

Guidance on Best Management Practices to address impacts of sea lice and escaped farmed salmon on wild salmon stocks

1. Since 1990, NASCO has co-convened three major international symposia to ensure that it had the best available information on interactions between wild and farmed salmon to guide its decisions. In 1994, in response to the information presented at these symposia, NASCO adopted the 'Oslo Resolution' designed to minimise impacts of aquaculture on the wild salmon stocks. The Oslo Resolution had been developed in consultation with the salmon farming industry and, in order to strengthen this relationship, a Liaison Group was established in 2000. The objective of the Liaison Group is to establish mutually beneficial working arrangements in order to make recommendations on wild salmon conservation and sustainable salmon farming practices, to maximise potential benefits and to minimise potential risks to both. Through the Liaison Group Guidelines on Containment of Farm Salmon were developed and reports on progress with developing and implementing containment action plans are made to the Liaison Group. These guidelines, together with Guidelines on Stocking and elements to ensure consistency with the Precautionary Approach, were incorporated into a new Resolution, the Williamsburg Resolution, CNL(06)48, adopted in 2003 and amended in 2004 and 2006.
2. The most recent NASCO/ICES symposium held in Bergen in 2005 highlighted that while much progress had been made in addressing impacts of aquaculture and in better understanding the nature of these impacts, sea lice and escapes were identified as continuing challenges both for the industry and the wild stocks and on which further progress was urgently needed. NASCO, therefore, decided that it would establish a Task Force comprising representatives of the Parties, the salmon farming industry and NASCO's accredited NGOs with the aim of: identifying a series of best practice guidelines and standards to address the impacts of aquaculture on wild salmon stocks; to identify knowledge gaps and research requirements to address them; and to consider if, and how, impact targets can be identified. In accordance with its Terms of Reference, the Task Force collated existing Codes of Practice as contained in document ATF(09)7 and developed this guidance on best management practices, framed around the elements of the Williamsburg Resolution, designed to achieve international goals to address the impacts of sea lice and escapes on wild Atlantic salmon. The guidance provides a range of measures from which those most appropriate to the local conditions should be put into place to safeguard the wild salmon stocks.
3. This guidance is intended to supplement the Williamsburg resolution and to assist the Parties and jurisdictions: in managing salmon aquaculture, in cooperation with their industries; in developing future NASCO Implementation Plans; and in preparing their 2010 and subsequent Focus Area Reports on aquaculture and related activities. It is anticipated that the triennial reviews of the FARs will provide a mechanism for assessing progress towards achievement of the international goals. It is the intention that NASCO and its jurisdictions explore, in collaboration with industry, opportunities for cooperative scientific research in support of the goals.

	Sea lice	Containment
International Goals	100% of farms to have effective sea lice management such that there is no increase in sea lice loads or lice-induced mortality of wild salmonids attributable to the farms.	100% farmed fish to be retained in all production facilities
	<i>Use Williamsburg Resolution as basic guidance, supplemented as below</i>	
Best Management Practices (BMPs)	Area management, risk-based, integrated pest management (IPM) programmes that meet jurisdictional targets for lice loads at the most vulnerable life-history stage of wild salmonids.	Codes of Containment including operating protocols
	Single year-class stocking	Technical standards for equipment
	Fallowing	Verification of compliance
	Risk-based site selection	Risk-based site selection
	Trigger levels appropriate to effective sea lice control	Mandatory reporting of escapes and investigation of causes of loss
	Strategic timing, methods and levels of treatment to achieve the international goal and avoid lice resistance to treatment	Adaptive management in response to monitoring results to meet the goal
	A comprehensive and regulated fish health programme that includes routine sampling, monitoring and disease control	
	Lice control management programmes appropriate to the number of fish in the management area	
	Adaptive management in response to monitoring results to meet the goal	
Reporting & Tracking	Monitoring programme appropriate for the number of farmed salmon in the management area and sampling protocols effective in characterising the lice loads in the farms and wild salmonid populations.	Number of incidents of containment breach and standardised descriptions of the factors giving rise to escapes
	Lice loads on wild salmonids compared to areas with no salmon farms	Number and life-stage of escaped salmon (overall number; % of farmed production)
	Lice-induced mortality of wild salmonids (e.g. as monitored using sentinel fish, fish-lift trawling, using batches of treated smolts)	Number of escaped salmon in both rivers and fisheries (overall number; % of farmed production) and relationship to reported incidents
	Monitoring to check the efficacy of lice treatments	

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Factors Facilitating Implementation	Development of a monitoring programme appropriate for the number of farmed salmon in the management area and sampling protocols effective in characterising the lice loads in the farms	Monitoring of rivers for escapes
	Access to a broad suite of therapeutants, immunostimulants and management tools	Site appropriate technology
	Collation and assessment of site selection and relocation criteria	Advanced permitting to facilitate recapture and exchange of information on effectiveness of recapture efforts
	Regulatory regimes which facilitate availability of alternative sites, as necessary, to support achievement of the goal	Technology development (e.g. cage design, counting methods for farmed salmon, methods to track origin of escaped salmon and their progeny)
	Training at all levels in support of the goal and to increase awareness of the environmental consequences of sea lice	Training at all levels in support of the goal and to increase awareness of the environmental consequences of escapes
	Monitoring of lice levels: in areas with and without farms; before, during and after a farm production cycle; and in plankton samples	Assessments of the relative risks to the wild stocks from escapes from freshwater compared to marine facilities and from large but infrequent escape events compared to small but frequent escape events.