Bison 2000
A Strategic Plan for Research and Development Needs of the Canadian Bison Industry

Prepared for the:
BISON RESEARCH AND DEVELOPMENT WORKING GROUP

Prepared by:
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Alberta
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AGRICULTURE, FOOD AND RURAL DEVELOPMENT

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The Bison 2000 Document:

The purpose of this document is to report the priorities of the many diverse needs of the bison industry so research agencies and industry can focus their collective resources on high priority items, avoid duplication and make commitments for long-term investigations.

This document has been circulated to 1) member organizations of the Canadian Bison Association, 2) members of the Bison Research and Development Working Group and 3) selected University and College libraries in Canada. It is also available upon request from the:

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4301 – 50th Street
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Table of Contents

Figures and Diagrams

BRADWG Research Priorities Committee – Purpose:

A committee of the Bison Research and Development Working Group (BRADWG) met in Edmonton AB on April 23, 1999. The strategic plan development committee was struck at the March 29, 1999 regular meeting of BRADWG in a manner to provide for a broad representation of the bison industry. The committee was charged with the task of finalizing a Strategic Plan for the immediate and long-term research and development of the Alberta (and if appropriate, the Canadian) bison industry. The Plan was to include statements regarding the current position of the industry, identification of current research and development needs and a prioritization of those needs. The Strategic Plan was to be prepared in a manner that industry groups, governmental agencies and researchers could utilize it in their activities to support the development of the bison industry. Version 4.0 of the Strategic Plan was accepted by the Directors of the Canadian Bison Association on June 25, 1999, as the Strategic Plan for Research and Development of the Canadian Bison industry.

Subsequently, BRADWG has only met to review the Strategic Plan. It met on December 12, 2001 at the Bison Centre of Excellence to review and update research priorities and to complete the Bison 2000 document (1st Edition). BRADWG met again June 9, 2003 for further revisions and to develop a revised (2nd) edition.

Strategic Plan Development Committee Members (1999) – Version 4.0:

Bruce Rutley	Fairview College Chair, Bison Research and Development Working Group
Brad Reinders	Peace Country Bison Association Chair, Research Committee – Canadian Bison Association
Allan Wocknitz	Alberta Bison Association Chair, Research Committee
Gorham Hussey	Alberta Bison Association Marketing and Red Meat perspective
Bjorn Berg	Lethbridge Agriculture Research Centre Alberta Agriculture, Food and Rural Development
Jennifer Aalhus	Lacombe Research Centre Agriculture & Agri-Food Canada
Marshall Patterson	Provincial Specialist – Specialized Livestock Saskatchewan Agriculture and Food
Basil Bactawar	Livestock Industry Development Specialist British Columbia Ministry of Agriculture and Food

Committee Resource:

Doug Bienert	Bison Marketing Specialist Alberta Agriculture, Food and Rural Development
Jacquie Burris	Project Coordinator – Bison Development Alberta and Peace Country Bison Associations
Diane McKenzie	Alberta Bison Association
Larissa Helbig	Student, University of Alberta

Meeting Facilitator:

BarbVanden Bosch	Organizations Specialist Alberta Agriculture, Food and Rural Development

Strategic Plan 1st Edition Committee (2002) – 1st Edition:

Bruce Rutley	Boreal R & D/Peace Country Bison Association Chair, Bison Research and Development Working Group
Robert Hudson	Professor of Wildlife Productivity and Management University of Alberta
John Church	Animal Welfare Specialist Alberta Agriculture, Food and Rural Development
Doug Bienert	Marketing Manager, Bison Alberta Agriculture, Food and Rural Development / Bison Centre of Excellence
Cathie Erichsen-Arychuk	Bison Production Specialist Alberta Agriculture, Food and Rural Development/Bison Centre of Excellence
Jill Hobbs	Professor, University of Saskatchewan
Janna van Kessel	Masters Student, University of Alberta
Tanja Schramm	Doctoral Candidate, University of Alberta
Hugh Gibbins	Doctoral Candidate, University of Calgary
Delaney Boyd	Masters Student, University of Calgary
Ellen Frombach	Branch Head, Diversified Livestock Alberta Agriculture, Food and Rural Development
Larissa Helbig	Masters Student, University of Saskatchewan
Dean Andres	Executive Director, Alberta Bison Commission
Mary-Jane Kilpatrick	Canadian Frontier Foods, Alberta Bison Association
Basil Bactawar	Livestock Industry Development Specialist British Columbia Ministry of Agriculture and Food
Wes Olson	Warden, Elk Island National Park
Jason Galbraith	Elk Production Specialist Alberta Agriculture, Food and Rural Development/Elk Centre of Excellence

Strategic Plan 2nd Edition Committee (2003):

Bruce Rutley	Boreal R & D/Peace Country Bison Association Chair, Bison Research and Development Working Group
John Church	Animal Welfare Specialist, Alberta Agriculture, Food & Rural Development
Gerald Hauer	Bison/Elk Production Specialist, Alberta Agriculture, Food & Rural Development
Jayson Galbraith	Elk/Bison Production Specialist, Alberta Agriculture, Food & Rural Development
Larissa Helbig	Diversified Livestock Specialist, Alberta Agriculture, Food & Rural Development
Basil Bactawar	Livestock Industry Development Specialist, BC Ministry of Agriculture and Food
Ray Nixdorf	Livestock Development Specialist, Sask. Agriculture, Food & Rural Revitalization
Murray Feist	Feed Industry Dev. Specialist, Sask. Agriculture, Food & Rural Revitalization
Cody Cunningham	Masters Student, University of Saskatchewan
Tyler Turner	Masters Student, University of Saskatchewan
Jag Dhanda	Professor, University of Saskatchewan
Kim Sanderson	University of Saskatchewan
Mark Silzer	Saskatchewan Bison Association
Richard Bintner	Saskatchewan Bison Association
Marshall Patterson	Saskatchewan Bison Association
Adele Boucher	Peace Country Bison Association
Jerry Haigh	Western College of Veterinary Medicine
Robert McCorkell	Western College of Veterinary Medicine
Wes Olson	Warden, Elk Island National Park
Vern Anderson	Animal Scientist, Carrington Research Extension Centre, North Dakota State University

Mission Statement – BRADWG

To provide direction so research within the developing bison industry can occur in a timely, efficient and logical manner in order to preserve the uniqueness and holistic nature of the bison while encouraging expansion and maintaining profitability.

Terms of Reference for Research and Development:

The Canadian Bison Industry:

- recognizes the need for market and production related research,
- will prioritize market and production related research and development needs,
- will collaborate with governmental agencies to meet its development needs,
- will identify and support initiatives that address both short and long-term needs,
- will support initiatives that address the industry's needs by providing:
  - funds (on a limited basis)
  - letters of support to research proposals
  - in-kind contributions in a manner that satisfies the project's needs and maximizes matching funds
  - active participation in the Bison Research and Development Working Group,
- will continue to explore methods of increasing its share of financial contributions for market and production related research and development.

Bison – an Emerging Growth Industry:

Background:

Since the late 1800's, when the species was rescued from extinction, bison have been ranched to preserve the species or for personal enjoyment. Recent commercial bison production has expanded, due in part to **1)** a changing demand for lean red meat, **2)** a new level of maturity associated with bison management, **3)** a threshold level of breeding stock, and **4)** a positive economic outlook for the industry.

Bison are managed in a manner similar to cattle. However, they retain many of the characteristics of wild ruminants. They exhibit severe stress when confined, they rut, and they are adapted annual grazers with seasonal cycles for growth and metabolism.

Recent Developments

In the decade of the 1990's, the bison industry experienced tremendous growth (approximately 25% annually in Canada and 15% in the USA). The Canadian bison herd reached its predicted size of 100,000 head by the year 2000. The number of ranch operations also expanded rapidly, growing from less than 200, to more than 1200 operations during this period.

The commercial bison industry's access to sustainable markets is still unfolding. Premium prices for breeding stock that were evident at the end of the 1990's years have been significantly discounted in the past 24 months. Meat prices have also been discounted in an effort to develop new markets. Newly emerging disease issues (primarily Malignant Catarrhal Fever) has captured the bison industry's attention. New research initiatives have resulted. Bison production technologies remain insufficiently researched, consequently many production and marketing techniques used for bison continue to be adapted from the livestock industry instead of developed specifically for bison.

There remains a great demand for information from all levels of the industry, including producers, retailers and restaurateurs. Two initiatives addressed this demand: **1)** the Bison Centre of Excellence was established by the Alberta and Peace Country Bison Associations in collaboration with Alberta Agriculture Food & Rural Development, and **2)** the Canadian bison industry hosted the IBC 2000 – Bison Are Back International Bison Conference in Edmonton, AB, in August 2000 which in part addressed the need to address the emerging market issues.

Cooperative industry development programs exist at many levels. Most provincial governments have assigned staff to assist with bison industry development while the federal government and the national producer association (the Canadian Bison Association) have collaborated on numerous issues including disease control initiatives, the establishment of a federal grading system, and production research. The Peace Country Bison Association in collaboration with Northern Alberta Development; Alberta Agriculture, Food and Rural Development; Agriculture & Agri-Food Canada – Research Branch and Prairie Farm Rehabilitation Administration; and the North Peace Applied Research Association established the Ft. Vermilion Long-Term Grazing Pasture as part of a research and development initiative. The facilities were established to provide a base for long-term grazing related research initiatives.

The Need for Research:

The prioritization of research and market development needs was initiated by BRADWG in 1999. Since that time funds have been allocated for bison research and development. Funding has been assigned for the bison industry within Alberta (various programs including the Diversified Livestock Fund of Alberta) and in Saskatchewan (University of Saskatchewan; Saskatchewan Agriculture and Food; Western College of Veterinary Medicine). Industry has ensured its ability to contribute by implementing a system of collecting funds for market research with the establishment of the Canadian Bison Marketing Foundation (Alberta Bison Commission within Alberta). In addition, the Canadian Bison Association bison research committee has recently obtained a substantial contribution from the IBC 2000 Bison Are Back residuals.

With a source of sustainable funds for market and production related research and development becoming a reality, the Canadian bison industry is poised to significantly benefit from a sustained strategic planning process to guide its research and development activities. That is the Mission of BRADWG – to set those priorities and to communicate them to the bison and research communities.

The purpose of this document, therefore, is to report the priorities of the many diverse needs of the industry so that research agencies and industry can focus their collective resources on high priority items, avoid duplication and make commitments for necessary long-term investigations.

Purpose of Research:

Research within the bison industry needs to be conducted to meet the industry's twin long-term objectives:

1. Growth of the commercial bison industry to attain world status as a marketable and economic food protein source, and
2. Conservation of bison species for public benefits.

Research can serve both short-term and long-term objectives. In the short-term, research is used to solve a current problem or to promote products. It can also provide a stopgap while long-term initiatives are undertaken. Because of the length of time associated with long-term research initiatives, a strategic approach is required. Research resources are limited. By concentrating on key 'pinch points' and developing an integrated and collaborative research strategy, the bison industry will be able to achieve maximum gain.

Planning Research*:*

The first step in organizing a research agenda for the bison industry is to understand the current status of the industry. This includes an understanding of knowledge gained from previous research and development work and an articulation of future goals. The second step is to identify areas that need further development complete with a determination of the factors that have the greatest impact on these areas. The third step is to set priorities on identified areas. The BRADWG Strategic Plan identifies bison industry needs and integrates these priorities with the physical, human and financial resources available for bison research and development. Opposing and complementary goals can be accommodated within the research strategy by focusing on needs that are common to those goals.

Research Selection Criteria:

The following criteria will be considered when making decisions to support any given research proposal:

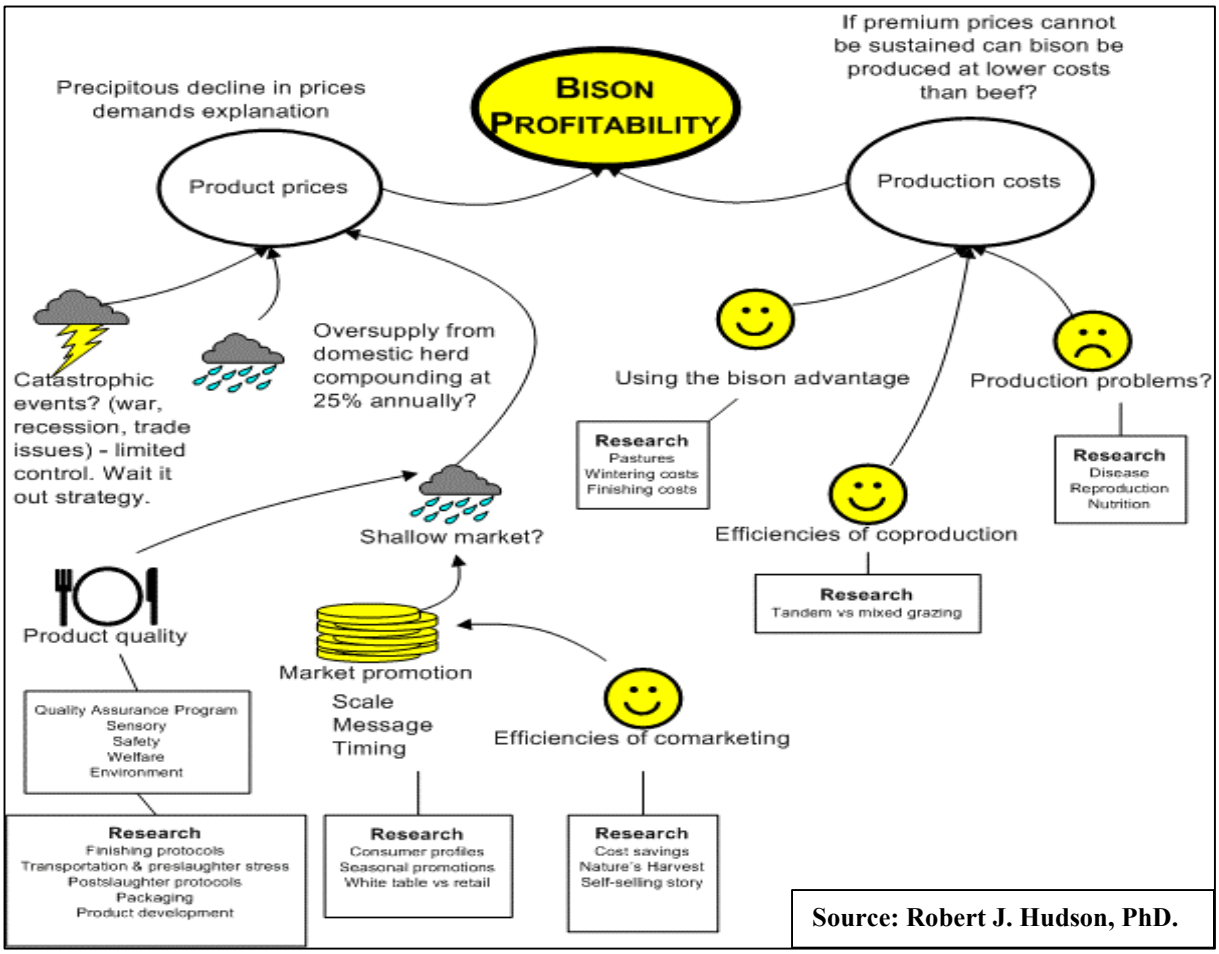
- cost / benefit of project
- benefit to the industry
- impact on / relationship to other industry issues
- addresses a key issue or "pinch point" for the industry
- degree to which it helps maintain the distinctiveness and uniqueness of the industry/ product e.g. natural, holistic approach
- impact on global marketing of industry / products
- implications for food quality and safety

Determining Research Priorities:

Research Question Decision Tree:

The research question decision tree (Figure 1) is designed to aid in identification of critical research questions and topics and to enable industry and researchers to better direct limited funds to critical research areas. Industry is encouraged to address and review these key questions regularly.

Figure 1. Research question decision tree for the bison industry.



Bison Research and Development Needs and Priorities:

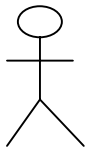
Categories of Industry Needs:

While the 'pasture to plate' continuum is catchy, it does not adequately describe the complete continuum, i.e. post consumption aspects of human nutrition. Also, industry needs do not adequately address the non-commercial bison research needs. Thus, current bison research and development needs are considered within five major categorizations:

A. Marketing, Economics and Overlap.

B. Production

C. Product



D. Human

E. Bison Issues

Flow diagrams have been developed with key research needs identified at strategic steps within the continuum. These provide a visual summary enabling the reader to quickly identify research needs, highest priorities and areas on which the industry will concentrate for the next year. For example, eight steps have been characterized between pasture and plate, while five characterizations of factors that impact these steps are identified and displayed (see Diagram #2). Flow diagrams associated with each category are presented. Categories are grouped within diagram for ease of presentation, not by priority. Needs identified as high priority have been shaded grey on the flow diagrams.

Describing needs holistically was preferred as categorization breaks the whole. However, describing needs only in terms of the whole impedes one's ability to focus on specific needs. Therefore, for the purpose of listing needs and assigning priorities the following thirteen categories will be used. These categories were chosen deliberately to provide for consideration of needs related to the whole (systems), specifics (within disciplines) and any 'overlap' that exists. For ease of presentation, needs and priorities have been tabulated. Needs within each category are expressed generally or as specific research questions. Please note that the needs have not been ranked. Researchers are encouraged to develop specific research questions within general topic areas.

A. MARKETING, ECONOMICS AND OVERLAP
I. MARKET DEVELOPMENT AND MARKETING
II. PASTURE TO PLATE EFFICIENCY
III. ANIMAL BEHAVIOUR AND WELFARE
IV. ECONOMICS / AGRONOMICS

B. PRODUCTION
I. LONG-TERM PRODUCTION
II. ANIMAL HEALT
III. ANIMAL NUTRITION
VI. REPRODUCTION
V. GENETICS
VI. FINISHING – FACTORS AFFECTING MEAT QUALITY

C. PRODUCT
I. MEAT QUALITY
II. PRODUCT PRESENTATION

D. HUMAN

E. BISON ISSUES

A: MARKETING, ECONOMICS and OVERLAP

I. MARKET DEVELOPMENT AND MARKETING (Diagram 1)

Development of sustainable markets for red meat and breeding stock are paramount to consistent and steady industry growth. Obtaining insights and answers to questions related to domestic and export markets, development of new products and marketing by-products, for example, are important to the long-term development of the industry.

a. Product Promotion/Consumer Awareness and Education (marketing a good practice industry, positive images)	High priority Short & long-term
b. Marketing Live Animals e.g. breeding stock	Low priority Short & long-term
c. Marketing Meat (including current & new products)	High priority Short & long-term
d. Marketing By-products	High priority Short & long-term
e. Investigating Export and Domestic Markets (tariff barriers)	Low priority Short & long-term
f. Understanding the bison market (consumer preferences)	High Priority Short-term

II. PASTURE TO PLATE EFFICIENCY (Diagram 2)

Profitability in commercial bison production revolves around efficient, effective and sustainable production and marketing systems with a "big picture" or holistic focus. Production systems are encompassed in this category. The industry can develop a red meat market system that is a) similar to other red meat industries - continuous finish and entry into the fresh meat market, b) exploit the seasonal nature of bison with seasonal markets or c) exploit seasonal finish but develop a storage and controlled release into the red meat market (cryovaced product) programs similar to the apple industry.

a. Model of/for sustainability	High priority Short & Long-term
b. Seasonal production systems	High priority Short & Long-term

III. ANIMAL BEHAVIOUR AND WELFARE (Diagram 3)

An animal's behaviour is an outward manifestation of its ability to grow and reproduce. Animals that are comfortable or unstressed produce more and reproduce more often, an economic incentive for ranchers. Issues of animal welfare will continue to grow and should be expected to have an impact on the commercial production of a 'wild' animal like the bison.

a. Recording and working with Natural Bison Behaviour e.g. computerized feed and weigh station tool	High priority Short & long-term
b. Development of New and / or Application of Existing Technologies to Bison (trace-back technologies)	High priority Long-term
c. Best Management Practices (Animal Welfare issues) Code of practice issues (related to Category A I a)	High priority Long-term

d. Transportation and slaughter protocols	High priority Short-term

IV. ECONOMICS /AGRONOMICS (Diagram 1)

Commercial exploitation of bison does not mean that the industry has to adopt the same models of breeding, feeding, finishing, and retailing as existing red meat industries. The advantage bison currently have is a production and market niche that gives it a high value. Competing directly with the other production sectors may or may not be in the industry's long-term best interests.

a. Cash costs of production (determine and recommend optimum)	High-priority Short-term
b. Backgrounding before finishing (western) vs. wean direct to feedlot finishing	High priority Long-term

B: PRODUCTION

I. LONG-TERM PRODUCTION (Diagram 4)

This category was identified to address questions related to long-term aspects of production like factors affecting lifetime productivity. It is expected that questions under this category will be very long-term. The need to begin these types of projects sooner rather than later has been identified.

a. Lifetime Productivity	Low priority Long-term
b. Systems e.g. handling, fencing	Low priority Long-term
c. Economics- alternatives, competitive intelligence, modeling (macro and strategic)	High priority Long-term

II. ANIMAL HEALTH (Diagram 4)

Issues of animal health tend to dominate research and policy initiatives. They can be broken into five groups, depending on the immediate need for answers, for the control of contagious disease or the management of disorders. In addition there is a commercial value to disease control that should be recognized separately.

a. Emerging Diseases: e.g. Malignant Catarrhal Fever and Johne's Disease	High priority, Short & long-term
b. Existing Diseases	
▪ Reportable - brucellosis, blue tongue, anthrax, tuberculosis: ▪ Risk Management and Mitigation (related to Category E d)	High priority, Short & long-term
▪ Production - IBR, BVD, pinkeye, and shipping fever:	Medium priority Short & long-term
c. Nutritional Disorders- bloat, grain overload, acidosis	Low priority Long-term
d. Product Approvals- labeling (related to on-farm food safety) (e.g. drug residues)	High priority Long-term

III. ANIMAL NUTRITION (Diagram 3)

A unique feature of bison production is that it is viable with a year-round reliance on forage resources. Several things are not known about bison, including their efficiency on pasture, their need for supplemental feeds, and the adaptations of their physiology to feed sources and climate. If protein is the commercial end product, then the industry needs to know how to produce it.

a. Suitability of Forages i.e. summer/winter, bulls/heifers e.g. long term grazing study – persistence	High priority Long-term
b. Rumen Function / Profile-microbial, enzyme	Low priority Long-term
c. Nutrient Requirements-vitamins, minerals, protein, energy...	High priority Long-term
d. Animal Physiology- protein, water, urine...	High priority Long-term
e. Nutritional Requirements for reproduction, maintenance, growth and finishing- by gender, age and season	High priority Long-term
f. Function/benefit of non-natural feed additives/ hormones	Highly unlikely Long-term

IV. REPRODUCTION (Diagram 4)

Although generally, there is little desire within the industry to over manipulate reproduction and to apply reproduction technologies to bison, the need to establish basic reproductive function remains. On the production level, pregnancy and calving rates are accepted as over 85% when adequate forage resources are available to the breeding herd. Therefore, reproduction has been deemed to be low priority.

a. Nutrient requirements for reproduction for heifers, cows and bulls	Medium–high priority Long-term
b. Breeding ratios	Low priority Short & long-term
c. Male fertility semen quality in multi-sire breeding systems	High priority Short & long-term
d. Reproductive function of females drop off during breeding season	Medium priority Long-term
e. Assisted reproductive technologies	Low priority Long-term

V. GENETICS (Diagram 4)

Two major areas of research have been identified under this category. First, examination of the extent and diversity within the existing gene pool. Many questions remain around wood and plains bison and park bison. Secondly, applying genetic marker techniques for identification of parents is possible. Application on a commercial scale has been considered a medium priority.

a. Identification of Genetic Pool -definitive traits, wood vs. plains bison, black vs. brown, aggression & docility, contribution to conservation programs (related to Category E a)	High priority Short & long-term

b. Parentage ID — High priority, Short-term

VI. FINISHING – FACTORS AFFECTING MEAT QUALITY (Diagram 5)

As the bison industry is a red meat industry, the development of the industry is dependent on its ability to prepare animals for slaughter. The grain-fed aspect of the industry is developing along two lines – placed on feed immediately from weaning or backgrounding before finishing. Alternately, considerable interest in grass-fed finishing exits. As the industry is currently producing animals for slaughter, the percentage of animals attaining A grade is lower than expected. Therefore, immediate needs are focused on questions related to grading vs. production. Impact of feeds and feeding on meat quality are also of interest.

a. Grass-fed vs. Grain-fed and others on Meat Quality and Taste — High priority, Short & long-term

b. Grading System – particularly, market weight, age and gender — High priority, Short & long-term
- relationship between grade and meat quality

C: PRODUCT

I. MEAT QUALITY (Diagram 6)

Bison meat markets are at an early stage of development and previous price premiums are severely challenged. It is extremely important to identify, protect and enhance bison's inherent advantages of distinctive flavour and nutrition for the consumer. Food safety and a perception of "naturally produced" are also important attributes that will help maintain and build a market niche for bison in the competitive race for protein food purchases.

a. Pre and Post Slaughter Treatments on Meat Quality — High priority, Short & long-term

b. Consumer acceptance — High priority, Short & long-term

c On-farm food safety programs (HACCP) — High priority, Short & long-term

- Residues - drug and pesticide residues
- Identification – pasture to plate ID (tracability)
- Safety - incidence of E. coli in bison meat

d. Feeding and management for Meat Quality (impact of feed on meat quality) (related to Category B VI a) — High priority, Long-term

e. Grain-fed vs. Grass-fed bison (related to Category B VI a) — Medium priority, Short & long-term

II. PRODUCT PRESENTATION (Diagram 6)

Competing in the red meat market requires, in addition to a high quality product, high quality product presentation in order to command premium prices. Determination of suitable packaging technologies, consumer cut-out preferences and market profiles are required.

a. Needs/Profile of the Global Market and the Domestic Market - plus the segments within each of these markets, based on geography, socioeconomic, values and their preferences for meat characteristics — High priority, Short & long-term

b. Processing and New Product Development (related to Category A I c)	High priority Short & long-term
c. Packaging technologies/protocols	High priority Short-term
d. Cutout: - as related to marketing (related to Category A I c&f) - as related to value-added/convenience products	High priority Short & long-term

D: HUMAN (Diagram 6)

Projects that will address research questions designed to determine the benefits of bison on human health and nutrition are needed. Some work has been completed on bison nutritive profiles, but flavour profiles and health attributes need attention. Related topics will also be considered. Questions associated with the associations business could also be considered under this category.

a. Flavour Profile of Meat (related to finishing protocols)	High priority Short & long-term
b. Nutrition Profile of Meat Omega 3 fatty acids, etc	High priority Short-term
c. Nutritional needs of persons and or Cultural Communities e.g. bison meat as a source of protein for persons with diabetes, cancer, allergies	High priority Short & long-term

E: BISON ISSUES (Diagram 1)

Topics included within this category include but are not limited to conservation of wood bison in the wild, identification of critical bison habitats, cultural significance of wild bison, disease issues in wild bison and risk management. Although research topics for this category are identified, they have yet to be prioritized.

a. Conservation of North American bison - Recovery Projects
(gene pool identification – related to Category B V a)

b. Critical Wild Bison Habitats

c. Bison and Cultural Issues

d. Disease – Risk Management and Mitigation (related to Category B II b)

e. Education
(school curricula; park programs – conservation and industry; health care professionals; chefs and cuisine programs)

Industry Actions:

Continuing Recommendations:

The Canadian bison industry needs a sustained strategy to direct its research and development activities. The Bison Research and Development Working Group recommends the following actions for the industry to achieve a sustained research and development strategy.

1. Utilize BRADWG as the coordinating committee for identification and prioritization of research and development needs of the Canadian bison industry.
2. Link the outcomes of BRADWG with the Canadian Bison Association (CBA) through the Chair of the CBA Research Committee.
3. Ensure that BRADWG identifies research needs and prioritize on an regular basis
4. Report research results in conjunction with the annual listing of research needs.
5. Assist individual researchers with grant applications.
6. Provide letters of support for qualified projects or provide funds as required.
7. Use existing funds as judiciously possible by leveraging funds from other sources.

Canadian Bison Association Research Committee:

The Canadian Bison Association Research Committee has been in operation since the early 1990's. Requests for research funding and or letters of support should be addressed to:

CBA Research Committee,
c/o Executive Director,
Canadian Bison Association
Regina SK S4P 3G7
Tel: 306-533-4766
e-mail: cba1@sk.sympatico.ca

The Bison 2000 Document:

The purpose of this document is to report the priorities of the many diverse needs of the bison industry so research agencies and industry can focus their collective resources on high priority items, avoid duplication and make commitments for long-term investigations.

This document has been circulated to **1)** member organizations of the CBA, **2)** members of BRADWG and **3)** selected University and College libraries in Canada. It is also available upon request from the:

Alberta Bison Centre
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Leduc, AB T9E 7H3
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Diagram 1. Market Development and Marketing - Economics / Agronomics - Bison Issues

Market development

- Product promotion / consumer awareness
- Investigating export and domestic markets
- Understanding the bison market

Economics / Agronomics

Marketing

- meat
- current and new products
- breeding stock

Bison Issues (not prioritized)

- Conservation of North American
- Critical Bison Habits
- Bison and cultural issues
- Disease - Risk Management & Mitigation
- Education

Priorities are highlighted in grey

Diagram 2. Pasture to Plate Efficiency

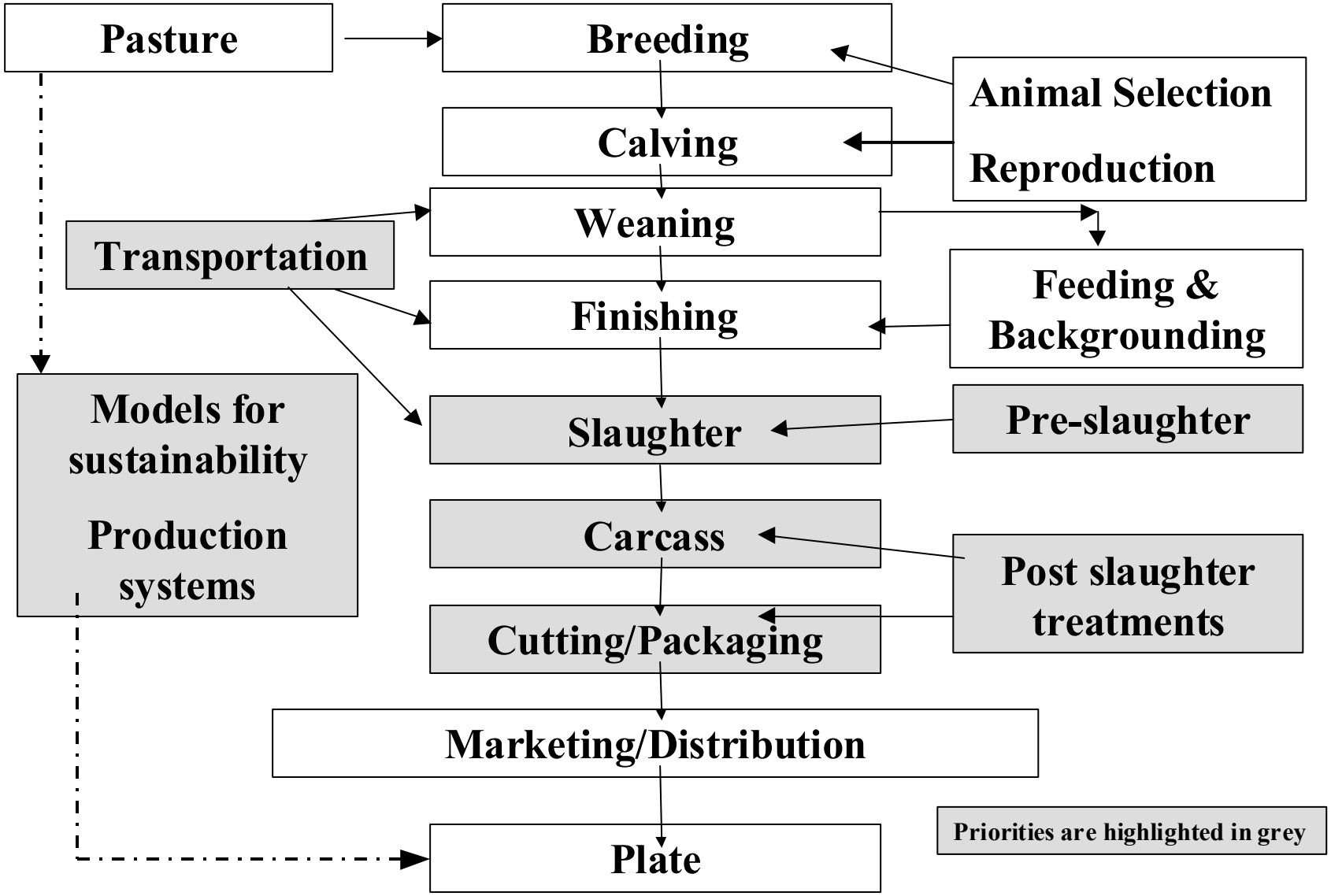


Diagram 3. Animal Behaviour - Welfare - Nutrition

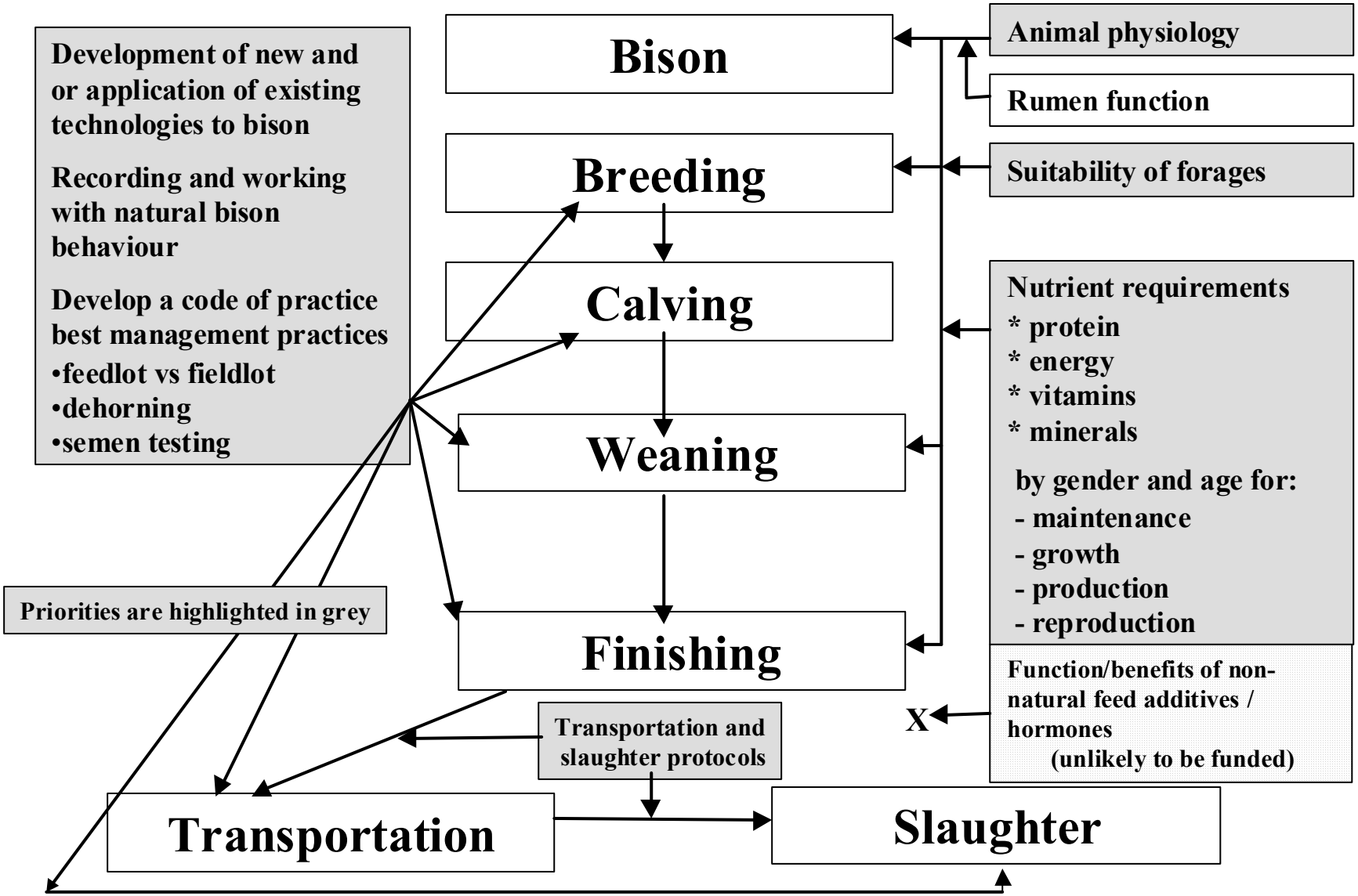


Diagram 4. Long-Term Production - Genetics - Reproduction - Animal Health

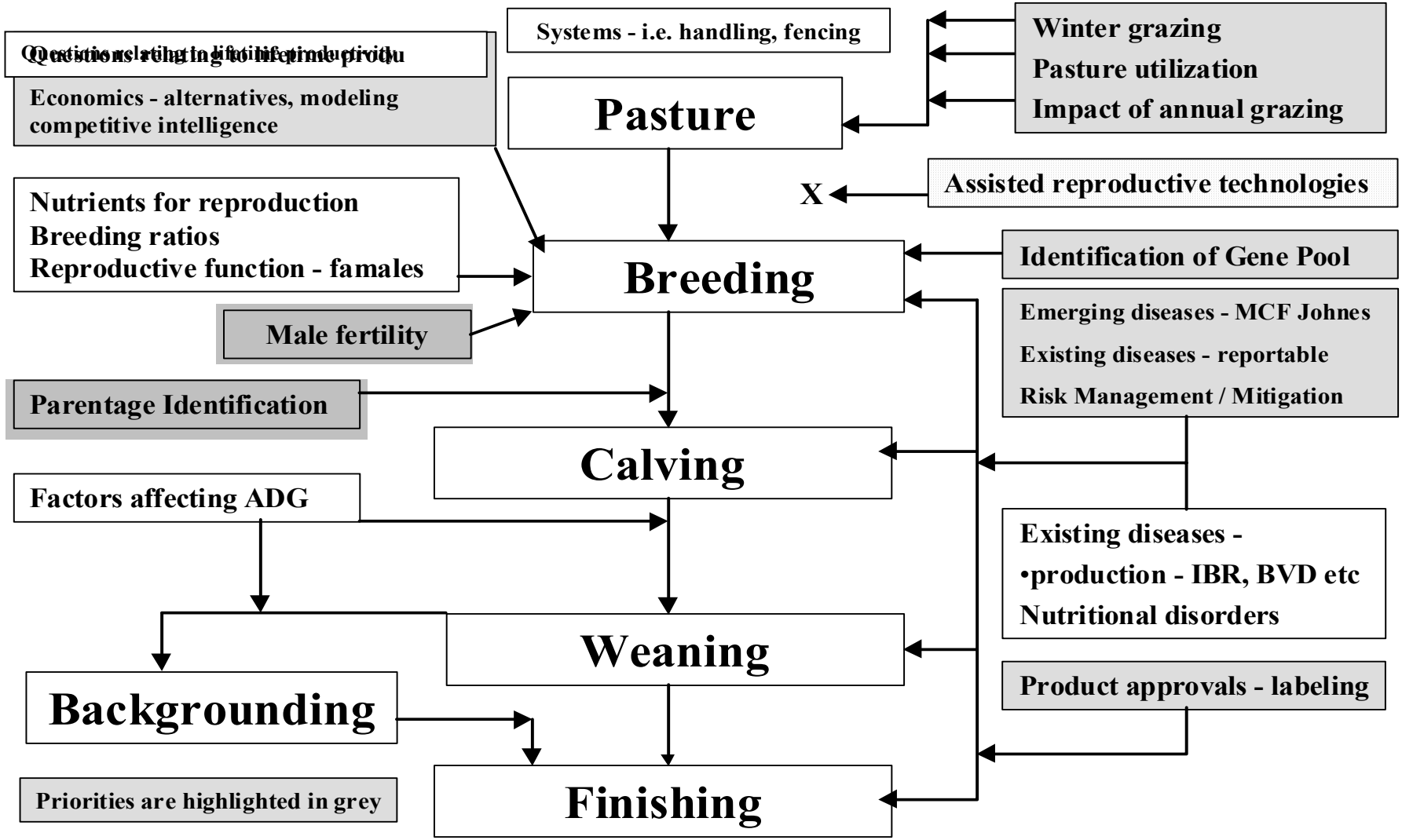


Diagram 5. Finishing and Factors Affecting Meat Quality

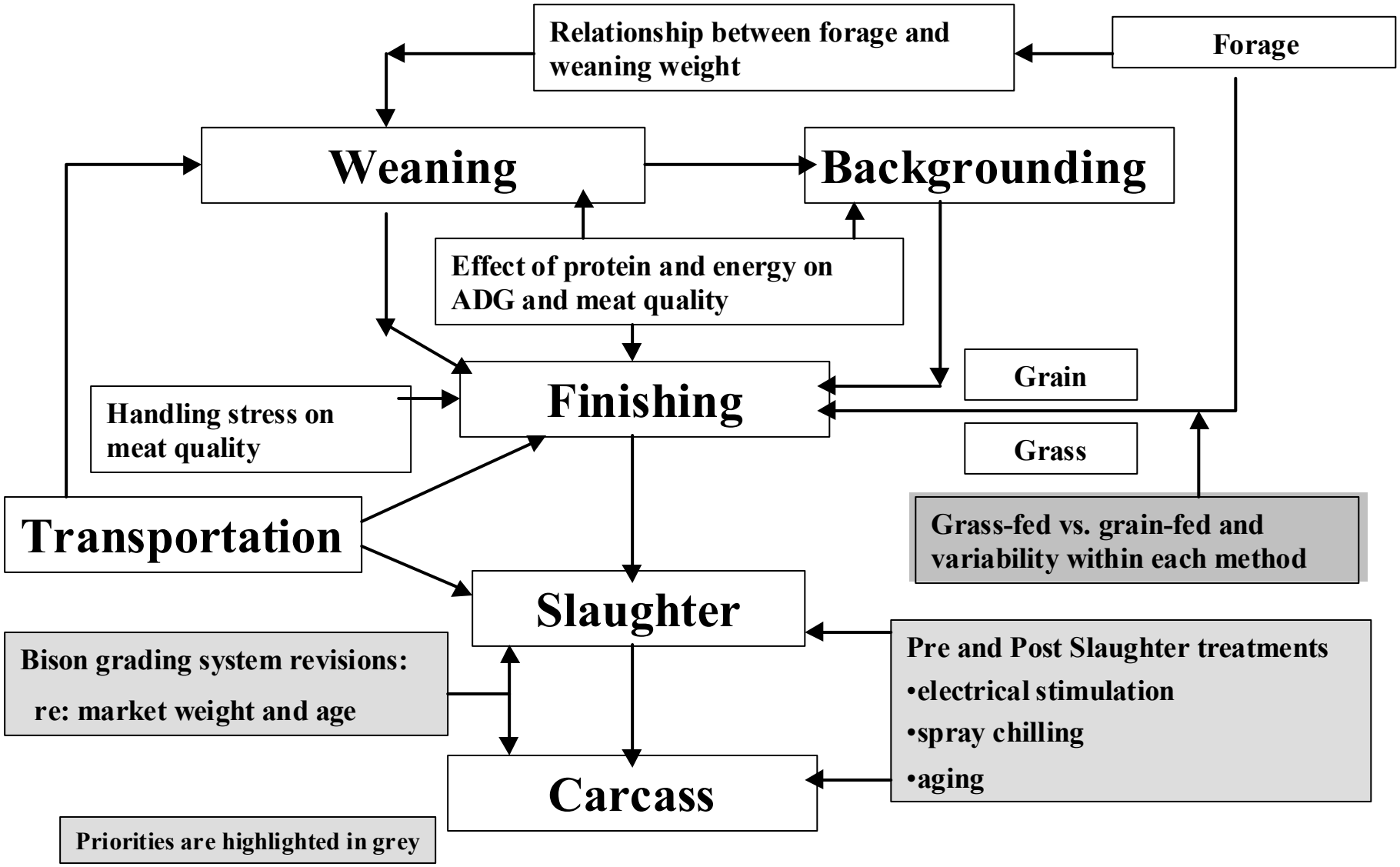
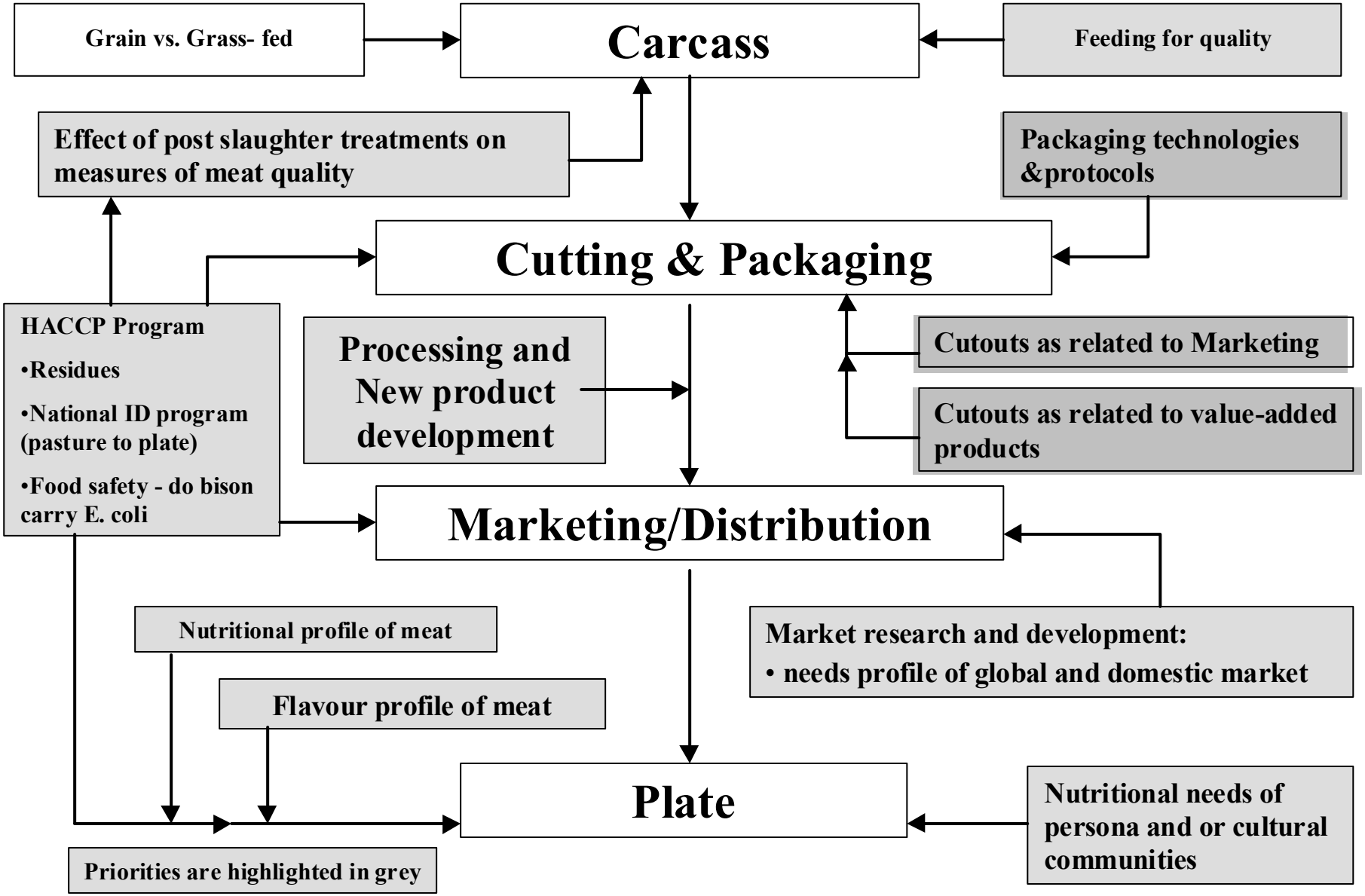


Diagram 6. Meat Quality - Human



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