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COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

INTERGOVERNMENTAL TECHNICAL WORKING GROUP ON AQUATIC GENETIC RESOURCES FOR FOOD AND AGRICULTURE

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OUTLINE OF GUIDELINES ON GENETIC MANAGEMENT IN STOCKING PROGRAMMES

The Intergovernmental Technical Working Group on Aquatic Genetic Resources for Food and Agriculture (Working Group), at its Second Session in 2018, recommended the development of voluntary guidelines and frameworks on a series of issues including on stock enhancement.¹

This document presents the outline of guidelines on genetic management to be applied to the stocking of hatchery-raised farmed types for deliberate release into open waters, both marine and inland. Content development for these guidelines is underway and is part of FAO's activities in follow-up to the adoption of the *Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture*. The guidelines will support countries in implementing strategic priorities 2.1, 2.3, 2.4 and 2.5 as summarized in the document *Status of the Implementation of the Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources*.²

The guidelines currently being developed by FAO on the basis of the outline contained in this document cover stocking, which may be carried out under different rationale including for fisheries, for conservation, or to support ecosystem services, and for different specific purposes including stock establishment, stock enhancement, restocking and ranching. The guidelines do not consider stocking for the purposes of aquaculture. They stress the importance of risk assessment and management to identify the appropriate genetic management strategies for the various rationale and purposes of stocking. The guidelines target stakeholders in aquatic genetic resources (AqGR) including policy makers, fisheries and resource managers and conservationists.

¹ CGRFA/WG-AqGR-2/18/Report, paragraph 25.

² CGRFA/WG-AqGR-4/23/3, paragraph 16.

Outline

Executive Summary

Glossary

1. Introduction

Wild relative aquatic genetic resources (AqGR), some of which are under threat for various anthropogenic and natural reasons, can be impacted both positively and negatively by stocking programmes utilizing hatchery-reared stock. Such programmes can have long-term implications for the genetic status of wild relative AqGR. It is necessary to proactively consider genetic resource management plans to optimize the benefits and/or minimize the potential harm of stocking programmes. The genetic management of farmed types for restocking is necessarily different from that used for aquaculture and plans must respond to different drivers.

Two international instruments that can shape guidance on genetic management of stocking are:

- The Code of Conduct for Responsible Fisheries
- The Global Plan of Action for the Conservation, Sustainable Use and Development of Aquatic Genetic Resources for Food and Agriculture

2. Scope of the guidelines

The guidelines cover genetic resources management in stocking of hatchery-raised farmed types, at various stages of their life cycle, for deliberate release into open waters (natural or modified) for any purposes, except for the purpose of aquaculture.

3. Objectives of the guidelines

To provide practical genetics-related advice to policy-makers, conservationists, hatchery, fishery and resource managers, on how to responsibly and sustainably use AqGR in stocking programmes for fisheries enhancement, recreation, ecosystem rehabilitation and conservation. The guidelines should be considered when planning or reviewing any such stocking activities.

4. General genetic principles of stocking

Hatchery-reared organisms adapt to the hatchery environment, both behaviourally and physiologically and, over generations, genetically, and it is important to understand the implications of both forms of adaptation. Genetic adaptation in particular can have significant impacts on the genetic status of wild relatives when adapted farmed types are used in stocking programmes, particularly where the stocked population is large relative to the receiving population. This section explores the impacts of various elements of the hatchery system and identifies mitigation measures to minimize impacts.

4.1 Rationale and objectives for stocking

This section examines the genetic implications relative to the different rationale for stocking including in support of fisheries or conservation or in support of ecosystem services. The section further examines the issues and impacts for different specific purposes of stocking programmes covering stock establishment, restocking, stock enhancement and ranching.

5. Guidelines for genetic resource management

This section provides guidance and recommendations on specific elements of restocking programmes covering:

- Genetics and the benefits of stocking
- The importance of baseline information
- Risk analysis
 - Harm identification
 - Genetic risks of/harm from stocking
 - Risk management
 - Risk communication
 - Relative risks and benefits

- Founder stock selection
- Genetic management in the hatchery
 - Broodstock management
 - Inbreeding
 - Genetic drift
- Release strategies
- Monitoring and evaluation
 - The precautionary approach

6. A decision support tool to guide decisions on stocking

This section presents a decision support tool as an annotated flow chart which users can use to identify the key decision points and the required information, when considering genetic management of stocking programmes.

7. Summary and conclusion

Provisional list of boxes to be included in the text:

- Examples of stocking as a tool for conservation
- Examples of management plans for stocking programmes
- Restocking programmes for native species in India
- Baseline data for conservation and aquaculture development in Zambia
- Parent based tagging systems for stocking programmes
- Potential for genetic harm posed by stocking of aquaculture farmed types
- The need for evidence-based monitoring of genetic impacts of stocking programmes
- The importance of population demographics in planning stocking programmes
- Example of ecosystem services provided by restocking – the case of Chinese carps
- The Goldstream conservation hatchery for coho salmon
- The current and future role of sterility in stocking programmes
- The GeMoLaR project – an example of genetic management of fish stocks
- Genetic markers used for monitoring the stocking of white seabass