

Integrated Fisheries Management Plan

for

Dolly Varden (*Salvelinus malma malma*)

of the

Gwich'in Settlement Area

and

Inuvialuit Settlement Region

Northwest Territories

2010 – 2014

Volume 1: The Plan

Photo Credit: Colin Gallagher-DFO, Big Fish River 2009

Foreword

The purpose of this Integrated Fisheries Management Plan (IFMP) is to identify the main objectives and requirements for the Dolly Varden (*Salvelinus malma malma*) fishery in the Gwich'in Settlement Area and Inuvialuit Settlement Region of the Northwest Territories, as well as the management measures that will be used to achieve these objectives. This document also serves to communicate the basic information on the fishery and its management to Fisheries and Oceans Canada (DFO) staff, legislated co-management boards, Parks Canada Agency, Hunters and Trappers Committees, Renewable Resource Councils, communities, fishermen and other stakeholders. This IFMP provides a common understanding of the basic “rules” for the management of sustainable Dolly Varden stocks.

This IFMP is not a legally binding instrument which can form the basis of a legal challenge. The IFMP can be modified at any time and does not fetter the Minister of Fisheries and Oceans’ discretionary powers set out in the *Fisheries Act*. The Minister can, for reasons of conservation or for any other valid reasons, modify any provision of the IFMP in accordance with the powers granted pursuant to the *Fisheries Act*.

Where DFO is responsible for implementing obligations under land claims agreements, the IFMP will be implemented in a manner consistent with these obligations. In the event that an IFMP is inconsistent with obligations under land claims agreements, the provisions of the land claims agreements will prevail to the extent of the inconsistency.

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1. Introduction

1.1. Purpose

This Integrated Fisheries Management Plan (IFMP) is for northern form Dolly Varden (*Salvelinus malma malma*) of the Gwich'in Settlement Area (GSA) and the Inuvialuit Settlement Region (ISR) in Canada's Western Arctic (see Fig. 1) where it occurs in several rivers and along the coast. Dolly Varden is an important food source for the communities of Aklavik and Teetl'it Zheh (Fort McPherson). Northern form Dolly Varden also occurs in the Sahtu Settlement Region of the Northwest Territories, the Yukon and Alaska. This IFMP, at present, is restricted to the GSA and ISR, and does not extend to the Sahtu Settlement Region, the Yukon or Alaska.

An IFMP serves as a guide for the conservation, sustainable use and recovery of fish species or stocks, and identifies measures to prevent harm to the species or stocks. The IFMP for Dolly Varden contains objectives, strategies and measures for managing these stocks and helping in their rebuilding. The IFMP will be used by the fishermen, communities, Gwich'in, Inuvialuit, Government of Canada and other stakeholders in managing day-to-day and longer-term activities and should achieve long-term conservation and sustainable use of Dolly Varden in the GSA and ISR.

This IFMP is based on traditional Gwich'in and Inuvialuit knowledge and practices, on 'western' knowledge, and on the underlying Gwich'in and Inuvialuit beliefs of the importance of showing respect to fish, including no overharvesting, quick and humane killing, clean handling and no derogatory talk about fish.

The IFMP identifies and addresses issues critical to the management of Dolly Varden in the GSA and ISR. Two Dolly Varden stocks, and possibly others, have declined in numbers in the last two decades, and important Dolly Varden habitat has changed. The climate is changing too, potentially having additional effects on Dolly Varden and its habitats.

Given these changes and the relatively low numbers of fish in Dolly Varden stocks, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is considering the status of the northern subspecies of Dolly Varden, the subspecies that occurs in the GSA and ISR. Its decision is expected in November 2010. Depending on COSEWIC's assessment, Dolly Varden might be listed under the *Species at Risk Act* (SARA) as threatened, endangered or of special concern; this may affect harvesting of Dolly Varden in the GSA and ISR. If Dolly Varden is listed under SARA, a SARA action plan, management plan or recovery strategy would be required. However the Minister may incorporate this IFMP into a SARA action plan, management plan or recovery strategy. SARA permits certain activities, such as fishing, if they are identified under a SARA recovery strategy, action plan or management plan or under an approved existing plan. Therefore this IFMP may meet possible requirements of SARA helping to allow continued harvesting. However this IFMP will not replace the formal requirements of COSEWIC and SARA.



Fig. 1. The general area covered by the Dolly Varden Integrated Fisheries Management Plan.

The IFMP was developed and will be implemented by the Government of Canada, Gwich'in and Inuvialuit partners through an adaptive co-management process that advances community-based management. Groups involved in the preparation of the IFMP were Fisheries and Oceans Canada (DFO), the Fisheries Joint Management Committee (FJMC), the Gwich'in Renewable Resources Board (GRRB), Parks Canada Agency, the Aklavik Hunters and Trappers Committee (HTC), the Ehdiitat Renewable Resource Council (RRC), the Gwichya RRC, the Nihtat RRC, the Teetl'it RRC, elders of Aklavik and Teetl'it Zeh, the Rat River Working Group and the West Side Working Group. The Working Groups have been instrumental in the development of the IFMP. In

2000, the Minister of Fisheries and Oceans supported community-based management, specifically in relation to Big Fish River Dolly Varden as soon as a management plan was developed and approved.

The IFMP should be read in the context of other pertinent legislation, including the Gwich'in Comprehensive Land Claim Agreement (GCLCA), Inuvialuit Final Agreement (IFA), *Fisheries Act*, *Canada National Parks Act* and *SARA*.

The Dolly Varden IFMP is a living document. The IFMP can be amended at any time if a request is submitted and agreed to by the signatories after meetings with all stakeholders.

The IFMP is in two volumes. This volume, Volume 1, contains the Plan. Volume 2 contains nine appendices including a list of abbreviations and glossary, selected sources of information, and the main contacts for further information.

1.2. Integrated Fisheries Management Plans

IFMPs provide a planning framework for the conservation and sustainable use of fishery resources as well as a process by which a fishery will be managed for a period of time. They were initiated to ensure greater integration of functional and technical expertise, integrate decision-making within areas subject to land claims agreements, identify performance outputs, and allow for enhanced input from resource users and industry within a given fishery.

IFMPs assist with: the identification of issues, objectives and management measures designed to ensure an orderly, economically viable, socially/culturally beneficial and sustainable fishery; the communication of basic information on a fishery and its management within and between co-management partners to outside parties; and the reporting and assessing of the achievement of management objectives. They should include criteria for changing management measures.

An IFMP usually contains more information on a fishery and its management than a fishing plan (e.g. the Rat River Charr Fishing Plan), such as additional information and actions related to habitat protection, research and monitoring, compliance, communication and education, but does not summarize all information. This IFMP emphasizes elements of the national process that are of greatest relevance in the GSA and ISR and includes additional elements that may not be considered important nationally but are important in these areas.

This IFMP builds on the work of the Rat River Working Group and the West Side Working Group. The Rat River Working Group has developed the Rat River Charr Fishing Plan for managing Rat River Dolly Varden in the GSA. The West Side Working Group has been developing plans for the management of Dolly Varden stocks in the ISR. Gwich'in and Inuvialuit organizations have been involved with developing and

implementing fishing plans and other IFMPs and with other planning initiatives such as Community Conservation Plans, Land Use Plans and Oceans Management Plans that contain pertinent information for the management of Dolly Varden. This IFMP will be relevant and used for the integrated management of the Dolly Varden fish stocks and fisheries of the GSA and ISR, will meet the national DFO needs, and should address any potential requirements of SARA.

2. Jurisdictional and Co-Management Context of Dolly Varden Management

This section describes the basic responsibilities of the major groups with legislated responsibilities for the management of Dolly Varden in the GSA and ISR, and, in general, how these and other groups interact through the co-management processes.

2.1. Jurisdictional Context

DFO, the FJMC, the GRRB, HTC's and RRC's, and the Parks Canada Agency all have responsibilities for managing Dolly Varden stocks in the GSA and ISR. All groups work closely together to fulfil their specific responsibilities. The partners fulfil their responsibilities within the context of the two land claims agreements, *Fisheries Act*, *Oceans Act*, *Canada National Parks Act*, and *SARA*.

DFO has the ultimate responsibility for the conservation and sustainable use of fish stocks. The FJMC and the GRRB are legislated public institutions, and are the main instruments of fishery management in the ISR and GSA respectively; their fishery management responsibilities are outlined in the respective land claims agreements. The Parks Canada Agency is responsible for managing Dolly Varden stocks in Ivvavik National Park on the Yukon North Slope.

Gwich'in Renewable Resources Board (GRRB)

The full text of the GRRB's responsibilities related to fish and fisheries is in the Gwich'in Comprehensive Land Claim Agreement (GCLCA). The GRRB must act in the public interest. In summary, its responsibilities include:

- establishing policies and proposing regulations for harvesting;
- calculating Gwich'in Minimum Needs Levels;
- determining Total Allowable Harvest Levels;
- approving plans for the management and protection of fisheries, endangered species and fish habitat;
- approving the designation of conservation areas and endangered species;
- establishing rules and procedures for consultation;
- reviewing matters related to fisheries management referred to it by government;
- providing advice to government on fisheries and fish habitat;
- participating in harvesting studies, data collection and the evaluation of research;

- involving the RRCs and Gwich'in harvesters in research and harvesting studies conducted in the GSA by government or the GRRB; and
- consulting regularly with the RRCs.

The GRRB has completed its “GRRB Rules and Procedures for Consultation” that is followed in the development of all management plans.

Fisheries Joint Management Committee (FJMC)

The full text of the FJMC's responsibilities is in the Inuvialuit Final Agreement (IFA). The FJMC must act in the public interest. In summary, its responsibilities include:

- reviewing information on the state of fishing in waters on lands in the ISR;
- identifying areas of waters and lands where fishing has or may take place;
- determining current harvest levels;
- developing and maintaining a public registration system for fishing in waters on lands in the ISR;
- restricting and regulating the public right to enter 7(1)(b) lands for fishing where required for conservation or interference with Inuvialuit activities, and denying entry to persons who abuse the right;
- allocating subsistence quotas among communities;
- determining the role of HTC's in regulating the subsistence harvest and collecting harvest statistics;
- making recommendations to the Minister of Fisheries and Oceans on subsistence quotas for fish, harvestable quotas for marine mammals, Inuvialuit commercial fishing, allocation of preferential fishing licences, regulations for sport and commercial fishing in waters on 7(1)(a) and 7(1)(b) lands, and identifying waters where such fishing may be prohibited; and
- advising the Minister of Fisheries and Oceans on regulations, research policies and administration of fisheries in the ISR, and on any new international agreements being developed that might apply to Inuvialuit fisheries.

Fisheries and Oceans Canada (DFO)

The federal government has constitutional authority for sea coast and inland fisheries. Legislatively, it exercises this authority through the *Fisheries Act*. The *Act* provides DFO with powers, authorities, duties and functions for the conservation and protection of fish and fish habitat (as defined in the *Fisheries Act*) essential to sustaining commercial, recreational and Aboriginal fisheries. The *Fisheries Act* contains provisions that can be applied to regulate flow needs for fish, fish passage, killing of fish by means other than fishing, the pollution of fish-bearing waters, and harm to fish habitat. Section 36 of the *Act* is the key pollution prevention provision that prohibits the deposit of deleterious substances into waters frequented by fish unless authorized by regulation or by federal laws. The administration of section 36 has been assigned to the Minister of Environment.

Hence, DFO is the ultimate management authority for Dolly Varden. In the GSA and ISR, DFO works in partnership with the legislated GRRB and FJMC to manage and

protect fishery resources. DFO is required to consult with the boards on fishery management topics.

Through development and implementation of the Sustainable Fisheries Framework, DFO is incorporating precautionary and ecosystem-based approaches into fishery management decisions. Application of the Framework should ensure the continued health and productivity of Canada's fisheries and fish stocks, while protecting biodiversity and fish habitats. The Framework comprises four main elements: conservation and sustainable use policies; economic policies; governance policies and principles; and planning and monitoring tools.

DFO's activities include: issuing a variety of fishery licences, including Commercial Licences and Licences to Fish for Scientific Purposes; protecting fish habitat under the provisions of the *Fisheries Act*; conducting research on fish, fish habitat and aquatic ecosystems; being the lead federal agency for the fish and marine mammal aspects of SARA and for the *Oceans Act*; and enforcing the *Fisheries Act*.

Initiatives in the Beaufort Sea under the *Oceans Act* include the development of the Tarium Niryutait Marine Protected Areas and the Integrated Ocean Management Plan for the Beaufort Sea. These are expected to be finalized in 2010, and may be beneficial in managing marine aspects of Dolly Varden.

Hunters and Trappers Committees (HTCs) and Renewable Resource Councils (RRCs)

HTCs and RRCs have specific fishery-related responsibilities assigned to them under the IFA and GCLCA respectively. The full texts of these responsibilities are in the agreements. In summary, their responsibilities include:

- allocating harvests among communities (HTCs and RRCs);
- managing the local exercise of Gwich'in harvesting rights (RRCs);
- advising the GRRB and FJMC on harvesting (HTCs and RRCs);
- participating in the collection of harvesting data (HTCs and RRCs);
- implementing Rat River Working Group decisions (RRCs);
- reporting back to the Rat River Working Group on harvest allocations (RRCs);
- setting by-laws on acceptable fishing gear and methods (HTCs), or recommending such measures to the GRRB (RRCs);
- reviewing and approving project proposals (HTCs and RRCs);
- participating in the development of fishing plans (HTCs and RRCs); and
- encouraging and promoting involvement in conservation, research, monitoring, management, enforcement and use of fishery resources (HTCs).

Parks Canada Agency

“On behalf of the people of Canada, we protect and preserve nationally significant examples of Canada's natural and cultural heritage, and foster public understanding, appreciation and enjoyment in ways that ensure their ecological and commemorative integrity for present and future generations.”

Parks Canada Agency is the federal agency responsible for protecting and managing the resources within Ivvavik National Park, encompassing 9,750 km² on the Yukon North Slope. The Park includes the Firth and Babbage rivers which support Dolly Varden stocks. Following the principles of the IFA, Parks Canada Agency supports the continuing traditional use of the North Slope and recognizes Inuvialuit rights to harvest fish and game within the Park. Parks Canada Agency has the legislated responsibility to carry out the objectives of the Park's management plan. These objectives include: monitoring and maintaining the ecological integrity of the aquatic ecosystems within the Park, including the Firth and Babbage river systems; regulating sport fishing within the Park; and working with the West Side Working Group to implement fisheries research and monitoring priorities.

Other Organizations

Many other organizations play roles in the overall management and protection of Dolly Varden in the GSA and ISR. These include other organizations created under the Gwich'in and Inuvialuit land claims settlements, the NWT and Yukon territorial governments, and other federal departments. Many of them are specifically involved in environmental protection decisions; for instance Environment Canada administers the pollution prevention provisions of the *Fisheries Act*. The territorial governments are responsible for issuing sport fishing licences. All groups are involved in the co-management of Dolly Varden appropriate to their responsibilities and interests.

2.2. Co-Management in the GSA and ISR

Fishery and fish habitat management in both the GSA and ISR are conducted through adaptive co-management processes. The processes are similar in both areas, but the details may differ.

Adaptive co-management is a process that permits stakeholders to share management responsibility and to learn from their actions through multi-level feedback. It includes a shared common focus, a high degree of interaction, multiple levels of shared responsibility, some autonomy at different levels, generation and sharing of knowledge at all levels, flexible learning, and recognition of uncertainty. Development of IFMPs through adaptive co-management in the GSA and ISR usually involves establishing a working group (e.g. the Rat River Working Group and the West Side Working Group for Dolly Varden), assembling background information, establishing conservation requirements (e.g. harvest limits as required) and setting management objectives and strategies through consensus, developing an operational plan, implementing the plan and reviewing the results. A steering committee may be established to provide direction to a working group.

Fishery Management

Co-management is a legislatively supported partnership that delineates shared management responsibilities between Gwich'in participants and Inuvialuit beneficiaries of the respective land claims agreement and the responsible government agency, which is DFO for fisheries. The FJMC and the GRRB are the legislated public institutions (co-management boards) with mandates to manage fish in partnership with DFO. They have a mix of decision-making, operational and advisory responsibilities which are assigned in the IFA and GCLCA (see section 2.1 above). They are the foci of fishery management in the ISR and GSA respectively, working with their stakeholders. The FJMC and GRRB work together to manage transboundary stocks and issues. Pertinent decisions or recommendations of the FJMC and GRRB are forwarded to the Minister of Fisheries and Oceans who may implement, vary, or reject them, providing a written response as required. DFO provides information and advice, and implements decisions as appropriate. The intent is that DFO, the FJMC and the GRRB should fully exchange information on their policies, programs and research. Details are provided in the GCLCA and the IFA.

Specific decision-making and approval processes for IFMPs and Fishing Plans follow the cycle of adaptive fisheries co-management. This model has been applied to the Rat River Dolly Varden, resulting in the Rat River Charr Fishing Plan, and is being applied to West Side Dolly Varden. The GRRB follows its consultation policy with timelines in the development and approval of management plans.

The process usually begins with a specific conservation issue identified by one or more fishermen at the local HTC or RRC. The concern is then formalized by the GRRB or FJMC in partnership with the HTC or RRC and DFO, and involving other appropriate community groups or government agencies. Usually a working group, composed of appointees from FJMC/GRRB, DFO, HTC/RRC and other relevant parties, is struck to coordinate the assessment of concerns and possible actions. For Dolly Varden management, the GRRB led the establishment of the Rat River Working Group with Aklavik HTC, DFO, Ehdiitat RRC, FJMC, GRRB and Teetl'it RRC membership, and with Gwichya RRC, Nihtat RRC as observers, as well as, more recently, the chair of the West Side Working Group. The FJMC later led the establishment of the West Side Working Group with Aklavik HTC and Elders Committee, DFO, FJMC and Parks Canada Agency membership, and with the Ehdiitat RRC, GRRB and the chair of the Rat River Working Group as observers. The working group annually conducts an assessment of the issues, evaluates pertinent scientific, traditional and local information and knowledge, revisits community concerns, management objectives and possible management options, and arrives at proposed management actions by consensus to address the initial concern(s). The working group consults with affected communities on any recommendations from their annual assessment.

These management actions and recommendations are presented in a community-based Fishing Plan, or possibly in a more formal IFMP. The draft plan is reviewed formally by all relevant stakeholders during all stages of development. The final version of the

Fishing Plan or IFMP is ratified by the FJMC/GRRB, DFO and the appropriate HTC(s)/RRC(s).

Each signatory's organization supports the implementation of the Fishing Plan or IFMP by implementing the fisheries management actions appropriate to its mandate and responsibilities. For instance, the FJMC and GRRB might establish research priorities consistent with local and regional concerns, determine harvest levels and fund research projects, DFO might change regulations and conduct research projects, and the HTC(s) and RRC(s) might adjust allocations of fish amongst harvesters and monitor harvests.

One important step is the annual allocation of harvests among communities and among harvesters. The Rat River Working Group and the West Side Working Group jointly recommend the allocation of harvests between the GSA and the ISR, and communicate and consult on decisions, management programs and research results to all groups in a timely fashion and in plain language. The GRRB and FJMC set the overall allocations. The Aklavik HTC, the Ehdiiat RRC and the Teetl'it RRC, in consultation with the working group(s), divide the allocations among the communities, and each HTC or RRC is responsible for the allocation among its members. The HTC and RRCs implement these decisions, and work with harvest monitors hired with funds from DFO to collect harvest data and report to the relevant Working Group. It is noteworthy that this process enabled the Rat River Working Group to implement voluntary closures successfully for three consecutive years with community compliance. If closure is not voluntary, the GRRB must conduct a public hearing to determine to address local concerns (e.g. to set a Total Allowable Harvest and Gwich'in Needs Level).

The working group then conducts an annual review of fisheries management programs and information that support the implementation of the IFMP or Fishing Plan. The review involves the presentation and sharing of new information and the evaluation of harvest monitoring results and approaches, research projects results and other items identified by working group members or the communities. The working group reports the results of its review to all stakeholders, often in a newsletter and/or in public meetings.

Every three to five years the working group conducts a thorough review of the completed Fishing Plan or IFMP, and proposes changes to the Plan and/or management actions based on any new information. The adaptive co-management process returns to the "consensus decision on actions to take" stage and the cycle repeats.

The Minister of Fisheries and Oceans can, for conservation or any other valid reason (e.g. safety), modify access, allocations and sharing agreements as outlined in the IFMP in accordance with the powers granted pursuant to the *Fisheries Act*.

Habitat Management

All development activities that may affect Dolly Varden or their habitats, directly or indirectly, must go through a co-management environmental review process conducted

by co-management bodies and meet the *Canadian Environmental Assessment Act (CEAA)* requirements.

In the ISR, the Environmental Impact Screening Committee (EISC) and the Environmental Impact Review Board (EIRB) are the co-management organizations with the mandate for assessing potential environmental impacts of proposed developments. DFO, the FJMC and the appropriate HTC(s) provide information and advice on pertinent projects. If the EISC determines that a proposed development has the potential for significant negative environmental impacts, it would be referred to the EIRB, or other body as deemed appropriate, for public review. Licences and permits are issued by the appropriate regulatory authority after the completion of the environmental review process. *CEAA* requirements are separate from those of the EISC and EIRB. For the Yukon North Slope, the *CEAA* requirements are replaced by those of the *Yukon Environmental and Socio-economic Assessment Act*.

In the GSA, the Gwich'in Land and Water Board, the Mackenzie Valley Land and Water Board and the Mackenzie Valley Environmental Impact Review Board, under the *Mackenzie Valley Resource Management Act*, are responsible for assessing potential environmental and socio-economic impacts of proposed developments. The GRRB, DFO and the appropriate RRCs and other bodies provide information and advice on pertinent projects in the GSA. The requirements of the *Mackenzie Valley Resource Management Act* replace the requirements of *CEAA*.

Important Dolly Varden habitats are identified in the Aklavik Community Conservation Plan and the Gwich'in Land Use Plan; these include Big Fish River, the Husky Channel – Rat River system, the Vittrekwa River and the Mackenzie Bay/Shallow Bay area east of Shingle Point. These plans are consulted when projects are reviewed. The Parks Canada Agency zoning system gives special protection to two areas of critical Dolly Varden habitat within Ivvavik National Park. The Joe Creek and Firth River fish holes are designated as “Zone 1: Special Preservation” due to their high ecological value. These zones are areas where public use may be controlled to protect fragile resources, and to which no motorized access (including air access) is permitted.

DFO is leading the development of the Tarium Nirytait Marine Protected Areas and the Integrated Ocean Management Plan for the Beaufort Sea. The processes involve many Gwich'in and Inuvialuit groups, communities, federal and territorial agencies and other stakeholders that have marine responsibilities or interests through a Regional Coordination Committee, the Beaufort Sea Partnership and several Working Groups.

The Gwich'in and Inuvialuit participate in international initiatives to help protect the Arctic environment. Through the Gwich'in Council International and the Inuit Circumpolar Conference, they participate on the Arctic Council and its initiatives such as climate change and the Arctic Council's Working Group on Protection of the Arctic Marine Environment. DFO also is involved in many Arctic circumpolar initiatives.

3. Dolly Varden and Dolly Varden Fisheries of the GSA and ISR

Dolly Varden is related to salmon, trout and Arctic charr (*Salvelinus alpinus*). Although Dolly Varden was considered a form of Arctic charr, it now is classified as a separate species, *Salvelinus malma* (Walbaum 1792). Dolly Varden in North America has two subspecies based on genetic and morphological analyses; their ranges do not overlap.

All Dolly Varden in Arctic Canada belong to the northern subspecies, *Salvelinus malma malma*. The northern subspecies occurs from the north side of the Alaskan Peninsula and the Aleutian Islands to the Mackenzie River in Canada's Western Arctic. In the GSA and ISR it is found, from west to east, in the Fish, Malcolm, Firth, Babbage, Big Fish, Rat (Ddhah Zhit Han), Vittrekwa and Blackstone rivers and along the coast west of the Mackenzie Delta (see Fig. 1). Dolly Varden also occurs in the Upper Peel River, Yukon (but may not be the northern form) and the Gayna River, Sahtu Settlement Area. This subspecies' range extends into Asia.

The southern subspecies, *Salvelinus malma lordi*, occurs in coastal watersheds of Washington and British Columbia and in Alaskan rivers that drain south to the Gulf of Alaska.

Northern Dolly Varden has three life history strategies in the GSA and ISR: anadromous (sea-run), residual (riverine), and isolated (stream-resident). The anadromous type of Dolly Varden resides in fresh waters for about the first three years of life, after which it migrates to the sea to feed, returns in the fall to fresh water to spawn (beginning at 4-6 years) and overwinter, and then repeats the migration cycle. Known anadromous populations in the GSA and ISR occur in the Firth, Babbage, Big Fish, Rat and Vittrekwa rivers. Residual, non-anadromous Dolly Varden co-exists with anadromous Dolly Varden in the Firth, Big Fish, Babbage, Rat and Vittrekwa rivers. Isolated, non-anadromous Dolly Varden occurs above falls on the Babbage and Big Fish rivers (where anadromous and residual forms occur below the falls), in some rivers of the Peel River watershed, and in the Gayna River. Upstream in the Peel River drainage some populations are present in lakes (e.g., Horn Lake); however, their life history (i.e. lacustrine only or adfluvial stream-resident/lacustrine migratory) is unknown.

Dolly Varden uses a variety of habitats. During winter, it occurs in upstream reaches of river systems that do not completely freeze primarily because of discharging groundwater. Habitats associated with discharging groundwater are used for spawning, rearing and overwintering, but they comprise a small proportion of each system and thus are spatially limiting to the stocks. It spawns in areas associated with perennial springs; this habitat type often corresponds with overwintering habitat and is considered critical and spatially limiting in most river systems. Small streams are used for spawning, rearing and overwintering. Larger rivers are migratory routes of anadromous Dolly Varden. Nearshore marine habitats are crucial feeding areas.

More information on the habitat and ecosystem needs of Dolly Varden in the GSA and ISR is contained in Appendix E.

3.1. Dolly Varden Fisheries

Anadromous Dolly Varden is the target for fisheries in the GSA and ISR. The main traditional fisheries now occur on the Rat River and along the western Mackenzie Bay coast (see Fig. 1). The Fish, Malcolm, Firth, Babbage and Big Fish stocks used to be fished directly, but little or no fishing activity has occurred recently on these or other stocks except as part of the mixed coastal and/or Mackenzie Delta fisheries. Appendix B contains a summary of the management history of Dolly Varden stocks in the GSA and ISR.

Traditional Fisheries

The Gwich'in and Inuvialuit have harvested anadromous Dolly Varden for subsistence purposes ever since they inhabited the Western Arctic about 8000 years ago. Dolly Varden fisheries have been and remain an essential part of the Gwich'in and Inuvialuit cultures for subsistence and cultural purposes. Dolly Varden continues to constitute an important cultural and nutritional resource for harvesters and their families. In emergencies, Dolly Varden was fed to dog teams which were vital for the Mackenzie Delta residents' participation in the fur trade economy. Traditionally the Gwich'in and Inuvialuit use as much of the fish as possible and share a good harvest within the community. Dolly Varden also was used for various medicinal purposes. Today, the fish is often smoked, dried and frozen to preserve it.

Before 1930 there were many traditional fishing locations across the GSA and ISR. Inuvialuit fishing was concentrated along the Beaufort Sea coast between the Alaska border and the Mackenzie Delta, and on the Big Fish River. The Gwich'in fished primarily in the Mackenzie Delta and Peel River drainage, and the Vuntut Gwich'in from the Yukon fished Yukon North Slope rivers, especially the Firth and Babbage. Several Dolly Varden fishing locations were used less frequently as people moved from traditional camps and RCMP posts to Aklavik. Traditional fishing methods included baleen, sinew and willow gill and sweep nets used in deeper waters, and rock, driftwood and willow traps and spears used for shallow streams and river beds. Gear restrictions and rotational use of rivers have been used as traditional management practices. More efficient cotton and nylon gill nets now are used and the mesh size has been changed from 3.0 - 5.5 inches to 4.0 - 4.5 inches. A 3.5 inch mesh had been a popular choice as it caught smaller, tastier fish.

Currently, the main fisheries for Dolly Varden occur in the Rat River and along the western Mackenzie Bay coast. Little or no fishing activity has occurred directly on other stocks in recent years, but they probably are harvested in mixed stock fisheries along the coast and in the Mackenzie Delta. The Big Fish River had been an important fishery, but at present it is closed because of the decline in numbers of fish.

Now the main fishing sites for Dolly Varden stocks are:

- Babbage River – Canoe Creek area (Fish Hole) and Shingle Point;
- Big Fish River - Shingle Point;

- Rat River - Husky (Eneekaii Han) and Peel channels, Tr'ih Zhit Tagohdii (Canoe Landing), Shingle Point, Aklavik townsite and Big Eddy (Ok Choo), but Ne'edilee (Rat River Fish Hole) is closed to fishing;
- smaller fisheries of unknown stocks occur at Thetis Bay (Herschel Island), Komakuk Beach, and to some extent at Nunaluk Spit, Catton Point and Ptarmigan Bay;
- the Vittrekwa River stock is harvested incidentally in Mackenzie Delta fisheries.

The Dolly Varden fisheries are conducted mainly by residents of Aklavik and Teetl'it Zheh primarily by gillnet in July, August and September.

Gwich'in and Inuvialuit do not require licences to fish for Dolly Varden for subsistence purposes, but require a commercial licence to sell fish to non-participants or non-beneficiaries.

Harvest levels have varied. However, opinion is that more Dolly Varden was consistently harvested in the 1960s and 1970s than in the 1990s and 2000s. Fewer harvesters may be one reason for the lower catches as may be higher gas prices.

Some general and some stock-specific harvest estimates exist (see Appendix D). Annual harvest levels have varied considerably.

General information on Gwich'in and Inuvialuit harvests shows:

- *Gwich'in*: for 1972-2000 the total annual Dolly Varden harvest estimates ranged from 376 fish in 1991 to 6,500 fish in 1972;
- *Inuvialuit*: for 1988-1997 the total annual Dolly Varden harvest estimates ranged from 349 fish in 1991 to 2,742 fish in 1994;
- *Gwich'in plus Inuvialuit*: for 1988-1997 the combined total annual Dolly Varden harvest estimates ranged from 725 fish in 1991 to 4,974 fish in 1996.

Information on harvest levels for specific Dolly Varden stocks is limited:

- *Big Fish River*: has been closed periodically to fishing since 1987, and currently is closed;
- *Rat River*: harvests for 1995-2005, before the voluntary closure (see below), ranged from 513 fish in 2004 to 3,331 fish in 1997;
- *Shingle Point*: harvests declined from 127 fish in 2006 to 29 fish in 2008;
- *Herschel Island*: harvests declined from 113 fish in 2007 to 41 fish in 2008.

Since the early 1970s, significant decreases have occurred in the abundance of the harvested stocks in the Big Fish River and the Rat River (see Table 2) resulting in the introduction of community-supported management measures to reduce harvests of these stocks. By 1987, Aklavik residents, having observed a decline in abundance and size of Big Fish River Dolly Varden over a number of years, agreed to a legislated closure of the Fish Hole for a period of five years. Beginning in 1992 a series of re-openings did not show the expected increases in abundance or size of fish. The Big Fish River currently is closed to fishing. Historic harvests of fish at levels above those the stock could support,

combined with likely changes in the water flow and habitat, appear to have kept this stock at lower levels.

Concern about the health of the Rat River Dolly Varden stock led to the development of the Rat River Charr Fishing Plan in 1996 that included recommended harvest levels. The Plan is in its seventh iteration and is being revised in 2010. Abundance was relatively stable from 1989 to 2001, with estimates ranging from 7,953 to 11,191. A significant but temporary decline of Rat River Dolly Varden was noted in 2004 when the stock was estimated to be 2,912 fish (see Table 2). Following the 2004 decline (documented in 2005) a voluntary closure of the fishery was established in 2006 and continued for three years. Three harvest monitors were allowed to harvest a total of 120 Dolly Varden per year to collect biological data. In 2007, an estimated 14,887 Dolly Varden occurred at the overwintering site, a significant increase from 2004. In 2007, observed increases in fork length of spawning fish, relatively stable sex and maturity composition and an observed pulse of juvenile production were positive findings after the 2004 decline. In March 2009, the Rat River Working Group recommended a controlled harvest allocation among the communities. The voluntary harvest allocation for 2009 was 1225 fish to be distributed among the user communities and groups and the harvest monitors; approximately 25% (provisionally 419 fish) of the allocation was harvested. Preliminary information is that about 11,000 Dolly Varden were counted at the Fish Hole in 2009. The Working Group has recommended a controlled harvest allocation of 600 fish for 2010. Ne'edilee was last fished by Gwich'in in 1978, and remains closed. The Rat River fishery continues to be monitored by the Gwich'in as it has been for the past 20 years. A new concern is the increased occurrence of parasites in the flesh of Rat River Dolly Varden.

Traditional fisheries for Dolly Varden also have occurred in adjacent Peel River drainages in the Yukon, and a few Dolly Varden have been taken in incidental harvests in the Sahtu Settlement Area.

Commercial Fisheries

In 1960, the Department of Northern Affairs and Natural Resources started a Dolly Varden fishery at Shingle Point. The fishery closed after two years. The harvest was 13,626 kg of Dolly Varden.

In 1965 and 1966, Menzies Fisheries of Edmonton operated a commercial fishery for Dolly Varden out of Pauline Cove and Ptarmigan Bay. The harvest was 7,675 kg of Dolly Varden. Due to the high cost of shipping the catch by air from the Yukon coast to Inuvik, the fishery operated with very high losses. There have been no further attempts to establish coastal commercial fisheries.

In the 1970s, there was a small commercial fishery on the Big Fish River, with a quota of 900 kg. This was unsuccessful, and was not continued.

Commercial quotas currently are not available for any Dolly Varden stocks in the GSA and ISR. The Firth and Babbage rivers within Ivvavik National Park are closed to commercial fisheries under the *Canada National Parks Act*.

Sport Fisheries

Sport fishing for Dolly Varden by DEW line personnel occurred around the stations at Komakuk and Stokes Point when the sites were active; the sites closed in 1993 and 1963 respectively. In recent years, only a small number of visitors have fished for Dolly Varden, primarily in Ivvavik National Park and Herschel Island Territorial Park.

Depending on the location, a Northwest Territorial Government Sport Fishing Licence, a Yukon Territorial Government Sport Fishing Licence, or a National Parks Canada Fishing Permit may be required. Sport fishing regulations differ among the jurisdictions. The Northwest Territories Fishery Regulations for Dolly Varden have been modified by a variation order; in the GSA and ISR the daily catch limit and the possession limit are zero Dolly Varden, i.e. catch and release only, and the Big Fish River is closed to all sport fishing. The Yukon Territory Fishery Regulations specify a daily limit of five Dolly Varden, a possession limit of ten Dolly Varden, and a minimum length of 20 cm. The fishing regulations for Ivvavik National Park specify a daily catch and possession limit of three Dolly Varden.

Most visitors to Ivvavik National Park raft the Firth River, and fish recreationally for Dolly Varden. A National Parks Fishing Permit is required to fish within the Park except by Inuvialuit beneficiaries. These permits are issued when visitors register for entrance to the Park. In addition to visitors, Parks Canada staff fish recreationally for Dolly Varden. They are required to buy a Fishing Permit. Between 21 and 49 permits have been issued each year since 2003 (Table 1). Most fishing occurs on the Firth River.

Table 1. Total number of National Park Fishing Permits issued for Ivvavik National Park, 2003 to 2009.

Year	Fishing Permits issued per year in Ivvavik National Park
2003	41
2004	21
2005	45
2006	49
2007	26
2008	22
2009	33

Scientific Collections

Over the past 30 years, Dolly Varden has been collected for scientific purposes from various stocks including the Firth, Babbage, Big Fish, Rat and Vittrekwa drainages, and

from along the Yukon Coast. This is in addition to the monitoring of Dolly Varden for the GRRB and FJMC by Gwich'in and Inuvialuit monitors. Prior to 2000, 100-200 fish were collected annually for scientific purposes. Since 2000, only fish from the traditional fisheries have been sampled.

Scientific sampling requires a Licence to Fish for Scientific Purposes issued by DFO. Issuing such a licence requires the support of the HTC or RRC and GRRB or FJMC, and should conform to any recommendations of the Rat River Working Group or the West Side Working Group. A research permit from the Government of the NWT or Yukon Territorial Government also may be required for non-DFO researchers.

From 2007-2009, nine Licence to Fish for Scientific Purposes have been issued for projects undertaking research relating to Dolly Varden and for other projects in which Dolly Varden might be caught incidentally.

Fish Health

Little information is available on contaminants, diseases and parasites of Dolly Varden in the GSA and ISR. Organochlorines were measured in Rat River Dolly Varden in 1986. Infectious Pancreatic Necrosis Virus (IPNV) was reported in Rat River Dolly Varden in 1980-84. Fishermen are concerned that parasite levels are increasing in Dolly Varden flesh.

4. Stock Assessment and Status

4.1. Stock Status

Stock assessments have been conducted since 1972 on the anadromous Dolly Varden stocks of the Firth, Babbage, Big Fish and Rat rivers. The results are summarized in Table 2, with further details in Appendix C. The Firth River and Big Fish River assessments used different methods and so are not directly comparable either within or between stocks. Assessment methods for the Babbage River and Rat River (with the exception of the 1989 Rat River assessment) used consistent methods, allowing for within-stock comparisons. These stock assessments suggest an overall decline in abundance of Dolly Varden in the Big Fish River, and a decline in the Rat River in 2004 with a possible increase in 2007.

Table 2. Stock size estimates for anadromous Dolly Varden in the GSA and ISR.

Stock	Stock Size		
	Year	Estimate	95% Confidence Interval
Firth River	1972	32,000*	NA
	1989	8,250-10,700+*	NA
Babbage River	1991	13,639	10,615-16,663
Big Fish River	1972a	20,700	15,800-27,600
	1972b	13,500	11,300-16,000
	1984	9,300	6,300-14,300
	1991a	2,840	2,014-3,666
	1991b	2,232	1,716-2,748
	1993	4,477	2,305-6,649
	1998	4,026	2,988–5,563
Rat River	1989	11,191	8,532–15,020
	1995	9,036	6,931-11,141
	1997	10,411	6,558-14,264
	2001	7,953	4,547-11,359
	2004	2,912	1,934-3,890
	2007a ¹	14,887	6,026–23,568
	2007b ¹	9,120	4,430-13,810
	2009c	11,000	

* Estimates based on aerial surveys that likely included stream resident Dolly Varden and Arctic Grayling.

a, b: some years have multiple estimates due to recaptures of tagged Dolly Varden from different locations/time of year.

a¹, b¹: the 2007 Rat River estimates have not been peer reviewed.

c: preliminary information from the Fish Hole.

No stock assessments have been conducted for the Fish, Malcolm, Vittrekwa and Blackstone rivers. GRRB studies of the Vittrekwa River in 2006 and 2007 suggest the river supports a moderate population of stream-resident male Dolly Varden and a small run of anadromous Dolly Varden numbering into the low hundreds at most. Only Ne'edilee Creek on the Vittrekwa River has been identified as a spawning ground for Dolly Varden, but there is limited spawning habitat.

4.2. Current Stock Status and Total Allowable Catch (TAC)

DFO Science most recently reviewed the status of Dolly Varden stocks in 2008 (see Appendix B). Its conclusions on stock status and Total Allowable Catch (TAC) were as follows.

- *Fish River*: the current status of the stock is unknown, and the TAC and Reference Points (see Section 4.3) cannot be determined.
- *Firth River*: the current status of the stock is unknown, and the TAC and Reference Points cannot be determined
- *Babbage River*: the current status of the stock is unknown, and the TAC and Reference Points cannot be determined.
- *Big Fish River*: the current status of the stock is unknown, and the TAC and Reference Points cannot be determined.
- *Rat River*: an updated Stock Assessment Report is under preparation. The TAC and Reference Points have not been determined. The 2009 harvest allocation was 1225 fish. The recommended 2010 harvest allocation is 600 fish.
- *Vittrekwa River*: the current status of the stock is unknown, and the TAC and Reference Points cannot be determined.

It should be noted that the GRRB has the responsibility for setting Total Allowable Harvests, as well as Minimum Needs Levels and Gwich'in Needs Levels, and that the FJMC may make recommendations to the Minister of Fisheries and Oceans on subsistence quotas.

COSEWIC is assessing the status of the northern form of Dolly Varden, and is expected to announce its conclusion in 2010. The Government of the Northwest Territories considers Dolly Varden “Sensitive”, meaning that it may require special attention or protection to prevent it from becoming “At Risk”.

4.3 Precautionary Approach

Because of the relatively low numbers of fish and limited information on each Dolly Varden stock, a precautionary approach is required for the management of Dolly Varden stocks in the GSA and ISR. A precautionary approach in fishery management is about being cautious when scientific knowledge is uncertain, and not using the absence of adequate scientific information as a reason to postpone or fail to take actions to avoid serious harm to fish stocks or their ecosystems.

As outlined in DFO's Fishery Decision-Making Framework, a precautionary approach to fishery management decisions entails establishing a harvest strategy that:

- identifies three stock status zones (healthy, cautious, critical) according to Upper Stock and Limit reference points;
- sets the removal rate at which fish may be harvested within each stock status zone;
- adjusts the removal rate, based on pre-agreed decision rules, according to fish stock status variations (e.g. spawning stock biomass or other index relevant to population productivity).

The Sustainable Fisheries Framework requires that a harvest strategy be incorporated into fishery management plans for three key reasons: to keep the removal rate moderate when the stock status is healthy; to promote rebuilding when stock status is low; and to ensure a

low risk of serious or irreversible harm to the stock. It also requires a rebuilding plan when a stock reaches low levels.

At present, the available information for the stocks of anadromous Dolly Varden in the GSA and ISR is inadequate for establishing the Upper Stock and Limit reference points, their stock status zones and removal rates

Until this information is available, an annual harvest rate of 5% or less of the stock size estimate is considered to be a low risk option when a Dolly Varden stock is healthy. The Dolly Varden stock from the Big Fish River did not show signs of recovery with an estimated rate of harvest between 4% and 9% but other factors, such as quality and quantity of available habitat, may have impeded recovery. The recommended ‘safe harvest level’ for the Rat River stock was 5% in the 2004-2006 Rat River Charr Fishing Plan.

In addition to harvest levels, other management measures help implement a precautionary approach as do responsibilities and processes established under the GCLCA and IFA.

5. Management Issues

Several issues need to be or continue to be addressed through the IFMP to help ensure the conservation, sustainable use and effective management of Dolly Varden stocks in the GSA and ISR.

Stock Conservation

Current information suggests that some Dolly Varden stocks may be declining. The cause is unknown, but it is suspected to be a combination of over-fishing, predation, habitat change and climate change (see below). The causes of stock abundance changes need to be understood, and the appropriate steps taken to address them. Stock assessments and stock and harvest monitoring are required to ensure conservation and sustainable use of Dolly Varden stocks and to optimize harvest levels.

Mixed Stock Fisheries

Dolly Varden congregate to feed along the Beaufort Sea coast, west of the Mackenzie Delta, and a significant movement of Dolly Varden occurs between Canadian and Alaskan waters. These Dolly Varden originate from several stocks in Canada and Alaska, and are harvested in both Canada and Alaska. Harvests are known to include fish originating from the Babbage, Big Fish and Rat rivers, and presumably from the Vittrekwa River. Mixed stock fisheries also occur in the Mackenzie Delta. When making annual harvest recommendations and other management decisions, the Rat River and West Side Working Groups consider that a portion of the total harvests for each stock comes from the coast. Better understanding of the origin of fish caught in the mixed stock fisheries in both Canada and Alaska is required to ensure that no stock is

overharvested. The Integrated Ocean Management Plan for the Beaufort Sea provides a framework to help address this issue.

Predation

Predation may be contributing to the decline of Dolly Varden stocks. Many community members are concerned that increased predation, especially by otters, may be a factor, especially by ‘over-harvesting’ from fish holes. An increase in the otter population has been reported since the 1970s; otters eat fish and travel up rivers, and the community is concerned that otters could wipe out Dolly Varden stocks if they reach fish holes. Black and grizzly bears, especially before hibernation, have been observed feeding on Dolly Varden runs in the Rat River, especially in the shallow rapids below the Fish Hole. Eagles and hawks also feast on Dolly Varden, especially in shallow areas of the channel, and high concentrations of eagles have been reported around Fish Hole. Ringed Seal eat Dolly Varden along the coast and their populations may be increasing; they have been reported congregating in large numbers at river mouths. Several other animals, such as mink, foxes, beluga, Northern pike (jackfish) and burbot (loche), also feed on Dolly Varden. Understanding the role of predation on stock size is required.

Habitat Change

Changes or loss of critical habitat (e.g. spawning and overwintering habitats) would severely affect Dolly Varden stocks and may have contributed to stock declines. Specific concerns include: groundwater levels at overwintering sites; reduced water flow in rivers especially at overwintering sites (both probably linked to climate change); less saline water at the Fish Hole on the Big Fish River; physical disturbance of spawning grounds and riparian habitats e.g. from resource extraction; dredging or building of transportation corridors; and possible disruption of offshore migrations by man-made structures and activities in the nearshore Beaufort Sea coast.

Dolly Varden habitats are protected through the requirements of the *Fisheries Act* and other legislation. Parks Canada gives special protection to the critical Joe Creek and Firth River fish holes within Ivvavik National Park. Areas that should be protected are identified in the Aklavik Community Conservation Plan and the Gwich’in Land Use Plan (currently undergoing its 5-year review), and include Big Fish River, Peel River and Channel, most parts of the Rat River watershed, parts of the Vittrekwa River, but not the known spawning grounds, and the Mackenzie Bay/Shallow Bay area east of Shingle Point. The Gwich’in Social and Cultural Institute is working with Gwich’in communities to nominate Big Eddy on the Husky Channel as a national or territorial historic site. Provisions of the Tarium Niryutait Marine Protected Area and the Integrated Ocean Management Plan for the Beaufort Sea may help protect marine habitats of Dolly Varden. The Integrated Ocean Management Plan for the Beaufort Sea identifies Herschel Island/Yukon North Slope and Shallow Bay as Ecologically and Biologically Significant Areas, and includes strategies and actions to help protect priority areas.

Critical Dolly Varden habitat should be identified, monitored and protected. On-land and off-shore industrial and other projects that may affect Dolly Varden habitat should be carefully reviewed to ensure appropriate protection requirements are included.

Climate Change

Impacts of climate change may affect Dolly Varden directly and indirectly. Climate change is projected to have effects on the physical environment (e.g. temperature, ice, storms etc.) which may have subsequent effects on Dolly Varden and other species. The following are some projections and concerns. The distribution of Dolly Varden could shift northwards in response to temperature changes. Other species, such as Pacific salmon (*Oncorhynchus* spp.), may become more numerous in the area and compete with Dolly Varden. Climate changes may render Dolly Varden habitat less suitable by altering substrate composition through bank and shoreline erosion and silting, and by shifting the amount of groundwater at spawning and overwintering sites upon which eggs, fry and overwintering fish depend. Climate change may be a cause of reduced water flow in the rivers and of decreased salinity in the Big Fish River. Coastal erosion may be affecting Dolly Varden's nearshore migration corridor. Climate change is projected to enhance productivity in the offshore pelagic environment, which would provide Dolly Varden with increased quality and quantity of food during the summer; Dolly Varden monitoring from 1995 to 2007 suggests this to be the case, with increased growth rates of Dolly Varden documented during this period. To the extent possible, the effects and implications of climate change on Dolly Varden should be predicted and monitored, and considered accordingly in all management actions. The Gwich'in, Inuvialuit and DFO should continue to participate in circumpolar climate change initiatives.

Over-Fishing

Over-fishing of some Dolly Varden stocks may have contributed to recent declines. Harvesters and managers should work together to ensure that over-fishing does not occur and to provide complete and accurate harvest information that is essential for the proper management of these fisheries.

GSA and ISR Overlap

Dolly Varden is distributed and harvested in both the GSA and ISR. The Overlap Agreement between the Gwich'in Tribal Council, the Inuvialuit Game Council and the Inuvialuit Regional Corporation states that wildlife (including fish) populations with ranges falling partly or entirely within the Aklavik 1400 Land will be managed jointly by the Aklavik HTC and the Ehdiitat RRC, and that each group will waive its exclusive and preferential harvesting rights. HTCs and RRCs make inter- and intra-community allocation decisions; for instance in 2009 the Aklavik HTC, the Ehdiitat RRC and the Teetl'it RRC decided on the inter-community allocation of the Rat River Dolly Varden harvest.

A formal working agreement is in place to ensure coordination and cooperation between the Rat River Working Group and the West Side Working Group. The chairs of the Working Groups are formally invited to participate as observers in the proceedings of the other Working Group. This guarantees a consensus approach to managing Dolly Varden overlap issues.

As more knowledge accrues, Sahtu and Yukon organizations may be required to participate in the management of these Dolly Varden stocks.

Canada and Alaska

Dolly Varden stocks are shared between Canada and Alaska. No formal Dolly Varden management agreement exists between Canada and the USA, nor among the Gwich'in, Inuvialuit and Inupiat. Informal information exchange has occurred. If more formal arrangements are required, the Inuvialuit/Inupiat Beluga Whale and Polar Bear commissions provide possible models.

Potential SARA Listing

If Dolly Varden is listed under *SARA*, harvesting might be affected. The purposes of *SARA* are “to prevent wildlife species from being extirpated or becoming extinct, and to provide for the recovery of a wildlife species that is extirpated, endangered or threatened as a result of human activity and to manage species of special concern to prevent them from becoming endangered or threatened”. The northern subspecies of Dolly Varden is being assessed under the COSEWIC process. COSEWIC’s designation, expected in 2010, will be considered by the Minister of Fisheries and Oceans. The Minister could choose or decline to list Dolly Varden under *SARA*, or could request more information; consultation with key stakeholders is a required part of the Minister’s decision-making process. *SARA* can allow certain activities, such as fishing, to continue if they are permitted under an action plan, management plan or recovery strategy. If Dolly Varden is listed under *SARA*, the Minister may incorporate an approved IFMP into a *SARA* action plan, management plan or recovery strategy. It is intended that this IFMP for Dolly Varden would be that approved plan, potentially allowing harvesting to continue and providing guidance on other management actions. An IFMP does not replace the formal requirements of *SARA*.

6. Objectives for the Management of Dolly Varden

6.1. General Objectives

The following general objectives exist that must be explicitly or implicitly reflected in this Dolly Varden IFMP.

Fisheries and Oceans Canada

DFO's objectives for the management of fish stocks are to protect and conserve fishery resources to ensure stable and sustainable fishing. Conservation is the first priority, followed by aboriginal food, social and ceremonial use. Any remaining harvestable surplus would then become available for other uses such as commercial and recreational fishing.

DFO also has the objective to achieve a net gain of productive capacity for fishery resources. This is achieved through fish habitat conservation, restoration and development, and the application of the habitat provisions of the *Fisheries Act*.

In addition, DFO and its partners are finalizing the Tarium Niryutait Marine Protected Areas and the Integrated Ocean Management Plan for the Beaufort Sea. Both initiatives have objectives and processes relevant for the management of Dolly Varden along the coast. These include maintaining ecosystem integrity, and protecting and conserving representative marine areas and special species.

Gwich'in

The GCLCA contains the following specific goals relevant to fishery management (N.B. under the GCLCA, wildlife includes fish):

- to protect for the future the right of the Gwich'in to gather, hunt, trap and fish throughout the settlement area at all seasons of the year;
- to conserve and protect wildlife and wildlife habitat and to apply conservation principles and practices through planning and management;
- to provide the Gwich'in with certain exclusive, preferential and other harvesting rights and economic opportunities related to wildlife;
- to respect the harvesting and wildlife management customs and practices of the Gwich'in and provide for their ongoing needs for wildlife;
- to involve the Gwich'in in a direct and meaningful manner in the planning and management of wildlife and wildlife habitat;
- to integrate planning and management of wildlife and wildlife habitat with the planning and management of all types of land and water use in order to protect wildlife and wildlife habitat;
- to ensure that traditional harvesting by other aboriginal peoples who have harvested in the settlement area can be accommodated in this agreement; and
- to deal fairly and equitably with persons who hunt, trap, fish or conduct commercial wildlife activities in the settlement area and who are not participants.

In addition, showing respect to fish, including Dolly Varden, is a key traditional component of Gwich'in culture.

Inuvialuit

The IFA also contains specific goals relevant to fishery management. They are:

- to preserve Inuvialuit cultural identity and values within a changing northern society;
- to enable Inuvialuit to be equal and meaningful participants in the northern and national economy and society;
- to protect and preserve the Arctic wildlife, environment and biological productivity;
- to establish an integrated wildlife and management regime;
- to ensure the effective integration of the Inuvialuit into all bodies, functions and decisions pertaining to wildlife management and land management in the ISR;
- to employ the relevant knowledge and experience of both the Inuvialuit and the scientific communities in order to achieve conservation; and
- to provide the Inuvialuit with certain harvesting rights subject to laws of general application respecting public safety and conservation.

In addition, showing respect to fish, including Dolly Varden, is a key traditional component of Inuvialuit culture.

Parks Canada Agency

The primary management objective of Parks Canada Agency is to protect and preserve the fish, wildlife, environment and biological productivity of Ivvavik National Park. Relevant to fishery management, Parks Canada has the following goals:

- to monitor and maintain the ecological integrity of the aquatic ecosystems;
- to support the sustainable traditional harvest of fish;
- to regulate sport-fishing within the park, in cooperation with the FJMC; and
- to work within the West Side Working Group to implement fisheries research and monitoring priorities for the region.

6.2. Management Objectives

The following long-term objectives for Dolly Varden management are consistent with the objectives of the land claims agreements, DFO, Parks Canada Agency, and those for Rat River and West Side Dolly Varden. They are broad in scope and require a long-term timeline for completion. They support the goals of achieving conservation and sustainable use of Dolly Varden in the GSA and ISR.

Stock Conservation

- To maintain healthy stocks of Dolly Varden throughout the GSA and ISR.

Ecosystem

- To preserve and protect Dolly Varden habitats in all rivers in the GSA and ISR and along the Beaufort Sea coast to ensure that the Dolly Varden stocks continue to thrive.

Stewardship

- To manage the Dolly Varden fisheries using adaptive management processes with full community participation.

Socio-economic

- To ensure the maintenance of Dolly Varden in rivers, streams and other waters of the GSA and ISR, primarily for the purpose of subsistence food and as a mechanism for the support of traditional Gwich'in and Inuvialuit culture.
- To manage, to the extent possible, the Dolly Varden fisheries in a manner consistent with Gwich'in and Inuvialuit cultural practices.

7. The Management Plan

Successful management of Dolly Varden stocks in the GSA and ISR to ensure their long-term conservation and sustainable use requires:

- applying the Precautionary Approach;
- applying harvest management guidelines;
- implementing specific management measures necessary to achieve the long-term objectives and the conservation and sustainable harvesting of Dolly Varden stocks; and
- using the adaptive co-management process to apply the Precautionary Principle, harvest management guidelines and management measures to the annual management of the Dolly Varden stocks.

7.1 Applying the Precautionary Approach

DFO's application of the Precautionary Approach requires identifying the appropriate stock status zone (healthy, cautious, critical) based on Upper Stock and Limit reference points calculated from stock assessment data, and relates allowed harvest levels to stock status.

The GRRB, the Inuvialuit Game Council and their aboriginal and government co-management partners use a comparable system in the Porcupine Caribou Harvest Management Plan. The Plan has four management zones: Green (healthy – no subsistence harvest limit, and quota for licensed hunters); Yellow (some voluntary subsistence harvest restrictions, and reduced quota for licensed hunters); Orange (some mandatory subsistence harvest restrictions, and further harvest limits for licensed hunters) and Red (extremely limited subsistence harvest, and no licensed hunting).

In 2010, insufficient stock assessment data exist to identify the stock status zone or reference points for any of the Dolly Varden stocks in the GSA and ISR. However, a preliminary 'ad hoc' assignment of Dolly Varden stocks to stock status zones can be made based on the relatively low numbers of fish, past history and current knowledge of the stocks and their harvests. The assignment is:

- Healthy (Green) Zone - no stocks;
- Cautious (Yellow) Zone - Firth, Babbage and Rat river stocks;
- Critical (Red) Zone – Fish, Malcolm, Big Fish, Vittrekwa and Blackstone river stocks, and any other Dolly Varden stocks in the GSA and ISR.

This approach is precautionary, and will be used until stock assessment data are available to calculate reference points and stock status zones or until other information warrants a change.

Table 3 summarizes specific management objectives for the three stock status zones.

Table 3. Stock Status Zones and their Management Objectives

Stock Status Zone	Stocks	Management Objectives
Healthy (Green) Zone	None	<ul style="list-style-type: none"> • 5% removal rate • Voluntary harvest management • Only general legislative requirements and sport fishing limits apply
Cautious (Yellow) Zone	Firth River Babbage River Rat River	<ul style="list-style-type: none"> • Less than 5% removal rate • Promote rebuilding of the stock through education and specific management measures • Voluntary harvest management • Only general legislative requirements and sport fishing limits apply
Critical (Red) Zone	Fish River Malcolm River Big Fish River Vittrekwa River Blackstone River	<ul style="list-style-type: none"> • No targeted harvest • Harvest closure in regulations • Promote rebuilding of the stock through education and specific management measures

7.2 Harvest Management Guidelines

Harvest Management Guidelines are required to determine when changes are needed to the harvest management measures or to the stock status classification. Ideally stock assessment and harvest data would be collected from each stock every year so that management measures can be changed as necessary to reflect any increase or decreases in stock numbers. Harvest monitoring will occur annually. A stock assessment program is planned for all stocks but after this plan, it is not expected that stock assessments will occur annually. In the absence of stock assessment information, information from proxies that are more easily measured will be collected annually as part of the harvest monitoring program or from other observations. Potential proxies include many normal observations and data collected from harvests such as number of fish caught, catch per unit effort, fish size, fish condition, sex ratio, maturity, number of migrating fish, number of overwintering fish, etc. Information from the proxies will be used in the annual reviews of Dolly Varden stocks and harvesting. The use of proxies and stock assessment data in making management decisions is complicated by natural variability of Dolly Varden stocks.

After consideration of natural variation, if significant changes in any of these parameters are noted, changes in management measures will be considered. Significant increases could result in cautiously increasing harvest levels or opening closed areas or times. Significant decreases could result in decreasing harvest levels or introducing additional fishing restrictions. Any habitat changes also will be considered in the process.

Table 4 identifies indicators, criteria and management responses for managing the harvest of Dolly Varden stocks in the GSA and ISR.

Table 4. Indicators, Criteria and Responses for Managing Dolly Varden Harvests

Indicators for Each Stock (from Data or Observers)	Criteria for Changing Management Measures	Management Responses	
		Increasing or Improving Indicators	Decreasing or Worsening Indicators
<ul style="list-style-type: none"> Stock Size and Reference Points from Stock Assessments 	<ul style="list-style-type: none"> New information 	<ul style="list-style-type: none"> Upgrade stock status zone if necessary (e.g. Red to Yellow) Adjust harvest levels if necessary 	<ul style="list-style-type: none"> Downgrade stock status zone if necessary (e.g. Yellow to Red) Adjust harvest levels if necessary
<ul style="list-style-type: none"> Catch Catch Per Unit Effort 	<ul style="list-style-type: none"> Significant increase or decrease (on top of natural variability) 	<ul style="list-style-type: none"> Consider increasing harvest and changing stock status zone from cautious to healthy 	<ul style="list-style-type: none"> Consider decreasing harvest and changing stock status zone from cautious to critical
<ul style="list-style-type: none"> Age Length Weight Condition 	<ul style="list-style-type: none"> Significant increase or decrease (on top of natural variability) 	<ul style="list-style-type: none"> Consider increasing harvest 	<ul style="list-style-type: none"> Consider decreasing harvest
<ul style="list-style-type: none"> Age Structure 	<ul style="list-style-type: none"> Weak year class 		<ul style="list-style-type: none"> Consider decreasing harvest Consider downgrading stock status zone

			<ul style="list-style-type: none"> • Consider changing harvest locations, time and/or gear
<ul style="list-style-type: none"> • Recruitment 	<ul style="list-style-type: none"> • Weak recruitment 		<ul style="list-style-type: none"> • Consider decreasing harvest • Consider changing harvest locations, time and/or gear
<ul style="list-style-type: none"> • Other Information (e.g. Habitat) 		<ul style="list-style-type: none"> • Consider appropriate changes 	<ul style="list-style-type: none"> • Consider appropriate changes

7.3 Management Measures

In applying the stock status zones and the Harvest Management Guidelines, specific management measures also are required to manage the Dolly Varden stocks effectively. Table 5 outlines the strategies and measures for the management of Dolly Varden in the GSA and ISR. These strategies and measures are arranged under the appropriate management objective. They are consistent with the general objectives (see Section 6.1) and attempt to address the issues (see Section 5). Leads are identified for implementation measures as appropriate. Many of the implementation measures are voluntary and have been developed by the Rat River Working Group and the West Side Working Group.

Table 5. Objectives, management strategies and management measures for Dolly Varden in the GSA and ISR.

Management Strategies	Management Measures (Lead)
<p><i>Stock Conservation Objective</i></p> <ul style="list-style-type: none"> • To maintain healthy stocks of Dolly Varden throughout the GSA and ISR 	
<ul style="list-style-type: none"> • Conduct stock assessments of all known anadromous Dolly Varden populations 	<ul style="list-style-type: none"> • Focus resources on developing and implementing a comprehensive stock assessment plan for anadromous Dolly Varden in the GSA and ISR (Working Groups and DFO) <ul style="list-style-type: none"> ○ Complete the current stock assessment plan (DFO) ○ Plan a regular cycle for repeating stock assessments with emphasis on harvested stocks (Working Groups and DFO)

	<ul style="list-style-type: none"> ○ Conduct research to understand the structure of mixed stock fisheries (DFO) ○ Conduct research on stock movement between Canada and Alaska (DFO) ○ Investigate and use appropriate new technologies for estimating stock abundance (e.g. DIDSON) (DFO) ○ Integrate stock assessment and ecological integrity monitoring of Firth River system (DFO and Parks Canada Agency)
<ul style="list-style-type: none"> ● Identify other harvestable Dolly Varden stocks in the GSA and ISR 	<ul style="list-style-type: none"> ● Include potentially harvestable stocks in the stock assessment plan (Working Groups and DFO) <ul style="list-style-type: none"> ○ Prioritize other stocks including Babbage, Vittrekwa and non-anadromous stocks
<ul style="list-style-type: none"> ● Ensure the harvesting of Dolly Varden is sustainable in the long term 	<ul style="list-style-type: none"> ● Take a precautionary approach in making management decisions (Working Groups, DFO, FJMC, GRRB and Parks Canada Agency) ● Develop Reference Points and Total Allowable Catch estimates for harvested Dolly Varden stocks (DFO) ● Determine Safe Harvest Levels/Total Allowable Harvests for all stocks and the coastal and Delta fisheries (Working Groups, FJMC, GRRB, DFO) <ul style="list-style-type: none"> ○ Maintain Dolly Varden harvests at 5% or less of stock levels until specific Reference Points and Total Allowable Catch estimates are developed ○ Introduce more stringent harvest levels if conservation concerns exist ○ Introduce other voluntary closures if necessary ○ Enable stock levels to recover or increase ● Establish harvest strategies for healthy, cautious and critical zones for all Dolly Varden stocks (Working Groups) ● Continue current stock-specific conservation measures until changes are required (Working Groups): <ul style="list-style-type: none"> ○ The Big Fish River is closed to fishing ○ The Rat River Fish Hole is closed to fishing

	<ul style="list-style-type: none"> ○ The Rat River harvest level is 600 Dolly Varden for 2010, and is to be reviewed annually ● Do not open any commercial fisheries (DFO, FJMC and GRRB) ● Improve sport fishing management (DFO and Parks Canada Agency) <ul style="list-style-type: none"> ○ Maintain NWT daily catch limit and possession limit for sport fishing at zero (DFO) ○ Review and modify if necessary Yukon sport fishing requirements (DFO) ○ Continue to regulate sport fishing within Ivvavik National Park (Parks Canada Agency) ● Document management history in the GSA and ISR (DFO, FJMC and GRRB) ● Identify to GNWT the need for research on and control of predators (Working Groups) ● Educate youth on the importance of Dolly Varden and research (Working Groups)
<p style="text-align: center;"><i>Ecosystem Objective</i></p> <ul style="list-style-type: none"> ● To preserve and protect Dolly Varden habitats in all rivers in the GSA and ISR and along the Beaufort Sea coast to ensure that the stocks continue to thrive 	

<ul style="list-style-type: none"> • Identify and assess critical habitats 	<ul style="list-style-type: none"> • Develop and implement a comprehensive winter and summer habitat assessment plan for Dolly Varden including photographic and other surveys and water quality and quantity studies (Working Groups and DFO) <ul style="list-style-type: none"> ○ Identify carrying capacity for each river (DFO) ○ Continue Rat River monitoring studies and survey its length (DFO and GRRB) ○ Monitor Firth and Babbage fish holes (Working Groups, DFO and Parks Canada Agency) ○ Monitor benthic invertebrates (DFO, Parks Canada Agency) ○ Measure water quality and quantity in the Firth, Rat and other rivers (DFO and Parks Canada Agency) ○ Involve the youth (Working Groups) • Investigate possible restoration of slumps at fish holes (DFO and Working Groups) • Partner with ArcticNet, Water Survey of Canada and others as possible (DFO and Working Groups)
<ul style="list-style-type: none"> • Protect Dolly Varden and its habitats from adverse effects of development 	<ul style="list-style-type: none"> • Provide information on and protection requirements for Dolly Varden and its habitats to review and regulatory agencies (DFO, FJMC and GRRB) <ul style="list-style-type: none"> ○ Ensure spawning and overwintering areas are fully protected and riparian habitats are not damaged ○ Highlight current national, regional and local protection requirements ○ Provide the Dolly Varden IFMP to developers, regulators and Beaufort Sea managers • Continue to protect critical Dolly Varden habitat in Ivavik National Park (Parks Canada Agency) <ul style="list-style-type: none"> ○ Give special protection to the Joe Creek and Firth River fish holes • Protect Dolly Varden from fuel spills, ballast water and drill cuttings (DFO, FJMC and GRRB) • Improve understanding of effects of seismic activity on Dolly Varden (DFO) • Conduct patrols and inspections of developments that may affect Dolly Varden (DFO)

	<ul style="list-style-type: none"> • Protect Dolly Varden marine habitats through <i>Oceans Act</i> initiatives and the <i>Fisheries Act</i> (DFO and FJMC) <ul style="list-style-type: none"> ○ Participate in relevant Beaufort Sea Integrated Ocean Management Plan initiatives including identification of Ecologically and Biologically Significant Areas • Monitor selected Dolly Varden habitats (DFO, Parks Canada Agency, HTC and RRCs) • Monitor possible effects of climate change on Dolly Varden and its habitats (DFO and Parks Canada Agency) <ul style="list-style-type: none"> ○ Develop studies to investigate climate change and adaptation measures (DFO) • Conduct contaminant, disease and parasite surveillance and studies (DFO) • Monitor invasive species (DFO)
<p><i>Stewardship Objective</i></p> <ul style="list-style-type: none"> • To manage the Dolly Varden fisheries using adaptive management processes with full community participation 	
<ul style="list-style-type: none"> • Manage the Dolly Varden fisheries in the GSA and ISR through the Rat River Working Group and the West Side Working Group 	<ul style="list-style-type: none"> • Review harvest, research and other new information annually and recommend revised conservation, other measures and studies as appropriate (Working Groups) <ul style="list-style-type: none"> ○ Engage communities as much as possible through education, consultation, communication and media ○ Hold joint meetings • Establish voluntary annual harvest levels (Working Groups) • Fish in accordance to the requirements of the NWT Fishery Regulations (Harvesters) • Apply Rat River management measures to all other fisheries: <ul style="list-style-type: none"> ○ use 4” or 4.5” mesh nets ○ use nets no more than 30 meshes deep ○ use no more than three nets per household ○ use nets no more than 25 yards long ○ check nets twice per day (Harvesters)
<ul style="list-style-type: none"> • Monitor coastal and inland fisheries 	<ul style="list-style-type: none"> • Develop and conduct plans for harvest studies and monitoring of all coastal and

	<p>inland fisheries (Working Groups and DFO)</p> <ul style="list-style-type: none"> ○ Continue harvest studies ○ Encourage community reports on fish run information, TK, ice and habitat conditions ● Provide information on harvests to monitors and others as requested (Harvesters) ● Report habitat changes and incidents of predation to Working Groups (Harvesters) ● Return all Dolly Varden tags with accurate information (Harvesters) ● Introduce a comprehensive harvest monitoring program (DFO, FJMC, GRRB and Parks Canada Agency) <ul style="list-style-type: none"> ○ Continue Rat River, Shingle Point and Ivvavik National Park monitoring programs (Working Groups and Parks Canada Agency) ○ Monitor other fisheries, including Herschel Island Territorial Park (Working Groups) ● Monitor parasites in Dolly Varden flesh (Fishermen) <ul style="list-style-type: none"> ○ Inform harvesters about monitoring parasites and fish health (DFO)
<ul style="list-style-type: none"> ● Involve the harvesters and communities in decision-making and information exchanges 	<ul style="list-style-type: none"> ● Meet each year with the harvesters and communities (Working Groups) <ul style="list-style-type: none"> ○ Include harvesters in decision-making processes on harvesting and allocation ○ Ensure annual recommendations are communicated effectively ● Develop a Dolly Varden communication plan and educational program (Working Groups) ● Increase information sharing with communities (Working Groups, DFO, FJMC, GRRB, Parks Canada Agency) <ul style="list-style-type: none"> ○ Ensure timely reporting from researchers with plain language information ○ Use existing media e.g. community newsletters ○ Use radio and internet to communicate important issues ○ Synergise efforts with ongoing investigations e.g. Arctic Borderlands ● Engage additional community members <ul style="list-style-type: none"> ○ Develop youth outreach programs

<ul style="list-style-type: none"> • Ensure compliance with requirements for the conservation and sustainable use of Dolly Varden 	<ul style="list-style-type: none"> • Promote compliance through education (Working Groups) <ul style="list-style-type: none"> ○ Encourage communication between harvesters and monitors • Comply voluntarily with management measures (Harvesters) • Conduct fishery patrols within their respective jurisdictions (DFO – see Appendix G) <ul style="list-style-type: none"> ○ Increase C&P presence (DFO) • Conduct prevention activities for Ivvavik National Park as required (Parks Canada Agency – see Appendix G)
<p><i>Socio-Economic Objectives</i></p> <ul style="list-style-type: none"> • To ensure the maintenance of Dolly Varden in rivers, streams and other waters of the GSA and ISR, primarily for the purpose of subsistence food and as a mechanism for the support of traditional Gwich'in and Inuvialuit culture • To manage, to the extent possible, the Dolly Varden fisheries in a manner consistent with Gwich'in and Inuvialuit cultural practices 	
<ul style="list-style-type: none"> • Ensure the subsistence food fishery is the first priority for sustainable use 	<ul style="list-style-type: none"> • Continue to ensure sustainable traditional food fisheries have priority over other uses of Dolly Varden (DFO, Working Groups, RRCs, HTC and Parks Canada Agency) <ul style="list-style-type: none"> ○ Do not open any commercial fisheries (DFO, FJMC and GRRB) ○ Amend sport fishing regulations as required (DFO and Parks Canada Agency)
<ul style="list-style-type: none"> • Ensure effective allocation of the harvestable fish 	<ul style="list-style-type: none"> • Allocate harvests between the GSA and ISR as necessary (Working Groups and Communities) <ul style="list-style-type: none"> ○ Involve all stakeholders ○ Respect GLCA and IFA process requirements • Divide allocations amongst their own membership (RRCs and HTC) <ul style="list-style-type: none"> ○ Include elders and others in the distribution of Dolly Varden
<ul style="list-style-type: none"> • Promote traditional practices in implementing Dolly Varden management decisions 	<ul style="list-style-type: none"> • Include elders and youth at meetings (Working Groups, RRCs, HTC) • Encourage traditional values (RRCs, HTC) <ul style="list-style-type: none"> ○ Educate youth about traditional values • Include traditional management measures in annual operational plans (Working Groups)

	<ul style="list-style-type: none">• Show respect to Dolly Varden (Harvesters)<ul style="list-style-type: none">○ Give priority in fishing site selection to fishermen remaining at the fishery throughout the season (RRCs and HTC)○ Harvest only what is needed for their own subsistence purposes (Harvesters)○ Kill quickly and humanely (Harvesters)○ Handle fish cleanly (Harvesters)○ Store and process Dolly Varden to minimize wastage (Harvesters)
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Appendix F contains more information on the Research and Monitoring Plan, and Appendix G contains more information on the Compliance Plan.

In summary, implementation of this IFMP includes:

- taking a precautionary approach in making decisions on Dolly Varden management;
- applying the harvest management guidelines, including closing the Fish, Malcolm, Vittekwa and Blackstone rivers to Dolly Varden fisheries;
- continuing with existing stock conservation measures;
- enabling recovery of depleted stocks;
- applying, where appropriate, the fishing practices and management measures of the Rat River Fishing Plan to other Dolly Varden stocks;
- complying with the harvest requirements;
- monitoring harvest levels of the Dolly Varden stocks each year;
- undertaking the current stock assessment plan (see Table 6);
- adjusting harvest levels and allocations each year as appropriate to ensure continued sustainable use;
- protecting freshwater and marine habitats of Dolly Varden stocks;
- conducting compliance activities as necessary
- developing and undertaking with the communities an integrated research and monitoring plan to address stock conservation and habitat protection requirements; and
- developing and delivering a comprehensive cultural and educational program.

Some of the stock conservation and monitoring measures are summarized by a stock or fishery basis in Table 6.

Table 6. Some measures for the management of specific Dolly Varden stocks or fisheries in the GSA and ISR.

River/Fishery	Harvest Level	Fishing Restrictions	Stock Assessment Plan	Monitoring
All stocks and fisheries	5% or less of the stock size estimate	4" or 4.5" mesh nets Nets no more than 30 meshes deep No more than three nets per household Nets no more than 25 yards long Check nets twice per day No commercial fishing Sport fishing regulated		Harvest Water quality/quantity
Fish River	No harvesting			
Malcolm River	No harvesting			
Firth River	5% or less of the stock size estimate		2012-14	Ongoing: Water Quality and Quantity
Babbage River	5% or less of the stock size estimate		2011-12	
Big Fish River	Closed		2009-10	Water Quality and Quantity
Rat River	2010: 600 fish recommended		2009-10	Ongoing: Dolly Varden monitoring
Vitrekwa River	No harvesting		2010-12	
Blackstone River	No harvesting			
Coastal fisheries	To be determined		To be determined	

7.4 The Annual Adaptive Co-Management Process

The Rat River Working Group and the West Side Working Group will lead the development of annual plans (fishing plans) for the management of the Dolly Varden stocks in the GSA and ISR. The Working Groups will involve the HTC and RRCs, communities, fishermen, DFO, GRRB, FJMC, Parks Canada Agency and others as appropriate. The development of the plans will follow the adaptive co-management approach identified in Section 2.2. The process will include the review of harvest information to determine whether any changes are required to management measures, and identification of any other required initiatives.

Table 5 is comprehensive in identifying the long-term needs for effective management of Dolly Varden stocks. In developing their annual plans, the Working Groups will:

- implement with DFO a comprehensive one-time stock assessment program that would lead to the identification of safe harvest levels and other necessary management measures for the Dolly Varden fisheries;

- develop and implement a comprehensive annual harvest monitoring program that would track harvest levels and other information indicating whether positive or negative changes are occurring to the Dolly Varden stocks;
- use the information from the stock assessment and harvest monitoring programs with the harvest management guidelines to determine:
 - whether management changes are required,
 - whether stock status zones should be changed,
 - when new stock assessments are required,
 - whether additional research initiatives (e.g. on habitat) should be undertaken,
 - whether the harvest monitoring program should be changed;
- use existing information to protect Dolly Varden habitats;
- determine whether to conduct additional research (e.g. on habitat);
- determine whether to undertake other essential initiatives such as
 - discussing Dolly Varden management with Alaska,
 - reviewing sport fishing regulations; and
- develop and deliver an education program.

7.5 Management of the Implementation Process

The implementation of the Dolly Varden IFMP needs to be managed well.

- A Steering Committee of senior representatives of DFO, the FJMC, the GRRB and Parks Canada Agency will be formed with clear Terms of Reference.
- The Terms of Reference for the Rat River Working Group and the West Side Working Group will be reviewed and modified as necessary to ensure they reflect the Working Groups' key roles in implementing the Dolly Varden IFMP.
- DFO, the FJMC, the GRRB and Parks Canada Agency will ensure through the Steering Committee that funds are available to support the effective implementation of their responsibilities in this Dolly Varden IFMP and for its revisions.

Discussion is required to determine whether and when to formally involve the Sahtu, Yukon and Alaska in the IFMP for the Dolly Varden stocks of the GSA and ISR.

The successful implementation of these management measures should ensure the conservation and sustainable use of Dolly Varden stocks in the GSA and ISR and aid the recovery of any depleted stocks.

However, the effects of climate change on Dolly Varden stocks remain unknown, and may affect the conservation of Dolly Varden stocks despite effective implementation of these management measures.

8. Performance Review and Modifications

Each year, the Rat River Working Group and the West Side Working Group will meet together to review the success of the year's fishing season and management activities,

plus any new information that has been collected. The performance review process will follow the adaptive co-management process (see Section 2.2). The Working Groups will propose any modifications of management measures that are needed to ensure the objectives continue to be met. The Working Groups will provide an annual report to the Steering Committee of DFO, FJMC, GRRB and Parks Canada Agency. The Steering Committee will be required to approve any changes to the IFMP.

Every three to five years the IFMP will undergo an in-depth evaluation to determine whether its objectives are being achieved and whether any changes are required. The in-depth IFMP evaluation should include assessment of the IFMP, the IFMP development process and the effectiveness of the implementation measures, and should make recommendations and suggestions for improvement. Evaluation criteria and measurable indicators need to be developed to help guide this process.

If Dolly Varden is listed under *SARA*, the resultant action plan, management plan or recovery strategy would have to be reviewed every five years. The *SARA* review process and the IFMP review process should be linked closely.

9. Signature Page

The Department of Fisheries and Oceans, the Fisheries Joint Management Committee, the Gwich'in Renewable Resources Board and the Parks Canada Agency support this Dolly Varden Integrated Fisheries Management Plan for the Gwich'in Settlement Area and the Inuvialuit Settlement Region, and are committed to its effective implementation.

The signatories wish to acknowledge the roles of the Aklavik HTC, the Ehdiitat RRC, the Teetl'it RRC, the Rat River Working Group and the West Side Working Group in the development of the IFMP, and their roles and responsibilities for its implementation.

The signatories undertake to conduct an in-depth review and evaluation of the Dolly Varden IFMP every three to five years.

R. Lambe, Regional Director General, Central and Arctic Region
Department of Fisheries and Oceans

V. Gillman, Chair
Fisheries Joint Management Committee

R. Charlie, Chair
Gwich'in Renewable Resources Board

I. Thomas, Field Unit Superintendent
Parks Canada Agency