FACE'S INFO NOTE - ADAPTIVE HARVEST MANAGEMENT

INTRODUCTION

Adaptive Harvest Management started its history in 1995 in the United States for the setting of Mallards (*Anas platyrhynchos*) hunting regulations. Since then, an annual process of setting duck-hunting regulations is well in place, based on a system of resource monitoring, data analyses, and rulemaking (Blohm, 1989). It has been successfully applied for several waterfowl species such as the American Black Duck (*Anas rubripes*), Northern Pintail (*Anas acuta*), and Scaups (*Aythya afnis*, *A. marila*). In Europe it has first been developed by the Agreement on the Conservation of African-Eurasian Migratory Birds (AEWA), in its single species action and management planning processes.

> "*Adaptive management promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders*." (Williams *et al.*, 2009)

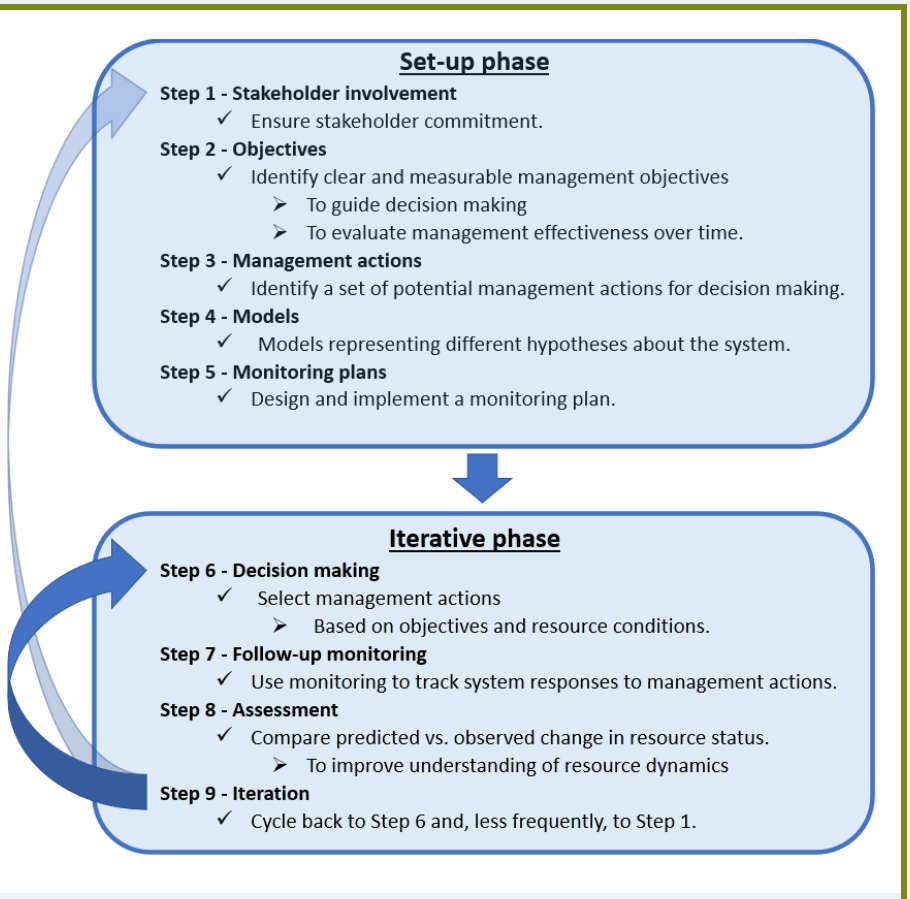
ADAPTIVE HARVEST MANAGEMENT FRAMEWORK

> "*An approach to managing natural systems that builds on learning – based on common sense, experience, experimenting and monitoring – by adjusting practices based on what was learned*" (Bormann *et al.* 1999)

Adaptive Harvest Management is an efficient tool to guide any process in the face of uncertainties prevailing about the system dynamics, including the impact of management actions (*e.g.*, harvest). Although facing uncertainties, **its implementation relies on a few basic parameters** needed for modelling: population size and trend, flyways delineation, survival and productivity rates and hunting bags (Marjakangas *et al.* 2015). However, **precise estimates of population size and all demographic parameters are not a requirement** (Nichols *et al.*, 2007).

Often referred to as "*learning by doing*", **adaptive management** is an approach to natural resource management that emphasizes **learning through management where knowledge is incomplete** and when, **despite inherent uncertainty**, managers and policymakers must act. In other words, it is **adapting management actions based on what is learnt** (Williams *et al.*, 2009). However, differentiating from "trial and error", adaptive management implies the incorporation of scientific method in the management framework. It has explicit structure, summarised as follow from Williams *et al.* (2009) "Adaptive Management operational steps", which constitute requirements to be successful.

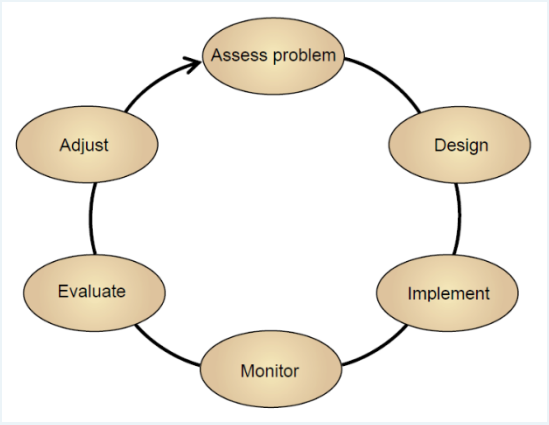
Recognizing that population dynamics and the underlying environmental conditions are variable over time, Adaptive Harvest Management uses the existing data to best provide information to inform a **transparent harvest decision** based on a scientifically rigorous decision-making process. An AHM programme is a **two-phase system** which allows the development of knowledge and improves the decision-making process as the process advances. The process is **iterative,** and serves to **reduce uncertainty,** build knowledge and **improve management over time in a goal-oriented and structured process** (Powolny *et al.*, 2018).



During the **set-up phase,** stakeholders set the objectives, develop monitoring protocols and predictive models, determine a set of management alternatives, and agree on the structure of the iterative phase. In the **iterative phase** resides the technical learning by monitoring the system's response to management actions and assessing the results (Madsen and Williams 2012). **Learning from management outcomes is an essential component of adaptive management,** which is necessary in the face of uncertainty (Marjakangas *et al.* 2015).

The key objective is to **adjust harvest levels** to reflect the current status of the population in a way that current harvest does not jeopardise future harvest opportunities (Marjakangas *et al.* 2015). The process is intended to systematically test assumptions to adapt and learn (Salafsky *et al.* 2001). Following decisions, **the outcomes are compared with predictions,** the **comparative results are used to improve the decision making** (Williams *et al.*, 2009).

A regular monitoring of the system's response is required to adapt and improve the management strategies using the iterative cycle of planning, modelling, implementing, monitoring, reviewing outcomes and adapting plans (Salafsky *et al.* 2001, Williams *et al.* 2009, McCook *et al.* 2010). The decisions outcomes and expectations can differ for a variety of reasons, but the adaptive approach helps to identify the management weaknesses that need improvement (Williams *et al.*, 2009).



"An adaptive approach involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions." (Williams *et al.* 2009)

AEWA MANAGEMENT PLANS

The **Agreement on the Conservation of African-Eurasian Migratory Birds** (AEWA) has been paving the way for AHM frameworks in Europe through the **European Goose Management Platform** (EGMP) which developed International Single Species Action and Management Plans (ISSAPs and ISSMPs) for the Pink-footed Goose (*Anser brachyrhynchus*) in 2012 and the Taiga Bean Goose (*Anser fabalis fabalis*) in 2015. These plans used AHM with excellent results and revised versions of the plans are expected to be adopted in late 2025.

The considerable grow of the population of **Pink-footed Goose** over the last decades led to the development of the ISSMP and the need of AHM as management tool. The plan aims to maintain the favourable conservation status of the Svalbard population and its habitat (increased intensity of grazing has detrimental effects on vulnerable tundra vegetation in Svalbard) while taking into consideration the socio-economic context relating to agricultural conflicts.

On the other hand, the declining **Taiga Bean Goose** population called for the implementation of an ISSAP addressing the conservation of the species using 4 separate flyway-based management units. Although the exact causes of population decline are largely unknown, both legal and illegal harvesting as well as the loss, fragmentation and degradation of suitable habitat are considered as significant threats. This was the first flyway conservation plan under AEWA for a species in decline which is still open for hunting.

In 2018, the EGMP integrated two new geese species: the Barnacle Goose (*Branta leucopsis*) and the Greylag Goose (*Anser anser*).

The need for an ISSMP for the **Barnacle Goose** emerged from the considerable grow of the population over the past decades which causes increasing human-wildlife conflicts, particularly in relation to agricultural damage and air safety. The aim of the plan is to manage the species' populations whilst ensuring their favourable conservation status.

Similarly, the ISSMP for the **Greylag Goose** aims to mitigate pressures caused by the growing Northwest/Southwest European population on agriculture, ecological networks and air safety, thus increasing the risk for public health. Using 2 separate flyway-based management units, the ISSMP is designed to provide a basis for coordinated decision-making within the agreed multi-stakeholder Adaptive Flyway Management Programme (AFMP).

The AEWA also developed an Adaptive Harvest Management Programme for the **Common Eider** (*Somateria mollissima*) in the Baltic/North Sea management unit. This process is a part of its International Single Species Action Plan for Conservation which goal is to halt the decline of the Eider's three AEWA-listed populations and to start their recovery by 2032, ultimately aiming to restore these populations to a favourable conservation status.

CONCLUSION

Adaptive Harvest Management is an **effective and flexible approach** to conservation of natural resources that enables good decision making in the face of uncertainty both about the ecological system and the impacts of management plans. **Over time, uncertainties are reduced**, and management is improved through the iterative learning system (Williams *et al.* 2009).

The process aims to correctly frame a problem to find the best possible solution with the existing knowledge at hand while promoting communication between stakeholders. AHM provides a clear connection between actions and stakeholders different objectives to develop knowledge and thus improve the capacity to address the issues and facilitate the decision-making process as it progresses on a yearly basis.

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