This document contains written Testimony by Shawn Stebbins, President and CEO of Archipelago Marine Research Ltd. The testimony will be presented to the House Subcommittee on Insular Affairs, Oceans and Wildlife oversight hearing on implementation of the Magnuson-Stevens Fishery Conservation and Management Act on October 27, 2009.

1.0 Introduction

The House Subcommittee on Insular Affairs, Oceans and Wildlife has requested testimony from Archipelago Marine Research Ltd. a privately held Canadian Corporation based in Victoria, British Columbia (BC). Archipelago will provide perspectives regarding monitoring needs to provide fisheries data in support of better management of fish resources and improved accountability by harvesters.

2.0 Archipelago Marine Research Ltd.

Archipelago's experience in this area comes from 30 years of providing objective, third party marine resource management advice and services. And more specifically with providing advice and services around the planning, implementation and operation of commercial fishery monitoring programs, primarily in British Columbia, Canada and more recently in the USA, EU countries, Australia and New Zealand.

The company has over 180 employees working out of a head office located in Victoria, BC and three regional offices along coastal BC. Our services benefit a diverse array of clients, including commercial fishers, resource industry groups, engineering companies, developers, government agencies, and non-governmental organizations. Archipelago's primary business services include fishery management consulting, fishery monitoring and marine environmental services.

Archipelago is a trusted advisor to both government and private industry clients. The company has developed a suite of in-house technologies and methods which enable the provision of a unique array of services in support of sustainable management of marine resources. The company's success and reputation can be attributed to its professional approach, client confidence with objectivity, and its arm's length relationship with both private industry and government.

Archipelago's experience with fishery management and monitoring services is extensive, including implementation and operation of at sea and shore based data collection programs for a wide variety of fin fish and shell fish fisheries both in Canada and internationally. Data gathering has traditionally been carried out by Observers but more recently electronic technologies have been developed to augment at sea monitoring capabilities. This Electronic Monitoring (EM) technology, which employs an on board computer and an array of data sensors, was developed to provide a more cost-effective monitoring alternative, and in the case of small vessels not suitable for carrying Observers, the first practical monitoring solution.

Archipelago delivers a variety of Observer programs and Electronic Monitoring Programs in British Columbia, many of which have been in operation for more than 15 years. Our experience with US fisheries is more recent but is growing, and includes provision of consulting advice and monitoring services in the South East, North East, South West and North West regions. Services have varied, ranging from providing technical analysis and advice, to designing and delivering small scale proof

of concept monitoring programs, to delivery of a long-term electronic monitoring program for the Pacific North West Whiting fishery, which is described later in this document.

3.0 The Fishery Monitoring Environment in British Columbia

Many fisheries in British Columbia have expanded reporting and monitoring requirements and many of these are met through the use of independent third party service providers. There are four companies offering monitoring services in BC, three of which offer specialty services to one or a few similar fisheries. Archipelago is the largest company, providing a broad range of services (Logbooks, Dockside Monitoring, At Sea Observing, and Electronic Monitoring) to a variety of fisheries. Monitoring programs in BC are uniformly structured with a single company providing services for an entire fishery or fleet group, ensuring cost efficiencies, business stability and continuity of services across the fishery. In most programs, the fishing industry funds the majority of the monitoring cost with industry associations contracting directly with service providers for monitoring services. The private service providers, who must be independent, are selected through a competitive bidding process and must meet performance specifications defined by both industry and the lead agency, Fisheries and Oceans Canada (DFO). Most monitoring programs are fully stand alone where the service provider is responsible for developing the methodology and resources to carry out all the steps from program design, implementation and operation to final data delivery and reporting. The 'products' of monitoring programs are the provision of service to meet the legislated and operational needs of the fishery and the provision of keypunched, edited data, analyses and reports to support management and science activities.

Monitoring programs operate under the authority of contractual arrangements between the service provider, industry associations and DFO. The contracts clarify the terms of service, responsibilities of parties, and generally bind service providers with the same privacy of information requirements as would occur if these programs were carried out by government. DFO has established a regulatory regime for the provision of third party dockside and at sea monitoring services in the Fishery General Regulations. The regulations identify the rights, qualifications, duties, restrictions and certification process for fishery observers. All individuals and corporations performing monitoring duties under the Fisheries General Regulations must carry the designation of certified fishery observer.

4.0 Example Monitoring Programs

The fisheries and monitoring program examples provided here are all familiar to Archipelago and all operate under carefully managed annual catch limits and have developed high levels of accountability by the harvesters. They present a range of scenarios involving both catch share management and competitive fisheries; Canada and the U.S.; as well as varied monitoring solutions.

4.1 BC Groundfish Trawl Fishery

BC's groundfish trawl fishery includes a fleet of about 80 vessels that subdivide into a small inshore fishery, and a large vessel offshore component. The fleet completes 1,900 trips, 7,700 days at sea, and lands 200 million pounds annually at a value of about $50 million (USD). The fishery occurs coast wide and year round. The broader groundfish fishery encounters over 140 different species but encompasses about 60 different managed stocks. License holders of trawl and hook and line vessels are allocated individual quota shares on an annual basis and there is a significant level of trading in

order to establish quota share portfolios that meet specific fishing plans and expected bycatch levels. Groundfish fisheries are universally governed by a principle of individual accountability, which mandates high levels of at-sea and shore based monitoring and compels fishers to account for their entire catch, including discards. DFO's groundfish management policies are guided by three objectives:

- 100% of all catch, including fish discarded at sea, must be accounted for.
- Catch levels for the 60 managed groundfish stocks must remain within established quotas.
- Licence holders must be individually accountable for their fishing practices.

In addition to meeting these agency requirements, industry requires accurate catch accounting in order to support quota trading needs. Industry, which is represented through several organizations, work cooperatively with DFO to develop a management and monitoring regime that meets the needs of both parties.

The monitoring system for the trawl groundfish fishery incorporates hails, logbooks, 100% dockside monitoring, 100% at sea monitoring with observers (offshore fishery) and electronic monitoring (inshore fishery). All monitoring components are delivered by a single service provider (Archipelago) allowing for the development of an integrated data system. Most components of the monitoring system are contracted and funded directly by industry. Industry and government participate on a committee to develop specifications for and manage the monitoring program. DFO partially funds the at sea observer program and electronic monitoring components (30%) and has the lead role in contracting the at sea observer service. The total cost of the monitoring program, is about $309 USD per sea day, or about 4.7% of landed value of trawl groundfish.

4.2 BC Groundfish Longline Fishery

The other component of BC's groundfish fishery is the longline fleet, which collectively comprises about 250 vessels, 1,600 trips, 12,000 days at sea, catches about 30 million pounds, and is valued at about $77 million USD annually. There are six separately licensed fishery components including halibut, sablefish, lingcod, dogfish, inshore rockfish, and offshore rockfish. While each fishery has a specific species focus, there is a high species overlap between fisheries. The groundfish longline fishery is part of an overall integrated management plan that also encompasses the groundfish trawl fishery, which shares catch species and management regime as described above for groundfish trawl.

The monitoring program for the longline groundfish was developed collaboratively by industry, DFO and Archipelago over a five year period beginning in 2002. The monitoring program includes vessel logbooks, a hail system, 100% dockside monitoring, and 100% electronic monitoring. One hundred percent at sea monitoring with EM became mandatory for the fleet in 2006 to comply with DFO's new management objectives requiring full accountability for all catch. All vessels must carry an EM system (or an observer) which records sensor data continuously during the fishing trip and imagery during gear setting and retrieval operations. Although video data is collected for all gear hauling activity only a 10% sample is randomly selected for review and image interpretation. The results of the image interpretation are compared with catch record provided in the vessel logbook and the level of agreement is evaluated. The results of this audit comparison are forwarded to both the fisher and DFO. A series of criteria have been developed to determine a pass or a fail for this audit. Failing an audit indicates that vessel logbook data are unreliable and may warrant further program consequences such as reviewing additional image data to construct an independent catch record, providing feedback to the skipper on areas of needed improvement, and possible punitive measures.

An industry led committee determines service delivery expectations and selects the service provider. This committee has chosen an independent third party service delivery model with a single provider (Archipelago) for all monitoring services. This approach has allowed for the development of a fully integrated data system. Industry and DFO co-fund the monitoring program with industry covering about 75% of the costs. The total cost of the monitoring program, including EM equipment, is about $170 USD per sea day, or about 3% of landed value.

4.3 BC Area "A" Crab Fishery

The Area "A" crab fishery takes place in the shallow marine waters of Hecate Strait and Dixon Entrance in northern British Columbia. The 50 vessel fleet collectively fishes about 35,000 single buoyed crab traps. The fleet collectively fishes about 4,000 days per year, fishing 32,000 traps and making about 500,000 trap hauls. Catches vary from year to year and recent levels are around 1,400 metric tons (~3 million pounds), valued at about $9 million USD. Industry leadership is through the Area "A" Crab Association. Formed in 1997, the Association's purpose is to advise and contribute to the management, monitoring, enforcement, and research activities for the fishery through consultation with DFO.

The fishery is managed by area soft shell (moulting crabs) closures, vessel trap limits and limits on trap soak duration. This is not a catch share fishery. The fishery is monitored with hails, harvest logs, and an electronic monitoring program which was established in 2000.

The monitoring program developed out of a mutual requirement of DFO and industry to effectively address the monitoring issues around trap limits, soak times and concerns over gear congestion, trap theft and damage. The Area "A" Crab Association provided leadership in contracting with Archipelago to carry out pilot studies and develop the EM program. The EM system includes radio frequency identification technology to efficiently record and monitor all trap hauls in the fishery. The monitoring program is contracted and funded entirely by industry and is estimated to cost about 2% of the value of the fishery, or about $75 USD per vessel day at sea.

4.4 US West Coast Shore Side Whiting Fishery

The commercial whiting fishery that operates off the coasts of Washington, Oregon and northern California is seasonally intense in spring and summer, and consists of both an at-sea processor fleet and a shore-based fleet. The shore-based fleet comprises approximately 40 vessels that make day trips and deliver their catch to six ports. The Pacific Fishery Management Council regulates the quota for different components of this fishery, and the total annual quota is about 100,000 metric tons, valued at about $25 million USD.

At-sea monitoring for the west coast shore side hake fishery is required to document interactions with threatened bycatch species such as rockfish and salmon and to document catch wastage of the target species which is an important concern in the fishery. Due to the large volumes of hake caught relative to bycatch, and to a rapid parasitic degradation common to freshly caught hake, the most practical catch handling method is to quickly transfer unsorted catch to refrigerated fish holds in order to slow the degradation process. Attempting to sort bycatch at sea would be labour intensive and would delay chilling the whiting. Estimates of bycatch are thus made from offloaded catch and it is necessary to ensure that landed fish are not pre-sorted or discarded at sea. At sea discard monitoring has been useful both in developing individual vessel accountability measures to encourage maximized retention and estimating any dumping excess catch that does occur.

The monitoring program for the shore based fleet includes logbooks, dealer reports, port sampling and 100% electronic monitoring. A pilot study carried out in 2002 demonstrated the feasibility of EM as a tool for discard monitoring. The EM program began as a science-based program to characterize the fishery and has recently transitioned to a management program with a stronger compliance focus.

Monitoring services for this fishery are managed through a number of agencies. The Pacific States Marine Fisheries Commission manages the Dealer Report, Fishing Log and port sampling data. National Marine Fisheries Service (NMFS) contracts with a service provider (Archipelago) for provision of the EM program. Archipelago separately contracts with each permit holder for the provision of the on board EM service. Industry and NMFS co-fund the EM program with industry covering about 75% of the costs. Industry now pays for all costs associated with placement and operation of EM systems aboard the vessel, and the cost for initial interpretation of EM data. NMFS pays for program outreach, training of NMFS staff, and data analysis, reporting and delivery of data to NMFS. The total cost of the EM program is about $250 per sea day, or about 1% of the catch value. The EM program cost is about 25% less than the cost of an at-sea observer program at the same coverage levels.

5.0 Data Requirements and Monitoring Tools

The data required to support effective management of fisheries are generally very well understood, involving detailed description of the catch and effort and in many cases biological characteristics of the catch. In too many fisheries this simple data set is either unavailable or there are data gaps or serious concerns about the reliability and/or credibility of the data. These concerns can be based on many factors, including: the data source, completeness of data set, sampling protocols, data format, timeliness and quality control.

When Fishery Managers establish annual catch limits they may build safety margins into their annual catch limits (ACLs) due to uncertainty surrounding the data. Improved monitoring and data collection processes can lead to increased ACLs due to the increased confidence Fishery Managers have in their data set and resulting assessment process.

The desired data points for effective fishery management can be numerous but are generally subdivided into the following categories:

- **Catch and catch disposition:** species, pieces, weight, retained or discarded, condition if discarded, product type if retained (also catch handling)
- **Fishing Gear, Effort and Methods:** fishing location (lat and long, area, zone), gear type (format and specifications), gear amount, time deployed, bait detail
- **Protected species interactions:** observed interaction with protected species, direct and indirect and utilization of mitigation measures.
- **Biological data:** sex ratios, maturity, length and/or age profiles, a variety of other biological characteristics, usually species specific

Although these categories and the examples provided appear relatively straight forward, there is considerable detail and complexity associated with successful implementation of a data collection program designed to gather the required data in a consistent and reliable manner. This challenge is magnified in multi-species and/or multi-gear fisheries and can be further magnified by a multi-jurisdictional environment. However, when program design and implementation are done properly the result will be a credible data set that can be used with a high degree of confidence to support fishery management functions and informed decision making.

The two primary opportunities for capturing fishery-dependent data are from an active fishing vessel at sea or from the site where the catch is landed.

5.1 Data Collection from Sea

Many of the critical data points needed for fishery management purposes are only available at sea from active fishing vessels. This presents a difficult challenge for Fishery Managers due to the complexity and cost of collecting real time data from the deck and wheelhouse of a commercial fishing vessel. In general, commercial vessels operate with the single primary motivation of capturing fish to deliver to a buyer and then return to sea again. Without incentives to do so, there tends to be little time, space or inclination for the skipper or crew to follow rigorous data collection and documentation protocols let alone make them a priority.

The critical data points that are only available from sea include:

- species catch and fishing time by area or location (numbers and/or weight)
- amount and type of gear
- species discarded (numbers and/or weight) and their condition (live, dead).
- habitat interactions
- protected species interactions

The most commonly used tools for data collection from sea include:

- fisherman completed Fishing Logbooks
- hail-in, hail-out fishing notification process
- aerial census
- VMS satellite tracking systems
- at-sea observer programs
- electronic monitoring

5.2 Data Collection from the Landing Site

Collecting data from a land-based location is much simpler and less costly than at sea but the data available are more limited. At this point, it is generally impossible to attribute the landed catch back to a specific catch location. In many cases some form of processing may have occurred such that the round catch weight and sometimes length and other biological information may no longer be attainable. The greatest limitation, however, is the inability to collect any independent data on catch that was released at sea. Contact with the skipper at the landing site also presents an opportunity to collect fishing log pages directly and interview the skipper with respect to the trip and the fishing log information.

The landing site is often the first and best opportunity to collect independent catch weights. Independently collected and verifiable landed weights are important to the credibility and success of many quota share managed fisheries. The data points that are available from the landing site include:

- landed weight by species (or a count in some cases)
- product type and condition
- biological data (length, sex, aging structures etc.)
- market information (buyer, shipping method, destination, price)

The most commonly used tools for data collection from the landing site include:

- buyer completed dealer reports
- dealer interviews and audits
- dockside monitoring

6.0 Monitoring Program Issues and Considerations

There is no single "silver bullet" monitoring solution for all fisheries. Different fisheries will each be suited to different monitoring strategies depending on many factors, but most importantly, the primary program objectives and constraints. These must be clearly articulated and fully explored before the best approach can be developed for each unique application.

6.1 Self-reporting vs. Independent data collection

One of the most significant issues that affect scientific value, general usability and decision maker confidence in the data products from a monitoring program is the source of the data. The two primary options for data reporting are: 1) self-reporting by fishery or industry participants; or 2) independent data collection by an unbiased government agent or contracted third party.

Fishing logs and dealer reports are examples of self-reporting scenarios where the industry participant is responsible for documenting a variety of data points. The data resulting from self-reporting methods raise questions about the accuracy and reliability of the data because of the perceived conflict of interest that exists. The focus becomes the source of the data rather than the meaning of the data. Some potential reasons for this perspective include:

- competing priorities
- potentially self-incriminating
- little or no data collection training
- conflicting motivations
- level of motivation and commitment to the quality of the product

These issues do not mean that self-reporting tools are not valuable fishery management tools, but these issues must be considered in the design of a program and use of the data. Program design and expectations of the resulting product should include a realistic assessment of these issues and strategies to mitigate against the associated risks.

Observer programs, VMS, electronic monitoring systems, and dockside monitoring are examples of independent, and theoretically unbiased, data collection methodologies conducted by a government agent or contracted third party. These methods result in a less biased data product. As there is no inherent conflict of interest, the result is a more credible data product in which Fishery Managers and the public have greater confidence. In these programs, the focus becomes the meaning of the data rather than the source of the data. The reasons for this include:

- singleness of purpose, clear motivation
- control of data collection training and supervision
- adherence to a consistent approach and methodology
- ability to establish professionalism
- commitment to the quality of the product

Independent data collection programs allow the Fishery Manager much greater latitude and confidence in establishing program objectives and sampling techniques as well as a high level of control over program design, training of personnel and quality management. The trade-off is that independent programs are generally much more complex, require more resources and are more costly.

6.2 Government vs. Private Service Delivery

Data collection programs have historically been designed, implemented and administered by government. Government has been and continues to be charged with managing fisheries resources but there is an increasing trend for greater involvement and responsibility by the fishing industry. The trend toward quota share management systems has increased the ownership ethic in some fisheries, specifically with license and quota holders. Quota share holders have a greater interest and investment in the data to inform management decisions and become involved in the design, implementation and in some cases funding of data collection programs. Their increased interest is not only due to their stake in the resource but also due to a desire to have accurate data to track quotas and create a level playing field for all quota holders. The importance of establishing a transparent quota tracking system increases with share value.

The increased interest by industry in fisheries management as well as a trend toward requiring industry to fund monitoring programs has led, in B.C., to the development of private monitoring service companies. Monitoring services delivered by private industry are usually tendered through a competitive bidding process to ensure the service is competitive and that the contract authority, government and/or fishing industry can pick the best combination of service, quality and cost. Experience has shown that privately administered programs are more likely to be tailored to the needs of the fishing industry and are more adaptive and generally have a stronger customer service orientation. Government agencies can also benefit from outsourcing monitoring services by increasing time and resources available to focus on core priorities.

The potential risks associated with outsourcing service delivery to private industry include financial viability, service reliability, concern with data quality and concern regarding data privacy and conflict of interest. These concerns can be effectively addressed by implementing government mandated standards for monitoring service delivery. Adherence to these standards can be legislated and/or required through a contractual arrangement. In cases where standards and an audit process are established a consistent level of data quality can be established.

When private service provision is chosen a further issue to be addressed is whether to organize service delivery by a single company chosen through a competitive tender or to certify multiple companies in a competitive environment. This issue needs to be carefully explored before choosing a path. Each approach has benefits and draw backs.

6.3 Coverage Levels

The appropriate coverage level for independent data collection will be dependant on the goals of each program. It is of paramount importance for a well designed program to have a clear expression of the management objectives. The development of goals and objectives for a program should stem from a consideration of the purposes for which data, estimates, and other potential products of the program are to be used.

It is not uncommon for sampling levels to range from as little as a few percent to 100% depending on the management goals and funds available. Where 100 percent coverage is not feasible or not required a sampling strategy may be adequate to apply on a fleet basis. Random sampling strategies must be carefully designed and can be problematic for many reasons. If the goal of a monitoring program is to document rare events such as by-catch of an endangered species then low at sea coverage levels may not be adequate. In addition, sampling at low coverage levels often doesn't achieve statistically significant results especially with a broad range of strata as is common in commercial fisheries.

A further challenge is presented with fleet sampling when vessels selected as part of a sampling strategy modify their fishing behavior, sometimes significantly, as a result of having an observer on board. This is commonly referred to as the "Observer Effect". As the level of sampling of the fleet increases, the data becomes more reliable due to decreasing opportunity for the fleet to engage in false behavior. The relatively high cost of monitoring each day at sea often prevents Fishery Managers from being able to implement sampling levels high enough to lead to high data confidence.

When individual vessel accountability is the goal, rather than fleet accountability, a sample-based monitoring approach will be less successful than a full census approach because of inherent variance in the sample results. Management strategies targeting full individual accountability require 100 percent monitoring both at sea and at dockside or an audit system that effectively achieves accurate self-reporting. Where weights are not available at sea, full individual accountability may also require more comprehensive dockside monitoring.

6.4 Industry Participation

Experience has shown that actively involving the fishing industry in resolving management concerns and developing stakeholder-driven solutions will produce better results than when government develops solutions on its own. This simple statement seems obvious but this approach is often not used for a variety of reasons.

Industry has been hesitant at times to get involved for fear that their involvement will be misinterpreted as support for unwanted government initiatives. In reality the issues affecting commercial fisheries today are significant and will not be easily resolved without input from fishermen. Proactive and forward thinking fishermen are engaging in problem solving with the goal of influencing the outcomes of government mandated management measures more acceptable to industry. In British Columbia, for example, groundfish fishermen have taken ownership of problems

they face by developing creative solutions through a collaborative process that are generally a better fit and more palatable than any solution that might have been imposed by government.

In cases where quota share systems have been implemented, quota holders become more proactive and want a say in the future of their fisheries. They feel a more significant and long term stake in the fishery than they may have felt under an input control management regime.

Most Fishery Managers who have worked closely with industry will agree that fishermen are resourceful and creative problem solvers. Behind this creativity may be a need to adapt and innovate in response to new management measures such as catch limits and endangered species avoidance. Taking advantage of this resource – i.e. creating a market and/or regulatory environment for conservation innovation – as has happened with the British Columbia groundfish fisheries will result in entrepreneurial and effective solutions to the complex problems faced.

7.0 Archipelago Perspective

Archipelago has had the opportunity to participate in and contribute to the positive transformation of a number of fisheries in British Columbia. They began as over-subscribed, data-poor fisheries with frequent quota overages, low Fishery Manager confidence and high industry frustration and evolved over time to become models for sustainable fishery management with high industry accountability and high Fishery Manager confidence, supporting successful businesses and a well-managed resource. Attachment A to this document provides a list of additional background reading relating to the information provided in this testimony.

What brought about these transformations is not an easily repeatable recipe and sometimes took many years with missteps along the way, but there are lessons to be learned that can benefit and expedite the fishery reforms that are being sought for US fisheries. A summary of these observations is provided below.

Our Observations:

1. Where change has happened quickly and the results are most profound there has been a catalyzing event such as a fishery closure, market weakness, regulatory change or other management imperative that the governing agency has stood by.
2. The responsible agency must be resolute in their desire to bring about change and provide clear guiding principles for reform, The fishing industry, (harvesters and processors) must be actively involved in developing solutions when significant change is needed.
3. Industry must have a representative association or other organizational body in order to represent their stake holders effectively in the discussions and negotiations that must occur with government.
4. Well designed, independent fishery monitoring programs will lead to data-rich fisheries where decisions can be made with confidence and the focus shifts to evaluating meaning of the data rather than debating the source of the data.
5. Effective fishery monitoring programs require significant effort and resources but once they are in place the ability to reduce uncertainty, increase confidence to make informed management decisions and the cost for enforcement and science can decrease.

6. The various data sources from a fishery must be integrated and available to Fishery Managers in a short time frame to achieve full value from the data and to support timely and well informed management decision making.
7. High levels of monitoring coverage create a transparent and level playing field for all participants. As a result the positive behavioural changes desired in harvesters are more likely to happen.
8. Increased need for monitoring services will grow a new profession which will create employment and grow a new industry in coastal communities.
9. Catch shares are a tool that can bring increased industry participation in ensuring the long term health of a fishery, reduced risk, and may also bring increased returns to harvesters.
10. Catch shares and improved monitoring and data collection processes are not co-dependent but are highly complimentary. Catch share management can benefit from improved data and implementation of catch shares can provide an opportunity to improve data collection and monitoring.
11. Catch shares and improved monitoring and data collection when used in concert can create a positive spiral leading to sustainable management.
12. Catch share management will create industry dependencies on reliable fishery data in order to support the commerce of quota trading.
13. Catch shares change the harvester's perspective to one of maximizing the value of their defined allocation rather than maximizing the volume of their catch.
14. Catch shares themselves do not ensure accountability. Accountability is motivated when harvesters gain faith in the management system and understand the role that they play. This change can be facilitated by catch shares and improved monitoring and data systems.
15. Increased accountability by industry leads to increased involvement and leadership in problem solving.
16. Catch shares are not a "cure all". They must be implemented thoughtfully in the context of a collaboratively developed and well-designed management strategy.
17. Fisheries may consolidate under catch shares but those fishers that remain in the fishery will have better business success. Short term economic success will turn into long term success.
18. Industry accountability can (and should) extend to funding of monitoring programs where the economics of the fishery support it. In BC catch shares facilitated industry to fund or co-fund much of the cost.
19. With a well designed management strategy industry can experience increased returns due to:
    a. increased fishing opportunity (quota or time)
    b. increased value of catch
    c. increased efficiency of business operation
20. Every fishery is unique and requires a unique solution based on its unique attributes.