

# Valencia Strategy: Building Capacity for Collaboration on Beluga Research

The First International Workshop on Beluga Whale Research,  
Husbandry and Management

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# **Valencia Strategy: Building Capacity for Collaboration on Beluga Research**

## **Preamble:**

This workshop was convened specifically to encourage the collaboration between people who work with belugas in wild and aquarium settings. This is an important goal in light of article 9 of the Convention on Biological Diversity, which states that *ex-situ* institutions should contribute to complement *in-situ* measures of conservation and sustainable use of biodiversity. We recognize there is tremendous potential for the sharing of information and samples as well as to provide opportunities to test, refine and calibrate research techniques. This workshop has taken the first steps towards promoting such collaboration and we would like to encourage continued work in this direction in the coming months and years. Therefore we have outlined a two part document that provides ideas, first for building the capacity for collaboration, and second, to suggest potential areas for collaborative research.

While this workshop began with a focus on collaborative research, it has catalyzed a similar effort in the field of public education. This is a particularly important time to facilitate collaborative research and public education regarding beluga whales given the rapid changes occurring in their Arctic environment due to climate change, expanded human exploitation of Arctic resources, and increases in shipping, fishing, and development. Decision-makers and the public must become better informed about the effects their actions have on the Arctic environment, and this requires our continued effort in research and public education. While facilitating better collaboration between our respective communities is our immediate goal, our ultimate goals are to promote the long-term sustainability of beluga populations in the wild and to maintain a healthy, self-sustaining population of belugas in public aquaria that can aid in our research and public education efforts.

## **A.- Building Capacity for Collaboration:**

- 1. Building capacity for communication (networking) and sharing information (ideas, who's doing what studies, publications, data)**
  - a. Part One:
    - i. Establish a secure website with contact information for each beluga collaborator (start with workshop participants)  
*Lead people: Vancouver Aquarium and Pierre Richard*
  - b. Part Two:
    - i. Expand website to include information on who is doing what, people's interests and publications, information on sampling procedures and archiving, data sharing, index of collaborative studies in progress, ideas about potential collaborative work, etc.

2. **Sample collection, preservation and archiving – techniques, standardization, storage and retrieval, and system for gaining access**  
*Lead people: Greg O’Corry Crowe, Tracy Romano, Christina Lockyer; and Cheryl Rosa*
3. **Strive to share methodologies and facilitate comparable data sets**
4. **Potential opportunities for building relationships and trust (basis of collaboration)**
  - a. Schedule of joint meetings (e.g. at marine mammal meetings)
  - b. Next workshop in four years: *hosted by SeaWorld (U.S.)*
  - c. Exchange program between aquaria and fieldwork settings (researchers, hunters, northern community members, husbandry staff, educators)
  - d. On-line communication on environmental data concerning the natural conditions of wild populations from where aquarium belugas originated

## **B.- Potential Areas for Research Collaboration**

1. **Standardized Sampling and Necropsy Procedures**
  - a. Native hunts
  - b. Aquarium setting / ocean pen setting
  - c. Satellite telemetry live capture and release of belugas (e.g. IPY – Pan Arctic Tagging of Beluga Whales PATOB)
  - d. Ice entrapment events (e.g. Husky Lakes; Be prepared to rapidly respond to other such events)
  - e. Methodologies and techniques for the archiving of tissues from aquarium, hunted, and stranded animals in order to establish a collection of multiple samples for various tests
2. **Testing Techniques and New Technologies**
  - a. Test, refine, calibrate, ground-truth research techniques (e.g. aging, fatty acid analysis)
  - b. Test new technology (e.g. electronic stomach pills that send signal about temperature indicating feeding; acoustic data loggers; oceanographic satellite tags, etc.)
  - c. Test non-invasive attachment techniques and design (hydrodynamics) on aquarium belugas
  - d. Share data on sedation/chemical immobilization techniques on aquarium belugas for potential application on wild ones
3. **Aging Animals**
  - a. Tooth Growth Layer Groups GLGs (especially with known age animals in aquaria; animals administered with tetracycline at known intervals)

- b. Eye lens – Aspartic acid isotope racemization calibration (eyes from newborn calves and from belugas from all known ages)
- c. Telomere degradation

#### **4. Natural Mortality**

- a. Investigate and keep records of causes of natural mortality of aquarium belugas (in particular of calves born in aquarium settings) and make this information available to those who work with wild belugas

#### **5. Reproductive Biology**

- a. Sample reproductive tracts or gametes from harvested animals or deceased aquarium animals
- b. Study reproductive behaviour and biology of all breeding aquarium belugas and compare with similar data from wild; compare methods or estimating reproductive parameters

#### **6. Feeding Behaviour and Ecology**

- a. Feeding physiology and energetics
- b. Fatty acid analysis of prey species and beluga blubber
- c. Analysis of Carbon and Nitrogen isotopes (and other isotopes) from blood and other tissues in feeding versus fasting conditions (blubber and muscle use for energy)
- d. Stomach contents analysis
- e. Stomach pills (remote sensing of temperature to indicate cold fish-filled stomach – feeding frequency and intervals)
- f. Field observations of beluga feeding behaviour (seasonality of feeding; feast or famine; prey types)
- g. Observations of aquarium feeding behaviour

#### **7. Health**

- a. Body condition indices developed
  - i. Girth measurements in different areas standardized
  - ii. Blubber thickness (depth-measurement or ultrasound)
  - iii. Lipid content of blubber (indicates quality of blubber)
  - iv. Photographic indices (e.g. photo of back of head-neck or lower back to show how skinny or fat a whale is)
  - v. Seasonal variation of body condition in different study populations (some feed in winter, others feed in summer; weight or appetite changes or in aquarium animals through seasons)
- b. Comparative studies of beluga health in the context of:
  - i. Odontocete health
  - ii. Cetacean health
  - iii. Marine mammal health
  - iv. Mammalian health
  - v. Human health (e.g. St. Lawrence aluminium plant workers – belugas as sentinels of human health)

- c. Contaminants/emerging chemicals of concern
- d. Cancers/etiology of cancers/potential causes of cancers
- e. Infectious diseases/emerging diseases
- f. Sharing of data on blubber biopsies performed on aquarium belugas for fatty acid/diet studies

## **8. Acoustics**

- a. Impacts of anthropogenic noise on beluga health (hearing and stress), behaviour, social interactions, and foraging efficiency
  - i. Seismic explosions (oil and gas exploration and development, drilling rigs)
  - ii. Shipping/icebreakers (supply traffic, eco-tourism, and others types of shipping)
  - iii. Outboard motors
  - iv. Active sonar
- b. Impacts of above (a.) on prey populations, particularly fish
- c. Acoustics as potential indicator of behaviour, social interactions and health of aquarium animals
- e. Acoustics as potential indicator of presence/absence, seasonality and distribution

## **9. Genetics**

- a. Test pedigree markers on aquarium animals of known relations
- b. Test telomere degradation techniques on aquarium animals of known age
- c. Test aquarium animals to determine from which population they originated if records are uncertain; test wild population for genetic stock identification (i.e. Russian beluga stocks from which all current aquarium belugas are collected)
- d. Test the use of genomic technology to investigate genetic aspects of health and fitness and to monitor effects of environmental change