be able to do a credible BEIA through the consultancy services of an academic ecologist or a conservation civil society organization in or familiar with the area and its ecosystem. One such person may be able to plan, implement and report on a BEIA.

In the above given differentiation, next to scale, the farming system in operation also plays a role. Intensive culture techniques (i.e. applying feed, aerating ponds, etc.) can have larger and more wide-

reaching impacts than more extensive (i.e. not requiring pond aeration, etc.) techniques. Therefore, the full overview of BEIA methodology, as it applies to scale and technology of the farm, is as follows in the table below:

|                  |  |  |   |
|------------------|--|--|---|
| Key-parameters:  | <b>Small-scale single farms or clustered/cooperative small farms applying for group certification:</b><br><br>local decision making authority and max. 5 ponds but no larger than 5 hectares of total production area. | <b>Medium-scale single farms or clustered/cooperative small farms applying for group certification:</b><br><br>6-15 ponds and no larger than 25 hectares of total production area. | <b>Large-scale single farms or clustered/cooperative small to medium farms applying for group certification.</b><br><br>More than 15 ponds or 25 hectares of total production area. |
| Non-aerated pond | BEIA done by an academic ecologist /NGO <sup>144</sup> consultant using guidance framework and methodology   | BEIA done by an academic ecologist /NGO consultant using guidance framework and methodology  | BEIA done by an accredited professional expert and based on guidance framework  |
| Aerated pond     | BEIA done by an academic ecologist /NGO consultant using guidance framework and methodology  | BEIA done by an academic ecologist /NGO consultant using guidance framework and methodology  | BEIA done by an accredited professional expert and based on guidance framework  |

### Auditing a BEIA

In auditing for this criterion, auditors need to look for the (apparent) completeness of a BEIA report and verify the manner in which the farm owner/operator took active responsibility in finding out about impacts, discussing these openly with stakeholders and seeking to come to mutually agreeable terms as to resolving concerns. Auditors need to look at the documentation to determine if it is appropriate and disseminated (i.e. is it informative, is it complete as to the steps outlined above, is it available in the local government and the community, and is it listing dates of meetings and names of participants?), cross-check with (some of the) participants to find out if the same information is indeed available to them (i.e. do they have a copy, did they proofread a draft for comments, were comments they made reflected in the final draft?) and determine if they agree with the outcomes/conclusions the documentation lists (i.e. are listed issues and negotiation points indeed the issues and negotiation points agreed to by all parties?).

1. Check for completeness of BEIA report
  - (a) contents as listed above
2. BEIA announcement, draft, final report and summary are locally disseminated and distributed according to the above checklist
  - (a) cross-check with local government, by stakeholders' chosen organization, at random with 2-3 stakeholders listed as participants in meetings (*random checks increase if doubts appear*)

<sup>144</sup> Ecologist academic/NGO consultant: Ecologist, biologist with university degree and knowledge of relevant environmental regulations, and employed by an education or research institution, or an environmental NGO. The specialist must demonstrate knowledge of the area to be assessed and related literature.

- i. was/is information on BEIA process and on BEIA contents available to them?
- ii. were their suggestions (i.e. impacts, solutions) reflected in the report?

To determine compliance with this particular criterion, auditors need not verify the accuracy, robustness or quality of the data-gathering in a BEIA report. Nor will auditors need to assess impacts, as the BEIA report will already provide this information.

**Suggested checklist for farmers and guideline for auditors on a complete BEIA process and report**

|  | Validated | To be improved |
|--|-----------|----------------|
| 1. Quality of the BEIA process (e.g. is it participatory and transparent?).  |           |                |
| (a) BEIA carried out by a valid expert in accordance with the above table.   |           |                |
| (b) The intent to conduct a BEIA is publicly (locally) communicated with sufficient time for interested parties to participate and/or get informed   |           |                |
| (c) Stakeholders are listed and impact descriptions, are documented and in preparation of a final BEIA report meetings with the listed stakeholders (or by stakeholders chosen representatives) have taken place.                      |           |                |
| (d) These meetings have been recorded and the minutes are attached to the final report; names and contact details of participating stakeholders included   |           |                |
| (e) Evidence is provided that draft and final BEIA reports have been submitted to local government representative and, if requested by stakeholders, a legally registered civil organization chosen by these stakeholders              |           |                |
| (f) Evidence is provided that the final BEIA reports have been submitted and reviewed by a specialist with appropriate expertise on biodiversity issues  |           |                |
| (g) BEIA done and completed according to guidance under 3.1 (transparency and consultation)  |           |                |
| 2. Risk analysis: actual (past and present) impacts of the current farms, or potential impacts of the intended farm and at least two alternatives (one of these is the 'no farm or no expansion' scenario). Concepts to cover include: |           |                |
| (a) The type of farming, possible alternatives and a summary of activities likely to affect biodiversity   |           |                |
| (b) An analysis of opportunities and constraints for biodiversity (include "no net biodiversity loss" or "biodiversity restoration" alternatives)  |           |                |
| (c) Expected biophysical changes (in soil, water, air, flora, fauna) resulting from proposed activities or induced by any socioeconomic changes  |           |                |
| (d) Spatial and temporal scale of influence, identifying effects on connectivity between ecosystems, and potential cumulative effects  |           |                |

|   |  |  |
|---|--|--|
| (e) Available information on baseline conditions and any anticipated trends in biodiversity in the absence of the proposal  |  |  |
| (f) Likely biodiversity impacts associated with the proposal in terms of composition, structure and function  |  |  |
| (g) Biodiversity services and values identified in consultation with stakeholders and anticipated changes in these (highlight any irreversible impacts)   |  |  |
| (h) Possible measures to avoid, minimize, or compensate for significant biodiversity damage or loss, making reference to any legal requirements   |  |  |
| (i) Information required to support decision making and summary of important gaps   |  |  |
| (j) Proposed IA methodology and timescale   |  |  |
| 3. Impact statement is available and contains all of the requirements listed above along with a clear indication of authors and affiliations  |  |  |
| 4. Review process, reviewers (decision makers), and decisions clearly documented  |  |  |
| 5. Clear understanding presented as to how options for mitigation and offsetting were determined and how avoidance actions were prioritized over compensation   |  |  |
| 6. Names, affiliations, and experience of the reviewing specialist are documented as well as clear understanding of how affected groups were involved and how balanced consideration was given to conservation vs. development goals in the peer review |  |  |
| 7. Clear articulation of the management systems including targets and monitoring strategies for mitigation  |  |  |

**Key references:**

BIODIVERSITY IN IMPACT ASSESSMENT (IAIA, 2005)

<http://www.iaia.org/publicdocuments/special-publications/SP3.pdf>

GUIDELINES FOR ECOLOGICAL IMPACT ASSESSMENT (Institute of Ecology and Environmental Management, IEEM, 2006)

<http://www.ieem.net/ecia/download.html>

FAO Fisheries and Aquaculture Technical Paper 527 Environmental impact assessment and monitoring in aquaculture - Requirements, practices, effectiveness and improvements (Aquaculture Management and Conservation Service, Fisheries and Aquaculture Management Division, FAO Fisheries and Aquaculture Department)

<http://www.fao.org/docrep/012/i0970e/i0970e00.htm>

## Appendix II – Guidance for participatory Social Impact Assessment

### **Guidance to Participatory Social Impact Assessment (p-SIA)**

*“[participatory] Social Impact Assessment includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment” (International Association for Impact Assessment, [www.iaia.org](http://www.iaia.org))*

p-SIA can be undertaken in different contexts and for different purposes. The way a p-SIA is done on behalf of a big multinational corporation as part of that company’s planning and development may be very different to a p-SIA undertaken by a consultant to comply with regulatory agency requirements, or a p-SIA undertaken by a development agency interested in ensuring their project has no unintended negative consequences. These, in turn, may be very different to a p-SIA undertaken by staff or students at a local NGO or university on behalf of the local community or a p-SIA undertaken by the local community itself. Each of these applications of p-SIA is worthwhile and the choice may depend on the size of the (actual or intended) farm.

The improvement of the social wellbeing of the wider community should be explicitly recognized as an objective of the farm and, as such, should be an indicator considered by any form of assessment. An absolute minimum benchmark is to avoid any harm and to be transparent about risks that may affect the wellbeing of people living around or between aquaculture farms. Impacts may vary among different groups in society and the impact burden experienced by vulnerable groups in the community should always be of primary concern.

The role of p-SIA will be to ensure that:

- (1) the views of all stakeholder groups have been considered;
- (2) there has been adequate negotiation about the outcomes (for each stakeholder group) of the intended activity or changes in ongoing activity,
- (3) the potential adverse consequences have been considered and classified according to the likelihood (risk) and severity (size, effect) of impact; and
- (4) the activity has been redesigned as much as possible to reduce these consequences and mitigation or compensatory mechanisms have been developed.

If done correctly, the effect of a p-SIA will be mutually beneficial:

- (1) Maximized positive and minimized negative impacts to the ‘surrounding’ community and their social wellbeing and livelihoods.
- (2) Reduced costs and risks to the farm operation due to increased comfort with and absence of conflict with the ‘surrounding’ community.

The essence of all properly implemented p-SIAs is that they are iterative (i.e. fine-tuned and adapted in a sequence of steps) and participatory (i.e. stakeholders are given the opportunity and invited to influence process and contents of discussions). Specific designs in methodology need to be developed in the context in which they are to be applied and they need to be addressed to a specific audience. Therefore, they need to be developed in conjunction with the relevant stakeholders. They need to become accepted as the guidelines of that group rather than being imposed.

## **Basic p-SIA methodology in seven steps:**

1. *The Stakeholder Analysis.* Look for stakeholders (possibly affected people, groups, communities) and develop a two-way communication.

The Stakeholder Analysis is the entry point to SIA and participatory work as it addresses the most important questions (e.g. who are the key stakeholders? What are their (positive and/or negative) interests in the project? What are the power differentials between them? What relative influence do they have on the operation?).

An easy way to identify stakeholders is to:

(1) Draw a sketch-map of the key components of the (planned or existing) farm, both on and off site, that may give rise to local social impacts (e.g. farm site, ancillary infrastructure (roads, powerlines, canals, etc.), sources of water, air, feed, pollution, etc.), (introduced or intended) restrictions to land or water use and mobility (e.g. fences, obstructions, etc.), and (observed or suspected) degradation in quality and quantity of natural resources around the farm and/or its ancillary infrastructure.

(2) Identify the geographical areas in which such impacts take place or may take place.

(3) Find out who lives in or makes use of these areas, or has (legal or customary) entitlements in these areas.

(4) Seek out these people or seek advice as to the identification of appropriate representatives of these people. Consider that women and children are often specific groups within a community with specific needs and interests.

(5) Double-check this by disseminating locally (in locally appropriate manner and language) the intention to undertake a p-SIA with the purpose of documenting (actual or potential) social impacts and the intention to consult stakeholders on ways to avoid, mitigate or compensate this.

### Ways to classify stakeholder groups include:

Primary stakeholders: those affected, either positively or negatively by a farm development or operation

Secondary stakeholders: those who are indirectly affected by a farm development or operation

Key stakeholders: (who can also belong to the first two groups) those who have significant influence upon or importance within or to the farm development operation

Non-Key stakeholders: (who can also belong to the first two groups) those who are directly or indirectly affected and without significant influence or importance to the farm development or operation

2. *Description of farm and effects.* Make a description of the (current or intended) farm and at least two alternatives (one of which is the 'no farm' scenario). Focus on siting, size (including ancillary structures and buffer-zones), habitat (conversion), inflows of natural resources (e.g. water and groundwater), interruption of natural processes (e.g. fisheries, tidal moves, surface streams, canals and dykes), interruption of social or socio-economic processes (e.g. walkways, paths, access to land and water, ancestral/cultural significance, etc.), and effluents coming from the farm (e.g. water, pollution, noise, light, etc.). Processes on the farm need only be described if risks outside the farm are associated (e.g. pesticides, and antibiotics may drift and even organic substances may have unintended consequences outside of a farm). Process descriptions need not include operational details that are not relevant to an external risk/impact discussion. For existing farms, a look at past impacts is part of the process.

3. *Initial listing of probable social impacts.* Describe or make an estimate on changes and how they will affect each identified stakeholder (group).

A convenient way of conceptualizing social impacts is as changes to one or more of the following impact areas:

- economic aspects (influence on employment, influence on other livelihoods in the village)
- natural resource access and use (land and water tenure, influence on quality and availability of natural resources)
- human assets (food security, health and safety, education, indigenous knowledge)
- physical infrastructure (access to roads, electricity, telephone, housing, waste disposal systems)
- social and cultural aspects (indigenous/local rights and beliefs, social exclusion/inclusion, gender equity, changes in age composition of the community, local informal institutions and organizations)
- governance aspects (influence of aquaculture on norms, taboos, regulations, laws, conflict management and whether these changes add up to more or less transparency, accountability, and participation in decision-making)

It is also important to consider that in all areas both positive and negative impacts can occur, or could have already occurred.

Results and outcomes can be organized in the form of a table; an impact-matrix with impact-areas and groups of stakeholders at the axes of the table. At this stage of a p-SIA, qualitative or even 'alleged or suspected' (positive and negative) impacts may suffice. When the importance of these is questioned (by farm owner or by stakeholders), deeper research can be undertaken in step 4.

*4. Deeper research on important impacts.* Perform or commission research on probable impacts that are likely to be most important (e.g. likelihood, scale, effect, etc.). Arrange a meeting, or meetings, with stakeholders or stakeholder representatives to let them prioritize as well as express how they feel/see/assess/perceive risks and impacts. Seek to identify both positive and negative impacts, as this paves the way for handling trade-offs.

*5. Propose adaptations.* Propose an adapted farm set-up or adapted farm operations with clarification on how impacts and risks are (positively or negatively) changed. Make recommendations to maximize the positive and minimize the negative impacts. Consider avoidance, mitigation, and compensation as possible measures.

*6. Agree on impacts and measures to address them.* Develop and approve with all stakeholders (groups, representatives) on a description of remaining impacts, the mitigation or compensation of those, and a monitoring plan.

*7. Summarize conclusions and agreements.* A minimum of a one-page summary with main outcomes is translated in the local language(s) that apply.

### **Applying a p-SIA on existing and new farms**

It does not matter whether a p-SIA is done for an existing farm, an expanding farm, or a newly planned farm establishment. In either scenario, the methodology and the recognition of issues (positive and negative) remain the same.

For new farms, the focus of this criterion lies in assessing future risks and impacts. This will be done before construction of the farm begins. For existing farms, the focus lies in assessing actual (previous and current) risks and impacts. In both cases, the outcome is oriented towards identifying how to responsibly address these risks and impacts in negotiated processes with those who are affected.

Avoiding unwanted impacts may be more difficult on existing farms, whereas a need to compensate affected stakeholders for negative impacts may be lessened when plans for a future operation can still be adjusted.

### **Applying a p-SIA relative to scale or size of the farm**

All of the steps outlined above can be done through various means. The extent of work and the depth of the analysis and data gathering depend largely on the size of the farm as is likely to be highly correlated to the geographical and population sizes of (potentially) affected communities. For most farms, the difference between methodology and size lies in the social aspects of a p-SIA process: the identification and meeting of stakeholders.

The following is guidance on how large farms and small farms may use different methodologies, and require different levels of support, when doing a p-SIA (steps 1, 3, 6 particularly).

In group certification approaches (cooperatives or a geo-physically defined area of individual farms of which products are moved to the same trader or processor), the whole group is the unit of interest. For cooperatives or groups of farms in the same area, the total number of ponds or total area covered by the cooperative/group determines what structure and resources a p-SIA will take. The group or cooperative needs to be bound on a legal basis; such as a registration of membership or a documented commitment to work together under a common set of rules or contract, and share a geographic location or geophysical resource (such as the water system).

Large farms or groups of farms (16 ponds or 25 hectares and above) will need professional expertise to undertake a p-SIA, largely due to the size of the area and operations, the size of stakeholder groups and the potential for indirect effects (e.g. displacements, social changes in community, health and income effects among parents and the repercussions these may have to survival and education of children, etc.). Hiring a small team (senior coordinator and junior researcher(s) with relevant academic expertise will be required. The engagement with stakeholders will most likely be structured through sampling and meetings with representatives.

*Beneficiary Assessment (BA)* is a systematic investigation of the perceptions of a sample of beneficiaries and other stakeholders to ensure that their concerns are heard and incorporated into project and policy formulation. The purposes are to (a) undertake systematic listening, which "gives a voice" to poor and other hard-to-reach beneficiaries, highlighting constraints to beneficiary participation, and (b) obtain feedback on interventions.

Medium-scale farms or groups (6-15 ponds but no larger than 25 hectares total production area, or a maximum of 5 permanent hired workers) may be able to do a credible p-SIA through the consultancy services of an academic or civil society organization in, or familiar with, the area and its people. One such person may be able to plan, implement and report on a p-SIA. A useful way to engage stakeholders is through organizing so-called participatory rural appraisal (PRA) sessions wherein the classification of stakeholder-interests need to remain clear, but the distinction between 'representatives' and 'those represented' need not be precisely known.

*Participatory Rural Appraisal (PRA)* covers a family of participatory approaches and methods, which emphasizes local knowledge and action. It uses group animation and exercises to facilitate stakeholders in sharing information and making their own appraisals and plans. Originally developed for use in rural areas, PRA has been employed successfully in a variety of settings to enable local people to work together to plan community-appropriate developments.

Small farms and small groups (local decision making authority over farm, max. of 1 permanent hired worker, and max. of 5 ponds but no larger than 5 hectares) can undertake a credible p-SIA through human expertise available within the local community, such as a local schoolteacher or informal leader with social standing. The ability to read and write, the respectability to convene and chair a meeting, and the social reputation of impartiality and integrity are all necessary basic skills. The impacts are likely to be small (geographically) and stakeholders are likely familiar with each other. “Under the mango tree” meetings will suffice, in which the differentiation between stakeholders and their specific interests need not be precisely known.

*Focus Group Meetings* are a rapid way to collect comparative data from a variety of stakeholders. They are brief meetings - usually one to two hours - with many potential uses (e.g. to address a particular concern; to build community consensus about implementation plans; to cross-check information with a large number of people; or to obtain reactions to hypothetical or intended actions).

*Village Meetings* allow local people to describe problems and outline their priorities and aspirations. They can be used to initiate collaborative planning and to periodically share and verify information gathered from small groups or individuals by other means.

In the above given differentiation, next to scale, the farming system in operation also plays a role. More intensive culture techniques (i.e. applying feed, aerating ponds, etc.) can have larger and wider-reaching impacts than more extensive (i.e. no feeding, no aeration applied, etc.) techniques. Therefore, the full overview of p-SIA methodology as it applies to scale and technology of the farm is as follows in the table below:

| Key-parameters:  | <b>Single small-scale farms or clustered/cooperative farms applying for group certification:</b>  | <b>Single medium-scale farms or clustered/cooperative farms applying for group certification:</b>                    | <b>Single large-scale farms or clustered/cooperative farms applying for group certification.</b> |
|------------------|---|--|--|
|                  | local decision making authority, and max. of 1 full-time permanent hired worker, and max. 5 ponds but no larger than 5 hectares of total production area. | 6-15 ponds but no larger than 25 hectares of total production area, or 2 full-time, permanent hired workers or more. | 16 ponds or more than 25 hectares of total production area.                                      |
| Non-aerated pond | p-SIA through human expertise available within the local community  | academic/NGO consultant and PRA methodology in p-SIA   | need professional expertise and BA methodology to undertake a p-SIA                              |
| Aerated pond     | p-SIA through human expertise available within the local community  | academic/NGO consultant and PRA methodology in p-SIA   | need professional expertise and BA methodology to undertake a p-SIA                              |

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Note: “decision making authority is local” means residing in an area within daily commuting distance. Decision making authority (often determined by ownership, but sometimes not) refers to the actual mandate to make decisions on concerns and expectations of interested third parties) needs to include the mandate to undertake and implement agreements of a p-SIA on matters such as: land acquisition, operational matters involving water use and management, pond design, security arrangements (e.g. fences, guards, etc.), conflict resolution, information and communication, allowing/endorsing adequate community representation, negotiation and reaching binding agreements.

Note: production area is the total area used by farm, including storage buildings, sheds, worker accommodation, office, etc. on the farm. Where farms are fenced or have put up barriers against unlimited access, the restricted area is considered the production area.

Note: A permanent hired worker is defined as someone contracted for the duration of a production cycle or longer, and receiving monetary compensation in exchange for the time he/she works on the farm. Hired labor, for specific short activities, such as harvesting, is not considered permanent hired labor. A family-worker is defined as being 1<sup>st</sup> or 2<sup>nd</sup> degree blood-related to the primary owner (male/female) or his/her spouse AND receiving his/her compensation or benefits for work done on the farm NOT calculated on the basis of the time he/she works on the farm but proportional to the productivity or profit of the farm (e.g. a son joining his father in the family enterprise, or a 2<sup>nd</sup>-degree cousin doing work in exchange for accommodation and food, or 2 brothers sharing harvest revenues). First or 2<sup>nd</sup> degree family members agreeing to do work in exchange of payments on the basis of work-time are considered ‘hired workers’. Whether agreements are verbal or on paper does not make a difference. Workers partially paid according to time/days and partially paid through share in product sales are considered ‘hired workers’.

### **Auditing on a p-SIA**

In auditing for this criterion, auditors need to look for the (apparent) completeness of a p-SIA report, and verify the manner in which the farm owner/operator took active responsibility in finding out about impacts, discussing these openly with stakeholders, and seeking to come to mutually agreeable terms as to resolving concerns. Auditors need to look at the documentation and whether it is appropriate and disseminated (is it informative, is it complete as to the steps outlined above, is it available in the local government and the community, and is it listing dates of meetings and names of participants?), and cross-check with (some of the) participants to find out if the same information is indeed available to them (do they have a copy, did they proofread a draft for comments, were comments they made reflected in the final draft?) and do they agree with the outcomes/conclusions the documentation is listing (are listed issues and negotiation points indeed the issues and negotiation points agreed to by all parties?).

1. Check for completeness of p-SIA report
  - (a) contents provided for as listed above
  - (b) stakeholder engagement process sufficient and appropriately documented (meetings + attendant-lists provided in a form that makes further verification possible)
2. p-SIA announcement, draft, final report, and summary are locally disseminated and distributed according to checklist above
  - (a) cross-check with local government, by stakeholders chosen organization, at random with 2-3 stakeholders listed as participants in meetings (*random checks increase if doubts appear*)

- i. was/is information on p-SIA process and on p-SIA contents available to them?
- ii. were suggestions (impacts, solutions) they brought in reflected in the report?

For compliance to this particular criterion, auditors need not verify the accuracy, robustness, or quality of the data-gathering in a p-SIA report. Nor will auditors need to assess whether impacts are present or absent, as the p-SIA report will already have done that.

The frequency of audits on P3 is expected to be less in more technical-operational requirements in this standard, after initial compliance has been checked and found to be in order.

**Suggested checklist for farmers and guideline for auditors on a complete p-SIA process and report**

|   | Done | Still to do |
|---|------|-------------|
| 1. Quality of the p-SIA process (e.g. is it participatory and transparent).   |      |             |
| (a) the intent to conduct a p-SIA is locally publicly communicated with sufficient time for interested parties to participate and/or get informed   |      |             |
| (b) in listing stakeholders, in making impact descriptions, and in preparation of a final p-SIA report-document meetings with the listed stakeholders (or by stakeholders chosen representatives) have taken place. |      |             |
| (c) these meetings have been minuted and these records are attached to the final report; names and contact details of participating stakeholders included   |      |             |
| (d) evidence is provided that draft and final p-SIA reports have been submitted to local government representative and, if stakeholders so desired, a by stakeholders chosen legally registered civil organization  |      |             |
| (g) BEIA done and completed according to guidance under 2.1 (appropriate accreditation and consultation)  |      |             |
| 2. The risks and actual (past and present) impacts of the current or intended farm and at least two alternatives (one of these is the 'no farm or no expansion' scenario). Concepts to cover include:               |      |             |
| (a) economic aspects (influence on employment opportunities, influence on other livelihoods in community)   |      |             |
| (b) natural resource access and use (land and water tenure, influence on quality and availability of natural resources incl. water)   |      |             |
| (c) human assets (food security, health and safety, education, indigenous knowledge)  |      |             |
| (d) physical infrastructure (access to roads, electricity, telephone, housing, waste disposal)  |      |             |

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| systems)   |  |  |
| (e) social and cultural aspects<br>(indigenous/traditional/customary rights and beliefs, social exclusion/inclusion, gender equity, changes in age composition of the community, local informal institutions and organizations)  |  |  |
| (f) governance aspects (influence of aquaculture on norms, taboos, regulations, laws, conflict management, and whether these changes add up to more or less transparency, accountability and participation in decision making)   |  |  |
| 3. Research and report probable impacts that are likely to be most important. In doing this, it is important to arrange meetings with stakeholders to let them prioritize as well as to let them express how they assess/view/feel; identify both positive and negative risks and impacts. |  |  |
| 4. Do deeper investigations into priority impacts with a focus on the question: “what changes will lead to if they indeed come about?” Including:  |  |  |
| (a) physical effects to man-made and natural structures and processes  |  |  |
| (b) likely adaptations and the social and economic effects of making such adaptations  |  |  |
| (c) how these effects and indirect effects would compare to having no intervention   |  |  |
| (d) how effects may or might be cumulative   |  |  |
| 5. Make recommendations to maximize the positive and minimize the negative, with consideration to compensation options for those lands and people impacted. Also include recommendations on how to avoid these issues with the intended farm or farm development.                          |  |  |
| 6. Propose a mitigation plan assuming the farm development will take place or continue (in an adapted form if that seems appropriate); include a ‘closure and reclamation plan’ explaining how repair or restoration will take place after farm closure or bankruptcy (see P2).            |  |  |
| 7. Develop and approve with all stakeholders a monitoring plan and indicators on both positive and negative risks and impacts. (make use of FDG and/or PRA methodologies in this step)   |  |  |
| 8. A summary with recommendations and conclusions is made available to all involved in the process and, through local public notices, made accessible to all members of the local community  |  |  |

**For further reading:**

International Finance Corporation (2007). *Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets*. Washington, D.C.<sup>145</sup>

Center for Good Governance (2006). *A Comprehensive Guide for Social Impact Assessment*. Andhra Pradesh, India<sup>146</sup>

World Resources Institute (2009). *Breaking Ground: Engaging Communities in Extractive and Infrastructure Projects*. Wash., D.C.: Herbertson, K., Ballesteros, A.R., Goodland, R., and Munilla, I.<sup>147</sup>

World Resources Institute (2007). *Development without Conflict: The Business Case for Community Consent*. Washington, D.C.: Herz, S., La Vina, A., Sohn, J.<sup>148</sup>

Oxfam Australia. (2010) *Guide to Free Prior and Informed Consent*. Victoria, Australia: Hill, C., Lillywhite, S. and Simon, M.<sup>149</sup>

[http://www.rspo.org/files/resource\\_centre/RSP0%20Criteria%20Final%20Guidance%20with%20NI%20Document.pdf](http://www.rspo.org/files/resource_centre/RSP0%20Criteria%20Final%20Guidance%20with%20NI%20Document.pdf)

<http://www.rspo.org/files/project/smallholders/Final%20RSP0%20Guidance%20on%20Scheme%20Smallholders%20as%20approved.pdf>

[http://www.fsc.org/fileadmin/web-data/public/document\\_center/publications/smallholders\\_briefing\\_notes/Social\\_Impacts\\_briefing\\_note\\_high\\_res.pdf](http://www.fsc.org/fileadmin/web-data/public/document_center/publications/smallholders_briefing_notes/Social_Impacts_briefing_note_high_res.pdf)

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<sup>145</sup> [http://www.ifc.org/ifcext/sustainability.nsf/AttachmentsByTitle/p\\_StakeholderEngagement\\_Full/\\$FILE/IFC\\_StakeholderEngagement.pdf](http://www.ifc.org/ifcext/sustainability.nsf/AttachmentsByTitle/p_StakeholderEngagement_Full/$FILE/IFC_StakeholderEngagement.pdf)

<sup>146</sup> <http://unpan1.un.org/intradoc/groups/public/documents/cgg/unpan026197.pdf>

<sup>147</sup> [http://pdf.wri.org/breaking\\_ground\\_engaging\\_communities.pdf](http://pdf.wri.org/breaking_ground_engaging_communities.pdf)

<sup>148</sup> [http://pdf.wri.org/development\\_without\\_conflict\\_fpic.pdf](http://pdf.wri.org/development_without_conflict_fpic.pdf)

<sup>149</sup> <http://www.oxfam.org.au/resources/pages/search.php?search=free+prior&Submit=%C2%A0%C2%A0Search%C2%A0%C2%A0>

### Appendix III – Explanation of FishSource scoring

FishSource scores provide a rough guide to how a fishery compares with existing definitions and measures of sustainability. The FishSource scores currently only cover five criteria of sustainability, whereas a full assessment – such as that by the Marine Stewardship Council (MSC) – will typically cover more than 60. As such, the FishSource scores are not a firm guide to how a fishery will perform overall. Nonetheless, the FishSource scores do capture the main outcome-based measures of sustainability.

FishSource scores are based on common measures of sustainability, as used by International Council for the Exploration of the Seas, the National Marine Fisheries Service and the MSC, among others (e.g. current fishing mortality relative to the fishing mortality target reference point or current adult fish biomass relative to  $B_{msy}$ ).

#### Components of the FishSource score

| Issue                                     | Measure  | Underlying Ratio  |
|---|--|---|
| Is the management strategy precautionary? | Determine whether harvest rates are reduced at low stock levels  | $F_{advised}/F_{target\ reference\ point}$ Or $F_{actual}/F_{target\ reference\ point}$ |
| Do managers follow scientific advice?     | Determine whether the catch limits set by managers are in line with the advice in the stock assessment | Set TAC / Advised TAC   |
| Do fishers comply?                        | Determine whether the actual catches are in line with the catch limits set by managers                 | Actual Catch / Set TAC  |
| Is the fish stock healthy?                | Determine if current biomass is at long-term target levels   | SSB/ $B_{40}$ (or equivalent)   |
| Will the fish stock be healthy in future? | Determine if current fishing mortality is at the long term target level                                | $F/F_{target\ reference\ point}$  |

If existing measures of sustainability consider a fishery to be relatively well managed, it will typically score 8 or more out of 10 on FishSource. If the fishery is judged to be doing okay, but requires improvement, then it will typically score between 6 and 8 on FishSource. A fishery falling short of minimum requirements of existing measures of sustainability is scored 6 or below, with the score declining as the condition of the fishery deteriorates.

The key relation between the MSC scoring system and FishSource scores is “80<->8”. For example, a FishSource score of 8 or above would mean an unconditioned passing for that particular aspect on the MSC system. Sustainable Fisheries Partnership devised scores in a way that, departing from 8, a score of 6 relates to a score of 60, and below 6, an MSC “below 60”, “no-pass” condition. Please note, however, that the MSC criteria have been interpreted through time with a substantial degree of variability among fisheries.

More information on FishSource is available at [www.fishsource.org](http://www.fishsource.org) and an overview of the FishSource indices is available at [http://www.fishsource.org/indices\\_overview.pdf](http://www.fishsource.org/indices_overview.pdf).

#### About scoring and availability of product meeting a minimum score

A typical full assessment of a fishery through the MSC will include significantly more areas/criteria assessed than through FishSource, typically including more than 60 sustainability criteria. A fishery is deemed sustainable by the MSC if it scores 60 or more in every performance indicator, and an

average of 80 or more at the principle level. The MSC requires certified fisheries to take corrective actions to improve any areas of the fishery that scored between 60 and 80, with the intention of achieving a score of 80 or above in every area of the fishery.

As of March 2010, only one of 22 forage fisheries assessed by FishSource meets a minimum FishSource score of 8 in all score categories: herring (Norwegian spring spawner) with a total 2007 catch of 1267 thousand mt, which is equivalent to 8% of the total catch of those 22 forage fisheries of 14360 thousand mt.

11 of the 22 assessed forage fisheries meet a minimum FishSource score of 6 with a maximum of one n/a and no n/a in the biomass sustainability score category, with a catch volume of 9632 thousand mt in 2007.

4 of the 22 assessed forage fisheries meet a minimum FishSource score of 6 with a maximum of one n/a and a minimum score of 8 in the biomass sustainability score category, with a catch volume of 1444 thousand mt in 2007.