

ASSOCIATION OF ZOOS & AQUARIUM'S ANIMAL CARE MANUALS: WHAT IS THE NUTRITION ADVISORY GROUP'S ROLE?

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Abstract

The Species Survival Plan ® (SSP) or Taxon Advisory Group (TAG) is responsible for creating and updating information on their prospective species. It is important to assemble this information in a systematic and consistent manner. In 2005, the Association of Zoo & Aquariums (AZA) created standardized guidelines. Considering the exact nutrient requirements of many exotic animals held in captivity are not known, AZA changed their approach, generating animal care manuals which provide guidelines to be updated as information becomes available. AZA produced a template to follow for nutrition chapters with the Nutrition Advisory Group's (NAG) assistance. It is the role of NAG members to participate in the development of these manuals, incorporating the science of nutrition into the daily care of AZA collections.

Introduction

Historically, SSPs and TAGs were challenged with generating husbandry manuals for those species they managed in a zoological setting. Husbandry manuals contained care, feeding, health, and reproductive information, assembled in an appropriate and functional manner to the editor or chair of the group managing the SSP or TAG. In 2005 AZA created a standard format template considering the current manuals varied in format, structure and content. AZA requested all mammal SSP programs prepare this document termed "standardized guidelines." All other species would follow in subsequent years. Because these guidelines represented the most current information on species husbandry, and would be expected to include the most recent advances in animal care management, they were to be living documents. Hence the term Animal Care Manual (ACM) was born.

It is the responsibility of the members of AZA's Nutrition Advisory Group (NAG), to write and review each ACM Nutrition section.

ACM Development as a whole document from AZA Perspective

The development of the ACMs is supervised by the AZA Animal Welfare Committee (AWC) and managed by the AZA Animal Conservation Office. The manual is divided into 11 chapters, each of which focuses on a different animal care or management topic. Within each chapter are specific sections with general introductory information and corresponding AZA Accreditation Standards identified. On site visits by the AZA accreditation committee to individual institutions

may include a request for documentation of these practices. These sections were created with input from AZA Committees and Scientific Advisory Groups.

The development process for each ACM follows a specific sequence that includes several review procedures both internal and external before the AZA Board of Directors reviews and approves the publication. This process involves 6 steps listed below. Also see figure 1 for a flow chart.

1. The SSP or TAG will identify an ACM coordinator to serve as the main communications conduit between authors of each section and the AZA Animal Welfare Committee and Conservation Department.

2. The ACM coordinator will work with the authors of each chapter to compile all the scientific data and information outlined in bullet points for each chapter.

3. Upon completion of the draft ACM, the ACM coordinator will identify two (or more) external reviewers (not part of the SSP or TAG) and three (or more) internal SSP/TAG member reviews. At that same time the ACM coordinator will submit the information to the AZA Conservation Department and AWC for proofreading and editing.

4. When all edits are considered and the document in final draft form, the ACM coordinator will direct the final draft to the AZA Conservation Department. That Department will send the final draft of the ACM to the external and internal reviewers and will post it on the AZA website for the required 30 day member comment period.

5. The ACM coordinator will work with the SSP/TAG, AWC, and AZA Conservation Department to review all comments, incorporate suggestions as deemed necessary and provide written justification for any omissions.

6. Once completed, the ACM will be sent to the AZA Board for review and final approval. Once ratified, the ACM is distributed via the AZA website to all member institutions, and it is incorporated into use.

ACM NAG nutrition chapter (chapter 5)

Several members of the NAG steering committee worked with AZA to outline the detailed information included in the nutrition chapter of the ACM. This was based on the outline the NAG created in the original Husbandry Manual nutrition sections, but considers new areas of emphasis such as considerations when feeding browse, food-based enrichment, and others. Once in place, this outline became the standard format for each nutrition section, in order to provide consistent and useful information within each chapter, regardless of species.

The specific sections of the Chapter Five outline are listed below. The flow of how the information is assembled can be tailored for individual collection species. Chapter Five is broken into the three sections listed below.

1. Nutritional Requirements

A formal nutrition program is recommended to meet the behavioral and nutritional needs of all animals (S5.1.1). Diets should be developed using the recommendations of nutritionists, the NAG's feeding guidelines (www.nagonline.net/feeding_guidelines.htm), and veterinarians as well as AZA Taxon Advisory Groups (TAGs), Species Survival Plans® (SSP) Programs. Diet formulation criteria should address the animal's nutritional needs, feeding ecology, as well as

individual and natural histories to ensure that species-specific feeding patterns and behaviors are stimulated.

AZA Accreditation Standard

(S5.1.1) A formal nutrition program is recommended to meet the behavioral and nutritional needs of all species and specimens within the collection.

- *Define foods consumed by free-ranging animals. Digestive strategies, including gastrointestinal tract morphology, should be included.*
- *Provide listings of diets currently fed and schedules from successful institutions. Include a nutrient analysis compared to target nutrient ranges.*
- *Address the influence of seasonal changes in ambient temperature, body condition, nutritional requirements, or activity levels on dietary requirements, as appropriate for the species.*
- *Suggest target ranges of nutrients for all life stages that are species-specific or if those data do not exist, then provide appropriate models from published literature (for example, data do not exist for rhinoceros and consequently, a horse model is proposed). Authors should include where appropriate suggestions that differ from the model. If appropriate, target ranges may reflect more than one model.*
- *Address the provision of variability in food type and presentation (e.g., spatial and temporal dispersal of food resources).*
- *Address opportunities for animals to process food in ways similar to their wild counterparts, and consider mechanisms that enable animals to work/forage for food; address issues of palatability, texture, processing, etc. that will encourage species-appropriate appetitive behaviors.*
- *Provide, if available, energy requirement calculations for the species, or an appropriate model to encompass energy requirements for a range of ages (infant, juvenile, reproductive adult, senescent adult).*

2. Diets

The formulation, preparation, and delivery of all diets must be of a quality and quantity suitable to meet the animal's psychological and behavioral needs (S5.2.1). Food should be purchased from reliable, sustainable and well-managed sources. The nutritional analysis of the food should be regularly tested and recorded.

- *Identify the nutrient profile of diet ingredients (complete feeds or otherwise) that are appropriate for this taxa or species.*
- *Provide several sample diets from successful institutions that meet the needs of your taxa.*

Food preparation must be performed in accordance with all relevant federal, state, or local regulations (S5.2.2). Meat processed on site must be processed following all USDA standards. The appropriate hazard analysis and critical control points (HACCP) food safety protocols for the diet ingredients, diet preparation, and diet administration should be established for the taxa or species specified. Diet preparation staff should remain current on food recalls, updates, and regulations per USDA/FDA. Remove food within a maximum of 24 hours of being offered unless state or federal regulations specify otherwise and dispose of per USDA guidelines.

If browse plants are used within the animal's diet or for enrichment, all plants must be identified and assessed for safety. The responsibility for approval of plants and oversight of the program

should be assigned to at least one qualified individual (S5.2.3). The program should identify if the plants have been treated with any chemicals or near any point sources of pollution and if the plants are safe for the species. If animals have access to plants in and around their exhibits, there should be a staff member responsible for ensuring that toxic plants are not available.

AZA Accreditation Standard

(S5.2.1) Animal diets must be of a quality and quantity suitable for each animal's nutritional and psychological needs. Diet formulations and records of analysis of appropriate feed items should be maintained and may be examined by the Visiting Committee. Animal food, especially seafood products, should be purchased from reliable sources that are sustainable and/or well managed.

AZA Accreditation Standard

(S5.2.2) Animal food preparations must meet all local, state/provincial, and federal regulations.

AZA Accreditation Standard

(S5.2.3) The institution should assign at least one person to oversee appropriate browse material for the collection.

- *Provide a plant list, detailing which plants are safe, unsafe, and which parts of the plant can be provided as food items or enrichment to your taxa.*
- *List the approaches that can be used to determine the safety of browse plants for your taxa.*
- *Describe issues related to chemical sprays or pollution reducing the suitability of browse that can affect your taxa.*

Recommend oversight procedures.

3. Nutritional Evaluations

- *Report health related problems known to be linked to diet for your taxa.*
- *Provide a list of tools and methods used for clinical nutritional evaluation of your taxa (i.e., body condition measurements, fecal scoring, etc.).*

Development of the ACM Nutrition Chapter and Review Process for the NAG

As part of an active SSP/TAG nutrition advisor's role, the ACM nutrition chapter should be written by the nutrition advisor(s) and include all the information listed above. It is advisable to have the ACM nutrition chapter reviewed by at least one NAG member before the information is sent back to the SSP/TAG. However, the NAG will be formally reviewing all ACM nutrition chapters as part of the external review process. The NAG has developed a template review form to be used to review all ACM nutrition chapters, figure 2. This template, as well as other information (1. technical papers on topics and species or taxa; 2. general feeding guidelines; 3. nutrition articles; 4. nutrition issues; 5. resource links.) are helpful in writing the Nutrition Chapter of an ACM and can be found on the NAG's website (www.nagonline.net).

Figure 1. Flow chart of development process of ACM as a whole document from AZA perspective.

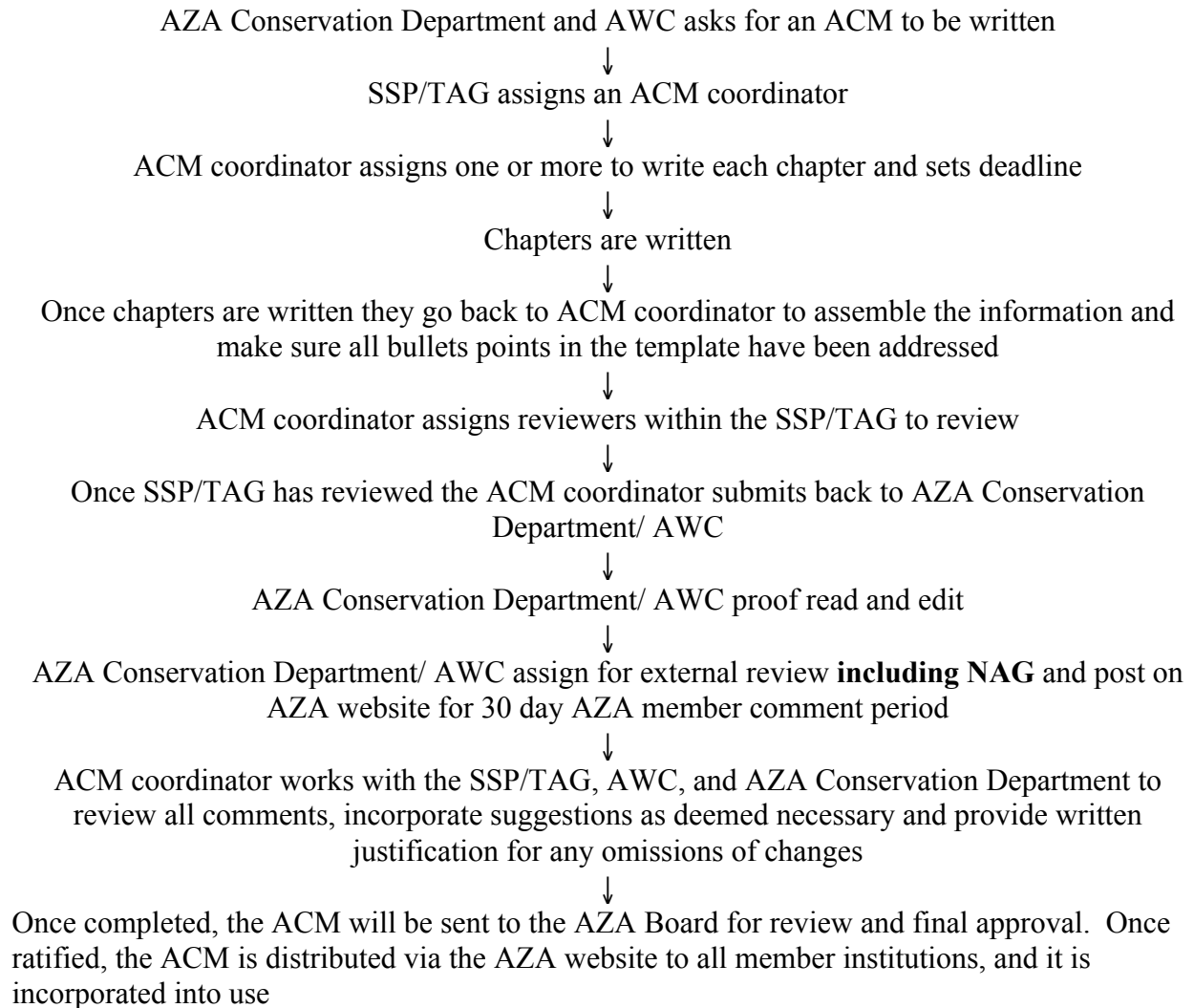


Figure 2. NAG ACM review form

**AZA Nutrition Advisory Group • Manuscript Review Form
TAG/SSP:**

Title:

Instructions to Reviewers

Guidelines established by the AZA suggest the following information be incorporated in the Nutrition sections of Husbandry documents:

- a. Feeding Schedule/Feeding Location(s)
- b. Nutrition Content of Diet
- c. Diet and Feeding Information
 - 1. Food Items
 - 2. Quantities and appropriate size of food items
 - 3. Behavior related to feeding (consumption, search, rumination)
 - 4. Stimulation of feeding behavior
- d. Hand-rearing protocol (details may refer to Infant Diet/Care Notebook)
- e. Nutrient requirement recommendations and/or guidelines (with appropriate model(s) identified)
- f. Health or other problems associated with diet

Additionally include:

- g. Literature review (including natural diet description and composition)
- h. Bibliography – cite all references used; others as available

- 1. The nutrition section should claim no more than can be substantiated with available information; interpretation should not become confused with speculation.
- 2. The nutrition section should be logically consistent and written in a clear, concise format and presented in a professional manner.
- 3. Source of all commercial products mentioned should be identified.

Reviewer's Evaluation:	Yes	No
1. Is the section technically correct?	<input type="radio"/>	<input type="radio"/>
2. Are references complete?	<input type="radio"/>	<input type="radio"/>
3. Is all recommended information incorporated?	<input type="radio"/>	<input type="radio"/>

Reviewer's Recommendations:	Content:	Style:
<input type="radio"/> Acceptable	<input type="radio"/> Accept as is	<input type="radio"/> Well written
<input type="radio"/> Acceptable w minor revision	<input type="radio"/> Revision required	<input type="radio"/> Revision req'd
<input type="radio"/> Not acceptable as written	<input type="radio"/> Unacceptable	<input type="radio"/> Unacceptable

Specific suggestions and editorial improvements (grammar, spelling, style, wording, etc.) should be made on the manuscript, or written on a separate page (attach).