SEP Production Planning:

A Framework

Salmonid Enhancement Program Fisheries and Oceans Canada Pacific Region

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Introduction

The purpose of this document is to provide a framework for a regionally consistent approach to salmon production planning for the Salmonid Enhancement Program (SEP). Production planning in its simplest form is the business of deciding how many fish are to be produced from each enhancement facility. To that end, salmon from SEP facilities are produced to meet particular objectives; and the decisions that are required about those objectives and how they are to be met follow a defined process. This document will clarify the planning process and the framework within which the more complex aspects of how and why fish production decisions are made, and by whom.

This document is designed primarily for planners and practitioners from participating sectors in the Regional Headquarters and Area offices, and for communication with program partners and the public. It highlights how fish production planning links departmental and program priorities, the scope of SEP fish production planning and how decisions are influenced and made. It explains the transition of program production planning to alignment with the *Canada's Policy for Conservation of Wild Pacific Salmon* (WSP)¹ integrated strategic planning through incremental implementation, and how production plans are an element of licences issued under the Pacific Aquaculture Regulations (PAR). Finally, the overview gives consideration to longer-term planning, such as possible implementation of multi-year Integrated Fisheries Management Plans (IFMPs) and production plans.

This document is one of a number of integrated planning tools SEP is preparing to guide future management and decision making. Companion documents are framework guides for SEP biological assessment and biological risk management. These products will be integrated into a long-term approach that focuses on a program-level strategic management framework.

SEP Mandate

The Salmonid Enhancement Program supports sustainable fisheries through fish production that provides harvest opportunities. Fish production from the program also supports stock assessment and conservation, both of which enable harvest management, and community involvement and public education. In addition to producing fish directly the program enhances and restores fish habitat in British Columbia and the Yukon. The program resides within the Ecosystem Management Branch (EMB).

The program is delivered through three program components:

- Major DFO facilities that provide harvest opportunities, rebuild stocks, and support stock assessment through hatcheries and spawning channels;
- The Community Involvement Program (CIP), which includes the Community Economic Development Program (CEDP) and the Public Involvement Program (PIP). CIP projects are operated by local community groups and First Nations and include projects that focus on fish production as well as others that focus on education, outreach and stewardship initiative. For production planning purposes, PIP projects are characterized as either designated or non-designated depending on their size and objective. The latter are smaller projects that are focused on stewardship activities.

¹ AKA, Wild Salmon Policy, June 2005.

• The Resource Restoration Unit, which supports habitat improvement and restoration, as well as watershed planning and partnerships related to habitat initiatives.

The Program has developed a logic model (Appendix 1) as part of its performance measurement framework. The model depicts the outcomes, or results, that the program works to achieve in support of broader government outcomes as well as the activities, inputs and outputs that are linked to attain such outcomes. The logic model provides the framework for setting priorities and objectives within the production planning process.

SEP has three program outcomes (Appendix 1):

- **"Vulnerable salmon populations are supported"** the outcome addresses both conservation and harvest through support for vulnerable populations that may constrain fisheries.
- **"Enhanced salmon provide harvest opportunities**" addresses the direct benefits generated from harvest opportunities.
- "First Nations, local communities and external parties participate in cooperative fisheries and watershed stewardship activities" this outcome includes CIP arrangements as well as initiatives such as watershed planning

All program components also support five outputs, or direct products and services:

- Salmon stock assessment information:
 - Formalizes the role that SEP plays in regional stock assessment.
 - Enhanced indicator stocks are instrumental in domestic management and Pacific Salmon Treaty (PST) commitments.
 - Includes assessment of SEP program production.
- Partnerships:
 - Partnerships with First Nations and communities are a key driver for the Community Involvement Program (CIP).
 - Other external parties (e.g. Province of BC, BC Hydro) also figure in the resource restoration and hatchery programs.
- Public Education:
 - Includes awareness and encompasses both formal K-12 education and less formal outreach opportunities such as tours and community events.
- Restored and Enhanced Fish Habitat:
 - DFO work and work undertaken in partnership with others to restore and improve salmon habitat to increase habitat productivity.
- Fish production:
 - Supported by both major facilities (hatcheries and spawning channels) operated by DFO and CIP facilities that include CEDP and PIP facilities.
- The full suite program activities, inputs and linkages can be seen on the logic model (Appendix 1).

1.1 Fish Production Objectives

SEP has defined five specific objectives for fish production which flow from the logic model. Each production line (defined by project, species, run, stock, brood year, release stage and release location) of fish considered through production planning must address at least one of these objectives. They are:

- **Harvest** enhancement for fisheries that are reliant on enhanced production, and would disappear or become severely constrained in the absence of enhancement. This includes harvest opportunities for First Nations, recreational, or commercial fisheries. When the objective is to provide a targeted-fishery opportunity, production targets may be set to consider both natural spawning and harvest requirements.
- Assessment fish produced for marking where stock assessment information contributes to Pacific region assessment priorities, such as the Pacific Salmon Treaty. The information may also contribute to assessment as defined under the regional stock assessment framework, Area stock assessment priorities and regional SEP assessment priorities i.e. those produced for program performance measurement. Fish produced for assessment generally address other objectives as well but, in a few instances, fish are produced solely for marking for assessment purposes.
- **Conservation** enhancement of a stock highly at risk of extirpation or extinction, or a vulnerable stock that has been identified as a regional priority (e.g. populations which have an approved conservation/recovery strategy). This includes re-establishing locally extinct populations and rebuilding populations at high risk of extirpation.
- **Rebuilding** enhancement of a stock that is below apparent carrying capacity. This includes rebuilding depleted populations and mitigating for habitat loss.
- Stewardship and Education small numbers of fish produced to provide a stewardship or educational opportunity. Production for these purposes is assessed based on contribution to stewardship and educational goals and not on production levels or contribution to harvest or escapement.

The objectives for fish production reflect the full array of approaches that may be applied at any given time to support the long-term departmental vision. However, the production plan in any given year will reflect an emphasis on objectives that address current priorities and will vary as priorities shift. Coordinating and applying fiscal resources to the highest priorities in meeting departmental objectives is key to successful production planning. Funding enhancement initiatives or re-tooling for changing priorities usually requires a wide range of very limited fiscal sources from within the department. It also depends on numerous partnering arrangements from which SEP has long benefited.

For example, fish production to support stock assessment objectives is a key priority. The program provides significant support to regional stock assessment in meeting fisheries management and Canada/US Pacific Salmon Treaty requirements. All chinook and most coho stock assessment and resultant harvest management, both domestic and international, is reliant on the information provided by hatchery coded wire tag programs. The program applies 6 million tags out of 6.1 million (98%) in support of stock assessment. Production from SEP facilities is also assessed to measure program performance and support performance indicators.

Planning Parameters

1.2 Scope of Production Planning

This document addresses production planning only for SEP enhancement facilities that undertake the cultivation of fish. It does not address planning for habitat restoration or other projects, such as lake enrichment. Salmon production from fish cultivation facilities averages some 386 million juvenile salmon (Appendix 3), and small numbers of trout, each year with greater than 700 production lines (defined by project, species, run, stock, brood year, release stage and release location) with combinations consisting of different salmon species and a range of different release strategies (i.e. un-fed fry, fed-fry, smolts, sea-pens, etc.) each with differing juvenile-to-adult survival rates. Chinook, chum, coho, pink, and sockeye salmon are produced under DFO authorities at facilities throughout the Pacific Region (see Appendix 2 for a map of SEP facilities). Steelhead and cutthroat trout are produced at some DFO facilities in partnership with the province of British Columbia who are responsible for the management and production planning for these species. Adult production numbers an average of 3.3 million adult salmon each year² (Appendix 3).

Beginning in 2010, all SEP facilities undertaking "the cultivation of fish" required a licence issued under the PAR. This includes educational projects and those operated as part of the Public Involvement Program. PAR licences for all SEP enhancement facilities include a production plan, as developed within the formal planning process described in this document. As a component of the PAR licence, the production plans are a regulatory requirement, heightening the importance of its content and the process through with it is developed.

1.3 Priorities within the Production Planning Process

Priorities for production reflect current DFO departmental priorities and commitments (DFO Report on Plans and Priorities³). The production lines in the production plan represent regional activities undertaken in support of departmental priorities. For example, SEP produces Cultus and Sakinaw sockeye as part of recovery plans that address both a Ministerial commitment and conditions set by the Marine Stewardship Council for the certification of sockeye fisheries. This is a regional activity that supports the departmental priority, Ecocertification, which in turn contributes to the Departmental outcome of Economically Prosperous Maritime Sectors and Fisheries.

The following represent regional application of current Departmental priorities. More than one priority can often be embedded within one enhancement objective. For example, chinook salmon produced to support harvest opportunities are also marked to meet PST commitments.

• Provision of harvest opportunities

Production to support harvest opportunities in First Nations, recreational and commercial fisheries will be considered for enhancement in support of economically prosperous fisheries. Production for harvest purposes must be cost effective and will be considered a higher priority if the production also addresses other priorities on this list.

² Source: 2010 Salmon IFMPs.

 $^{^3\,}$ Available at: http://www.tbs-sct.gc.ca/rpp/2012-2013/inst/dfo/dfo01-eng.asp

• Existing Pacific Salmon Treaty (PST) commitments

PST commitments include stock assessment for international harvest management of chinook and coho salmon, and fish production commitments (i.e. Yukon/ Transboundary rivers sockeye production).

Marine Stewardship Council conditions

Production required to meet conditions placed on certifications by the Marine Stewardship Council (MSC) will be a priority for enhancement (e.g. Cultus and Sakinaw sockeye enhancement as per conservation plan).

• Regional stock assessment requirements

Production of coho and chinook for domestic stock assessment purposes, as informed by Science stock assessment framework, will be a priority.

• Recovery of vulnerable populations

Priorities for enhancement will be given to salmon populations where enhancement has been identified as part of the recovery plan for COSEWIC-listed populations and where there are ministerial commitments, or that are regional priority populations or conservation units (CU). These populations will be identified through regional business planning, or through review by regional SEP, Science and Fisheries Management, and the list may vary from year to year. Production to rebuild populations or CUs that may be depleted but that are not at risk of extirpation will be considered but is of lower priority.

• Species at Risk requirements

Species legally listed under the federal *Species at Risk Act* (SARA) will be a priority for enhancement, where it is required. There are currently no SARA-listed salmon species.

Over time, the focus among these priorities may shift from one to another as the department responds to changing conditions and emerging issues. For example: production priorities may be influenced by new or changing international agreements, First Nations treaty negotiations, settlements and interim agreements, and current fisheries and habitat policies.

Relative priorities may also change from year to year due to events such as recruitment failure in a certain population or loss of important habitat. Southern BC chinook production and assessment and increased coho marking are current examples. Over the longer term, global events such as climate change may also alter production-planning priorities. It is, however, expected that the majority of shifted and emergent priorities will fit within these objectives and criteria.

SEP priorities may be used to evaluate existing and new production lines for making business decisions. Because SEP does not have the resources to fully fund all high-priority production lines, those groups that address multiple priorities will be given preferential consideration in business planning decisions.

In making investment decisions, SEP links these objectives with those for infrastructure management. Enhancement objectives generally drive SEP infrastructure requirements; however, it is possible that a particular stock may rank very high in the enhancement objectives, but facility logistics and costs may be prohibitive.

1.4 Operational Guidelines

The production planning process operates within a framework of risk management practices and operational guidelines, such as those that prescribe brood stock collection and spawning practices intended to safeguard genetic integrity of wild populations. Practices and guidelines are codified into a comprehensive biological risk management framework. The framework includes documentation of program risk management activities and will serve as an operational guide, as well as a decision-making and communication and engagement tool. This framework follows the basic steps of risk identification, risk analysis/mitigation, and risk management, with program activities and resultant pathways of effects clearly defined.

Additionally, there are guidelines specific to production objectives. Production targets for conservation and rebuilding objectives will be set at levels that re-establish the naturally spawning population but that limit the risk of changing its genetic variation by regulating the proportion of enhanced fish that spawn within the naturally spawning population. As such, release targets and strategies should be set such that salmon returns of enhanced origin do not exceed 50 percent of the target escapement. This may be exceeded in years prior to full achievement of target. Brood stock collection targets should not exceed 30 percent of the escapement.

However, where the objective is re-establishment of a locally extinct population, or where the population is the focus of an active recovery process, such as under the *Species at Risk Act* (SARA), broodstock collection plans and enhanced contribution should be set as part of the recovery or production planning process and may exceed these limits in order to address the recovery objectives and schedules.

Exceptions may also be applied in watersheds where natural spawning habitat is severely limited, such as the Capilano River where the installation of a dam has limited fish access to much of the spawning habitat.

For production lines with a defined harvest objective, the proportion of the naturally spawning escapement that may be comprised of hatchery fish and collected for brood stock may be established as part of an endorsed integrated planning process or harvest roundtable. Such a process will link fish production with harvest planning for the target fishery and will consider hatchery and natural escapement requirements. If the proportion of the escapement to be comprised of enhanced fish or collected for broodstock is not established through an approved integrated planning process, the limits that are set for rebuilding and recovery will apply.

Production Planning Process

The planning process operates within the consultative framework of the integrated harvest planning process that is used to develop the IFMP⁴. Production plans for DFO, CEDP and designated PIP projects are included in the IFMP. Production plans for smaller SEP facilities with social, stewardship and education as primary objectives such as small (non-designated) PIP projects, are not included in the IFMP but are included as part of the PAR licence for that project. External consultation and involvement in the process is achieved through the IFMP process.

The SEP production-planning horizon currently operates through an annual planning cycle, while at the same time looking toward the longer-term. Because SEP objectives reflect the objectives of other programs within the department, such as Science stock assessment and Fisheries Management, planning for SEP fish production necessarily involves and engages several sectors within the department and a range of external partners and advisory bodies. Timing of the annual planning cycle is critical as it is linked to the departmental business planning process and the development of the annual salmon IFMP, both of which are in turn driven by the biology of the fish.

⁴ IFMPs can be found at: <u>http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/MPLANS/MPlans.htm?&lang=en</u>

Production targets are developed through an integrated planning process that involves establishing juvenile release targets and strategies that will produce the number of adults desired to meet specific objectives while considering species interactions, effects on existing stocks, harvest, habitat capacity, project capacity and overall CU objectives. Operationally, SEP production plans for a given facility are set for individual populations or stocks and production lines, with each carrying a specific identified enhancement objective or, in some instances, a primary and secondary objective.

The annual cycle produces a single regional production plan comprised of donor stocks, eggtake and juvenile salmon release targets, release sites, stages at release for each SEP facility. Each individual stock together with the associated release numbers, release site and life-history stage is known as a production line. Each production line is linked to one or more of the fish production objectives in Section 4. Production targets are maximum amounts and are documented as such in each Facility PAR licence. Priorities are reviewed annually based on the national and regional priorities using a consistent approach across the program

Production planning meetings use standardized templates and processes (agenda, attendees, action items, decisions, distribution of notes for review) as much as possible. Template and process development will be subject to continuous improvement and updating as time goes on. Production planning meetings will move forward from previous decisions using documented in-season decision rules where possible (e.g. adjust targets or strategies based on in-season escapement information).

The enhancement production planning process begins in September with a review of the previous year and the setting of regional priorities based on national and sector priorities, then cascades through a series of internal and external meetings that lead to a June release of the North and South Coast salmon IFMPs with finalized SEP production plans.

Overall, the annual cycle is defined by eight key milestones as illustrated in Figure 1 and expanded upon in the discussion following.



Production planning annual cycle with key milestones and activities

Figure 1. Production planning annual cycle with key milestones and activities.

1.5 Key Milestones Descriptions

1. Regional Priority Setting

Regional priorities should emerge from regional business planning and will be informed by Departmental priorities. Operationally they will be developed annually by regional SEP managers in consultation with Fisheries Management and Stock Assessment. These will initiate and frame the planning process and guide development of Area-based priorities and production planning. Their development will be informed by post-season fishing and SEP production reviews.

The specific regional priorities, including a list of which stocks or populations will be a priority for the planning year will be developed within the broader fish production objectives. These priorities will not usually change significantly from year to year, but may be altered in response to events such as new stock vulnerability status or listing designations. In some cases major habitat disruptions may create a need for prioritizing a stock for enhancement.

An annual set of regional priorities is provided in Appendix 4. These priorities are set based on the process above and will be adjusted year-to-year as required.

2. Area Priority Setting

Area-based priorities, while consistent with regional priorities, will take into account input from external groups as reflected by Area FM, Aboriginal Fisheries Program (AFS) and Science stock assessment staff. They will at the same time take into account other planning processes (e.g. Cowichan River and Barkley Sound), and consider objectives and priorities of other sectors. Area-based priorities often pertain to local populations of which Area staff have particular knowledge. Significant shifts in priority from one year to the next will be supported by rationale.

3. Draft Area Production Plan

Area staff will lead a series of meetings with DFO sectors and consultation with external advisors, and include an Area production planning meeting attended by responsible and supporting SEP, FM, TAPD and Science staff. Based on these meetings, a draft Area production plan will be assembled taking into account regional and Area-based priorities and the results of post-season fishing and production reviews.

4. Draft Regional Production Plan

Regional SEP staff will review draft Area production plans for consistency with regional priorities, guidelines and objectives and then compile them into a draft Regional production plan that is provided to Fisheries Management. FM will prepare the plan for inclusion into the consultation draft of the IFMP. The consultation draft of the IFMP, including the SEP production plan, will be reviewed internally by cross branch bodies such as the Salmon Working Group and Stock Assessment Coordinating Committee and by external advisors through the Integrated Harvest Planning Committee (IHPC) and sector and area advisory bodies.

5. Consultation on SEP Production Targets as Part of Draft IFMP Consultation

FM will lead the IHPC consultation with external advisors and collect feedback. SEP will lead targeted consultation on production targets through the IHPC SEP sub-committee and the Salmonid Enhancement and Habitat Advisory Board.

6. Final Production Plan

Taking consultation feedback into account, adjustments may be made to form the final regional production plan for inclusion in the final IFMP. Final production plan targets are signed off between the Regional Director of the Ecosystem Management Branch (EMB) and the Area Directors, and individual facility production plans form the basis for each Facility PAR licence.

7. Final IFMP Release

After ministerial sign-off, the final IFMP is publicly released.

8. Implementation and Adjustments

The regional production plan is incorporated into the SEP business plan, and SEP facilities prepare to take eggs for the fall program. In-season production target changes may be accepted with justification and rationale when following the process for making in-season changes.

Production Planning Responsibilities and Accountabilities

Accountabilities for decisions and responsibilities for delivering products are shared between significant numbers of individuals in the development of the annual SEP salmon production plan. There are also those who simply participate and provide advice or need to be informed of developments and outcomes. For purposes of this discussion, accountability resides with a single individual while responsibility for delivery may reside with several individuals.

The EMB Regional Director is accountable for the SEP budget and is consequently the manager responsible for the overall production plan and will sign off as such. The Director of SEP is responsible for regional implementation of the production plan. Area Directors are accountable to the Director of SEP for implementation of the plan in their respective Areas. The EMB Area Managers are responsible for implementation of the plan through Hatchery Managers and Community Advisors in their respective Areas. FM is responsible for the external consultation process through IFMP development.

SEP Region and Area responsibilities and accountabilities for program levels are shown in Table 1, and for each milestone in Appendix 5. SEP, Science and FM staff share responsibilities and accountabilities for the overall process within each milestone with specific tasks, also indicated in Appendix 5. Detailed responsibilities and accountabilities and names of those who participate and need to be consulted or informed are available in Appendix 5.

In the longer term, with implementation of multi-year IFMPs and production plans and a shift to WSP strategic integrated planning processes, governance and accountabilities may be adjusted to reflect the cross-sector integration of planning processes and the multi-year products.

	Responsible	Accountable
Program	SEP Director	EMB Regional Director
Area	EMB Area Manager	Area Director
Project	Community Advisor Hatchery Manager	EMB Area Manager

Table 1. General levels of responsibility and accountability within SEP.

Future and Long-Term Production Planning

Production plans will be reviewed annually through the planning process using the objectives and criteria outlined in this document. Decisions to embark on new enhancement initiatives will be based on the same objectives and priorities, while taking into account a range of physical factors, including the most effective enhancement strategy for a particular salmon population and the existing or technically feasible and affordable infrastructure. Longer-term production planning will also take an extended view of overall program priorities and resource inputs/budgets while contemplating macro external drivers such as the effects of global environmental change, policy shifts and First Nations treaty settlements.

In future, the department may adopt multi-year IFMPs and fishing licences, and SEP may move toward setting multi-year production targets, based on multi-year stock assessments and science advice for major fisheries. These initiatives are intended to provide a more stable, long-term footing for the fishing industry. They will also create efficiencies for production planning and alleviate some pressures created by timing-critical events that currently exist in the annual planning process.

Over time, SEP production planning will be incorporated into an integrated strategic planning processes described in the WSP, which envisions making decisions for harvest, habitat management and enhancement activities based on the status of conservation units (CU) and salmon populations, supported by the principle of open and transparent decision making. Moving from the current state to a fully integrated strategic planning process is expected to take time, with incremental steps in the interim and SEP linking in when and where possible. Although efficiencies and effectiveness of the planning process may change over time, the type of product – egg-take and juvenile production targets for each species or stock in each facility – is expected to remain the same.

The transition to a WSP-integrated planning process will, in part, depend on completion of CU identification and reporting on the status of salmon populations and their habitats within each CU. Implementation of the WSP is also highly dependent on functioning integrated watershed planning processes built around planning units, which may be CUs or some aggregation of CUs. Early watershed planning processes have been initiated on a pilot basis in Barkley Sound and the Fraser, Skeena, and Cowichan watersheds.

Appendix 1: Salmonid Enhancement Program logic model



Appendix 2: Major SEP and Community Economic Development Project Hatcheries and Spawning Channels in British Columbia



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Type of facility	Chinook	Coho	Pink	Chum	Sockeye	Steelhead/ Cutthroat	Totals
Major Facilities	37,298,938	11,119,207	10,367,840	104,989,463	188,569,890	482,569	352,827,907
CEDP	5,710,812	2,037,078	2,309,933	7,086,178	715,264	96,259	17,955,524
Designated PIP**	2,867,922	1,457,686	3,872,758	1,445,989	135,775	24,139	9,804,268
PIP	495,308	1,334,661	270,082	1,421,817	179	14,423	3,536,468
Aboriginal Fisheries Strategy	57,357	335,339	N/A	484,918	1,062,700	N/A	1,940,314
Overall Average	46,430,337	16,283,970	16,820,613	115,428,365	190,483,808	617,390	386,064,481

Appendix 3: Annual SEP Production

Table 1. Annual SEP Juvenile Releases by Facility Type – Average 2000-2009*

* Source: SEP Enhancement Planning and Assessment Database. Average = 10 yr. sum of each species for each facility type/10 (nil years included in sum)

**Designated PIP projects are generally larger with production directed at conservation or harvest objectives, whereas regular PIP projects produce salmon primarily for educational purposes.

Location	Chinook	Coho	Chum	Pink	Sockeye
South Coast					
Major Facilities	243,200	87,414	800,395	515,430	517,085
CEDP, Designated PIP and AFS	54,945	33,189	178,650	203,670	22,440
North Coast	26,672	26,040	317,789		2,786,300
Totals	324,817	146,643	1,296,834	719,100	3,325,825

Table 2. SEP Adult Salmon Production – estimated 2010⁵

Appendix 4: Regional Priorities

The regional priorities are set based on the process for priority setting above and will be adjusted as required, but are not expected to change significantly year-to-year. They are supported by the Strategic Directions Committee as well as Operations and Planning Committee (as of 2011-2012) and are not in priority order:

- o Provide harvest opportunities
 - Focus on being cost effective/terminal/selective
- o Existing Pacific Salmon Treaty commitments
 - Stock assessment (chinook and coho, e.g. Robertson Creek chinook coded wire tagging for PST Chinook Technical Committee requirements)
 - Production (sockeye production to meet Yukon Transboundary Treaty requirements)
- Regional domestic stock assessment requirements
 - Coho/chinook informed by Science stock assessment framework
- o Marine Stewardship Council fishery certification conditions
 - Cultus/Sakinaw sockeye enhancement as per conservation strategy
- Recovery of vulnerable populations
 - Ministerial commitments (e.g. Cultus and Sakinaw sockeye)
 - Agreed upon regional priority populations/CUs (e.g. Southern BC Chinook)

Appendix 5: Responsible, Accountable, Consulted, Informed Table.

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