

**FINAL APPLICATION TO THE DEPARTMENT OF  
ENVIRONMENT AND HERITAGE ON THE  
WESTERN AUSTRALIAN SALMON MANAGED  
FISHERIES**

*Against the Australian Government Guidelines for  
the Ecologically Sustainable Management of  
Fisheries*

For Consideration Under Part 13A of the  
*Environment Protection and Biodiversity  
Conservation Act 1999*

JUNE 2004



**Department of Fisheries**  
Government of Western Australia



*DEPARTMENT OF FISHERIES, WESTERN AUSTRALIA  
LOCKED BAG 39, CLOISTERS SQUARE WA 6850*

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## 1. INTRODUCTION TO THE APPLICATION

### 1.1 DESCRIPTION OF INFORMATION PROVIDED

This is an application to the Department of Environment and Heritage (DEH) to assess the Western Australia Salmon Managed Fisheries against the Australian Government Guidelines for the ecologically sustainable management of fisheries. The submission of a successful application against these guidelines is now needed to meet the requirements under Part 13A of the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC), to enable WA Salmon (*Arripis truttaceus*) and other relevant by-products of these fisheries to remain on section 303DB list of species exempt from export regulations (previously Schedule 4 of the *Wildlife Protection (Regulation of Exports and Imports) Act, 1982*) past December 2004.

The information provided in this application covers all the elements specified in the *Guidelines for the Ecologically Sustainable Management of Fisheries* (located on the DEH website [www.deh.gov.au/coasts/fisheries/assessment/guidelines.html](http://www.deh.gov.au/coasts/fisheries/assessment/guidelines.html)) along with other information (at a variety of levels of complexity) considered relevant to those who wish to gain an understanding of the management of these fisheries. The application includes:

- Comprehensive background information on the history of these fisheries, the biology of the primary species and a description of the current management arrangements, which provides the context for assessing this application (see Section 2 for details).
- A description of the National Ecologically Sustainable Development (ESD) Reporting Framework and methodology that was used to generate the information presented in the application (see Section 3 and [www.fisheries-esd.com](http://www.fisheries-esd.com) for details).
- Specific supporting statements relevant to each of the criteria within the Guidelines. These criteria include the “General Requirements”, which cover many of the governance aspects related to the management of the fisheries, plus each of the objectives listed under “Principle 1” (target species issues) and “Principle 2” (broader ecosystem issues) of the Guidelines (see Section 4).
- Section 4 also has, where appropriate, specific links and reference to the detailed component reports contained in Section 5. {Referral to this additional information is facilitated by the incorporation of appropriately placed hyperlinks (electronic version only)}.
- At the end of Section 4 there is an **OVERVIEW TABLE** that outlines for each issue, which Guidelines are relevant; if there is an operational objective, the availability of suitable data for the indicators; whether the current performance against the limit/measure chosen is acceptable; and a summary of what (if any) future actions are required.
- Section 5 includes a comprehensive account of the risk assessment outcomes and current performance presented in the National ESD format as outlined in the Department’s ESD Policy (Fletcher, 2002). This

covers each of the environmental and governance issues relevant to this application for these fisheries. These reports include either; the explicit objectives, indicators, performance measures, current and future management responses and justification for each major component; or a full justification for why specific management of this issue within the fisheries is not required.

## **1.2 OVERVIEW OF APPLICATION**

The only target species for these fisheries is the WA Salmon. In 2002, the WA Salmon Managed fisheries caught a total for the year of 2,623 tonnes with an approximate value of \$ 1.1 million.

These fisheries have been operating for over 50 years and have been under a detailed and sophisticated management regime for over 20 years using a comprehensive set of regulations that include limits on licence numbers, gear restrictions and spatial closures. Each of these has been refined through time, and is subject to regular reviews to achieve the overall aim of successful management.

The *Fish Resources Management Act, 1994* (FRMA) provides the legislative framework to implement the management arrangements for these fisheries. The FRMA, and the specific management plan for each fishery, adheres to arrangements established under relevant Australian laws with reference to international agreements as documented in Section 5.4.2.

The combination of having a large amount of relevant and accurate information on the biology of the target species, the sophisticated suite of management arrangements in place and the proactive management used in the fisheries has resulted in the maintenance of salmon stocks as well as the continuation of the fisheries.

The WA Salmon Managed Fisheries have minimal impacts on the wider ecosystem. Beach seining is the only permissible method and there are significant practical restrictions on where this can occur (generally only in shallow waters with a sand substrate).

Consequently, the management regime for these fisheries should meet the *Guidelines for the Ecologically Sustainable Management of Fisheries*. Detailed justification for this conclusion is documented within the remainder of this application.

## 2. BACKGROUND ON THE WA SALMON MANAGED FISHERIES

### 2.1 DESCRIPTION OF THE FISHERIES



**Figure 1 Location and boundaries for the SWCS managed fishery and the SCS managed fishery.**

#### 2.1.1 LOCATION OF FISHERIES

##### 2.1.1.1 LICENCE AREA

The WA Salmon Managed Fisheries are comprised of two salmon fisheries, the South Coast Salmon (SCS) and the South West Coast Salmon (SWCS) managed fisheries. The boundaries of the SCS fishery along the south coast are '*Western Australian waters below high water mark from Cape Beaufort to the waters up to the eastern boundary of the State on the south coast of Western Australia*'. The boundaries of the SWCS fishery along the west coast are '*Western Australian waters from the eastern boundary of the State on the north coast of Western Australia to Cape Beaufort on the south-west coast of Western Australia*'.

### **2.1.1.2 FUNCTIONAL FISHING GROUNDS**

In the SCS fishery, each licence holder is restricted to a specific nominated beach (Proclaimed Fishing Zone). In the SWCS fishery, the licence holders are permitted to operate on any beach in the area of the fishery. In practice, there are only a few beaches fished, and these are usually the proclaimed fishing zones in the area of the fishery. In the situation where more than one license holder is present on a beach in the SWCS fishery, there is a “priority of fishing” arrangement specified in the regulations which specifies who has priority of access to the salmon that move into the range of the beach-based netting operation.

### **2.1.2 NUMBER OF LICENSEES**

As at April 2004, 18 licensed south coast fishing teams each have access to a specified beach in the area of the fishery. Each of 12 licensed south-west coast teams has access to any of the beaches on the south-west coast. Three additional people hold a fishing boat licence and/or commercial fishing licence with a condition stating that they may take salmon between Busselton Jetty and Tim’s Thicket (Mandurah).

### **2.1.3 DESCRIPTION OF GEAR**

#### **2.1.3.1 GENERAL**

WA salmon are taken by beach seining along the exposed coastline and as a by-product of commercial gill netting activities in shark and estuarine fisheries. There are no legislated maximum net length or mesh size restrictions for the beach seine nets used by south coast and south west coast fishers, but there are prohibitions regarding the use of other types of net to take salmon (i.e. set nets and purse seine nets).

#### **2.1.3.2 OPERATING DESCRIPTION**

Schools of WA salmon migrating along the southern coastline of Australia towards spawning grounds off the south west coast are most vulnerable to capture between February and May each year. Industry members occasionally accompany whale research aerial survey flights to the east of Albany each year so that the overall quantity and behaviour (i.e. schooling or dispersed) of salmon can be assessed prior to the start of the season. During the “season”, a majority of fishers spot schools from a high vantage point in the dunes along the south and south west coast beaches. Once a school of WA salmon is located within the range of a beach-based seine net team, either rowboats or water-jet propelled boats are launched and the seine net is run from the beach to encircle the school. The fish are not actively herded towards the beach with nets, but are instead allowed to swim freely until being encircled by the net. Fishing nets can vary in length, but are usually about 400 metres long and have a drop of 2-6 metres. The maximum net length is constrained by the need to manually deploy the gear off surf beaches using dinghies. The mesh is large enough to allow small fish to escape, but not large enough to gill the target species, which would render the fishing operation unmanageable.

The configuration of the beach seine nets varies between fisheries and beaches. In the SCS fishery, the bunt end is located in the centre, whereas in the SWCS fishery, there is often a bag or pocket which can be tied off to allow for easier transport of the catch to a more sheltered area on the beach for further processing. Once the seine net surrounds the school of WA salmon, the captured fish are hauled onto the beach either by hand, winch or with the assistance of a vehicle (4WD vehicles, tractors or trucks). The catch is then loaded onto a truck for transport to the processor. Depending on the size of the catch, it is either loaded manually, or with the aid of a front-end loader, or elevator. The relatively cool prevailing weather conditions, and the fact that most beaches are situated in close proximity to the processor means that in most instances, an acceptable quality of product can be maintained. Over recent years however, demand for higher quality product for a more diverse market has seen a number of the teams putting ice on their catch in large plastic tubs for transport to the market.

## **2.1.4 SPECIES CAUGHT**

### **2.1.4.1 TARGET**

The target species in these fisheries is the WA salmon (*Arripis truttaceus*). Catches of salmon over the past 25 years have varied from 900-4,000 tonnes (Figure 2). The wide range in catches is considered to be primarily influenced by environmental variations, particularly the strength of the Leeuwin Current. Stock abundance is mostly dependent on the strength of recruitment from nursery areas (Lenanton *et al.*, 1991). The Leeuwin Current, in conjunction with westerly winds, assists the dispersal of eggs and larvae eastwards along the southern coastline.

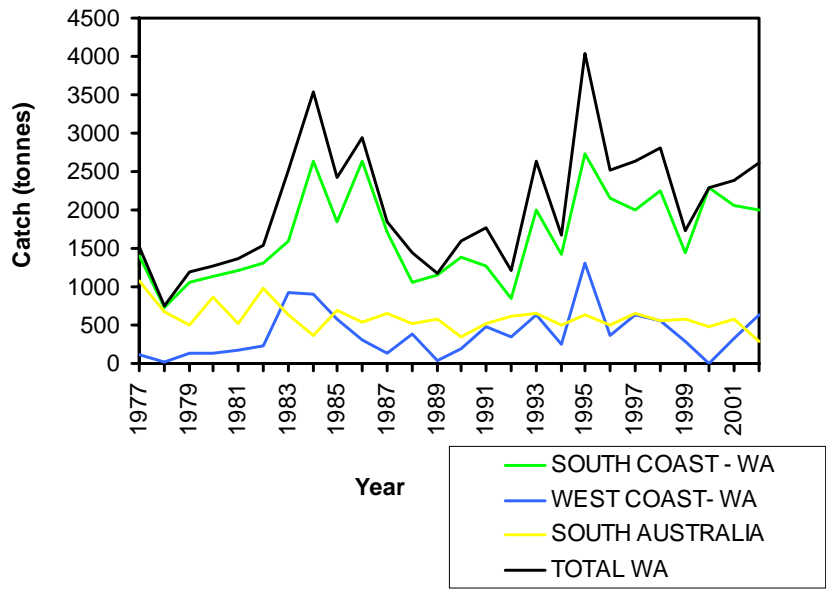
The early 1980's were years of weak or very weak Leeuwin Current, which probably resulted in poor recruitment to nursery areas, including those in South Australia (SA) waters, and subsequent low catches in the late 1980's in WA (Figure 2). In years of strong Leeuwin Current, however catches can be affected when warm water flows nearer to the shore, forcing the salmon offshore and into deeper water where they are unavailable to capture by the beach based fishing teams.

Some variation in catches is likely to have been caused by the decline in the number of licenses, which were reduced by 3 in the late 1980's, and a further reduction of 4 licenses in the 1990's. Fishers also report that there are times when they do not catch as much as they could, due to the lack of available markets.

The 3 operators who have a license condition to fish between Busselton Jetty and Tims Thickett have reported an average annual catch of 16 tonnes of salmon in the 10 years from 1993 to 2002.

The average annual reported catch of salmon from estuaries over the last 10 years (1993-2002) is 3 tonnes. Salmon are caught only in south coast estuaries. No salmon catches were reported on the monthly returns from shark gillnets. Anecdotal evidence suggests they are occasionally caught in the deeper water in shark nets, but are returned to the water, as it is currently illegal for this fishery to land salmon.

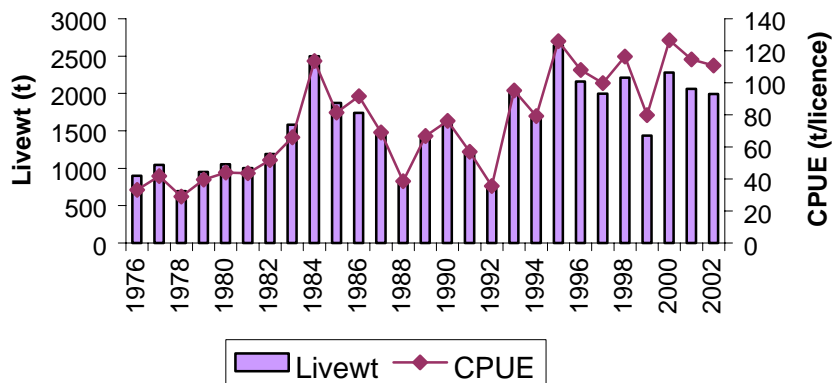
The estuarine catches are reported annually, and as such are considered as part of the annual assessment of the status of the stock.



**Figure 2 Catch of Australian salmon in WA and SA.**

Because the operations of fishers are restricted to relatively few Proclaimed Fishing Zones, fish are vulnerable to capture only if they swim into one of these zones. There are relatively few of these zones spread along the coast. Thus a large number of beaches are available as “refuges”. Moreover, it is clear that there is no potential for effort creep in this fishery.

Many factors independent of fishing determine whether or not fish enter one of the fishing zones. During most of this period the number of fishing teams has been relatively stable. Furthermore, the fishing effort expended by any one team in each year looking for schools is relatively consistent. Thus the magnitude of the actual catch is largely independent of the “effort” expended by each team. Under these circumstances catch is viewed as providing an equally useful index of abundance as catch rate. Indeed plots of catch and catch rate (tonnes caught /licensee) are almost identical (Figure 3).



**Figure 3 Catch (livewt) of salmon from the south coast fishery and the catch per unit effort (CPUE, tonnes per licence).**

**2.1.4.2 BY-PRODUCT**

The schools of WA salmon are mainly mono-specific and therefore there is a very limited catch of non-target species. Research of the by-product caught during the past five years, indicates that only minor quantities (all <1t) of the following species have been taken; blue sprat, sharks, skates and rays, cobbler, herring, trevally, yellow tail kingfish, skipjack, tarwhine, sea mullet, yellow eye mullet, and squid (Table 1). Most of these species are caught in much greater quantities as a part of other WA finfish fisheries and the biology and assessment of the stocks will be dealt with there. These species are under no risk of over-exploitation from the WA Salmon Managed Fisheries.

The small catch (<100 kg) of “unspecified” sharks reported most years does not include protected species such as grey nurse as it is illegal to retain such species in WA and the method of fishing allows for live release. There are also no reports of any invertebrates being entangled in the nets during hauling on what are mostly high energy sandy beaches which constitute the proclaimed fishing zones.

**Table 1 The annual reported catch (kg) of by-product from the SCS Fishery between 1999-2002.**

Year	1998	1999	2000	2001	2002
Bronze whaler	0	0	95	58	0
Blue sprat	0	20	0	0	0
Sharks	80	103	72	0	72
Skates & rays	148	0	0	0	0
Cobbler	0	0	0	12	0
Herring	50	55	570	320	10
Trevally	3	0	0	0	0
Yellow tail kingfish	0	81	0	0	0
Skipjack	0	10	0	0	0
Tarwhine	4	0	0	10	0
Sea mullet	69	331	160	287	0
Yellow eye mullet	0	882	250	370	200
Squid	15	0	0	0	0
Other	0	11	10	0	0

**2.1.4.3 NON-RETAINED SPECIES**

These fisheries catch minimal amounts of non-retained bycatch.

### **2.1.5 BAIT USAGE AND PACKAGING**

Bait is not used in the WA Salmon Managed Fisheries.

### **2.1.6 TRADITIONAL INVOLVEMENT IN THE FISHERY, OR TRADITIONAL INTEREST IN THE RESOURCES**

There is no known traditional involvement in these fisheries.

## **2.2 HISTORY OF THE FISHERY**

### **2.2.1 COMMERCIAL FISHERY**

Records of Australian salmon fishing date back to the 1900's in the southern States. However, the development of the fishery was stunted in all States by a lack of acceptance of this species in the fresh fish market and for some States by a lack of access to fishing areas along the coastline. This situation was improved from 1936 by the building of canneries and more access roads in each of the southern States. These developments gave rise to an increase in the catches (Stanley, unpubl.; 1980).

In Western Australia, the Western Australian salmon fishery was first established in the Hopetoun area. One of the oldest Western Australian salmon commercial fishing families is the Heberle family. They have fished from Cape Riche to the Hopetoun area since 1936 and have kept a detailed account of their fishing activity (Heberle, 1985; 1993). This area opened up to commercial fishing activity in the mid 1940's. The Heberle's have operated from their nominated beach at Doubtful Island Bay since 1946 continuously, except for 1956 when there were flood conditions. This commercial fishing operation began modestly using a row boat and hemp nets and sleeping in tents on Reef Beach, Doubtful Island. These conditions have been upgraded through the years; including surfacing the rough track to the cannery between 1971 to 1982. This reduced travel time significantly.

The managed commercial fisheries for the WA salmon in WA currently operate predominantly during February to April along the south coast and between March and April on the lower west coast. Between 15<sup>th</sup> February and 30<sup>th</sup> April a number of beaches in the south and south-western fisheries are declared "proclaimed fishing zones" with salmon licence holders having priority (but not exclusive) access to these zones. In the SCS fishery the commercial salmon fishers are each limited to operating at a nominated beach; while in the SWCS fishery the fishers are allowed to fish on any beach within the fishery. However, the commercial fishers usually operate from only a few beaches (Walker, 1982).

While the majority of the catch is reported from the February through to April period, small and variable catches of *A. truttaceus* are reported from other times of the year (Walker, 1982). The commercial catch of Australian salmon taken along the south and west coast beaches as the schools of fish are moving westward to spawn is referred to as the "front run". In certain years, large quantities of Australian salmon travel from the west to the south coast and return east to Esperance and the Great Australian Bight

between May and August. The commercial fishers refer to this movement as the “back run” and provided there is market demand, will set their nets to catch these fish. The size and age composition of the WA salmon commercial catch has changed during the nearly 50 years of monitoring. In the 1950’s and 1960’s the ages ranged from 4+ to 9+ years of age and was predominantly 5+ to 6+ years of age (Malcolm, 1966). The age composition of the commercial samples have become dominated by fish 3+ to 4+ years of age during the past 20 years (1970’s to 1990’s) (C. J. Dibden pers. comm.).

### **2.2.2 PROCESSING THE CATCH**

Integral to the success of the WA Salmon Managed Fisheries has been the development of the fish processing and canning operations. The first canning of Australian salmon was in 1943 by Vincent Gardiner of Ocean Canning Co. in Perth. A few years later in 1946, Dan Hunt commenced a low capacity cannery operation of 20 tonnes/week in Albany, and Young opened a cannery near Hopetoun that took a capacity of 50 tonnes/week. During 1948, Simonsen opened a cannery (Sea Foods) in Albany, Hunt opened a cannery in Esperance and another cannery opened in Busselton. In 1977, Southern Ocean Fish Processors built a processing plant in Albany that was subsequently taken over by Hunt in 1981. In order to keep this operation financially viable a portion of the Tasmanian catch was being sent to Perth for processing. Despite these efforts, in 1984 Hunts Foods encountered financial difficulties and they went into receivership after the 1985 season. While there are currently a number of factory receival depots on the south coast there were no canneries in Western Australia that canned Australian salmon beyond 1995 (Tregonning, 1995).

Australian salmon heads have been used as rock lobster bait since the 1950’s. The use of salmon bodies as bait for the rock lobster industry was common until 1977 when Australian salmon were declared a food fish and the bodies could not be sold as bait (Walker, 1982). However, high catches of WA salmon in 1986 saw the regulations changed to allow commercial fishers to sell 7 tonnes of their catch as rock lobster bait (Cappo, 1987). During the early 1990’s the regulations changed several times in regards to the proportion of the Australian salmon catch that could be used as bait. Currently there are no restrictions regarding the quantity of salmon that may be sold as bait. A report of the proportion of various species that comprised rock lobster bait during 2001/2002 indicated that 4% of the total bait used in the fishery was WA salmon.

### **2.2.3 REGULATIONS FOR THE COMMERCIAL FISHERY**

As mentioned previously, the WA Salmon Managed Fisheries is divided into two managed fisheries; a SCS fishery from the WA/SA border to Cape Beaufort (located between Augusta and Windy Harbour): and a SWCS fishery from Cape Beaufort to the WA/Northern Territory border (Lenanton, WFRC 1993). As of April 2004, there were 30 salmon fishing teams holding salmon licences in both fisheries (18 managed fishery licences from the SCS fishery and 12 managed fishery licences from the SWCS fishery). Three additional licensees hold a condition 68 to fish for WA salmon between the Busselton Jetty and Tims Thicket in Mandurah. The maximum number of managed fishery licences is not explicitly capped in either the south coast or south-

west salmon management plans. However, entry into the fishery requires that an applicant was the holder of a professional fisherman's licence "endorsed" to take salmon by means of nets immediately prior to the declaration of the salmon managed fishery in December 1982 (see clause 8 of the south coast and south west coast management plans).

The SCS fishery licence holders are restricted to catch WA salmon from nominated beaches, while in the SWCS fishery the licenced fishers are allowed to catch fish on any beach within the boundary of the fishery; however in practice only a few beaches are fished. Between 15 February and 30 April some beaches are proclaimed fishing zones which provide commercial WA salmon fishers with more "protected" access to the beach and the salmon (see Appendix 2). Current salmon licence holders all have a long standing history of fishing in the WA Salmon Managed Fisheries; some of these fishers are full-time fishers involved in several fisheries and others are part-time fishers engaged in other activities outside of the WA salmon season. The majority of the SCS fishery licensees also fish for Australian herring using herring trap nets. The use of such nets is prohibited between 10 February and 25 March each year, to allow for the peak salmon migration to pass without being hindered by the trap nets. Few salmon are caught in trap nets, and of those that are caught, all are released alive, as it is illegal to retain salmon caught in this way.

The fisheries management regulations have been subject to change during the past 15 years. Prior to 1990, these fisheries were managed solely as a limited entry fishery. However in 1990, total allowable catch (TAC) quotas for both the SCS and SWCS fisheries were set at 1,200 tonnes for the SCS fishery and 300 tonnes for the SWCS fishery. From their quotas, each fishing team was allowed to sell a maximum of 18 tonnes of salmon as bait. In that year, the south coast TAC was reached before the close of the traditional season and the Minister of Fisheries used his "discretionary powers" to permit fishing to continue at certain beaches. The total 1990 catch was 1,593 tonnes (Monaghan, 1991).

During 1991 the WA salmon TAC quota was set at a higher catch, 2,000 tonnes from the south coast and 600 tonnes from the south-west coast. Each licence holder was allowed to sell 8 tonnes of WA salmon as bait. (Minister for Fisheries, Western Australia, Media Statement 91/11, 12 February 1991). By the end of April 1,278 tonnes of WA salmon had been caught by the 21 licence holders; 1,259 tonnes had been sold as food and 19 tonnes sold as bait. The nine south west coast licence holders caught 484 tonnes of salmon, all of which was sold as food. Neither fishery had reached the allocated TAC quota. The total catch of WA salmon from the managed fisheries was 1,762 tonnes (Lenanton, WFRC 1991).

The 1992 WA salmon TAC was increased for the south west coast licences holders with the catch limits now set at 2,000 tonnes for the south coast fishers and 650 tonnes for the south west coast licence holders. Each licenced salmon fisher from the south coast was able to sell 30 tonnes of WA salmon as bait, an increase from the previous years' maximum. By the close of the fishing season, the 21 south coast licence holders reported a catch of 852 tonnes of which 718 tonnes were sold as food and 134 tonnes as bait. The nine south west coast licence holders reported a catch of 350 tonnes of which the majority was sold as food. The total 1992 catch was 1,202 tonnes. This reported catch was the second lowest since 1980. (Lenanton, WFRC 1992).

The TAC quota was removed from both fisheries in 1993, once it became clear to the fishing community that the magnitude of the catch was primarily a function of environmentally driven variations in recruitment, and that the commercial sector had a finite capacity to harvest fish, and was declining in size. This remains the current situation. The 30 tonne quota on WA salmon caught from the south coast that could be sold as bait, remained the same as during the 1992 season (Minister for Fisheries, Western Australia, Media statement 93/14, 23 March 1993), but was repealed in 1996.

#### **2.2.4 CATCH STATISTICS**

The catch and effort statistics of the WA Salmon Managed Fisheries are evaluated annually in preparation for the annual 'State of the Fisheries' report. The data sources that are available for consideration are the:

1. *Data from monthly commercial fishers returns.* It is compulsory that the fishers complete these monthly returns. During the 1940's the Australian Bureau of Statistics initiated the collection of the return data. Later, this responsibility was passed to the Research Division of the Department of Fisheries and the data collection system was called the Catch and Effort System (CAES). Monthly returns are forwarded to the Research Division and the data entered onto the system by data operators. Occasionally fishers do not record their information accurately or data are entered incorrectly which leads to difficulties when analysing the data for assessment purposes. Such errors are corrected through a data validation process, which has utilised data sources such as research logbooks and processor data. We are satisfied that these data accurately represent the magnitude of the monthly catch from locations around the coast.
2. *Research logbooks are filled out voluntarily by the Western Australian salmon fishers.* They are a daily record of the fishing operation during the main fishing season. Salmon fishers commenced filling out these logbooks in 1962 (Walker, 1982) and the logbook system is ongoing. At this time the logbooks have not been used to assess the status of the fishery as there is not 100% return of the logbooks. Returns can be as low as 30% in some years. Nevertheless, they do provide an understanding of important and ongoing events within the fishery. Although the system will be maintained, there are currently no plans to allocate additional resources to attempt to improve return rates.
3. *Daily receival data from the factories.* Western Australian salmon processors have been collecting receival data since 1948. While the factories still maintain the records of the licence holders' catch, the Research Division is no longer receiving these data. Generally, these records are very accurate unless the fishers have sold a portion of their catch (i.e. to spectators on the beach) prior to reaching the processors.

Currently, in line with the resources made available to monitor these fisheries, only the monthly fisher return data are used in the annual review of the performance of these fisheries.

Table 2 lists the WA salmon catch from the WA SWCS and SCS fisheries and SA since 1973. The Western Australian catch figures are from the CAES system and the South Australian information is provided annually by the finfish section at SARDI.

Historically, annual catch figures are available from as early as the 1940's. However, reliable data from the current CAES database is available from 1973 onwards. During the 1970's the total catch was generally below 1,500 tonnes except for 1977 when the catch was 1,518. This began to change in the 1980's when higher catches were reported. Reported commercial catches rose steadily during the early part of the decade to a maximum of 3,543 tonnes in 1984. After that time the catches began to decline until 1989 when the catch was just over 1,000 tonne.

**Table 2 Annual reported commercial catch of WA salmon from the south coast of WA, the west coast of WA and SA between 1973 and 2002. Data have been compiled from the Dept of Fisheries CAES system.**

YEAR	Catch (tonnes)			TOTAL WA
	SOUTH COAST WA	WEST COAST WA	SOUTH AUSTRALIA	
1973	901	263	na*	1164
1974	755	501	na	1256
1975	942	341	na	1283
1976	909	177	na	1086
1977	1399	119	1068	1518
1978	728	27	681	755
1979	1054	137	503.1	1191
1980	1132	128	874.6	1260
1981	1208	165	527.5	1373
1982	1312	235	984.5	1547
1983	1598	920	641.5	2518
1984	2640	903	363.4	3543
1985	1843	574	701.2	2417
1986	2633	308	543.3	2941
1987	1708	144	651.6	1852
1988	1064	380	527.7	1444
1989	1147	29	582.8	1176
1990	1392	201	345	1593
1991	1278	484	512.2	1762
1992	852	350	608.3	1202
1993	2007	634	660.9	2641
1994	1431	250	500.2	1681
1995	2728	1316	638.6	4046
1996	2163	360	506.7	2523
1997	2000	626	655.1	2626
1998	2241	560	566.6	2801
1999	1440	286	586	1726
2000	2283	0.357	474	2283
2001	2066	325	577	2392
2002	1995	628	281.5	2623

\*na – not available

## **2.3 RECREATIONAL FISHERY**

### **2.3.1 GENERAL DESCRIPTION**

The most recent recreational catch and effort data for the south coast bioregion are from an FRDC-funded shore-based recreational fishing survey conducted during 1994 and 1995 (Ayvazian *et al.*, 1997). This survey was focused specifically on WA salmon and Australian herring, the two most abundant and most frequently targeted species of finfish in this region.

The estimated recreational catches of WA salmon for 1994 and 1995 from the west coast zone were 64.3 and 55.4 tonnes respectively, from the south coast zone 64 and 103 tonnes respectively, and from the south-east zone 26 and 25 tonnes respectively. These estimated recreational catches represented 8-16% of the total (commercial and recreational) west coast catch, 4-6% of the total south coast catch and 100% of the total south-east catch. The west coast fishing zone from the recreational survey covers the same area as the SWCS fishery, and the south coast zone combined with the south-east zone from the recreational survey covers the area of the SCS fishery.

This was followed by a 12-month creel survey of recreational boat-based fishing off the lower west coast of WA, conducted in 1996-97 (Sumner and Williamson, 1999). In the survey area (Kalbarri to Augusta) the total annual recreational fishing effort was 453,000 boat-based fisher days. The total recreational WA salmon catch was estimated to be 3,241 ± 991 fish (9.7 ± 3 tonnes) harvested and 1,281 fish caught and released. This survey covered the area of the SWCS fishery. A catch of 136 tonnes of WA salmon was reported from WA in the National Recreational Fishing Survey, which was conducted in the 12 months from May 2000 to April 2001 (Henry and Lyle, 2003).

Comparison of the catches between the mid 1990's surveys, and the recent National Survey has revealed that under conditions of adequate stock abundance, the WA recreational catch has not increased over that period.

### **2.3.2 ISSUES ASSOCIATED WITH THE RECREATIONAL FISHERY**

A significant number of WA salmon are released following capture by the recreational sector. When released into shallow water habitats, it is anticipated that the rate of survival for this robust species would be extremely high. We have no empirical data on the relative survival of fish released in shallow and deep water.

In 2001, a logbook system was instigated to collect catch and fishing effort information from tour operators. These data became available in 2003 and are being analysed. It is not anticipated that there will be a significant harvest of WA salmon from this recreational fishing sector. Indeed during 2002, the first complete year of data collection <80 fish were reportedly caught by this sector.

## **2.4 BIOLOGY OF SPECIES**

### **2.4.1 TARGET SPECIES – WESTERN AUSTRALIAN SALMON**

The WA salmon is distributed between Tasmania, Victoria, and from SA westwards to Kalbarri in WA. In WA waters, this species is the main target for the south and south west coast managed commercial fisheries along portions of the lower southwest and southern coasts. It is only rarely encountered as far north as Kalbarri, with the main area of distribution being the lower west and south coast where the vast majority of this species is caught. There is a long history of biological research conducted on WA salmon in Western and South Australia. The following synopsis of the WA salmon (*Arripis truttaceus*) life history is from Cappo (2000). This large piscivorous fish is subject to recreational and commercial fishing pressure in both Western and South Australia, with minor catches reported in Victoria and Tasmania. Schools of adult WA salmon can be found associated with open surf beaches and rocky reefs, offshore to mid to outer regions of the continental shelf. However juveniles are found exclusively in shallow marine embayments and estuaries.

The complex life history includes the westward migration of 3-6 year old fish (about 60-65 cm caudal fork length) from nursery areas in eastern states to WA during the late summer and autumn (January-February) (Walker, 1982). This migration is triggered as fish are about to reach maturity. It is a size, not age related process, with the fastest growers migrating at age 3, and the slowest growers migrating at age 6, noting that each individual only makes one migration. After migration they become resident along the WA coast.

Currently the majority of the catch is comprised of fish that have recently migrated. Depending on the size of the annual migration, and the magnitude of the catch of those fish, variable numbers that survive fishing during the year of migration contribute to the fishery in subsequent years. These larger/older fish constitute the “back-run”. They normally also comprise a relatively large proportion of the fish that are taken by the commercial fishers during the early part of the spawning run. “Back-run” fish that are present on the coast during the non-spawning period are mostly located offshore/away from the nettable beaches, and often comprise few very large schools. As such, they are rarely accessible to beach-based netting operations. It is not until they join the spawning migration at the beginning of the spawning season that they become accessible to capture.

WA salmon may live until they are about 9 years of age reaching a maximum fork length of 80cm (10.5kg) (Cappo 1987).

Spawning is believed to occur predominantly around the Cape Naturaliste to Cape Leeuwin coastline. Annual variation in the exact location of the spawning grounds may be due to the timing and strength of the Leeuwin Current. Along with westerly winds, this same current assists the dispersal of eggs and larvae back along the southern coastline (Lenanton *et al.*, 1991). It is the migratory life cycle and inshore schooling habit that make this species vulnerable to both recreational and commercial fishing pressure at all life history stages across the south and lower west coast of Australia.

Adults feed on pilchards, anchovies, Australian herring southern garfish and calamari (Cappo, 1987). Salmon are prey of migrating schools of sharks including dusky whalers, white pointers and grey nurse sharks; dolphins and occasionally seals (Kailola *et al.*, 1993).

It was originally thought that there was only one species of Australian salmon, *A. trutta*. However, genetic evidence from the 1980s showed that the eastern and western populations were sufficiently different to raise them above the level of subspecies (Macdonald, 1980). The two species now recognised are the Eastern Australian salmon (*Arripis trutta*), and the Western Australian salmon (*Arripis truttaceus*).

## **2.4.2 SIGNIFICANT NON-TARGET SPECIES**

There are no significant catches of non-target species taken in these fisheries.

## **2.5 MAJOR ENVIRONMENTS**

### **2.5.1 PHYSICAL ENVIRONMENT**

The substrate of the main fishing grounds of these fisheries is predominately sand. This is primarily related to the fact that most of the locations that are fished are medium to high-energy beaches, and sand is the ideal substrate over which to set and retrieve seine nets. Seagrass meadows are scarce in the areas of active fishing.

### **2.5.2 SIGNIFICANT ENVIRONMENTAL CHARACTERISTICS OF THE AREA OF THE FISHERY**

Protected/listed species that may occasionally be caught by these fisheries are listed below. (Acronyms refer to the legislative Acts, which afford each species its protected status).

- Sea lions (EPBC)

### **2.5.3 SOCIAL ENVIRONMENT**

The SCS fishery involved an average of 82 fishers (within 18 teams) and the SWCS fishery involved an average of 38 fishers (within 12 teams) during the 2002 season.

### **2.5.4 ECONOMIC ENVIRONMENT**

In 2002 the estimated annual value of the WA Salmon Managed Fisheries to the fishers was \$ 1.1 million. The south coast catch was received by 5 processors: Albany Bait Producers, Austral Fisheries, Bevan's Fish Supplies, Polar Group and Bremer Bay Fish Processors.

Catches from these fisheries dominate local food (fresh and canned) and bait markets in Australia. There is a small existing export market for Australian salmon trunks and roe in the Phillipines and a new trial market just developing. After receiving funding from the Minister for Fisheries in WA the South Coast Fisherman's Association employed a person in 2002 to investigate emerging opportunities for this product. Currently, the product and the markets being considered include; salmon trunks to Thailand, salmon roe and fillet to European and Asian countries.

## **2.6 CURRENT AND FUTURE MANAGEMENT ARRANGEMENTS**

### **2.6.1 SUMMARY OF MANAGEMENT STRATEGIES AND JUSTIFICATION**

There are two managed salmon fisheries:

- The SCS Fishery permits authorisation holders to operate from assigned beaches between Shoal Cape and Cape Beaufort.
- The SWCS Fishery operates north of Cape Beaufort, comprising specific beaches that are shared by the authorisation holders.

The number of licences in the WA salmon fisheries is limited. A legal minimum length of 300 mm applies in the commercial fisheries but this is largely irrelevant because they only target migrating mature fish which are usually > 600mm.

The recreational bag limit for salmon is 4 fish per angler per day and the legal minimum size limit is 300 mm.

Industry members are being encouraged to investigate ways of improving fish handling and value-adding techniques to improve their profit margin. As salmon is considered a prime recreational species, resource-sharing issues are likely to be a major consideration in future management of these fisheries.

No joint management arrangements exist between WA and SA. However, good communication exists between the two states and liaison occurs. SA also does liaise with Victoria, and Tasmania. The SA fishery is managed by quota.

Management is currently addressing the issue of salmon being captured in shark fisheries. At the meeting of the WA Demersal Net and Hook Fisheries Management Advisory Committee (MAC) meeting of June 21, 2002, the issue of bycatch of salmon was discussed. These notes are from the minutes:

1. i) The MAC recommends an upper annual season limit of 200 kgs per unit for accidentally caught salmon that Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery and West Coast Demersal Gillnet and Demersal Longline Interim Managed Fishery licence holders should be allowed to retain.
2. ii) The WA Demersal Net and Hook Fisheries Management Advisory Committee supports the Department's intention to seek the Minister's approval to commence consultation with:

- all licensed salmon fishers,
- all south coast and west coast demersal longline and demersal net license holders,
- Recfishwest,
- The Conservation Council, and
- Other identified interested parties,

To revise the legislation governing salmon fishing to:

- make the management plans and other legislation more current and consistent with the thrust of the FRMA,
- allow south coast and west coast demersal gillnet and demersal longline license holders to retain salmon they accidentally catch (within and agreed annual limit), and
- remove the existing prohibition that restricts the end use of commercially caught salmon.

iii) The MAC notes that this is not considered a priority issue for the Department and that it may take some time for consultation process to commence and be completed.

At the MAC meeting held on October 2, 2003, the meeting was advised that the licensed salmon fishers are prepared to allow a 10 tonne per year allowance for the demersal gillnet and longline fisheries. It made the following recommendation:

- In consultation with salmon fishers, a proposal be developed based on providing a defence on the southern and south western salmon management plans so that it is not an offence to incidentally take salmon if the person is the holder of a demersal gillnet and demersal longline and there is no evidence to suggest that a licensee was fishing in a manner that would suggest they are targeting salmon.

## **2.6.2 LEGISLATION AND POLICIES AFFECTING THE FISHERY**

### **SCS Managed Fishery**

*South Coast Salmon Fishery Management Plan 1982*

*South Coast Salmon Managed Fishery Licence*

*Proclaimed Fishing Zone Notices*

*Salmon block net prohibition Notice 1966*

*Salmon and Snapper purse seining prohibition notice 1987*

### **SWCS Managed Fishery**

*South West Coast Salmon Fishery Management Plan 1982*

*South West Coast Salmon Managed Fishery Licence*

*Proclaimed Fishing Zone Notice (South West Coast) 1975*

*Salmon block net prohibition Notice 1966*

*Salmon and Snapper purse seining prohibition notice 1987*

## **Consultation Process**

Department–industry meetings

Community meetings

## **2.7 RESEARCH STRATEGY**

### **2.7.1 RECENT/CURRENT RESEARCH**

Source of data for ongoing monitoring:

- CAES data derived from compulsory monthly returns supplemented with information from trip based voluntary logbooks. Verification of the catch was routinely undertaken throughout most of the history of the fishery (see 2.2.4, Point 3)
- Recreational survey information.
- Catch and effort information from South Australia (and Victoria).
- Intensive review of the fishery in 1991 and the development of an unpublished harvest strategy evaluation model (Walters, Cappo and Lenanton). Although the specific outputs from this model have not been used to provide management advice, the detailed understanding of the behaviour of the stock in response to past commercial and recreational fishing pressure has provided valuable guidance for ongoing management advice in relation to this fishery.
- Shore-based creel survey 1994 – 96 (FRDC project number 93/79).
- Time-series analysis of historic catches (FRDC project number 99/155).
- Development of a rigorous sampling methodology to construct a juvenile index of recruitment for seven key species along the southwest of Western Australia (FRDC project number 99/153).
- South Australian SARDI research on the development of indices of juvenile recruitment in South Australian waters, their use in predicting future Australian salmon commercial catches from WA waters and the correlations with the strength of the Leeuwin current.

Most of the data used to assess the status of the stocks is “fishery-dependent”. However some recent research has focused on the development of a fishery-independent index of juvenile recruitment. Although this project has been completed, the implementation of the research outcomes has been delayed because of inadequate funding (see below).

Whilst there are no formal arrangements, communication with researchers in other states is very co-operative. Each year, researchers from SA provide a copy of their

annual assessment of their fishery, and exchange of information occurs on a regular basis.

### **2.7.2 PROPOSED/FUTURE RESEARCH**

Research proposed for the future includes:

1. A recent review of the unpublished Walters *et al.* harvest strategy evaluation model has revealed that the original code used in the model cannot be updated, and that new code needs to be developed. During this process, the last 10 years of catch and effort data will be added to the historical database that was used in the original model.
2. Develop a predictive model of the status of the spawning biomass.
3. Develop an ongoing WA juvenile index of recruitment for Australian salmon and examine its usefulness in predicting future commercial catches. Methodology to maintain such an index was developed as part of the recent FRDC Project (99/153). However currently there are insufficient resources available to maintain the collection of these data.

### 3. METHODOLOGY

#### 3.1 SCOPE

This application is based upon the ESD report for the WA Salmon Managed Fisheries. The ESD report was generated by assessing “**the contribution of the WA Salmon Managed Fisheries to ESD**”. This assessment examined the benefits and the costs of the WA Salmon Managed Fisheries across the major components of ESD (see Table 3). In doing so, it will eventually provide a report on the performance of the fisheries for each of the relevant ecological, economic, social and governance issues associated with this fisheries. Given the timeframes involved, only the criteria required for the “Guidelines for the Ecologically Sustainable Management of Fisheries”, which cover mainly the environmental elements of ESD (outlined below in Table 3) were generated for this application.

**Table 3 Main National ESD Reporting Framework Components.**

*Nb:* Only those ESD components in *italics\** are reported in this application.

National ESD Framework – ESD COMPONENTS
<b>Contribution to Ecological Wellbeing</b>
<i>Retained Species*</i>
<i>Non-Retained Species*</i>
<i>General Ecosystem*</i>
<b>Contribution to Human Wellbeing</b>
Indigenous Community Issues
Community Issues
National Social and economic Issues
<b>Ability to Achieve</b>
<i>Governance*</i>
Impact of the environment on the fishery

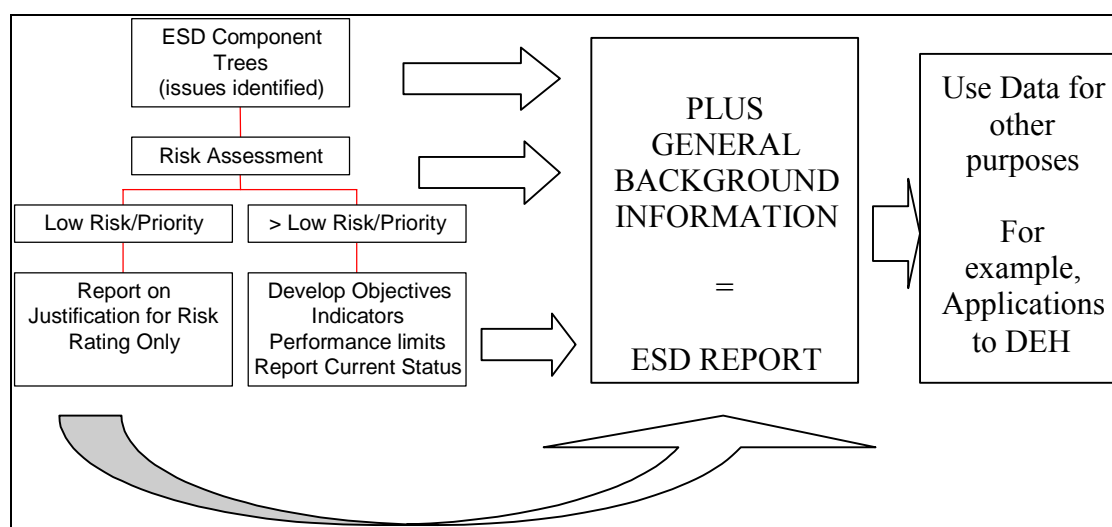
#### 3.2 OVERVIEW

There were four steps involved in completing the ESD report for the WA Salmon Managed Fisheries. It was based upon using the National ESD Reporting Framework, which is outlined in detail in the WA ESD policy paper (Fletcher, 2002) and in the “*How to Guide*” (Fletcher *et al.*, 2002) located on the website ([www.fisheries-esd.com](http://www.fisheries-esd.com)):

1. The issues that needed to be addressed for these fisheries were determined through an internal workshop (i.e. involving Department of Fisheries staff only) for the fisheries. This process was facilitated by adapting the set of “Generic

ESD Component Trees” into a set of trees specific to the WA Salmon Managed Fisheries.

2. A risk assessment/prioritisation process was completed at the interim workshop that objectively determined, which of these identified issues was of sufficient significance to warrant specific management actions and hence a report on performance. The justifications for assigning low priority or low risk however were also recorded.
3. An assessment of the performance for each of the issues of sufficient risk to require specific management actions was completed using a standard set of report headings where operational objectives, indicators and performance measures, management responses etc were specified.
4. An overview assessment of these fisheries was completed including an action plan for activities that will need to be undertaken to enable acceptable levels of performance to continue or, where necessary, improve the performance of the fisheries.



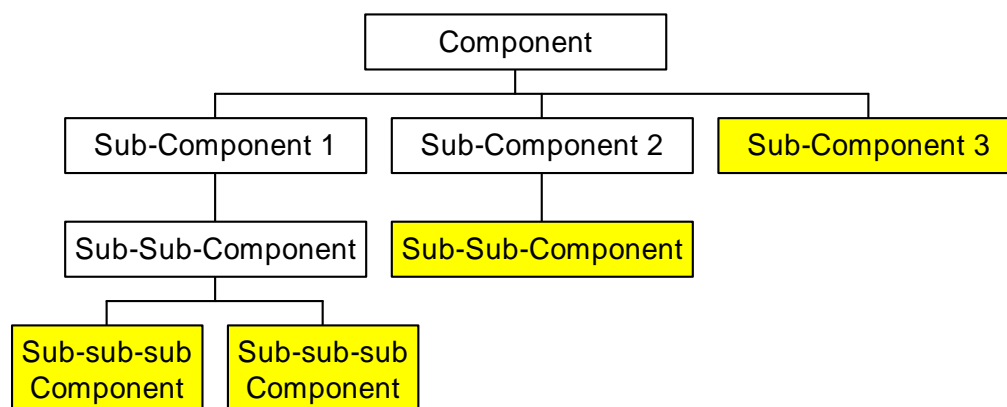
**Figure 4 Summary of the ESD reporting framework processes.**

### **3.3 ISSUE IDENTIFICATION (COMPONENT TREES)**

The National ESD Reporting Framework has eight major components, which fall into three categories of the “contributions to ecological wellbeing”, “contributions to human wellbeing” and the “ability to achieve the objectives” (Table 3). Each of the major components is broken down into more specific sub-components for which ultimately operational objectives can be developed.

To maximize the consistency of the approach amongst different fisheries, common issues within each of the components were identified by the SCFA and ESD reference groups within each of the major component areas and arranged into a series of “generic” component trees (See Fletcher (2002) and the [www.fisheries-esd.com](http://www.fisheries-esd.com) web site for a full description). These generic trees were used as the starting point for

identifying the issues. These trees were subsequently adapted into trees specific to the WA Salmon Managed Fisheries by expanding (splitting) or contracting (removing/lumping) the number of sub-components as required (see Figure 5).



**Figure 5 Example of a component tree structure.**

### **3.4 RISK ASSESSMENT/PRIORITISATION PROCESS**

After the components/issues were identified, a process to prioritise each of these needs was completed using a formal risk assessment process. The risk assessment framework that was applied at the internal workshop was consistent with the Australian Standard AS/NZS 4360:1999 Risk Management, concentrating on the risk assessment components. The general Risk Assessment process is well documented but in summary, it considers the range of potential consequences of an issue/activity and how likely those consequences are to occur. The combination of the level of consequence and the likelihood is used to produce an estimated level of risk associated with the particular hazardous event/issue in question.

These fisheries did not have an external workshop. Consequently, the information collected through the other fishery risk assessment processes were applied and utilised to generate the application for the WA Salmon Managed Fisheries.

An estimate of the consequence level for each issue was made by the group at this internal workshop. This level was from 0-5, with 0 being negligible and 5 being catastrophic/irreversible (see Appendix 2 for details of consequence tables). This assessment was based upon the combined judgments of the participants at the workshop, who collectively had considerable expertise in the areas examined.

The level of consequence was determined at the appropriate scale for the issue. Thus for target species the consequence of the WA Salmon Managed Fisheries was based at the population not at the individual level. Obviously catching one fish is always catastrophic for the individual but not always for the population. Similarly, when assessing possible ecosystem impacts this was done at the level of the whole ecosystem or at least in terms of the entire extent of the habitat, not at the level of an individual patch or individuals of non-target species.

The likelihood of a consequence occurring was assigned to one of six levels from remote to likely. In doing so, again it was considered the likelihood of the “hazardous” event (consequence) actually occurring based upon collective wisdom, which included an understanding of the scale of impact required.

From these two figures (consequence and likelihood), the overall risk value, which is the mathematical product of the consequence and likelihood levels (Risk = Consequence x Likelihood), was calculated. Finally, each issue was assigned a Risk Ranking within one of five categories: High, Moderate, Acceptable, Low and Negligible based on the risk value (see Table 4).

**Table 4 Risk ranking definitions.**

RISK	Rank	Likely Management Response	Reporting
Negligible	0	Nil	Short Justification Only
Low	1	None Specific	Full Justification needed
Moderate	2	Specific Management Needed	Full Performance Report
High	3	Possible increases to management activities	Full Performance Report needed
Extreme	4	Likely additional management activities	Full Performance Report needed

In general, only the issues of sufficient risk (Moderate, High & Extreme), - those that require specific management actions need to have a full performance reports completed. Nonetheless, the rationale for classifying issues as low risk or even negligible were also documented and formed part of the ESD report. This allows all stakeholders and interested parties to see why issues were accorded these ratings. This process is summarized in Figure 4 (above).

It is important to note that the Risk Assessment involves the completion of reports that contain the completed justifications for the scores generated. Thus, the scores determined within the meeting by themselves are insufficient.

### **3.5 COMPONENT REPORTS**

Only the issues of sufficient risk or priority that require specific management actions have a full performance report completed (which form section 5 of this application). Nonetheless, the rationale for classifying issues as low risk/priority were also documented and forms part of the report so that stakeholders can see where all the identified issues have finished.

For each of the lowest level sub-components (assessed as being of sufficient risk/priority to address), a detailed assessment of performance is generated. The SCFA Working Group in conjunction with the ESD Reference Group agreed upon a set of 10 standard headings each of which need to be addressed (Table 5). Added to this list a further heading, “**Rationale for Inclusion**”, has been added. This specific heading allows the issues raised within the risk assessment process to be explicitly recorded. A full description of each of these headings is located in the WA ESD policy (Fletcher 2002), which is available on the WA Fisheries website.

**Table 5 The National ESD reporting framework headings used in this report.**

1. Rationale for Inclusion
2. Operational Objective (+ justification)
3. Indicator
4. Performance Measure (+ justification)
5. Data Requirements
6. Data Availability
7. Evaluation
8. Robustness
9. Fisheries Management Response
  - Current
  - Future
  - Actions if Performance limit is exceeded
10. Comments and Action
11. External Drivers

Progress towards completing these reports was subsequently made by a variety of Departmental staff. The draft application was sent to DEH and stakeholders including industry members and industry groups for review. This final application was generated after the review process.

## **4. ASSESSMENT OF THE WA SALMON MANAGED FISHERIES MANAGEMENT REGIME AGAINST THE GUIDELINES FOR ASSESSING THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES**

### **4.1 GENERAL REQUIREMENTS OF THE GUIDELINES**

The management arrangements must be:

***Documented, publicly available and transparent;***

As per the FRMA “the Executive Director is to cause a copy of every order, regulation and management plan in force under this Act-

- *To be kept at the head office of the Department; and*
- *To be available for inspection free of charge by members of the public at that office during normal office hours.”*

In addition to the legislative requirements, the current management regime, as documented in the formal set of management regulations, can be purchased by interested parties from the State Law Publisher and appears on the website: [www.slp.wa.gov.au/statues/subsidary.nsf](http://www.slp.wa.gov.au/statutes/subsidary.nsf).

Of more relevance is that any discussion papers and proposals for modifications to these management arrangements are distributed widely to stakeholder groups automatically and other interested individuals by request in hard copy format. Where appropriate, they are now also available from the Departmental web site [www.fish.wa.gov.au](http://www.fish.wa.gov.au).

Finally, once completed, the full ESD Report for the WA Salmon Managed Fisheries will be made publicly available via publication and electronically from the Departmental website. This will provide increased transparency through explicitly stating objectives, indicators, performance measures, management arrangements for each issue and how the fisheries are currently performing against these criteria. As a result, the Department of Fisheries is meeting this guideline.

***Developed through a consultative process providing opportunity to all interested and affected parties, including the general public;***

The Department of Fisheries is meeting this guideline through a variety of consultative processes. S64 and S65 of the FRMA define the requirement for procedures that must be undertaken before determining or amending all management plans. More specifically, the current management arrangements for the WA Salmon Managed Fisheries were developed through formal consultation with the industry.

The Department of Fisheries arranges annual meetings with industry members regarding the fisheries. These meetings review data from the past seasons harvest and discuss management arrangements.

In previous years recreational and community views regarding the management of the salmon fisheries were expressed through the Australian Salmon and Herring Industry Advisory Committee (ASHIAC). However, appointments to the committee have since expired, and the committee no longer formally exists. The Department is currently consulting with various stakeholder groups separately, but is exploring a number of revised consultation models for the WA Salmon Managed fisheries all of which will involve more formal processes for wider stakeholder input into the management of the fishery.

In 2003, the Department of Fisheries initiated a series of public meetings around the State with a view to informing the public about the status of management and research in the State's commercial and recreational fisheries. These public meetings are expected to continue, and will provide and improve the consultation with the wider range of stakeholder groups.

In addition, after this document is assessed it will be made publicly available for all interested parties to view. This process will be repeated every five years as part of a WA Department of Fisheries policy.

***Ensure that a range of expertise and community interest are involved in individual fishery management committees and during the stock assessment process;***

The range of expertise and community interests that have been involved in the process of determining management and reviewing stock assessments is extensive. The groups that have been involved in the generation and review of the information contained in this application include:

- Department of Fisheries, WA;
- Western Australian Fishing Industry Council (WAFIC); and
- Industry Representatives.

As was previously discussed above, the Department of Fisheries is investigating different consultative methods in an attempt to engage the wider range of stakeholders in the fisheries. The public meetings that begin this year are expected to help improve the consultation with the wider range of stakeholder groups. As a result, the Department of Fisheries is meeting this objective. See Section 5.4.2.1 Consultation for more information.

***Be strategic, containing objectives and performance criteria by which the effectiveness of the management arrangements are measured;***

The Department of Fisheries is achieving this guideline through the ESD Component Reports. These reports (see Section 5 Performance Reports) contain the available objectives, indicators and performance measures for measuring and assessing the effectiveness of the management arrangements for the WA Salmon Managed

Fisheries. For some components, the objectives, indicators and performance measures are well established and the data are available to demonstrate levels of performance over time. For other components, the objectives, indicators and performance measures have only just been developed and/or the necessary data collection is only just being initiated. The status of this information is documented within each of the individual component reports within the National ESD Reporting Framework in Section 5.1-5.4. It is not intended to explicitly include performance measures, indicators, responses and information requirements regarding ESD into the management plan. Under the FRMA, management plans are considered to be more so a set of rules and processes rather than strategic plans.

***Be capable of controlling the level of harvest in the fishery using input and/or output controls;***

The FRMA and specifically the management plans for these fisheries assist in controlling the level of harvest of WA salmon. This is currently an input controlled fishery with effort restricted to a few teams and only a small number of salmon beaches. The requirement for the holders of licences to be present in order to fish, and the restrictions on the number of boats that may be used on any beach restrict effort to some extent, but the catch in any one year is more influenced (and limited) by annual recruiting variations and by the market (including an industry code of conduct, which requires fishermen ensure a market exists before the fish are caught).

The WA Salmon Managed Fisheries are divided into two managed fisheries; a SCS fishery and the SWCS fishery. The SCS managed fishery licence area is from the WA/South Australian border to Cape Beaufort but each licence holder is restricted to only catch salmon from a single nominated beach.

The SWCS fishery is from Cape Beaufort to the WA/NT border and licensed fishers are allowed to catch fish on any beach within the boundary of the fishery; however in practice only a few beaches, mostly in the Geographe Bay area, are fished. Between 15 February and 30 April a small number of beaches in this area become proclaimed fishing zones to allow the commercial fishers more “protected” access to the beach.

As of April 2004, there were 30 salmon fishing teams holding salmon licences across both fisheries; 18 in the SCS fishery and 12 licences in the SWCS fishery. Three additional licensees hold a licence condition to fish for salmon between the Busselton Jetty and Tims Thicket in Mandurah.

The fisheries management regulations have been subject to change during the past 15 years. Prior to 1990, these fisheries were managed solely as a limited entry fishery. However in 1990, TAC quotas were set for both fisheries. In 1991 the TAC was increased for both fisheries and then again in 1992 the TAC was increased for the south west coast licences holders. In 1993 the TAC limitation was removed from both fisheries because it was determined that catch variations were mainly due to changes in recruitment, not effort, and this remains the current situation.

The current and past management measures used in these fisheries have helped ensure that the sustainability of the stocks and fisheries over the long term. As a result, the

Department of Fisheries is meeting this guideline. See Sections 5.4.1.1 and 5.4.1.2 for more information.

***Contain the means of enforcing critical aspects of the management arrangements;***

The Department of Fisheries employs operational staff to ensure compliance with the critical aspects of the management arrangements for WA Salmon Managed Fisheries. Beach patrols are conducted on a random basis through the seasons. Compliance operations are mainly focused on dealing with any conflict arising between the recreational and commercial fishing sectors. Compliance staff also conduct annual licence and gear inspections on the beach. For the WA Salmon Managed fisheries zero offences were reported in 2000-2002.

Given the value of licences, fishers themselves are also a source of information on illegal activities. A full summary of these compliance activities and their effectiveness is provided in Section 5.4.1.3. Through the combination of having employed operational staff as well as a good dialog with the fishers, the Department is meeting this guideline.

***Provide for the periodic review of the performance of the fishery management arrangements and the management strategies, objectives and criteria;***

The Department is meeting this guideline through a review of the performance of the major aspects for these fisheries during the completion the annual “State of the Fisheries” report and the five-year review of this document. The “State of the Fisheries” report is updated and published each year including periodic reviews by the Office of the Auditor General (OAG). It forms an essential supplement to the Department’s Annual Report to the WA Parliament with the latest version located on the Departmental website [www.fish.wa.gov.au](http://www.fish.wa.gov.au). See Section 5.4.3.1 Assessments and Reviews for more information.

The ESD Component Reports contain a comprehensive performance evaluation of the fisheries based upon the framework described in the ESD policy (Fletcher, 2002). The reports include the development of objectives, indicators and performance measures for all aspects of the fisheries and status reports for those components that are not subject to annual assessment. The Department intends to complete and review externally this full assessment, including examination of the validity of the objectives and performance measures every five years.

***Be capable of assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates; and***

The Department of Fisheries is meeting this guideline through the development of this report. Capabilities for the assessment, monitoring and avoidance, remedying or mitigating any adverse impacts on the wider marine ecosystem are documented in the “General Environment” Section 5.3. This has been completed through a formal risk assessment analysis of the issues and, where necessary, the development of suitable monitoring programs. Even though all the issues relating to the wider marine

ecosystem were rated as low or negligible the Department of Fisheries recognises that an assessment of trophic impacts by fisheries at a regional level, rather than at the individual fishery level, would be beneficial. Consequently, the Department will investigate the development of research to identify any detectable changes in the structure of coastal fish communities in this region over the last 40 years.

***Require compliance with relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under that policy.***

Although there are no explicit threat abatement plans or recovery plans for this fishery, the management regime complies with all relevant threat abatement plans for species where there is an interaction and therefore is meeting this guideline. Details are provided in the “non-retained species” section of the ESD report (Section 5.2).

In addition, the Department of Fisheries will be developing Bycatch Action Plans for both fisheries. These plans will be based on the information presented in this application and are due to be completed in the coming years.

## PRINCIPLE 1 OF THE COMMONWEALTH GUIDELINES

### OBJECTIVE 1. MAINTAIN VIABLE STOCK LEVEL OF TARGET SPECIES

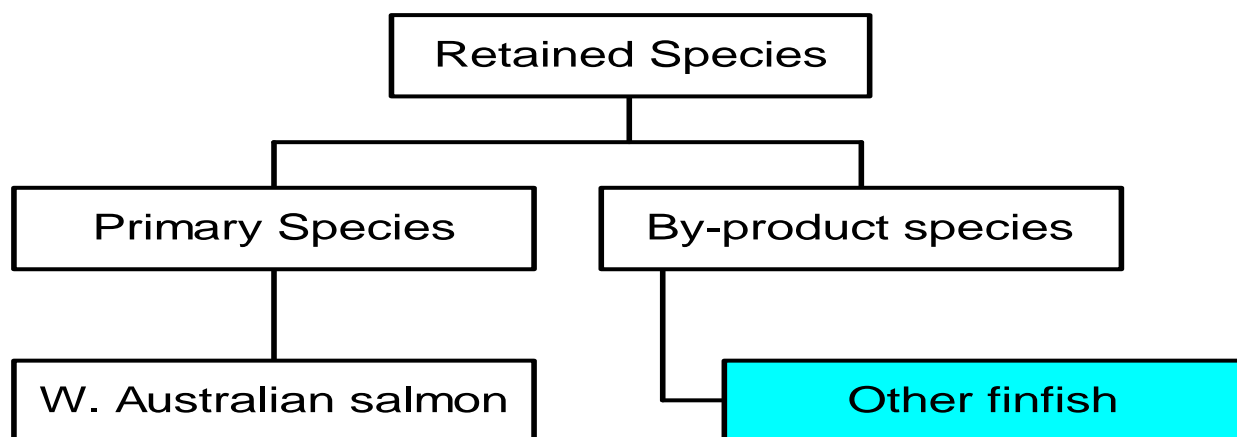
*The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability.*

The component tree detailing the retained species for the fishery is shown below. The primary species and by-product species retained by the fishery have been assessed with appropriately detailed reports having been compiled on each of them. A **Moderate Risk** rating was given to the Western Australian salmon the major target species in the fishery requiring a full report (Section 5.1.1.1). A **Negligible Risk** was given to other finfish (scalefish) (Section 5.1.2.1).

An assessment of the current performance for the WA Salmon Managed Fisheries demonstrates that all of the fish species are being maintained at acceptable levels to maintain ecologically viable stock levels. Thus, in summary:

- The catch has been kept within the acceptable catch range. The acceptable catch range is the range of annual catches, taking into account natural variations in recruitment to the fished stock, which can be expected under a fishing-effort based management plan. In the case of Australian salmon, the acceptable range is based on over 35 years of catch history. The magnitude of the current commercial catches, together with the fact that recreational catches have remained relatively unchanged over the last 10 years, indicate that the breeding stock is still at an acceptable level and being maintained. Management arrangements to ensure that catch remains within the acceptable range are outlined under Objective 1 Section 1.1.6.
- The level of capture of other by-product species by this fishery is very small. In 2002, <3 tonnes of other scalefish/sharks were caught and this was spread over four species. This level of catch would not have a significant impact on their dynamics.

Consequently, these fisheries are meeting the requirement of Principle 1. The information relevant to this principle for these species is detailed below.



### Information Requirements

**1.1.1 There is a reliable information collection system in place appropriate to the scale of the fishery. The level of data collection should be based upon an appropriate mix of fishery independent and dependent research and monitoring.**

Data are collected through a combination of fishery independent and fishery dependent systems to monitor the stock abundance within the fished areas.

Section 2.6.1 discussed the recent and current research projects, much of which is fishery-independent, which have been undertaken for this region. In 1991 there was an intensive review of the fisheries and the development of a harvest strategy evaluation model (Walters, Cappo and Lenanton, unpublished). From 1994-96 there was an FRDC project (93/79) that conducted a shore based creel survey. FRDC project 99/155 included a time series analysis of historic catches, which uses the monthly return data from the commercial fishery, discussed under 2.2.4 above. Through FRDC project 99/153 development of a rigorous sampling methodology to construct a juvenile index of recruitment for seven key species along the southwest of WA was progressed.

In addition, work has also been done in South Australia, which has provided management advice to the Department. Annual South Australian commercial catch is routinely provided. The SA SARDI research on the development of indices of juvenile recruitment to South Australian waters, their use in predicting future WA salmon commercial catches from WA waters and the correlations with the strength of the Leeuwin Current has also proved useful in improving our understanding of the recruitment process, and the factors driving it. However, ongoing collection of this information has not been possible. Given the current adequate performance of the fishery, and the constraints on available resources, there is no intention to proceed to the development of a TAC management system for this fishery.

Section 2.6.2 also identifies research project for these fisheries in the future. These include:

- Update the Walters *et. al.* harvest strategy evaluation model using the last 10 years of catch and effort data.
- Develop a predictive model of the status of the spawning biomass.
- Develop a WA juvenile index of recruitment for Australian salmon and examine its usefulness in predicting future commercial catches.

The specific data requirements needed to assess performance for each of the relevant objectives are detailed in the relevant sections of the ESD reports in Section 5.1 Retained Species. Listed below are the current data collection systems in place.

<b>Monitoring Program</b>	<b>Information Collected</b>	<b>Robustness</b>
CAES for commercial fishers	Monthly catch and effort returns completed by the fishers.	Moderate
Catch and effort for recreational fishery	Occasional recreational surveys. Surveys conducted in 1994/95 and 1996/97. National recreational fishing survey conducted in 2000/01.	Moderate
Age structured data	Data were collected up to 2000 but currently not being collected.	High
FRDC project 93/79	Shore based creel survey 1994-96.	High
Factory receival data	Collected up to 1996. Currently not collected.	High
FRDC project 99/155	Time-series analysis of historic catches	High
FRDC project 99/153	Development of sampling methodology to construct a juvenile index of recruitment for seven key species along the WA southwest.	High

**1.1.2 There is a robust assessment of the dynamics and status of the species/fishery and periodic review of the process and the data collected. Assessment should include a process to identify any reduction in biological diversity and/or reproductive capacity. Review should take place at regular intervals but at least every three years.**

The status of the breeding stocks, and intra-annual variation in the catch of the target species is assessed every year using a synthesis of catch and other relevant information obtained from the fisheries. A review of the performance of these fisheries is conducted at least once a year. This review includes an assessment of the total catch by the commercial fisheries and other sectors. These assessments are reported annually within the State of the Fisheries Report.

Although it is acknowledged that more complex analyses are needed as a basis for more accurate stock assessment, the current methods of assessment are considered robust, noting that by virtue of the nature of the fishery, the fishing effort for the major part of the fishery can never exceed historical levels, and is, in reality declining. Under these circumstances, the return to higher levels of catch during the 1990's indicates that the overall abundance of the stock is being maintained.

**1.1.3 The distribution and spatial structure of the stock(s) has been established and factored into management responses.**

The distribution for the target species in these fisheries is well documented. Section 2.2 of this report covers the biology of salmon including its distribution. The WA salmon is distributed between Tasmania, Victoria, and from South Australia westwards to Kalbarri in WA.

The life history cycle of this species involves the westward migration of maturing 3+ and 4+ years old Australian salmon from Victoria, South Australia and the eastern south coast of WA. Between March and April each year, it is hypothesised that these fish converge on spawning grounds between Cape Leeuwin and Busselton, however spawning activity has been noted throughout much of the western south coast and lower west coast region (Nicholls, 1973). This strategy brings together individuals from all parts of the distribution for spawning. Subsequently, the resultant eggs and larvae are distributed eastwards to spatially distant nursery habitats. The physical processes responsible for this eastward movement are most likely the Leeuwin current assisted transport, west winds and storm activity and active swimming of the larvae (McDonald, 1980).

An examination of the genetic connectivity of Australian salmon populations has been conducted on samples collected in Victoria, South Australia and WA between 1976 and 1977. The results of the allozyme electrophoretic analysis on 27 enzyme loci demonstrated very low levels of genetic differentiation between sites, with only 3/27 loci (11.1%) exhibiting polymorphism where the frequency of the most common allele for the combined samples was less than 0.99. This is low in comparison to other fish species reported in the literature (McDonald, 1980) and indicates that the WA salmon may be considered one biological stock.

**1.1.4 There are reliable estimate of all removals, including commercial (landings and discards), recreational and indigenous, from the fished stocks. These estimates have been factored into stock assessments and target species catch levels.**

Within the list of monitoring programs outlined above for the WA Salmon Managed Fisheries data covering each of the sources of removal are outlined. While there is no indigenous fishery there is a recreational fishery. Catches by all sectors are included in the stock assessments of the target species, salmon.

<b>Sector</b>	<b>Catch Data Collected</b>	<b>Frequency</b>
Commercial	Fishers monthly or trip summaries (CAES). Catch, effort and location for both fisheries.	Monthly or trip based during the season.
Charter Boat	Compulsory logbook with trip summaries of catch and effort.	Annually since 2001.
Recreational	Catch Surveys.	Occasionally; survey done in 1994/95 and 1996/97.
Indigenous	N/A	N/A
Illegal	Estimated from compliance data.	Annually.

**1.1.5 There is a sound estimate of the potential productivity of the fished stock/s and the proportion that could be harvested.**

The history for WA Salmon Managed Fisheries (around 40 years) combined with the extensive catch and effort data and research that has been collected for these fisheries have enabled a very reliable estimate of the sustainable yield to be calculated for the fishery. These have been translated into the indicators and performance measures used to manage and ensure the sustainability of the fisheries.

The management for the fisheries is adaptive and tailored to the major target species in the fishery. As previously mentioned, the indicator used to monitor the major target species for the fisheries is catch level. This is reviewed annually and if triggered action is taken whether it be the review of the data or change in management. In addition, the fisheries are managed through input controls in particular fishery licence areas for each fishery, nomination of beaches (south coast fishery only) and limited number of licences.

The total State catch for the calendar year 2002 was 2,623 tonnes, which was about 200 tonnes more than the previous year (see Figure 2, Section 2.1.4.1). The 2002 south coast commercial catch of Australian salmon was 1,995 tonnes. This catch was taken from the designated salmon beaches, with a minor catch component from the estuaries. Almost the entire south coast catch of salmon was taken between February and May 2002, the time of the spawning run along the south coast. There was a negligible 'back run' catch this year.

The highest proportion of the 2002 south coast catch (1,211 tonnes or 61%) was taken from the western sector of the fisheries (west of Albany to Windy Harbour). A total of 580 tonnes (29%) was taken in the central region of the fishery (east of Albany to Cape Riche). Fewer fish (205 tonnes or 10%) were taken from the eastern sector of the fishery (from Cape Riche to the east).

The south-west and west coast catch for 2002 totalled 627.5 tonnes, nearly twice the low catch reported in 2001. Refer to section 5.1.1.1 for more detail on catch, effort, stock assessment and breeding stock levels.

The long term average annual WA catch of salmon (including the recreational sector) is 2000 t. This value is less than the MSY predicted from a preliminary biomass dynamics model developed for this fishery using data from the last 30 years. Thus the fishery can be classed as fully exploited. See the stock assessment Section 5.1.1.1 for more details.

## **Management Responses**

### **1.1.6 There are reference points (target and/or limit) that trigger management actions including a biological bottom line and/or a catch or effort upper limit beyond which the stock should not be taken.**

Evidence from other fisheries suggests that a limit of 30%, with a target of 40%, of the virgin biomass is appropriate to ensure sustainability of long lived species (Mace, 1994; Mace and Sissenwine, 1993; Die and Caddy, 1997; Gabriel and Mace, 1999). Since salmon are a short lived species (living less than 10 years), a limit of 30% of the virgin biomass is considered to be a very safe level to maintain. The spawning biomass of salmon in 1936 is assumed to represent the virgin level. The WA Salmon Managed Fisheries are being maintained through the acceptable catch range, which ensures that the fishing mortality keeps the egg production above 30%. See further details on the egg per recruit analysis in Section 5.1.1.1 Stock Assessment.

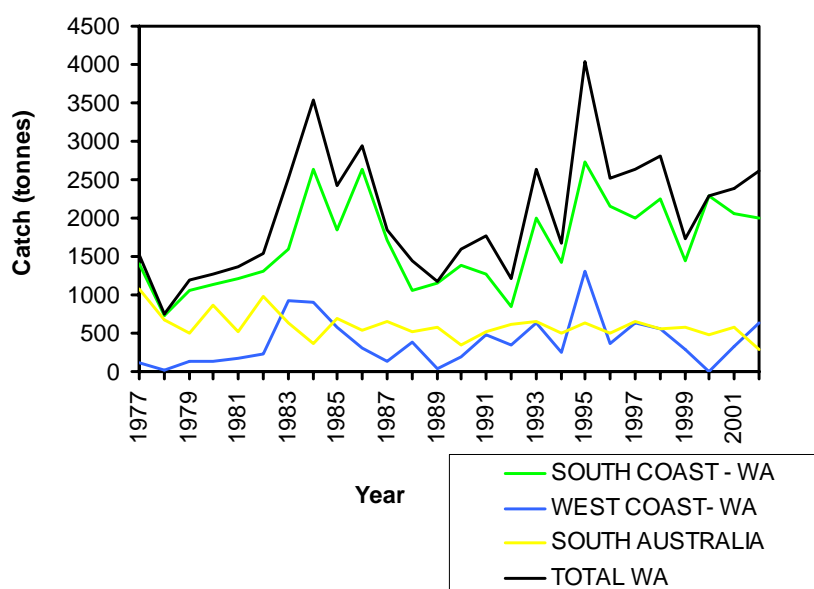
The Department of Fisheries manages the major target species through the catch level. The expected catch range under the current management regime is 1,300–3,600 tonnes (rounded to the nearest 50 tonnes) of Australian salmon. This projection is derived by double exponential smoothed forecasting of the past 35 years of annual catches to 1998 and the variation of observations around the predictions. The confidence intervals have been set at 85%. Future annual catch values that fall outside of this range will be investigated. Where consecutive values occur outside of the range, changes to the management arrangements to protect the stock may need to be considered. The 2002 catch of 2,623 tonnes fell well within the catch range.

This approach to ensuring that the stock of Australian salmon is sustained is adapted from techniques used in statistical process control, a field for which there exists a considerable body of literature. Double exponential smoothing provides a prediction similar to that provided by a moving average, and thus removes much of the variability associated with changes in the annual level of catchability or recruitment. The confidence limits that are calculated provide an estimate of the range of values of catch that might be expected in the year for which the prediction has been made and which would encompass similar inter-annual variability to that which had been experienced in previous years. Thus, the prediction and its 85% confidence limits,

which were calculated for 1999 using the data from the previous 35 years of catches, represent the expected range of values that would be consistent with the known history of the fishery and during which period the stock has been demonstrated to have been sustainable.

The underlying basis for regarding the catch projection as a worthwhile tool arose out of the 1991 review. This review determined that environmentally driven variations in recruitment were the main determinants of catch. Given this situation, provided that (1) commercial fishing practices remained essentially unchanged, and the level of commercial participation in this fishery did not increase, and (2) the recreational catch did not increase significantly, then the stock was unlikely to experience any serious overexploitation.

Under these circumstances, current monitoring and assessment methodology outlined above is considered most appropriate. Furthermore, results of the most recent assessments have revealed that assumptions (1) and (2) above are being met.



**Figure 6 The commercial catch of WA salmon in WA and South Australia between 1977 and 2002.**

### **1.1.7 There are management strategies in place capable of controlling the level of take.**

A full description of the management arrangements is located in the managements plans for the SCS and SWCS fisheries, 1982 which are available via the [State Law Publisher web site www.slp.wa.gov.au/statutes/subsidiary.nsf/Fisheries](http://www.slp.wa.gov.au/statutes/subsidiary.nsf/Fisheries).

A full discussion of the main regulations and their justifications are located in Section 2.

As previously mentioned the WA Salmon Managed Fisheries are divided into two managed fisheries; a SCS fishery and the SWCS fishery. The SCS fishery licence area is from the WA/South Australian border to Cape Beaufort but licence holders are restricted to catch salmon from nominated beaches.

The SWCS fishery is from Cape Beaufort to the WA/NT border and licenced fishers are allowed to catch fish on any beach within the boundary of the fishery; however in practice only a few beaches are fished. Between 15 February and 30 April these beaches are proclaimed fishing zones to allow the commercial fishers priority access to the beach. This was done to ensure orderly fishing practices for the western Australian salmon.

As of April 2004, there were 30 salmon fishing teams holding salmon licences in both fisheries; 18 in the SCS fishery and 12 licences in the SWCS fishery. Three additional licensees hold a licence condition to fish for salmon between the Busselton Jetty and Tims Thicket in Mandurah.

The fisheries management regulations (i.e. input and output controls) have been subject to change during the past 15 years. Prior to 1990, these fisheries were managed solely as a limited entry fishery. However in 1990, TAC quotas were set for both fisheries. In 1991 the TAC was increased for both fisheries and then again in 1992 the TAC was increased for the south west coast licences holders. In 1993 the TAC was removed from both fisheries and this remains the current situation. In addition, a limit was placed on each fishing team on the amount of salmon that could be sold as bait. This has also changed through the years and at present is set at 30 tonnes of salmon caught from the south coast that can be sold as bait.

The current and past management measures used in these fisheries have helped ensure that the sustainability of the stocks and fisheries for the long term. As a result, the Department of Fisheries is meeting this guideline. See Sections 5.4.1.1 and 5.4.1.2 for more information.

Significant effort is put into ensuring adequate compliance with these regulations. This includes at-sea patrols to ensure closed season and areas, as well as operational rules are being adhered to (full details on Compliance activities and their effectiveness are located in Section 5.4.1.3).

**1.1.8 Fishing is conducted in a manner that does not threaten stocks of by-product species.**

A full description of the information available and the levels of risk of impact on the by-product species group by the WA Salmon Managed Fisheries are located in section 5.1.2.1. Only one group of by-product species was identified for these fisheries, Other Scalefish/Sharks and this was given a **Negligible Risk** rating.

**Table 6 The annual reported catch (kgs) of by-product species from the SCS Fishery between 1998-2002.**

Year	1998	1999	2000	2001	2002
Bronze whaler	0	0	95	58	0
Blue sprat	0	20	0	0	0
Sharks	80	103	72	0	72
Skates & rays	148	0	0	0	0

Cobbler	0	0	0	12	0
Herring	50	55	570	320	10
Trevally	3	0	0	0	0
Yellow tail kingfish	0	81	0	0	0
Skipjack	0	10	0	0	0
Tarwhine	4	0	0	10	0
Sea mullet	69	331	160	287	0
Yellow eye mullet	0	882	250	370	200
Squid	15	0	0	0	0
Other	0	11	10	0	0

There are a number of other scalefish and sharks that are taken in very small quantities by the fisheries recorded on the monthly returns (Table 6). In 2002, the reported catch of these species caught in addition to those listed above as primary target species from the south coast fishery was <0.5 tonne. Reported catches of individual species in this year ranged between 0 and 0.2 tonnes (Table 6).

Specific figures for by-product cannot be provided for the west coast fishery due to the nature of the reporting of this fishery. However, any take of species other than salmon in this area will be included within the assessment of general beach seining operations. The actual take of other species whilst specifically targeting salmon is expected to have a negligible impact on these species.

**1.1.9 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.**

Management actions taken within these fisheries over the past 50 years have been very effective and there is, therefore, a very high probability that they will continue to achieve the main objective of maintaining the spawning stocks for the major target species caught.

The management responses that are currently in place for the fisheries are very detailed, both for current actions, future actions and if the performance limits are reached/approached (see Section 5.1.1.1).

The use of indicators and performance measures for the major target species allow the Department to respond to changes outside the normal variations thus ensuring the maintenance of the spawning stock for the species. If the probability of these performance limits being reached increases, management arrangements can be implemented.

**OBJECTIVE 2. RECOVERY OF STOCKS**

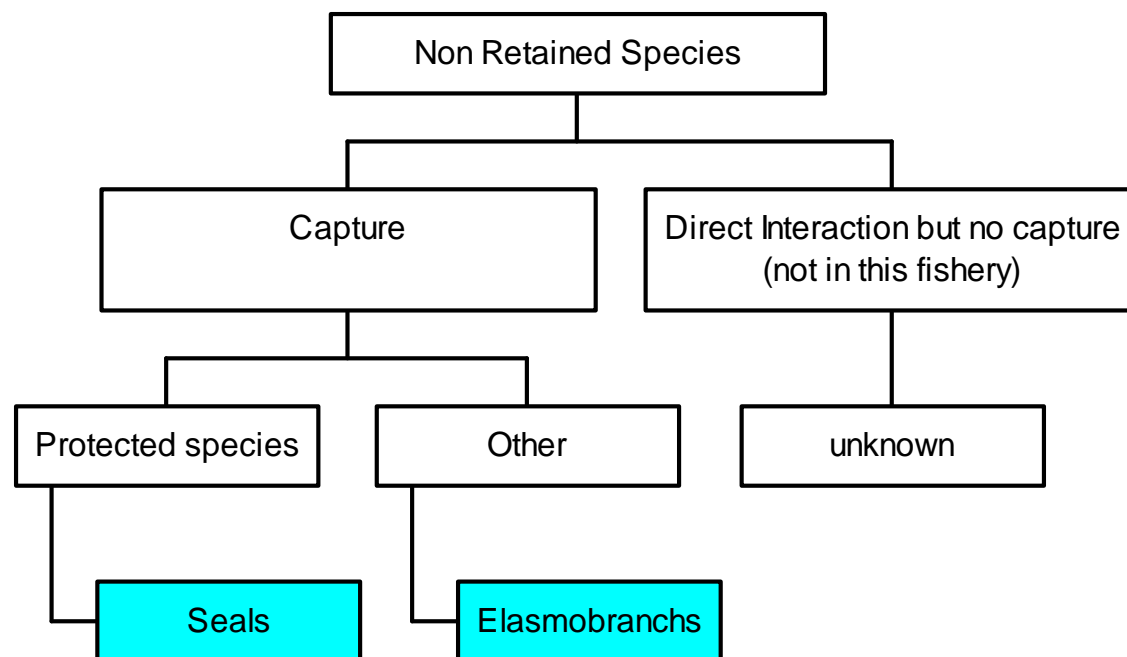
***Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes.***

No stocks in these fisheries are now considered to be below their defined levels.

## PRINCIPLE 2 OF THE GUIDELINES

### OBJECTIVE 1. BYCATCH

*The fishery is conducted in a manner that does not threaten bycatch species.*



Two non-retained (bycatch) species/groups were identified in these fisheries and are shown above in the component tree. The impacts of the fisheries were identified as having a **Negligible Risk** to both species/groups of species. As a result of the risk ratings accorded to these issues only a brief justification was required (Section 5.2). The threatened and protected species (e.g. seals) are covered in Objective 2.2; the remaining non-retained species are covered under objective 2.1.

The minimal bycatch issues associated with these fisheries and the negligible risks involved demonstrate that the performance of the fisheries is not threatening any bycatch species, including protected and threatened species. Consequently, it is meeting both objectives 1 and 2 of Principle 2.

#### Information Requirements

##### 2.1.1 Reliable information, appropriate to the scale of the fishery, is collected on the composition and abundance of bycatch.

There is limited information on the nature and volume of bycatch species for the WA Salmon Managed Fisheries because fishers do not record discards and no formal survey of bycatch in this fishery has been conducted. However from years of

observations of these fishing operations, nets are only deployed to target schools of salmon that swim into a particular Proclaimed Fishing Zone. As mentioned earlier, these zones are most often high-energy sites, with clean sandy bottoms. As such, rarely has the capture of any bycatch species been observed. Furthermore, beach seining is a very labour intensive fishing method, which does allow for bycatch species to be identified immediately by the fishing teams. The fishers are then able to release any bycatch species from the seine soon after capture. Under these circumstances, there is little need to get involved with any estimation of release mortality.

## **Assessments**

### **2.1.2 There is a risk analysis of the bycatch with respect to its vulnerability to fishing.**

A formal risk assessment for the identified non-retained/bycatch species was completed (see Section 3.2 for details on how this was completed). This assessment concluded that the WA Salmon Managed Fisheries were of negligible risk to elasmobranchs.

## **Elasmobranchs - Summary**

### ***ERA Risk Rating (C0 L6 NEGLIGIBLE)***

Elasmobranchs i.e. sharks and rays are known to be caught by these fisheries. These species are vulnerable to overfishing because they have a highly K-selected life history (i.e. long-lived, slow to reproduce). However, only very minor quantities of each elasmobranch species are caught some of which are sold. There is only a small annual catch (generally < 250kg) of sharks and/or rays taken as a byproduct of the SC salmon fishery (see Table 6 for details). For more information see Section 5.2.1.2.

## **Management Responses**

### **2.1.3 Measures are in place to avoid capture and mortality of bycatch species unless it is determined that the level is sustainable (except in relation to endangered, threatened or protected species). Steps must be taken to develop suitable technology if none is available.**

### **2.1.4 An indicator group of bycatch species is monitored.**

The combination of the low level of effort, areas where they operate and the relatively small area in which the WA Salmon Managed Fisheries operate within greatly reduces the impacts on all of these affected species.

Due to the minimal risks associated with this group of non-retained species, it is not necessary to monitor or implement further management for any of these species in the longer term.

### **2.1.5 There are decision rules that trigger additional management measures when there are significant perturbation in the indicator species numbers.**

The risks associated with this group of species will be reassessed at the next major review of these fisheries. This will occur within five years, as a requirement of the WA ESD policy.

**2.1.6 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.**

Given the relatively low levels of interactions for the WA Salmon Managed Fisheries with non-retained species, it is more than likely that the current situation of having only negligible impacts on these species will continue. Nonetheless, as monitoring data becomes more available, the suitability of the current performance limits may need to be reviewed. If they are inappropriate and/or the level of interactions increases, appropriate alterations to the practices will be taken.

## **OBJECTIVE 2. PROTECTED/LISTED SPECIES**

***The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids and minimises impacts on threatened ecological communities.***

### **Assessments**

**2.2.1 Reliable information is collected on the interaction with endangered, threatened or protected species and threatened ecological communities.**

Mawson and Coughran (1999) have collected and published information on records of sick, injured and dead pinnipeds in Western Australia. These records from 1980 – 1996 show that of 179 seal deaths recorded in Western Australia only 7 over the 17 year period were attributed to drowning in fishing nets.

There have been no reports of injury or death of seals due to salmon fishing operations. Seals are occasionally surrounded by the beach seine, however as seine netting operation is labour intensive and catches of seals are noticed immediately and seals are released without injury. Fishers are not required to record interactions with seals.

**2.2.2 There is an assessment of the impact of the fishery on endangered, threatened or protected species.**

A formal risk assessment for the identified non-retained/bycatch species was completed (see Section 5.2 for details on how this was completed). Seals were identified as the only bycatch species relevant in this case. This assessment concluded that the WA Salmon Managed Fisheries were of **Negligible Risk** to seals.

### **Seals - Summary**

***ERA Risk Rating (C0 L1 NEGLIGIBLE)***

Seals are occasionally surrounded by the beach seine, but are released immediately by the fishers. This is due to the fact that the seine netting operation is labour intensive

and catches of seals are noticed immediately by the fishing team. The fishers are then able to release the seals from the seine net soon after capture and without injury. For full details see Section 5.2.1.1.

**2.2.3 There is an assessment of the impact of the fishery on threatened ecological communities.**

There are no threatened ecological communities associated with these fisheries.

**Management Responses**

**2.2.4 There are measures in place to avoid capture and/or mortality of endangered, threatened or protected species.**

Current management arrangements prohibit the landing of these species. However, due to the fishing method being used in these fisheries fishers are able to release the seals from the seine net after capture and therefore actually landing of the species is not an issue for these fisheries.

**2.2.5 There are measures in place to avoid impact on threatened ecological communities.**

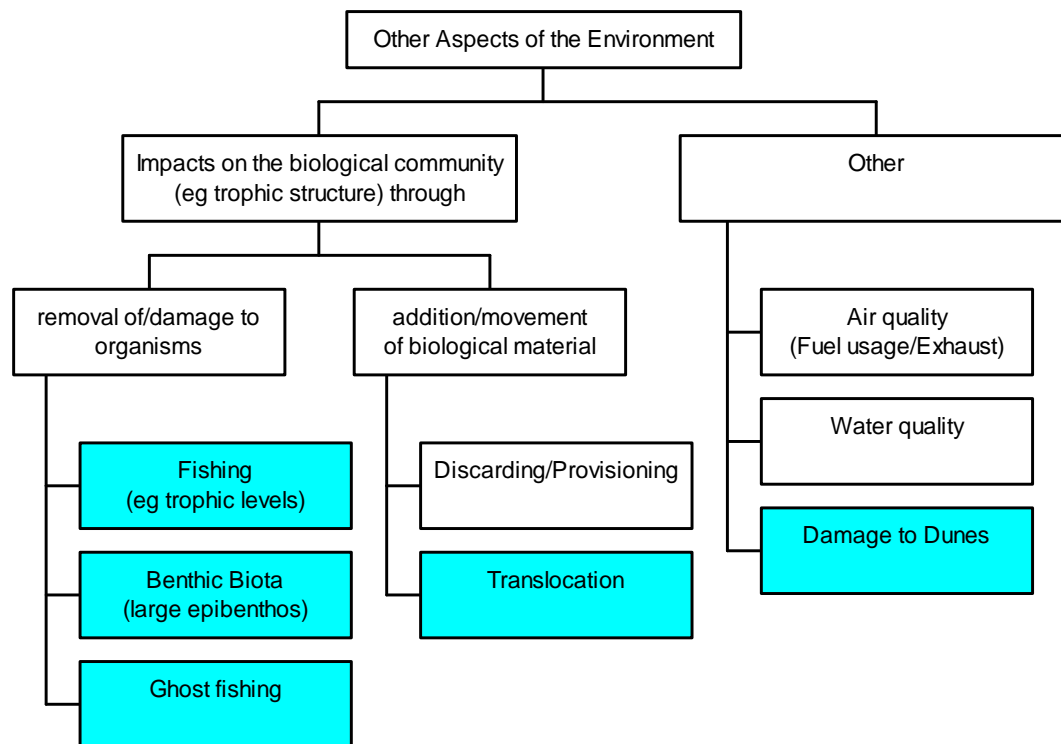
Not applicable.

**2.2.6 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.**

Given the relatively low levels of interactions for the WA Salmon Managed Fisheries with protected species, it is more than likely that the current situation of having only negligible impacts on these species will continue. Nonetheless, as monitoring data becomes more available, the suitability of the current performance limits may need to be reviewed. If they are inappropriate and/or the level of interactions increases, appropriate alterations to the practices will be taken.

### OBJECTIVE 3. GENERAL ECOSYSTEM

*The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally.*



The issues that relate to the broader ecosystem which were identified for the WA Salmon Managed Fisheries are shown above in the component tree. A risk assessment process subsequently assessed each of these issues with the information relating to each issue detailed in Section 5.3.

Of the five issues identified for the fisheries, two were of **Low Risk** (trophic interactions and translocation on vessel hulls) the other three were rated as **Negligible Risk** (ghost fishing, Benthic impacts and damage to dunes). Consequently, the current performance for the fisheries is meeting Objective 3 and this acceptable performance is likely to at least continue or improve in the future.

#### Information Requirements

**2.3.1 Information appropriate for the analysis in 2.3.2 is collated and/or collected covering the fisheries impact on the ecosystem and environment generally.**

Appropriate levels of information have been obtained for most of the issues identified, which has allowed a sensible assessment of the level of risk to be made. This information includes data collected, which is directly related to the fisheries- in terms

of levels of catch and effort, gear designs, and understanding of spatial and temporal closures. There are also a number of publications that provide valuable information on trophic interactions in addition to the research that the Department of Fisheries has undertaken and is currently working on within other similar fisheries.

### Assessments

#### **2.3.2 Information is collected and a risk analysis, appropriate to the scale of the fishery and its potential impacts, is conducted into the susceptibility of each of the following ecosystem components to the fishery.**

A formal risk assessment was completed (see Section 5.3 for details) on each of the identified issues relevant to the fisheries (see component tree for issues). The identified issues were assessed and a summary of the outcomes is located in Table 7. Complete justifications are located in the performance reports in Section 5.3.

**Table 7 Summary of risk assessment outcomes for environmental issues related to the WA Salmon Managed Fisheries.**

<b>ISSUES</b>	<b>RISK</b>	<b>SUMMARY JUSTIFICATION</b>	<b>FULL DETAILS</b>
Removal of/damage to organisms:			5.3.1
Trophic Interactions	Low	As salmon are one of a suite of top-end predators in the marine food chain of the lower west and south coasts. Whilst the fishery has the potential to reduce the mortality on salmon prey species, given the naturally occurring variability in Australian salmon biomass, any fishery effect is likely to be similar in magnitude to other factors contributing to the natural variation in mortality of these prey species.	5.3.1.1
Benthic Biota	Negligible	Beach seining over sandy beaches (most of which are relatively high energy locations) will have virtually no impact on the benthic habitat.	5.3.1.2
Ghost fishing	Negligible	There are no known records of fishers losing gear. There is also minimal chance for gear to be lost since the fishers operate in the shallows of sandy beaches.	5.3.1.3
Addition/Movement of biological material:			5.3.2
Translocation on vessel hulls	Low	The Leeuwin Current flows along the WA coastline, transporting biological material and resulting in a high level of connectivity between	5.3.2.1

		regions. Therefore, vessels in the fishery are unlikely to translocate organisms beyond the range of dispersal that would occur through natural processes.	
Other:			5.3.3
Damage to Dunes	Negligible	The use of vehicles on the beaches to assist the fishing process will have negligible impacts on the associated dune structures. Only a small number of places are allowed to be fished- these are kept the same between years	5.3.3.1

### Management Response

#### **2.3.3 Management actions are in place to ensure significant damage to ecosystems does not arise from the impacts described in 2.3.1.**

The most important management method required to ensure that there is minimal impact on the broader ecosystem include maintaining significant biomass levels of the target species. In most cases, this serves to achieve both objectives of having a sustainable fishery and minimising the potential for any trophic interactions.

With the proposal of future studies to be conducted to assess trophic impacts of fisheries at a regional level (i.e. development of research to identify any detectable changes in the structure of coastal fish communities) an increase of information will be generated to more accurately assess these issues in the future.

#### **2.3.4 There are decision rules that trigger further management responses when monitoring detects impacts on selected ecosystem indicators beyond a predetermined level, or where action is initiated by application of the precautionary approach.**

None of the issues identified for this category were of sufficient risk to require specific target levels as they are effectively covered by the other management arrangements and trigger points. If future studies prove that risk to any of these issues has increased a review will take place and management will be implemented.

#### **2.3.5 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.**

The risk assessment identified that under current management arrangements there have been minimal or negligible impacts from the WA Salmon Managed Fisheries on the broader ecosystem even after around 30 years of fishing. It is, therefore, highly likely that this fishery will continue to meet the objectives of having only acceptable levels of impact. If future studies indicate that further management is required for any of the issues, then appropriate actions will be developed.

## OVERVIEW TABLE

The following table provides a summary of the material present in this report.

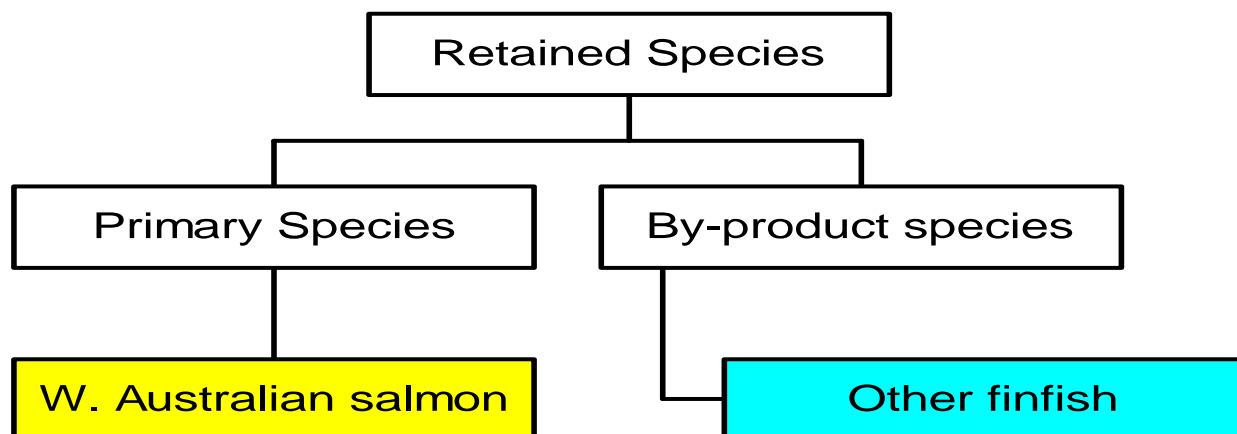
Issue	Objective Developed	Indicator Measured	Performance Measure	Current Performance	Robustness	DEH Guidelines Covered	Actions
<b>RETAINED SPECIES (Component Tree)</b>						1.1	
5.1.1.1 WA salmon	Yes	Annual catch level	Expected catch range under the current management regime is 1,300-3,600 tonnes.	Acceptable	Medium	1.1.1 – 1.1.7	Catches will be monitored annually.
5.1.2.1 Other Scalefish/Sharks	No-Negligible Risk	N/A	N/A	N/A	N/A	1.1.1 – 1.1.7	Review at next risk assessment.
<b>NON-RETAINED SPECIES (Component Tree)</b>						2.2.2 – 2.2.6	
5.2.1.1 Seals	No-Negligible Risk	N/A	N/A	N/A	N/A	2.2.2 – 2.2.6	Review at next risk assessment.
5.2.1.2 Elasmobranchs	No-Negligible Risk	N/A	N/A	N/A	N/A	1.1.1 – 1.1.7	Catches will be monitored annually.
<b>GENERAL ENVIRONMENT (Component Tree)</b>						2.3	
5.3.1.1 Trophic Interactions	No- Low Risk	N/A	N/A	N/A	N/A	2.3.1 – 2.3.5	Review Risk at Next Major Assessment
5.3.1.2 Benthic Impacts	No-Negligible Risk	N/A	N/A	N/A	N/A	2.3.1 – 2.3.5	Review Risk at Next Major Assessment
5.3.1.3 Ghost Fishing	No-Negligible Risk	N/A	N/A	N/A	N/A	2.3.1 – 2.3.5	Review Risk at Next Major Assessment

<b>Issue</b>	<b>Objective Developed</b>	<b>Indicator Measured</b>	<b>Performance Measure</b>	<b>Current Performance</b>	<b>Robustness</b>	<b>DEH Guidelines Covered</b>	<b>Actions</b>
<b>GENERAL ENVIRONMENT continued</b>						2.3	
5.3.2.1 Translocation by Vessel Hulls	No – Low Risk	N/A	N/A	N/A	N/A	2.3.1 – 2.3.5	Review Risk at Next Major Assessment.
5.3.3.1 Damage to Dunes	No- Low Risk	N/A	N/A	N/A	N/A	2.3.1 – 2.3.5	Review Risk at Next Major Assessment.

## 5. PERFORMANCE REPORTS

### 5.1 RETAINED SPECIES

#### COMPONENT TREE FOR THE RETAINED SPECIES



A **yellow** box indicates that the issue was considered a high enough risk to warrant a full performance report. A **blue** box indicates that the issue was considered a low risk, with no specific management required, and only a justification is presented.

#### 5.1.1 PRIMARY SPECIES

##### 5.1.1.1 WA SALMON

#### Rationale for Inclusion:

WA salmon (*Arripis truttaceus*) is the major target species of the SCS and SWCS fisheries and therefore the potential impact of the fishery on their stocks needs to be assessed.

#### ERA Risk Rating: Impact on breeding population (C2 L3 MODERATE)

The WA salmon is distributed between Tasmania, Victoria, and South Australia westwards to Kalbarri in WA. In WA waters, this species is the main target for the two managed commercial fisheries along portions of the southern coast and the lower southwest corner.

The life history cycle of this species involves the westward migration of maturing 3+ and 4+ years old Australian salmon from Victoria, South Australia and the eastern south coast of WA. Between March and April each year, it is hypothesised that these fish converge on spawning grounds between Cape Leeuwin and Busselton, however spawning activity has been noted throughout much of the western south coast and lower west coast region (Nicholls, 1973). This strategy brings together individuals from all parts of the distribution for spawning. Subsequently, the resultant eggs and larvae are distributed eastwards to spatially distant nursery habitats. The physical processes responsible for this eastward movement are most likely the Leeuwin current

assisted transport, west winds and storm activity and active swimming of the larvae (McDonald, 1980).

The genetic connectivity of Australian salmon populations collected in Victoria, South Australia and WA between 1976 and 1977 was examined. The results of the allozyme electrophoretic analysis on 27 enzyme loci demonstrated very low levels of genetic differentiation between sites, with only 3/27 loci (11.1%) exhibiting polymorphism where the frequency of the most common allele for the combined samples was less than 0.99. This is low in comparison to other fish species reported in the literature (McDonald, 1980) and indicates that the WA salmon may be considered one biological stock.

The main fisheries for Australian salmon are the SCS and the SWCS fisheries in WA. The maturing and breeding fish are vulnerable to these coastal fisheries as they move into spawning grounds. These shore-based commercial fisheries wait for a school to swim into a nettable beach in one of the limited number of Proclaimed Fishing Zones. Thus there is no active searching for the schools on the part of the fishers. In years of an early and strong Leeuwin Current carrying warm water along the south coast inshore regions, the fish will remain in cooler waters offshore and will be unavailable for capture within these shoreline zones. It has been suggested that environmental factors are responsible, in part, for both the level of commercial catch, and the relative abundance of juvenile salmon settling within specific nursery areas.

Despite the fact that we are currently unable to make the best use of the available fishery independent data, the excellent long-term set of catch (and effort) data from all of the commercial fisheries, supported by the catch quota being enforced in South Australia, and several estimates of the magnitude of the recreational catch has enabled us to have confidence in the annual assessments of the status of the stock.

Thus, when considering the potential consequence of fishing on the Australian salmon stock both fishing and environmental factors must be taken into account. During the past 10 years there has been a slow attrition of fishers from the fishery resulting in a decrease in commercial fishing effort. This decline in effort in combination with the long-standing catch history from these two commercial fisheries indicates that the potential consequence is “**moderate**” (C2) but there is only a “**possible**” (L4) likelihood of this occurring, yielding a **MODERATE** risk of the fishery on the breeding stock.

### **Operational Objective**

To maintain the spawning stock of WA salmon at or above a level that minimises the risk of recruitment overfishing.

#### ***Justification:***

*An operational objective that maintains the potential for recruitment at historical levels is consistent with the statutory obligation under Section 3 of the FRMA (1994) "to conserve, develop and share fish resources of the State for the benefit of present and future generations."*

## Indicators

Annual catch level (See Section 4.1 Objective 1).

## Performance Measures

The expected catch range under the current management regime is 1,300–3,600 tonnes (rounded to the nearest 50 tonnes) of WA salmon. This projection is derived by double exponential smoothed forecasting of the past 35 years of annual catches to 1998 and the variation of observations around the predictions. The confidence intervals have been set at 85%. Future annual catch values that fall outside of this range will be investigated. Where consecutive values occur outside of the range, changes to the management arrangements to protect the stock may need to be considered. The 2002 catch of 2,623 tonnes fell well within the catch range.

### ***Justification:***

*Evidence from other fisheries suggests that a limit of 30%, with a target of 40%, of the virgin biomass is very precautionary for such a short lived species as salmon to ensure sustainability of the fishery (Mace, 1994; Mace and Sissenwine, 1993; Die and Caddy, 1997; Gabriel and Mace, 1999).*

## Data Requirement for Indicator

Data Required	Availability
Catch & Effort by commercial fisheries	Monthly catch & effort returns are completed by the fishers and are stored electronically on the CAES system at WAMRL.
Catch & effort by recreational fishery	Occasional recreational surveys. Surveys were conducted in 1994/1995 and 1996/1997. National recreational fishing survey conducted in 2000/2001.
Age structured data	Age structured data were collected up to 2000. Data are not currently being collected.
Factory receival data	Factory receival data were collected up to 1996. Data are not currently being collected.

## Evaluation

**Commercial Catch:** The total State catch for the calendar year 2002 was 2,623 tonnes, which was about 200 tonnes more than the previous year (see Table 2 in Section 2.2). The 2002 south coast commercial catch of WA salmon was 1,995 tonnes. This catch was taken from the designated salmon beaches, with a minor catch component from the estuaries. Almost the entire south coast catch of salmon was taken between February and May 2002, the time of the spawning run along the south coast. There was a negligible ‘back run’ (June – December) catch this year.

The highest proportion of the 2002 south coast catch (1,211 tonnes or 61%) was taken from the western sector of the fishery (west of Albany to Windy Harbour). A total of 580 tonnes (29%) was taken in the central region of the fishery (east of Albany to Cape Riche). Fewer fish (205 tonnes or 10%) were taken from the eastern sector of the fishery (from Cape Riche to the east).

The southwest and west coast catch for 2002 totalled 627.5 tonnes, nearly twice the low catch reported in 2001.

**Fishing effort:** There are 18 south coast and 15 southwest and west coast fishing teams (three with access only north of Busselton Jetty).

**Catch rate:** During 2002, the average catch per fishing team was 110.9 tonnes (down from 114.8 t in 2001) for the south coast and 41.8 tonnes for the west coast (up from 21.7 t in 2001).

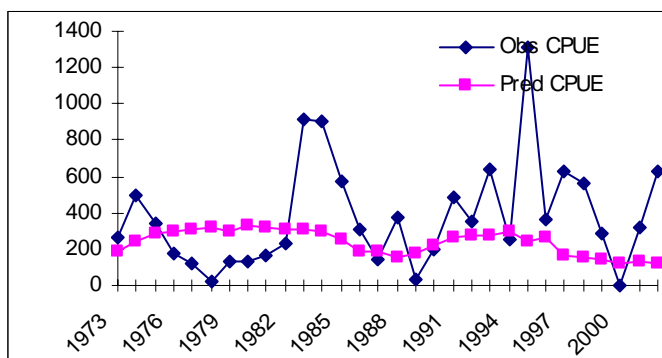
**Recreational component:** The most recent surveys, conducted in 1994 and 1995 (Ayvazian *et al.*, 1997), indicated that the recreational catch share was about 6% of the total south coast catch and 8–16% of the west coast catch. Given the slightly increased commercial catch in 2002, there would have been an improved recreational catch for the year.

**Stock assessment:** The results from preliminary yield-per-recruit and egg-per-recruit analyses indicate that, while many smaller salmon are being caught in the fishery, the fishing effort has not impacted on the number of eggs available. Research to date has shown that environmental factors exert a dominant influence on year-class strength and subsequent recruitment to the Western Australian commercial fishery. However, this annual level of recruitment is a function of the relative size of contributions from WA and South Australian nursery areas to the overall recruited year classes. Hence there is a need for some index of the relative contribution of South Australian and WA recruitment to the WA fisheries. Although more complex yield-per-recruit or egg-per-recruit analyses are needed to account for this variability in recruitment before an accurate determination of the status of the stock can be completed, there are insufficient resources available to undertake this research.

Noting that the effort in the major part of the fishery on the south coast is fixed, the higher levels of catch since the mid-1990s indicate that the overall abundance of the stock is being maintained. The movement of spawning-run fish from the south coast to the west coast indicates a beneficial environmental effect rather than a higher stock level.

A preliminary biomass dynamics model has been developed using data available for the past 30 years using the catch on the west coast as the observed measure of relative abundance. This analysis produced outcomes that suggested that the long-term WA catch of salmon (including the recreational component) will be in the vicinity of 2,500 t per year. The average catch (all sectors) during this period was about 2,000 t, which given that the MSY calculated from these models tend to be optimistic, the fishery can be considered fully exploited.

Parameters	Value
r	1.129602
K	8566.791
q	0.043
Bo	4283.396
	2E-07
SS	62.56432
MSY	2419.266



**Figure 7. Preliminary Biomass dynamics model using west coast catch as CPUE (includes recreational catch).**

**Breeding stock levels:** Current commercial catches indicate that the breeding stock is still at an acceptable level.

The egg-per-recruit analysis (Table 8, Figure 8) indicates that given the age at first capture between 3 to 4 years of age, so long as the fishing mortality (F) is < 1.65 the spawning stock will be greater than 30 % of unfished levels.

The estimates of F made during the period 1975 – 1994 had a mean level of 1.51 (this estimate of F includes the catch taken in the SA fishery), thus the current exploitation level on the WA salmon population is high, owing to the ‘gauntlet’ nature of the fishery, which catches migrating schools of salmon as they pass each of the fishing beaches in turn. Consequently, any substantial increase in the exploitation rate from either commercial or recreational fishers, could take the stock below a limit biological reference point of 30% of virgin egg biomass. It should, nonetheless, be reiterated that a biological reference point of 30% may be considered to be a very conservative figure for a short lived (<10 years) species such as salmon.

**Table 8 Egg per recruit for the WA salmon fishery.**

Eggs per recruit	F	Age of recruitment to fishery
E30%	0.94	(Age of recruitment to fishery = 3)
	1.65	(Age of recruitment to fishery = 4)
E40%	0.56	(Age of recruitment to fishery = 3)
	0.81	(Age of recruitment to fishery = 4)

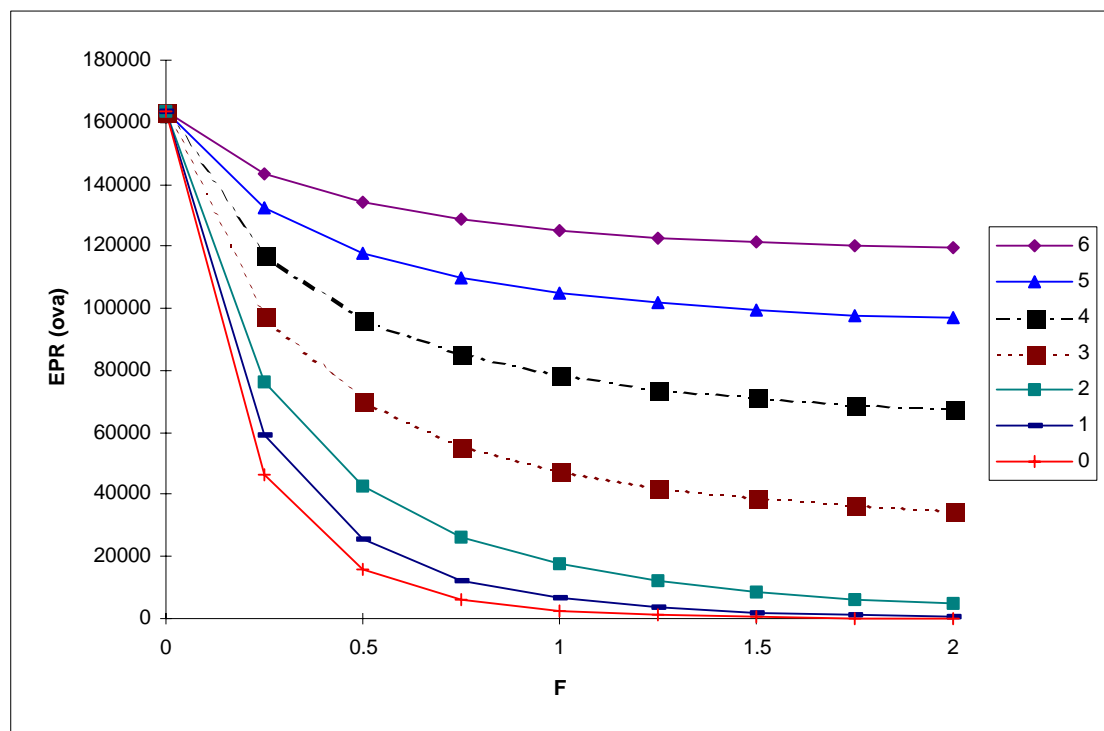


Figure 8. Eggs per recruit at differing ages of recruitment to the fishery.

## Robustness Medium

Currently, the assessment of the spawning stock of WA salmon is largely derived from the catch and effort returns for the commercial WA salmon fishers. The long-term catch and effort data series from these fisheries and the preliminary assessment models indicate that the fisheries are operating at sustainable levels and problems with recruitment have not been encountered. Consequently, the current methods of management and the use of catch to monitor performance are sufficiently robust at the current levels of harvesting for this species. This situation will remain stable as long as the nature of the commercial fisheries remain the same, and the recreational catch remains within historical limits.

## Fisheries Management Response

**Current:** The number of licences in the WA salmon fisheries is limited. There are two managed salmon fisheries. The SCS fishery permits licence holders to operate from assigned beaches between Shoal Cape and Cape Beaufort. The SWCS fishery operates north of Cape Beaufort and comprises specific beaches (proclaimed fishing zones) that are shared by licence holders. A legal minimum length of 300mm for salmon applies in the commercial fisheries.

Both shore and boat based recreational line fishers catch salmon along the lower west coast of WA. The recreational bag limit for salmon is 4 fish per angler per day and the size limit is 300 mm total length. Recreational netters in estuaries may occasionally catch juvenile salmon.

The legal minimum length affords protection to the relatively small number of juvenile fish which are vulnerable to capture largely only by the recreational sector. The commercial fisheries only target migrating adult fish, usually from 600-650 mm caudal fork length (see Section 2.4.1), thus the minimum size is largely irrelevant to this group.

**Future:** The fishery will continue to be monitored by analysis of monthly catch data from the CAES system. The usefulness of the catch and effort information could be improved by daily reporting. The quality of stock assessments would be improved with increased resources to examine existing age composition data from the fishery.

**Actions if Performance Limits are Exceeded:** Where consecutive catch levels fall outside of the acceptable catch range changes to the management arrangement to protect the stock may need to be considered.

### **Comments and Actions**

Not applicable.

### **External Driver Check List**

Catches of WA salmon along the west and south coasts have been associated with the behaviour and strength of the southward-flowing Leeuwin Current. A weakly flowing Leeuwin Current has been associated with higher catches of WA salmon along south coast beaches and west coast beaches. In this situation, coastal waters are cooler and the salmon typically move closer to shore and they migrate further up the west coast, becoming more vulnerable to the west coast recreational and commercial fisheries.

In addition, the commercial catch levels are influenced on an annual basis by market demand for the product. In recent years, the catch of salmon may not have been indicative of abundance, as there was a decline in markets.

## **5.1.2 BY-PRODUCT SPECIES**

### **5.1.2.1 OTHER SCALEFISH/SHARKS**

#### **Rationale for Inclusion:**

A small quantity of other finfish species is caught with the salmon.

#### **ERA Risk Rating: Impact on breeding stocks of other scalefish/sharks (C0 L6 NEGLIGIBLE)**

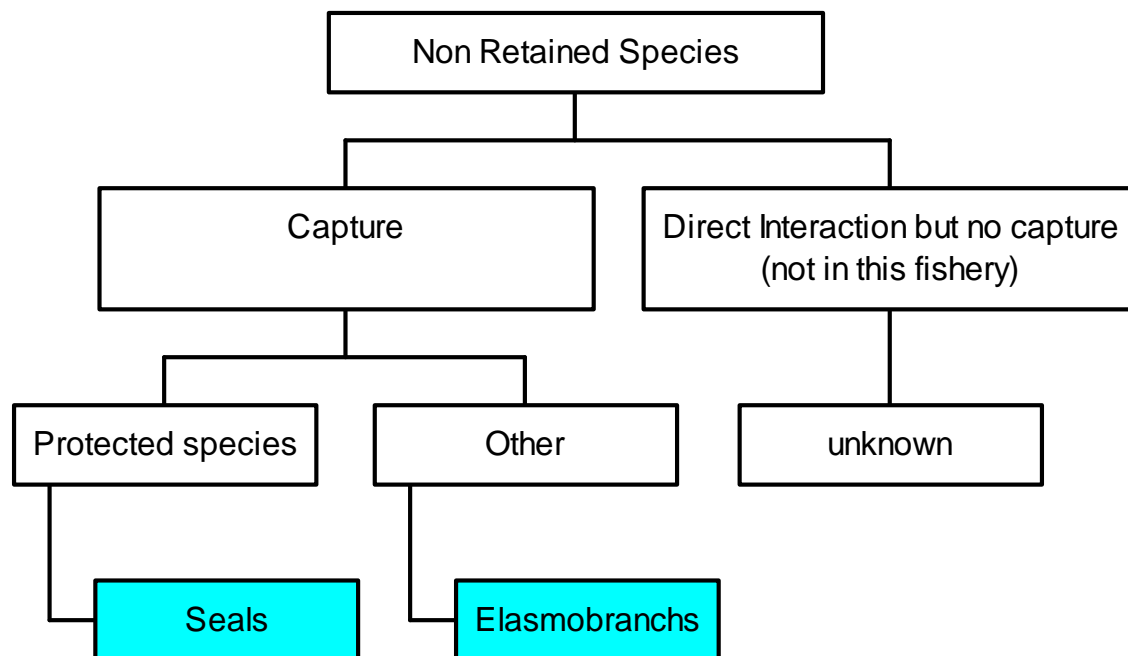
There are a number of by-product species from commercial salmon fisheries that are taken in very small quantities (Table 8), therefore the risk to these species is regarded to be **NEGLIGIBLE**.

**Table 8 The annual reported catch (in kgs) of by-product species from the WA SCS Fishery between 1998-2002.**

Year	1998	1999	2000	2001	2002
Bronze whaler	0	0	95	58	0
Blue sprat	0	20	0	0	0
Sharks	80	103	72	0	72
Skates & rays	148	0	0	0	0
Cobbler	0	0	0	12	0
Herring	50	55	570	320	10
Trevally	3	0	0	0	0
Yellow tail kingfish	0	81	0	0	0
Skipjack	0	10	0	0	0
Tarwhine	4	0	0	10	0
Sea mullet	69	331	160	287	0
Yellow eye mullet	0	882	250	370	200
Squid	15	0	0	0	0
Other	0	11	10	0	0

## 5.2 NON-RETAINED SPECIES

### COMPONENT TREE FOR THE NON-RETAINED SPECIES



A **blue** box indicates that the issue was considered a low risk, with no specific management required, and only a justification is presented.

#### 5.2.1 CAPTURE

##### 5.2.1.1 PROTECTED/LISTED SPECIES SEALS

#### Rationale for Inclusion:

Seals are occasionally surrounded by the beach seine, but are released immediately by the fishers.

#### ERA Risk Rating: Impact on breeding stock (C0 L1 NEGLIGIBLE)

At this time, the impact on the south coast seal population from the SCS managed fishery is negligible. This is due to the fact that the seine netting operation is labour intensive and catches of seals are noticed immediately by the fishing team. The fishers are then able to release the seals from the seine net soon after capture and without injury.

It was considered that the impact of the fishery on seal populations is '**remote**' and '**negligible**'. This results in a risk rating of **NEGLIGIBLE**.

**Action:** No action needs to be prescribed for the fishery at this time.

### **5.2.1.2 ELASMOBRANCHS**

#### **Rationale for Inclusion:**

The fisheries occasionally catch some non-marketable and marketable sharks and rays.

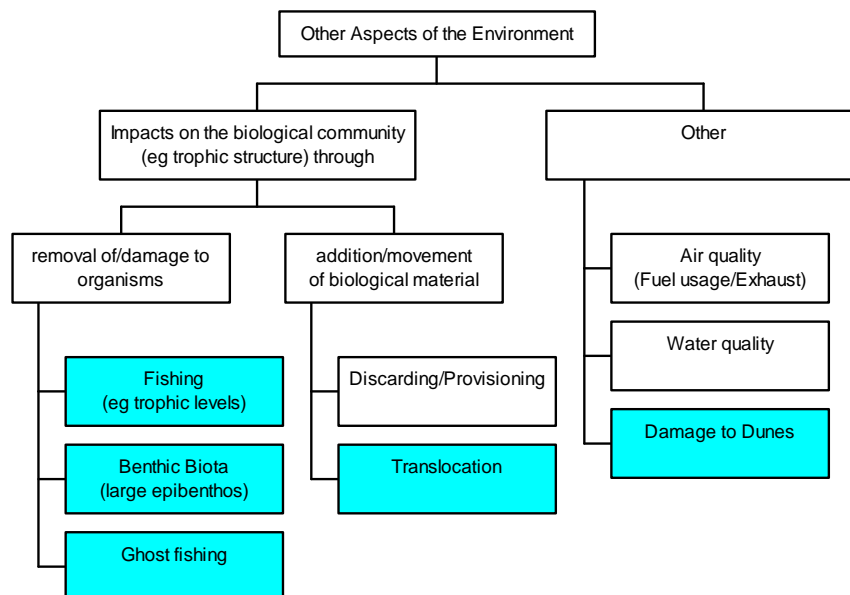
#### **ERA Risk Rating: Impact on breeding stocks (C0 L6 NEGLIGIBLE)**

Whilst elasmobranchs are vulnerable to overfishing because they have a highly K-selected life history (i.e. long-lived, slow to reproduce), the impact of these fisheries on each elasmobranch species is likely to be negligible because very minor quantities of each species are caught. The impact of the fisheries on each elasmobranch species is also likely to be negligible because the area of the fisheries in which each species is vulnerable to capture is small relative to the total distribution of each species. Therefore, it was considered that the impact of the fisheries on shark and ray populations is **'likely'** to be **'negligible'**. This results in a risk rating of **NEGLIGIBLE**.

**Action:** No action needs to be prescribed for the fisheries at this time.

## 5.3 GENERAL ENVIRONMENT

### COMPONENT TREE FOR THE GENERAL ENVIRONMENT



A blue box indicates that the issue was considered a low risk, with no specific management required, and only a justification is presented. White boxes indicate the issues were not significant enough to warrant any attention.

#### 5.3.1 REMOVAL OF/DAMAGE TO ORGANISMS

##### 5.3.1.1 TROPHIC INTERACTIONS

The assessment of potential indirect ecosystem impacts that could result from the removal of target species by a fishery should always be assessed.

#### ERA Risk Rating: Impact on the environment (C1 L5 LOW)

Salmon are only one of a number of top-end predators in the marine food chain of the lower west and south coasts. While the fishery has the potential to reduce the mortality on salmon prey species, given the high natural variability in WA salmon biomass, the effect of the fisheries is likely to be similar in magnitude to other factors contributing to the natural variation of in the prey species.

##### 5.3.1.2 BENTHIC IMPACTS

#### ERA Risk Rating: Impact on communities (C0 L6 NEGLIGIBLE)

These fisheries only operate at a very small number of beaches along the WA coastline. Moreover, the fishing operations only shoot the nets when fish schools are seen; hence most teams only shoot their nets a few times a season. Finally, the beach seining method when completed over the sandy beach environments in these high-energy areas will not impact significantly upon these habitats.

### **5.3.1.3 GHOST FISHING**

#### **ERA Risk Rating: Impact on fish communities (C0 L6 NEGLIGIBLE)**

There are no known records of fishers losing gear. There is also minimal chance for gear to be lost since the fishers operate in the shallows of sandy beaches.

### **5.3.2 ADDITION/MOVEMENT OF BIOLOGICAL MATERIAL**

#### **5.3.2.1 TRANSLOCATION BY VESSEL HULLS**

Vessels used in these fisheries travel between regions and could potentially be a vector for exotic species and diseases.

#### **ERA Risk Rating: Impact on the environment (C4 L1 LOW)**

The hulls of vessels moving between regions could provide an opportunity for translocation of organisms. However, hulls are regularly anti-fouled. Also, the Leeuwin current flows along the length of the WA coastline, transporting biological material and resulting in a high level of connectivity between regions. Therefore, vessels in the fishery are unlikely to translocate organisms beyond the range of dispersal that would occur through natural processes. Vessels operating in the fishery do not use ballast water.

Therefore, although the impact of translocation of exotic pests or diseases could be '**major**', the likelihood of this event is '**remote**'. This results in a risk rating of **LOW**.

### **5.3.3 OTHER**

#### **5.3.3.1 DAMAGE TO DUNES**

##### **Rationale for Inclusion:**

These fishing operations rely upon the use of 4 wheel drives and/or tractors on the beach to pull the nets to shore and to take the catch away.

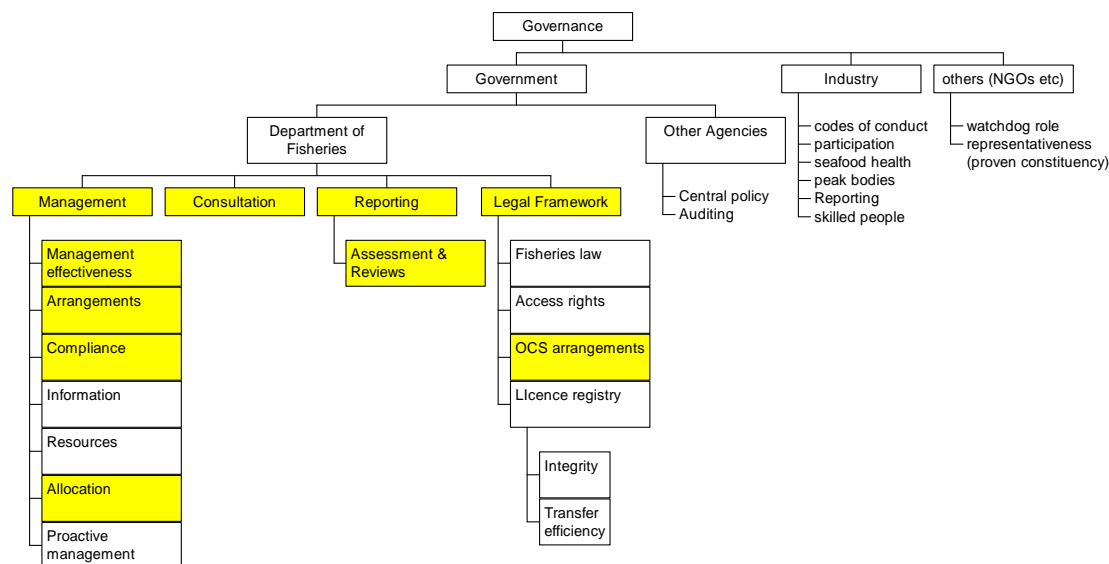
#### **ERA Risk Rating: Impact on the environment (C1 L2 LOW)**

The fisheries only operate on a few beaches. Access to the beaches is controlled and the type of substrate is hard packed sand, which will not be easily affected by vehicles.

Therefore, although the impact of vehicles on dune structures could be '**minor**', the likelihood of this event is '**unlikely**'. This results in a risk rating of **LOW**.

## 5.4 GOVERNANCE

### COMPONENT TREE FOR THE GOVERNANCE OF THE WA SALMON FISHERIES



Nb- no generic components have been removed from the tree but only those boxes that are yellow will be reported in this application.

#### 5.4.1 DEPARTMENT OF FISHERIES – MANAGEMENT

##### 5.4.1.1 MANAGEMENT EFFECTIVENESS (OUTCOMES)

###### Rationale for Inclusion:

The effectiveness of management arrangements in both the SCS and SWCS fisheries is ultimately measured by assessing the outcomes of various strategies employed to manage these fisheries.

Effort in both fisheries has been controlled since the introduction of a separate “management plan” for each fishery on 31 December 1982. These plans restrict the number of licence holders who can commercially fish for salmon in each of the areas of the fishery. The SCS management plan further restricts effort in that the area, which may be fished by each licence holder, to a beach specified on the managed fishery licence.

Catches in both the SCS and SWCS fisheries are highly variable, being largely dependant on the peculiarities of the annual migratory run of the species which appear to be strongly influenced by environmental conditions (e.g. the Leeuwin current). The Department of Fisheries Research Division has many decades of catch and effort data for the fishery, and has developed a system that assesses current catches, relative to the acceptable long-term range in annual catch to gauge the status of the salmon fishery. A comparison of the actual catch in a year to the predicted catch for that year can be used to assess the effectiveness of management arrangements.

### **Operational Objective**

The commercial catch of salmon in the SCS and SWCS fisheries is maintained within the annually predicted range.

#### ***Justification:***

*If effective management arrangements are operational in the fishery (including restrictions on effective effort levels and compliance with the regulations) then the actual total catch of salmon in each fishery should be very close to the total predicted catch. Any variation outside of the predicted total catch range would elicit the need to explain the cause of this deviation and potentially result in changes to management arrangements.*

### **Indicator**

The total actual catch compared to the historically predicted catch for salmon in the SCS and SWCS fisheries.

### **Performance Measure**

The expected catch range under the current management regime is 1,300 – 3,600 tonnes of salmon.

#### ***Justification:***

*The justification for the catch levels for salmon is located in Section 5.1.*

### **Data Requirements for Indicator**

The following data are required for this indicator:

#### **SCS Fishery**

<b>Data Requirement</b>	<b>Data Availability</b>
Commercial catch and effort	Yes – obtained annually
Historical catch levels	Yes – records available and accessible
Level of fishing effort	Yes

Environmental indicators	Yes – key environmental indicators readily available
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### **SWCS Fishery**

<b>Data Requirement</b>	<b>Data Availability</b>
Commercial catch and effort	Yes – obtained annually
Historical catch levels	Yes – records available and accessible
Level of fishing effort	Yes
Environmental indicators	Yes – key environmental indicators readily available

### **Evaluation**

Summary: Historical catch and effort information indicate that the catch of Australian salmon in both the SCS and SWCS fisheries falls within the acceptable catch range. Therefore, the performance measures have not been triggered and current management strategies appear to be effective in achieving the overall objectives for the fishery.

The total salmon landing for both fisheries for the 2002 season was 2,623 tonnes. Typically, the SCS fishery has a higher catch than that of the SWCS fishery, but in years of a strong Leeuwin current, the southwest fishery can have a higher catch.

### **Robustness Medium/High**

The data required for the indicators in most cases are readily available. Fishing practices have changed little over the past number of decades in these two fisheries, the operators have generally been involved in the fisheries for many years, and they are well practiced at providing the information required by the Department.

### **Fisheries Management Response**

Management measures help to achieve the objectives for the total salmon catch (see above). However, the total catch in the fishery is more driven by the ability of processors to process and market fish, and environmental influences. Industry members operate under a self imposed code of conduct relating to the take of salmon, which requires them to contact processors and confirm that the fish will be accepted before any fish are caught. This ensures that all the fish, which are caught, will be processed and marketed thereby eliminating the undesirable practice of dumping unmarketable fish.

Historically, variations in the catch outside of the predicted range have been explained either in terms of increased fishing effort, increased fishing efficiency or seasonal environmental factors. The response to these issues has sometimes been to reduce fishing effort (e.g. spatial closures) with a focus on limiting the exploitation of breeding stocks or new recruits and to develop better predictive models to take into account environmental factors such as sea surface temperature and ENSO, El Nino and La Nina events (see Section 2.7).

**Actions if Performance Limit is Exceeded:** If the catch were outside the range of predicted values then a review of the causes would be undertaken. This review would examine why the predicted catch range was not met. If this variation is not explained by changes in market conditions or environmental variations or a peculiarity of industry dynamics and behaviour, then strategies that offer further protection to the breeding stock will be considered. These strategies, which could be employed within the season or at the start of the next season, include:

- Further reductions in the total effort expended in the fishery through a reduction in the number of days that may be fished.
- Area closures.

### **External Driver Checklist**

Environmental factors such as climatic changes, ocean currents and sea surface temperatures are known to heavily impact upon the migration and recruitment of salmon, and therefore are likely to significantly impact the level and productivity of breeding stocks and the fishery.

#### **5.4.1.2 MANAGEMENT ARRANGEMENTS**

##### **Rationale for Inclusion:**

In WA, a number of instruments are used to articulate the management arrangements for fisheries. The FRMA has elements that affect all fisheries. The FRMA provides for the creation of Management Plans, Orders (Notices), Regulations, Ministerial Policy Guidelines and Policy Statements.

In cases where the current management arrangements were developed under the previous Act (as was the case for both the SCS and SWCS managed fisheries), whilst the terminology is slightly different, the powers from the previous Act have been transferred under various sections of the Transitional Provisions of the FRMA ((S 266) Savings and transitional provisions – Schedule 3 parts 8-12, 15-19).

The Act sets out the objects for the sustainable management of fish resources in WA, and provides the framework for developing and implementing management plans for each of the State's fisheries. The SCS and SWCS management plans are effectively a set of rules for those fisheries and includes, amongst other things, clauses concerning the spatial boundaries of the fisheries, gear restrictions, temporal closures and transferability arrangements.

**Table 9 Objects of the FRMA.**

Objects

1. The objects of this Act are to conserve, develop and share the fish resources of the State for the benefit of present and future generations.
2. In particular, this Act has the following objects-
  - a) to conserve fish and protect their environment;
  - b) to ensure that the exploitation of fish resources is carried out in a sustainable manner;
  - c) to enable the management of fishing, aquaculture and associated industries and aquatic eco-tourism;
  - d) to foster the development of commercial fishing and recreational fishing and aquaculture;
  - e) to achieve the optimum economic, social and other benefits from the use of fish resources;
  - f) to enable the allocation of fish resources between users of those resources;
  - g) to provide for the control of foreign interests in fishing, aquaculture and associated industries;
  - h) to enable the management of fish habitat protection areas and the Abrolhos islands reserve.

**Operational Objective**

In consultation with the industry members and other stakeholders, the Department periodically reviews the legislation, regulations and Ministerial policy guidelines to ensure the management framework remains relevant and aligned with the management objectives.

To have an effective and understandable plan for the management of this fishery with all of the 10 principles covered within the suite of arrangements developed for the fishery.

***Justification:***

*Management arrangements ultimately enable the ecologically sustainable exploitation of a natural resource where the potential to harvest the resource may exceed the ability of the resource to replenish itself. In addition, management arrangements can assist in maintaining the economic sustainability of fisheries by regulating effort so that the best possible return may be achieved for the catch.*

*Management arrangements can also define processes within which access to the resource can be allocated to competing user groups (including natural ecosystems).*

## **Indicator**

The extent to which the FRMA, FRMR, Management Plans, Ministerial Policy guidelines and other management arrangements allow for the timely setting of appropriate effort levels and resource allocation in the fishery.

The extent to which the management plan and supporting documentation addresses each of the issues and has appropriate objectives, indicators and performance measures, along with the planned management responses

## **Performance Measure**

This should be 100%.

## **Evaluation**

Formal evaluation of the management arrangements of the SCS and SWCS fisheries has been completed. Preliminary investigations suggest that management arrangements for each fishery are adequate in that very little potential exists for fishermen to activate inappropriately high levels of effort that could place the target species at risk.

For both the SCS and SWCS fisheries, the performance of current management arrangements can be evaluated on two levels –

1. the micro level - the relevance of individual clauses/regulations and the role they play; and
2. the macro level - the relevance of the plans, endorsements or arrangements as a whole and the role that they play.

Current Performance against each of the areas required within the “plan”<sup>1</sup>:

1. **An explicit description of the management unit** – The management unit for both the SCS and SWCS fisheries is explicitly described in Clause 3 of each management plan.
2. **The issues addressed by the plan** – The issues that need to be addressed by the South Coast Salmon and South West Coast Salmon management arrangements have been examined thoroughly and are documented within the 8 ESD component trees and their reports.
3. **Descriptions of the stocks, their habitat and the fishing activities** – the SCS and SWCS stocks are described in Section 2.1.4 and the fishing activities are described in Section 2.1.
4. Clear operational (measurable) objectives and their associated performance measures and indicators – These are now located in Section 5 for each of the major issues.

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<sup>1</sup> “Plan” – includes all management arrangements

5. **Clearly defined rules, including what actions are to be taken if performance measures are triggered** – For each of these major issues, the management actions that are planned to be taken if performance limits are exceeded are now articulated in Section 5.
6. **Economic and social characteristics of the groups involved in the fishery** – A brief articulation of the economic and social characteristics of the fisheries is located in Section 2.5 and there is to be a greater level of detail accumulated during the process of completing the remainder of the ESD components.
7. **Management and regulatory details for the implementation of the actual management plan** – The regulations relating to the SCS and SWCS fisheries are located in both the *South Coast Salmon Management Plan 1982*, the *South West Coast Salmon Management Plan 1982*, and the FRMR (A complete set of which has been provided to DEH).
8. **The reporting and assessment arrangements** – These arrangements are documented in Section 5.4.3.1 and include annual reporting against current agreed performance limits and targets and a five yearly review of these arrangements and assumptions.
9. **How and when reviews of the plan will occur (including consultation mechanisms).** – The FRMA clearly sets out how the process for the review of any management plan must occur. At this time, the Department of Fisheries has commenced a review of the management plans for each fishery with a view to amending the plans into a more contemporary format. However, occasional changes to the plan are made as required.
10. **A synopsis of how each of the ESD issues are being addressed** – A synopsis of ESD issues has been compiled within the Overview Table of this report.

## **Robustness High**

The management plans for the SCS and SWCS fisheries and related legislation has provided a diverse but reasonably complete set of fisheries management legislation. The fact that the management arrangements are contained within legislation for each fishery provides a high degree of stability with respect to how the fishery is managed. The process for achieving management plan changes is well understood by the majority of stakeholders and the system is flexible enough for the management process to respond to change in stimuli.

## **Fisheries Management Response**

The Department has successfully administered the management plans and related legislation to achieve and pursue the stated objectives for the SCS and SWCS fisheries. Changes have occasionally occurred to address key concerns or issues (such as the payment of access fees by instalment).

## **Comments and Actions**

The SCS and SWCS fisheries are managed in a consultative way and would respond readily to changed circumstances. However, fishers are often resistant to change. This means that before the fishers accept changes to management arrangements, they often require substantial evidence of the need for such measures. While most fishers have a very high level of confidence in the Department's research activities, some members of the industry demand certain knowledge before accepting the need for change and can be skeptical of research findings no matter how statistically valid. Individual fishers' views can understandably be greatly influenced by their own experiences and observations while fishing that sometimes may give them a contrary view of the state of the fishery. Nonetheless, there is generally a very good relationship between fishers and the Departmental research scientists and most will accept the advice of the researchers.

## **External Driver Check List**

- Potential resistance of fishers to support Department initiated management arrangements.
- Industry lobbying for change in each fishery.
- Potential reluctance of Minister to exercise power.

### **5.4.1.3 COMPLIANCE**

#### **Rationale for Inclusion:**

Effective compliance is vital to achieve the management objectives of any fishery. In the case of the WA Salmon Managed Fisheries this involves land-based patrols.

#### **Operational Objective**

To have sufficiently high levels of compliance with the FRMA, FRMR and each salmon management plan, regulations, conditions [endorsements] and notices.

#### ***Justification:***

The activities of the participants in the fishery need to be sufficiently consistent with the management framework and legislation in order to make it likely that the expected outcomes and objectives of the fishery will be achieved.

#### **Indicators**

The levels of compliance with the legislation, including the estimated level of boundary infringements, and compliance with any conditions of licence.

The degree of understanding and acceptance of the rules governing the operation of the SCS and SWCS fisheries by licensees and the broader fishing community.

## **Performance Measure**

That no fishing for salmon in the SCS fishery occurs at a beach other than the beach described on a managed fishery licence in that fishery.

That the members of a salmon team who require a Commercial Fishing Licence hold the appropriate licence.

## **Data Collection Requirements and Processes**

Random inspections of salmon operations are carried out throughout the season.  
Ongoing collection of data on illegal activities.  
Comparative data on the relative effectiveness of certain compliance techniques.

## **Evaluation**

For the SCS and SWCS managed fisheries zero offences were reported in 2000, 2001 and 2002. Compliance operations are mainly focused on maintaining the integrity of the catch sharing arrangements within the fisheries. Compliance staff also conduct annual licence and gear inspections on the beach.

Currently, a FRDC project is underway to examine compliance in the Western Rock Lobster Fishery. This project aims to develop data collection, analysis and reporting protocols for all Western Australian recreational and commercial fisheries (including the salmon managed fisheries).

## **Robustness** **Medium**

## **Fisheries Management Response**

Despite the relatively low levels of compliance work being done in the SCS and SWCS fisheries, the Regional Services division of the Department continues to gather intelligence on suspected breaches within these two fisheries.

## **Comments and Actions**

The Department will continue to provide a compliance service within budgetary and resourcing constraints to both salmon fisheries. It is expected that the completion of a compliance risk assessment for each fishery within the next year will enable the Department to better direct resources to further increase the effectiveness of the limited compliance activities.

## **External Driver Check List**

- Changes to technology that may facilitate an increase the level of non-compliance.

- Changes to non-Fisheries legislation (National Competition Policy) may impact upon the Department's ability to restrict activities in a way that assist compliance (e.g. processor receipt restrictions).

#### **5.4.1.4 ALLOCATION AMONG USERS**

##### **Rationale for Inclusion:**

In addition to the commercial fishery there is also a significantly large recreational fishery for salmon in southern WA. It is therefore important that all extractive users are considered when implementing arrangements designed to secure the resource and ecological sustainability. Furthermore, there are other non-extractive interests in the resource and its related ecosystem that also need to be considered within the management process.

##### **Operational Objective**

To ensure that adequate management processes are in place that allow for the inclusive management of the salmon fisheries. This includes the facilitation of debate about management arrangements that will help to achieve an appropriate level of use of the resource amongst the various extractive and non-extractive stakeholders.

##### **Indicator**

The percentage of catch taken by each sector (recreational and commercial)

The level of resource sharing conflict amongst user groups.

The level of participation of interested groups / parties in any focused resource sharing process.

The willingness of the various interest groups to participate in the resource sharing process.

##### **Performance Measure**

To be determined as part of the Integrated Fisheries Management Process.

##### **Data Requirements**

Information on the catch by the recreational sector.

Projected growth of recreational fishing for WA salmon.

The cost associated with various management options and the identification of potential funding sources – particularly relevant for those measures targeted at the recreational sector.

The establishment of appropriate resource allocation mechanisms across user groups as a part of the Integrated Fisheries Management Process.

##### **Evaluation**

As previously described in Section 2.3.1, the most recent recreational catch and effort data for the south coast bioregion was from an FRDC-funded shore-based recreational fishing survey conducted during 1994 and 1995 (Ayvazian *et al.*, 1997). This survey

was focused specifically on WA salmon and Australian herring, the two most abundant and most frequently targeted finfish species in this region.

The estimated recreational catches of WA salmon for 1994 and 1995 from the west coast zone were 64.3 and 55.4 tonnes, respectively; from the south coast zone 64 and 103 tonnes, respectively; and from the south-east zone 26 and 25 tonnes, respectively. These estimated recreational catches represented 8-16% of the total (commercial and recreational) west coast catch, 4-6% of the total south coast catch and 100% of the total southeast catch.

This was followed by a 12-month creel survey of recreational boat-based fishing off the lower west coast of WA, conducted in 1996-97 (Sumner and Williamson, 1999). In the survey area (Kalbarri to Augusta) the total annual recreational fishing effort was 453,000 boat-based fisher days. The total recreational Australian salmon catch was estimated to be 3,241± 991 fish harvested and 1,281 fish caught and released. A catch of 136 tonnes of WA salmon was reported from WA in the National Recreational Fishing Survey, which was conducted from May 2000 to April 2001 (Henry and Lyle, 2003).

### **Robustness Medium**

There is at present no specific allocation made to either the commercial or recreational sectors regarding the take of salmon. However, the total catch of the commercial sector is monitored annually, and the recreational catch is estimated.

If there was a significant increase in the percentage of catch from the recreational sector, this may prompt a reassessment of the current management arrangements, possibly for both sectors in line with the normal dynamic management approach that is used.

### **Fisheries Management Response**

**Current:** In previous years, recreational and community views regarding the management of the salmon fisheries were expressed through the ASHIAC. However, appointments to the committee have since expired, and the committee now no longer exists.

Recreational fishers interests are currently also catered for through the Recreational Fishing Advisory Committee that advises the Minister for Fisheries on matters relating to recreational fishing, including recreational salmon fishing.

**Future:** The Department is currently exploring a number of revised consultation models for the salmon fisheries, which all involve wider stakeholder input. A requirement of the new consultation model will be that the relevant sectors of the fishery have an opportunity to respond to management arrangements, and also ensure that the rights of commercial and recreational fishers are considered in the development of management arrangements.

It should also be noted that the inquiry into the agency's proposed approach for the implementation of Integrated Fisheries Management has recently been completed. This process is charged with determining a more explicit process of allocation amongst the sectors.

### **Comments and Actions**

Through the processes already established and underway, the Department will continue to promote the integration of fisheries management across user groups. To this end the Department has a number of initiatives related to improving the governance of allocation and reallocation. An Integrated Fisheries Management policy was released in early 2000. This was followed up by the formation of the "Toohey Committee" which has reported its views to the Minister on the most appropriate framework to try and achieve these objectives.

### **External Driver Check List**

Resource sharing issues being raised with the Minister independently of the Department.

## **5.4.2 DEPARTMENT OF FISHERIES - CONSULTATION**

### **5.4.2.1 CONSULTATION (INCLUDING COMMUNICATION)**

#### **Rationale for Inclusion:**

*The FRMA has certain requirements with regard to consultation that must be undertaken in the course of managing fisheries. The management of the SCS and SWCS fisheries is based around a robust consultation and communication process.*

There are sections in the FRMA that relate to the development of management plans and interim management plans (Section 64) and to the amendment of such plans (Section 65). Given that the two fisheries already have a management plan, Section 65 is the most relevant.

Section 65 of the FRMA states:

#### **Section 65. Procedure before amending a management plan**

*(1) A management plan must specify an advisory committee or advisory committees or a person or persons who are to be consulted before the plan is amended or revoked.*

*(2) Before amending or revoking a management plan the Minister must consult with the advisory committee or advisory committees or the person or persons specified for that purpose in the plan.*

*(3) Despite subsection (2), the Minister may amend a management plan without consulting in accordance with that subsection if, in the Ministers opinion, the amendment is –*

*(a) required urgently; or*

*(b) of a minor nature*

*(4) If –*

*(a) the Minister amends a management plan; and*

*(b) the amendment is made without consultation because it is, in the Minister's opinion , required urgently,*

*the Minister must consult with the advisory committee or advisory committees or the person or persons specified for that purpose in the plan as soon as practicable after the plan has been amended.*

The Department holds a meeting with the members of each of the salmon managed fisheries each year. These meetings typically involve discussions about management, research and compliance issues in the fishery, and provide a forum for industry to raise concerns and/or ask questions of the Department concerning management arrangements.

### **Operational Objective**

To administer a consultation process that is in accordance with the requirements of the FRMA and allows for the best possible advice from all relevant stakeholders to be provided to the decision maker (Minister/ED) in a timely manner.

### **Indicators**

- The Minister (or the Department on his behalf) conforms to the consultation requirements of the FRMA and the Management Plans.
- The level to which licensees and other stakeholders consider that they are adequately and appropriately consulted.

## **Performance Measures**

Proper consultation procedures have been followed in any amendment of the management plans.

Industry meetings held annually.

Public meeting regarding these and other fisheries held annually.

## **Data Requirements**

The views of industry collected from stakeholders at each annual meeting.

When an amendment is proposed, documentation of the formal consultation procedures is needed.

## **Evaluation**

Consultation on the management of the SCS and SWCS fisheries is conducted in an open, accountable and inclusive environment where all sectors of the industry and the Department's managers and researchers collectively identify and discuss appropriate courses of action.

Decision makers are provided with advice based on this consultation and reasons are provided for decisions that vary from consultation-based advice.

Previously, there has been a lack of pro-active consultation with other potential stakeholder groups for these fisheries. However, in 2003, the Department initiated a series of public meetings around the State with a view to informing the public about the status of management and research in the State's commercial and recreational fisheries.

## **Robustness**

### **High**

The formal consultation process is very well understood with relatively high levels of participation from the various stakeholder groups.

## **Fisheries Management Response**

The Department is attempting to improve communication links with industry in the SCS and SWCS fisheries through regular correspondence and encouraging communications with the fishery manager who is located in Albany.

Public meetings (held in regional locations) are expected to improve consultation with a wider range of stakeholder groups.

## **Comments and Actions**

The Department will continue to provide a commercial fisheries management officer who coordinates and further develops the consultation process for the SCS and SWCS fisheries.

## **External Driver Check List**

Despite the aforementioned consultation processes that are in place, disaffected parties may still seek to use political avenues to further their cause.

### **5.4.3 DEPARTMENT OF FISHERIES - REPORTING**

#### **5.4.3.1 ASSESSMENT AND REVIEWS**

##### **Rationale for Inclusion:**

It is important that the outcomes of the fisheries management processes administered by the Department for the SCS and SWCS fisheries are available for review by external parties. It is also important that the community is sufficiently informed on the status of the fisheries, given that industry are utilising a community resource.

The reports that are currently developed annually include: the State of the Fisheries Report, the Annual report to the Auditor. Other reports that are completed include the ESD report and this application to DEH. There is a longer-term plan to have the entire system of management audited by the WA Environmental Protection Agency (EPA).

##### **Operational Objective**

To continue to report annually to the Parliament and community on the status of all fisheries including the SCS and SWCS fisheries.

To prepare a framework for reporting on ESD for all WA fisheries.

##### **Indicators**

The extent to which external bodies with knowledge on the management of fisheries resources have access to relevant material and the level of acceptance within the community.

##### **Performance Measure**

General acceptance of the management system by the community.

##### **Data Requirements**

The majority of data required to generate reports are already collected in the course of pursuing resource management objectives. The Department conducts an annual survey of the community with respect to the community's opinion on the status of the State's fisheries and attitudes to the performance of the Department.

## **Evaluation**

The Department has implemented more than one process to report on the performance of this fishery and in doing so has acted to ensure that the community has access to this information. In addition to this base level reporting, continual development of the management process will see the fishery undergo regular independent audits ensuring that the evaluation of the management arrangements in these fisheries is robust.

The Department has been the recipient of a number of awards for excellence for its standard of reporting - Premiers Awards in 1998, 1999 for Public Service excellence, Category Awards in Annual Reporting in 1998, 1999, 2000; Lonnie Awards in 2000, 2001 and 2002.

Current Reporting Arrangements for this fishery include:

### **State of Fisheries**

There is annual reporting on the performance of the fishery against the agreed objectives within the "State Of The Fishery Report". The document is available in hard copy format but is also available from the Department's web site in PDF format.

### **Annual Report**

A summary of this report is presented within the Department's Annual Report and is used in some of the Performance Indicators that are reviewed annually by the OAG.

### **ESD**

The Department is developing and producing these applications for all of its export fisheries. The applications will be published as part of the ESD Report Series.

### **Reports to Industry**

Each year, the status of the resource and effectiveness of current management are presented to industry in meetings in Albany (for the SCS fishery) and Busselton (for the SWCS fishery).

### **Robustness High**

## **Fisheries Management Response**

**Current:** For many years the Department has produced substantial and high quality documents that report on the operation of the Department and the status of its fisheries – these reports are the Annual Report and the State of the Fisheries.

**Future:** The Department is working with the EPA to prepare a framework for reporting on ESD for all WA fisheries. It is proposed that this framework will be

linked to a regular audit cycle involving the EPA and periodic reporting to the OAG. The Department is working to combine the processes for reporting to the States and the Commonwealth and believes that this can best be achieved by using a Bilateral Agreement with DEH under the EPBC.

### **Comments and Actions**

The assessment and review processes already established together with proposed external review processes should ensure that there will be many opportunities for the appropriateness of the management regime and the results it produces to be reviewed.

### **External Driver Check List**

The assessments provided by independent review bodies and the community.

## **5.4.4 DEPARTMENT OF FISHERIES – LEGAL FRAMEWORK**

### **5.4.4.1 OCS ARRANGEMENTS**

All fishing for salmon occurs within state waters and often from the beach. As a result, there is no OCS arrangements or considerations.

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## **APPENDIX 1 - ACRONYMS**

ASHIAC	Australian Salmon and Herring Industry Advisory Committee
CAES	Catch and Effort System
EA	Environment Australia
ED	Executive Director
EPA	WA Environmental Protection Agency
EPBC	Environment Protection and Biodiversity Conservation Act, 1994
ESD	Ecologically Sustainable Development
FRDC	Fisheries Research and Development Corporation
FRMA	Fisheries Resources Management Act, 1994
FRMR	Fisheries Resources Management Regulations, 1995
OAG	Office of Auditor General
SCFA	Standing Committee for Fisheries and Aquaculture
SCS	South Coast Salmon Managed Fishery
SWCS	South West Coast Salmon Managed Fishery
TAC	Total Allowable Catch
WA	Western Australia
WAFIC	Western Australia Fishing Industry Council

## **APPENDIX 2 – DESIGNATED FISHING ZONES**

Section 112 (1) of the FRMA states that:

*A fisheries officer may direct a person to –*

- (a) immediately leave a designated fishing zone;*
- (b) cease any activity in a designated fishing zone; or*
- (c) remove anything from a designated fishing zone;*

*if in the officer's opinion –*

- (d) the person, activity or thing is hindering, obstructing or interfering with fishing or any other activity, or is disturbing fish, in the zone; or*
- (e) the activity or thing is likely to hinder, obstruct or interfere with fishing in the zone.*

### APPENDIX 3 - DETAILS OF CONSEQUENCES TABLES

Level	Ecological
<b>Negligible</b>	<p>General - Insignificant impacts to habitat or populations, Unlikely to be measurable against background variability</p> <p><b>Target Stock/Non-retained:</b> undetectable for this population</p> <p><b>Byproduct/Other Non-retained:</b> Area where fishing occurs is negligible compared to where the relevant stock of these species reside (&lt; 1%)</p> <p><b>Protected Species:</b> Relatively few are impacted.</p> <p><b>Ecosystem:</b> Interactions may be occurring but it is unlikely that there would be any change outside of natural variation</p> <p><b>Habitat:</b> Affecting &lt; 1% of area of <b>original</b> habitat area</p> <p><i>No Recovery Time Needed</i></p>
<b>Minor</b>	<p><b>Target/Non-retained:</b> Possibly detectable but little impact on population size but none on their dynamics.</p> <p><b>By-product/Other Non-retained:</b> Take in this fishery is small (&lt; 10% of total) compared to total take by all fisheries and these species are covered explicitly elsewhere.</p> <p>Take and area of capture by this fishery is small compared to known area of distribution (&lt; 20%).</p> <p><b>Protected Species:</b> Some are impacted but there is no impact on stock.</p> <p><b>Ecosystem:</b> Captured species do not play a keystone role – only minor changes in relative abundance of other constituents.</p> <p><b>Habitat:</b> Possibly localised affects &lt; 5% of total habitat area</p> <p><i>Rapid recovery would occur if stopped - measured in days to months.</i></p>
<b>Moderate</b>	<p><b>Target/Non-retained:</b> Full exploitation rate where long term recruitment/dynamics not adversely impacted</p> <p><b>By-product:</b> Relative area of, or susceptibility to capture is suspected to be less than 50% and species do not have vulnerable life history traits</p> <p><b>Protected Species:</b> Levels of impact are at the maximum acceptable level</p> <p><b>Ecosystem:</b> measurable changes to the ecosystem components without there being a major change in function. (no loss of components)</p> <p><b>Habitat:</b> 5-30 % of habitat area is affected.</p> <p>or, if occurring over wider area, level of impact to habitat not major</p> <p><i>Recovery probably measured in months – years if activity stopped</i></p>
<b>Severe</b>	<p><b>Target/Non Retained:</b> Affecting recruitment levels of stocks/ or their capacity to increase</p> <p><b>By-product/Other Non-retained:</b> No information is available on the relative area or susceptibility to capture or on the vulnerability of life history traits of this type of species. Relative levels of capture/susceptibility greater than 50% and species should be examined explicitly.</p> <p><b>Protected Species:</b> Same as target species</p> <p><b>Ecosystem:</b> Ecosystem function altered measurably and some function or components are missing/declining/increasing outside of historical range &amp;/or allowed/facilitated new species to appear.</p> <p><b>Habitat:</b> 30- 60 % of habitat is affected/removed.</p> <p><i>Recovery measured in years if stopped</i></p>

<p><b>Major</b></p>	<p><b>Target/Non retained:</b> Likely to cause local extinctions  <b>By-product/Other Non-retained:</b> N/A  <b>Protected Species:</b> same as target species  <b>Ecosystem:</b> A major change to ecosystem structure and function (different dynamics now occur with different species/groups now the major targets of capture)  <b>Habitat:</b> 60 - 90% affected  <i>Recovery period measured in years to decades if stopped.</i></p>
<p><b>Catastrophic</b></p>	<p><b>Target/Non-retained:</b> Local extinctions are imminent/immediate  <b>By-product/Other Non-retained:</b> N/A  <b>Protected Species:</b> Same as target  <b>Ecosystem:</b> Total collapse of ecosystem processes.  <b>Habitat:</b> &gt; 90% affected in a major way/removed  <i>Long-term recovery period will be greater than decades or never, even if stopped</i></p>