Best Aquaculture Practices Certification Program
Global Aquaculture Alliance
5661 Telegraph Road, Suite 3A • St. Louis, Missouri 63129 USA
Phone: +1-314-293-5500 • Fax: +1-314-293-5525 • Web: www.gaalliance.org/bap/

Comments on BAP Standards

Tilapia Farm Standards

Comments concluded April 2008

Environmental Defense Fund

Becky Goldburg, Ph.D.; Teresa Ish; Tim Fitzgerald

GENERAL COMMENTS:
These comments should not be considered an endorsement of the GAA or its standards; neither should the suggestions made be considered conditions to obtain that endorsement. Environmental Defense Fund recognizes the importance of certified seafood in today's market and offers comments and suggestions to the document that address both the content and performance of the standards. We appreciate the opportunity to comment on the standards and hope that that they will contribute to strong, performance-based standards.

The best way to demonstrate environmental impact and improvement is through measurable results. Although the standards proposed address many of the main impacts of tilapia production, few of the control points use a quantifiable metric to determine compliance, opting instead for terms like "minimize," "excessive" or "acceptable response," which are subjective and not measurable. In order to ensure that the standards are consistently enforced, demonstrate change over time and continually improve, performance metrics should be adopted wherever possible.

Of special concern is the fact that many of the critical items refer to generalized and aggregate assessments of compliance against more numerous and quantifiable informational criteria, e.g., are records maintained and available for... . This could be construed as a mechanism for increasing discretionary scope for individual evaluators, but risks making overall standards less exacting. Critical criteria, especially, should be as specific and individually quantifiable as is reasonably possible.

BAP: *The tilapia standard is the first BAP standard to consider aggregate impacts. Potential lake and reservoir pollution is tackled via feeding rate limits and these must take into account inputs from other farms on the water body.*

While not explicitly covered in this document, we also have concerns about the development and implementation of the standards. The first concern is that the members of the technical committee and their affiliations are not listed on the BAP documents. This transparency is a key component of developing credible standards. Secondly, recruiting a private sector company to assist with the tilapia accreditation is potentially problematic. The private sector company, H.Q. Sustainable Maritime Industries Inc. (HQSM), headquartered in the USA, exports value-added hybrid tilapia and white-legged shrimp with integrated farming, processing, feeds and supplements operations in Hainan Island, China. It is not yet clear what form this assistance will take, nevertheless, this raises further questions regarding impartiality, conflict of interest and consumer representation. Academics and other parties without a financial interest in the industry should also be included in the accreditation process.

BAP: *We will investigate this possible conflict of interest.*
Please see further general responses on BAP tilapia farm standards at the end of this document.

SPECIFIC COMMENTS:

2. Community Relations

It is unclear how this standard will be evaluated. "Striving" for good community relations is difficult to assess, and depends on the intent of the producer.

Implementation. The standard should require more than an "attempt" to accommodate traditional uses. The standard should also stipulate that farms cannot impede traditional uses.

BAP: *The compliance points for this standard are stricter than you suggest. The farmers are required to demonstrate that they do not block traditional access routes to fishing grounds, wetland areas and other public resources. This may be backed up by the evaluator conducting interviews with local residents if there are any doubts.*

4. Wetland Conservation and Biodiversity Protection

Escapes are briefly mentioned in the implementation section, and need to be more fully addressed. As a particularly adept invader, tilapia escapes need to be controlled by more than simply screened water outlets. In areas where tilapia don't currently exist in the wild, farms should be prohibited to prevent new colonization events.

While encouraging wetland restoration is admirable, the GAA should require a minimum amount of successful restoration to demonstrate compliance. This could be demonstrated by requiring a minimum amount of funds committed per hectare needed to restore, a specific requirement of how much should be restored and/or a biodiversity target once restoration is complete.

BAP: *As we gather data on best practices, we intend to set meaningful, measurable criteria.*

While this standard does make an attempt to require responsible predator control (point 4.5), the standard should include monitoring of predator mortalities (species and numbers) as critical, and include a zero-mortality clause for species listed by the World Conservation Union (IUCN) red list or protected by local or national laws. To move this standard toward a performance-based standard, the monitoring data should lead to an appropriate quantitative metric and standard that will be included in a timeline defined in the standards.

BAP: *We would appreciate more specific guidance on how best to make use of the IUCN red list, so that we can alert farmers to specific species that may occur and be at risk in their localities. Then we can be very clear about the need to make special provisions. At GAA, we see our job as translating important resources, like the IUCN red list, into practical guidance for farmers. Asking each farmer to consult the IUCN red list would be less efficient. This comment also applies to "areas of high conservation value." GAA needs to spell out to farmers in its standards what these areas are. In the case of mangroves, there is no confusion.*

5. Effluent Management

It is unclear how the values for the concentration standards for land-based tilapia farms were chosen. Depending on the intake and receiving waters used, the concentration that is achievable and the concentration that causes impact will vary. Furthermore, a loading requirement would be beneficial for both the land-based farm standard and the cage and net pen standard for the same reasons mentioned in the "Water Use and Load Indices" section.

BAP: *Effluent limits were based on U.S. standards for equivalent point discharges. They require farms to make improvements over time and are subject to revision. For example, the TSS limit has been halved.*

Stipulations for sampling are important for concentration standards, but the program set out in the sampling section does not address ponds that are only periodically drained or ponds with multiple discharges and not a single point. This question should be amended to reflect this. Rules for compliance for flow-through systems should mimic net cage standards if water is untreated.

The rules for compliance in Cages, Net Pens, where effluents are not allowed, are unclear as to how effluent is defined, since uneaten feed, fish feces and metabolic excretions of fish are the main source of nutrients in effluent.

Please provide a citation for why the HRTs are classified as such, and a justification for how the maximum allowable daily feed inputs where chosen. Furthermore, HRT alone isn't enough. A typology which reduces all lakes and reservoirs to just three environmental categories is likely to have insufficient resolution for acceptable performance. Other key factors include morphometric characteristics -- for example, nutrients which become locked in deep sediments may be discounted until extreme turnover events periodically return them to the surface. Nor is any consideration given to effluents from other catchment uses such as forestry and agriculture.

These are complex issues, for which simple indicators are of limited use. Without consideration of these highly variable contexts, standards performance is likely to be erratic at best. Possible performance metrics for this standard could be the amount of measurable signature of farm a certain distance from the cage.

BAP: *The BAP standard does specify that water samples must be taken at three stations. One at the center of the farm, one at approximately 200 m and one at approximately 500 m. This will enable a broad picture of the farm's signature to be built up. The water quality must meet the BAP effluent criteria.*

While calculating annual effluent loads is critical, setting a limit for loading is an important part of setting a standard. We strongly encourage the GAA to set a strong, science-based loading capacity standard, building upon the concentration standards that the BAP currently requires.

The rule for cages and pens in streams (5.23) should refer more specifically to lotic or flowing water systems. While we understand that due to "measurement difficulties associated with variable flows in streams and rivers," compliance being contingent on downstream concentrations not exceeding upstream levels by more than 25% seems arbitrary, as no flow estimates or load indices are stipulated, i.e., farmers could spread feeding events rather than reducing feed rates and stocking levels. This standard raises the complex issue regarding appropriate system scales for evaluation of environmental impacts. In this schema where effluents are rapidly removed, the potential for downstream impacts is not effectively addressed.

For many of the effluent standards, performance could be improved significantly by imposing limits based on ratios of nitrogen and phosphorous fed (the main nutrients responsible for eutrophication) to levels retained in the fish.

6. Fishmeal and Fish Oil Conservation
The inclusion of a fishmeal and fish oil conservation standard is positive; however, this standard is misleading if no conservation goals are set. A strong performance standard should be set for the use of forage fisheries in feed, potentially capping the use of forage fisheries for fishmeal and oil at .25:1 Feed Fish Equivalence Ratio (FFER) [Feed Conversion Ratio x Fishmeal Inclusion x 4.25 (Menhaden) or (FCR x fish oil inclusion x 8.3), whichever is greater] to capitalize on the ability of tilapia to grow on a low animal protein diet. While the standards do require farmers to report Fish In:Fish Out (FFER), FCR and other calculations, it is not clear how this information is then applied in the standards.

BAP: *Please refer to the general response on how the data will be used.*
We prefer to borrow/use the phrase "fish in:fish out ratio" rather than Feed Fish Equivalence Ratio, because it has a more intuitive feel. But you are right that we don't need to reinvent things for the sake of it. The AMPIR is a way of combining the fishmeal and fish oil content into a single percentage, based on the fact that oily feed fish contain both ingredients. If there is already an equivalent method or term we would be happy to adopt it. The AMPIR thus combines the two equations for fishmeal and fish oil that you quote above and avoids the need to use your phrase "whichever is greater." Strictly, if you use the "whichever is greater" method, you will be forever exaggerating the fishmeal and fish oil inputs without allowing for the fact that a feed that does not have the same meal:oil ratio as the original feed fish effectively results in a by-product of additional meal or oil. AMPIR has a correction for this double accounting.

** Due to comments from EDF and others, the issue of fish in:fish out ratios was revisited, and the AMPIR method was dropped in favor of a simpler, more intuitive method.*

To support the goal of wild fish conservation, the source of forage fish must also be limited to fisheries that are considered healthy or not overfished, depleted or similar descriptions as designated by relevant fisheries management agencies. Sources of by-products should also be encouraged as an alternative to forage fish, with preference given towards by-products from well-regulated fisheries (such as those certified by the Marine Stewardship Council (MSC) and avoidance of those from fisheries that are overfished and/or overfishing is occurring. Furthermore, we would like to see a ban on the use of "trash fish" in feed both to reduce the incidence of disease on the farm and to protect juvenile fish that are often a significant component of the trash fish fishery.

BAP: *We don't address this key issue here. Instead, the BAP feedmill standard (soon to be released for public review) is GAA's chosen vehicle to put pressure on the aquaculture industry to source fishmeal and fish oil more wisely. This standard places great emphasis on the sourcing of sustainable fishmeal and fish oil, from sources such as MSC fisheries, and sustainable by-products. We are also working with IFFO to help develop its new, auditable Code of Responsible Practice that will insist on sustainable sourcing of fish for fishmeal.*

Please provide a source for your AMPIR equation. Similar equations are widely used and documented, and it would be preferable to use an established calculation.

While emphasis on fishmeals is laudable, his should not be to the exclusion of other dietary sustainability issues. For example, soybean is an increasingly important fishmeal substitute. Standards should reward local sourcing from local producers and "rainforest-friendly" certified products, etc. or products produced following the Basel Criteria for Responsible Soy Production.

BAP: *Sustainability of all feed ingredients is clearly important. We are focusing on the most critical one, fishmeal/fish oil, at the moment. Groups such as WWF have been insistent on the need to focus on key impacts rather than to create "a long shopping list." In general, GAA thinks this is the best approach, too.*

7. Soil and Water Conservation
Some of the "useful" practices should be critical criteria, namely not discharging saline water into freshwater areas, excessive pumping of groundwater and monitoring chloride concentrations in freshwater wells. The phrasing of this standard, not allowing "excessive" use of water, is vague and unenforceable. Contamination of freshwater wells by saline water should not be allowed.

BAP: *Please refer to compliance point 7.2, which does indeed make this a critical issue, by insisting that "quarterly monitoring of neighboring well and surface water shows that chloride levels are not increasing due to farm operations."*

8. Control of Escapes, Use of GMOs
This standard should be strengthened significantly. As an adept invader that has the potential to displace native species, tilapia should not be farmed in an area where they are not already established in natural water bodies. Special efforts should also be made to prevent escapes from the farm in areas where they are already established.

As a performance metric to measure escapes, we propose that producers be required to meet a specific counting accuracy on their farms and demonstrate a reduction in escapes over time. Furthermore, they should be required to report any escapes of over 100 fish to governmental authorities.

BAP: A*nother good point for the tilapia technical committee to assess.*

10. Animal Welfare
While this standard touches on some issues of disease management and prevention, we feel that this

issue warrants its own standard. A strong disease standard should include requirements to record disease outbreaks and mortality rates, source disease-free larvae and demonstrate a reduction in disease outbreak and mortality over time.

11. Drug and Chemical Management
Farmers are encouraged to produce a written health management plan dealing with these issues, disease prevention, diagnostic and monitoring techniques and water quality management. However, this is only a scored question. An effective health management plan is key, but verification that the plan is carried out can only be demonstrated by reporting disease outbreaks and chemical usage. To demonstrate that the plan is effective, producers should show a continued reduction in chemical use over time (or no drug use).

While the standard does prohibit prophylactic use of antimicrobials and antibiotics, diagnoses and the authorization for treatment should require the authorization of and be conducted by a veterinarian or fish health specialist for the standard to be effective.

The approach to methyl-testosterone is inevitably contradictory, as it tries to cross the divide between the available evidence-base and consumer perceptions. A critical point (form 2) stipulates simply that "hormones shall not be administered to animals intended for human consumption." However, elsewhere, MT sex-reversal of juveniles (standard practice for most commercial production) is accepted, as there is no evidence of elevated residues in harvested product. However, the practice is mildly discouraged in one scored question which favors alternative methods for all-male fry production. One related critical question deals with worker protection when handling hormones.

Since chemical use is not prohibited in this standard, inclusion of discharge prevention for treatments should also be included, with monitoring of effluents to ensure prevention systems are operating.

12. Microbial Sanitation
Two critical questions stipulate requirements for preventing human sewage or animal wastes draining into ponds, channels or other water bodies. These standards effectively preclude organically fertilized pond systems from the assurance scheme. While these semi-intensive systems are unlikely to contribute to export-orientated aquaculture, they are widely practiced as integrated farming systems producing vegetables and other livestock. We suggest that the BAP create a composting requirement, akin to that in USDA organic standards, and then allow use of agriculture materials in ponds only, if the materials are first composted.

BAP: *This is an interesting point for further discussion. Do you not feel that farmers that use such organic fertilizer should be encouraged to go for an organic certification rather than BAP? Is this not an opportunity to differentiate the two types of certification? Certainly the market premium to organic farming is likely to be greater per kg than farming to BAP. On the other hand, we don't want to write a standard that excludes small-scale producers, since they predominate in Asia.*

The language in this standard implies that trash fish are an acceptable feed source. As in Standard 6, we strongly feel that no trash fish should be allowed as feed.

BAP: *Agreed. We should make it clearer that trash fish are prohibited.*

New England Aquarium

Michael Tlusty, Matthew Thompson, Heather Tausig
Boston, Massachusetts, USA

GENERAL COMMENTS:
These comments are provided to the Global Aquaculture Alliance (GAA) on the Draft Tilapia Standards with regard to the role that the New England Aquarium plays in the seafood industry within its mission to protect, preserve and promote the world of water. These comments should not be considered an

endorsement of the GAA or its standards; neither should the suggestions made be considered conditions to obtain that endorsement. The Aquarium recognizes the challenges and potential benefits of certification schemes, especially in regard to aquacultured products, and offers comments and suggestions to the draft standards. These comments are presented from a general perspective and not prescriptive, as the GAA technical committees should be allowed to generate the specific technical values.

BAP: *Please see further general responses on BAP tilapia farm standards at the end of this document.*

SPECIFIC COMMENTS:
3. Worker Safety and Employee Relations
Application Form: Minimal safety requirements such as first aid kits and emergency response plans should be critical requirements (specify in 3.9 and 3.12).

4. Wetland Conservation and Biodiversity Protection
Application Form: Where mitigation is based on financial grounds, a minimum amount should be specified. We acknowledge that this may reduce input in some cases; however it will give greater confidence in the standard. Potentially the GAA may wish to identify specific restoration programs and require a statement from them that the amounts donated will enable a 3:1 restoration.

The inclusion of point 4.5 (Does your facility use humane, nonlethal methods of predator control?) is positive, however the standard should include monitoring of predator mortalities (species and numbers) as critical, with a statement that an appropriate quantitative metric and standard will be included in the next three years or sooner if practical, based on the data collected (or a five-year target of zero mortalities similar to the effluent decreases). A critical item should also be included that where lethal methods are used, they must be in accordance with national laws. The methods used should also be listed along with the number and type of species killed by them. The GAA should include zero mortality of species listed by the World Conservation Union (IUCN) red list.

Water based farms: No farm should be located in a designated nature reserve or protected area.

5. Effluent Management
Application Form: For point 5.10, delete "For Processing." For point 5.11, "quality of lake, including discharge point" is too broad. As the lake and discharge point is a large and highly variable area, this point needs to be reworded. Point 5.17 -- there are often multiple discharges and not a single point, so this question should be amended to reflect this. For Point 5.23, 25% is too much of an increase; 10% would be represent a more suitable level. In point 5.24, how was the value of 7.5kg/ha/day derived? Please explain in the guidelines.

Points 5.14, 5.23 and 5.24 are feed issues that would be more pertinent to Standard 6. One significant issue with setting maximum limits on feed use is that farmers have been shown to increase levels of protein/fishmeal in the feed to get more fish out of what they are feeding. This was shown in Norway with salmon farming; they also used a feed that was higher in fish oils. If using feed limits, then a cap must also be placed on the proteins, fishmeal and fish oil inclusions.

Guidelines: Column 1, bottom of paragraph 2; page 20: "Sites at which water quality in the water body containing cages or net pens does not comply with BAP effluent guidelines shall not be eligible for certification." This philosophy is problematic because it is actually pushing aquaculture into pristine areas. Since tilapia can live in degraded areas, this should be eligible for certification, but in these cases, the allowable change in water quality should be limited to no reduction or an improvement in water quality. On page 18 there is a "limited option" below the land-based farm table which states this issue.

Page 20, column 2 paragraph 7: "If cages or net pens are installed in an embayment with restricted water exchange... ." Restricted water exchange should be defined in terms of HRT. Also, identify whether the 50% reduction from the 2.5kg value?

6. Fishmeal and Fish Oil Conservation
Application Form: We see the inclusion of a fishmeal and fish oil conservation standard as a positive

move and recognize the importance of gathering data on feed. However, the title is misleading if no conservation goals are set, especially if using feed limits to reduce environmental damage (see above). We recommend that the GAA introduces a fishmeal inclusion cap of 5% or uses a Feed Fish Equivalence Ratio (FFER) (Feed Conversion Ratio x Fishmeal Inclusion x 4.25 (Menhaden)) with a suitable cap (e.g., 0.8) or a value maximum of 0.75 from the FI:FO table shown in the guidelines.

The GAA should also state that it will use audited data to create and establish a quantitative standard in three years or sooner if practical. Sources of by-products should also be considered, with preference given towards by-products from well regulated fisheries (such as those certified by the Marine Stewardship Council and avoidance of those from fisheries that are overfished and/or overfishing is occurring.

7. Soil and Water Conservation
Guidelines: To ensure prevention of salinization of groundwater (where higher salinities are used), monitoring should be included to ensure that those methods are working. Quarterly assessment would be suitable.

8. Control of Escapes, Use of GMOs
Application Form: Please identify how escapes will be recorded, as there may be potential counting problems (i.e., unknown numbers of fish introduced to the system and unknown numbers taken out). With the view of encouraging improvement, a scored criteria of no escapes for three years could be included, as well as a maximum level by which certification could be removed if numbers of escapes are exceeded.

The GAA should also state that it will use this data to create and establish a quantitative metric and standard in three years or sooner, if practical. In addition, farms should be required to monitor escapes in drainage canals to assess the effectiveness of the holding systems. Farms should operate effective recapture plans, possibly using trigger levels (such as 5 fish in a sample net) when escapes get too high or as a result of a major escape event.

10. Animal Welfare
Application Form: The GAA should include requirements to record disease outbreaks and mortality rates. Mortality rates should separate between the growth phases. The GAA should also state that it will use this data to create and establish a quantitative metric and standard in three years.

11. Drug and Chemical Management
Application Form: The standard should include a critical point that all treatments should require the authorization of and be conducted by a veterinarian or fish health specialist. The inclusion of discharge prevention for treatments should also be included, with monitoring of effluents to ensure prevention systems are operating. In point 11.3, change "imorting" to "importing." Add "including hormone-treated feeds" to point 11.8.

Guidelines: This aspect should include environmental protection linked to drug and chemical use, with aspects of monitoring to ensure that the methods are working. All treatments should be authorized and conducted by a licensed veterinarian or fish health specialist.

12. Microbial Sanitation
Application Form: Point 12.3 suggests that the GAA would allow trash fish to be used. Only commercial formulated feeds should be allowed for improved resource efficiency.

Jean-Marc Libioulle

Noe Aquaculture
Brussels, Belgium

GENERAL COMMENTS:
I have reread the Inspection Form to see if the explanations given in the standards are clear. In general, I find that the tilapia standards are as good as those for shrimp. Here are some comments that I hope you find helpful.

SPECIFIC COMMENTS:
Audit question 5.24 indicates a maximum 7.5 kg/ha/day of feed in cages in estuaries. What are the reasons for the standard, and is it a punctual daily rate or an average? It's not clear. It must be clear it is the maximum daily rate per day allowed and not the average daily rate.

BAP: *You are right to insist on transparency for the origins of these feeding rate limits. This information needs to be supplied.*

The fish in:fish out ratio should be implemented also in the shrimp standards.

BAP: *Yes, agreed.*

For audit question 8.2... this topic can be hardly discussed, especially in Africa, where the commercial lines of tilapia can be the same species as the native wild species but are genetically very different and might genetically pollute the local strains. Anyway, outside of the original tilapia African native zone, it is OK.

BAP: *Good point. For this reason, the standards are designed to minimize escapes, whether the species is native or not.*

GAA Response to Comments Received

Daniel Lee
BAP Standards Coordinator

GENERAL RESPONSE:
Thank you for your detailed appraisal of the BAP tilapia standards. This kind of detailed input will certainly help to strengthen the standards and help make sure they deliver the intended environmental and allied benefits. In my reply, I can't predict how the Tilapia Farm Technical Committee will chose to modify the final tilapia standards, but I can speak for GAA in general and explain the workings of the program and how it intends to tackle the various concerns you raise.

We are in agreement with your emphasis on the need for measurable performance metrics. Our first standards, for shrimp farms, started life as codes of conduct and have evolved into performance-based standards for which progressively more stringent, measurable requirements are being added. For example, the shrimp farm effluent standard initially included a limit to the total suspended solids (TSS) of 100 mg/L. These original limits were set to coincide with those applied in the United States for similar point discharges.

Feedback from biologists at Conservation International suggested that this limit was too high, so Prof. Claude Boyd was commissioned to make an assessment. He was able to review effluent data from a sample of 47 shrimp farms in the BAP program to decide what was achievable for the farms following best practices. Following approval from the Shrimp Farm Technical Committee, the TSS limit has now been halved to 50mg/L, and this limit will be transferred to the BAP finfish standards, too. This example illustrates how BAP is trying to promote best practices, following an assessment of what the best-managed farms can achieve.

You are rightly concerned about total loads of nitrates and phosphates. We intend to set limits for these loads, too, but at first we require farms to calculate their annual loads and provide the data. Once the data have been analysed, we will be in a much better position to set load limits at a level that will force farms to improve their performance.

You are also right to infer that effluent controls are not enough, on their own, to prevent pollution and eutrophication. The tilapia committee had a particularly difficult job considering how to address tilapia effluents because of the numerous different types of sites and production systems. Reflecting the complexity of the job, nearly half of the standard now relates to effluents. This shows that we are taking the effluents issue very seriously. I am sure we can make improvements, particularly as we gather data from participating farms.

We view the job of gathering data as an essential part of the program. You are again correct when you say that there is little point in requiring the calculation of the fish in:fish out ratio if we do not set critical limits to this important measure. Our problem is that we simply do not know where to set the limit. We could make a guess now but it may well be preferable to delay the process and then set the limit on the basis of some hard data. This approach, identifying best practices and then setting limits, should serve us well in the long run and enable the bar to be steadily raised as technology and management practices evolve.

On trash fish, you are right that we should be more explicit about banning its use. Farms that use trash fish would not, in any case, be able to meet our effluent criteria, but it would be helpful to make this more explicit.

You are right to insist on the need for more transparency on the membership of different committees. When the SOC gets underway we will have a dedicated website where all such information will be clearly available.

You express a concern that terms like "minimize," "excessive" and "acceptable" are overused and that more specific requirements should be laid down. These words do occur quite often in the guidelines for the standards, but we obviously try to avoid them in the compliance criteria so that yes or no answers can be meaningfully applied. To an extent, we have generally gone for prohibition of clearly unsustainable practices, rather than setting a measurable performance metric. For example, use of wild seed is totally prohibited, cutting of mangroves (except for inlet and outlet channels) is totally prohibited, use of banned antibiotics is prohibited, salinization of surrounding land and well water surface freshwater is prohibited.

Additional specific comments are provided within your comments submission.