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# **South Australian Fisheries Management Series**

## **Ecological Assessment of the South Australian Prawn Fisheries**

**Spencer Gulf, Gulf of St. Vincent and West Coast Prawn  
Fisheries.**

### **Reassessment Report**

Prepared for the Department of Environment, Water, Heritage,  
and the Arts

For the purposes of Part 13 and 13(A) of the Environment Protection and  
Biodiversity Conservation Act 1999

11 September 2009

**Prepared by the Fisheries Division of Primary Industries and  
Resources South Australia**

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**25 Grenfell Street, Adelaide  
GPO Box 1625**

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## 1. Purpose

This report has been prepared by the Fisheries Division of the Department of Primary Industries and Resources, South Australia (PIRSA).

The purpose of this report is to provide a revised assessment of the management arrangements in place for the South Australian Prawns Fisheries; Spencer Gulf Prawn Fishery (SGPF), Gulf of St. Vincent Prawn Fishery (GSVPF), and West Coast Prawn Fishery (WCPF).

This report updates information provided to the Department of Environment, Water, heritage and the Arts (DEWHA) in 2003 for assessment against the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Additional annual update reports have been provided to DEWHA since the 2003/04 assessment process. This submission has been prepared in accordance with the *Guidelines for the Ecologically Sustainable Management of Fisheries, 2<sup>nd</sup> Edition*, and particularly addresses the level of change that occurred in the fishery since the 2003/04 assessment.

## 2. Background

The legislation that governs the management of the South Australian prawn fisheries includes the *Fisheries Management Act (2007)*, the *Fisheries Management (General) Regulations 2007*, and the *Fisheries Management (Prawn Fisheries) Regulations 2006*. Two of the prawn fisheries have formal management plans; the GSVPF, and the SGPF.

The WCPF is a smaller fishery with three vessels in operation. It is currently managed through less formal arrangements that are outlined in the Management Plan for the Spencer Gulf and West Coast Prawn Fisheries (McDonald 1998; now considered outdated). PIRSA Fisheries is in the process of developing a set of updated and more formal arrangements for the WCPF, in partnership with the WCPF. This arrangement is expected to be implemented through a policy statement by the start of 2010.

The Management Plans set objectives and strategies designed to maintain ecologically viable stock levels. The plans set out formal harvest strategies for the fisheries and include a set of reference points and decision rules to guide harvest strategy development for each fishing period within the season.

The management plans the SGPF and the GSVPF operate for 5 years, subject to annual review and amendments that are considered necessary by the Fisheries Council, the Director of Fisheries or the Minister for Agriculture, Food and Fisheries. The plans are due to be formally reviewed and updated in 2011. The plans include all fishing activities related to western king prawns, and can be found at PIRSA's website: [www.pir.sa.gov.au](http://www.pir.sa.gov.au).

### 3. Level of Assessment

The South Australian Prawn Fisheries were collectively assessed and approved as exempt from the EPBC Act in 2004. Since last assessment there have been significant changes in three of the areas of interest outlined in page 5 of the *Guidelines for the Ecologically Sustainable Management of Fisheries*.

**Table 1:** Level of assessment required by the South Australian Prawn Fisheries.

Issue	Area of Interest	Yes	No
Fishery	Has there been any change to management arrangements, and/ or fishing practice?	X	
External Influences	Has there been any change in the target stock status? i.e. Increase or decrease in number of overfished or uncertain stock, limit reference points or performance indicators have been triggered.	X	
Interaction with protected species	Has there been any change in the nature, scale, intensity of impact, and/or management response?		X
Ecosystem impact	Has there been any change to an environmental issue/influence outside of the fishery management agencies control?		X
Target Stock Status	Has there been any change to management arrangements, and/ or fishing practice?	X	
By-product/ bycatch status.	Has there been any change in the by-product and/or by-catch stock status? eg. Performance indicators triggered or risk assessment outcomes show risk levels have changed.		X

Some significant changes that have occurred in the management of the fishery since the previous assessment submission in 2003, include:

- The overarching legislative framework for managing South Australia's fisheries has been updated. The *Fisheries Act 1982* has been replaced by the *Fisheries Management Act 2007*.
- The new Act replaced fisheries management committees with a formal co-management framework for fisheries management, through the formation of the Fisheries Council of South Australia. The council has an expertise based membership structure.

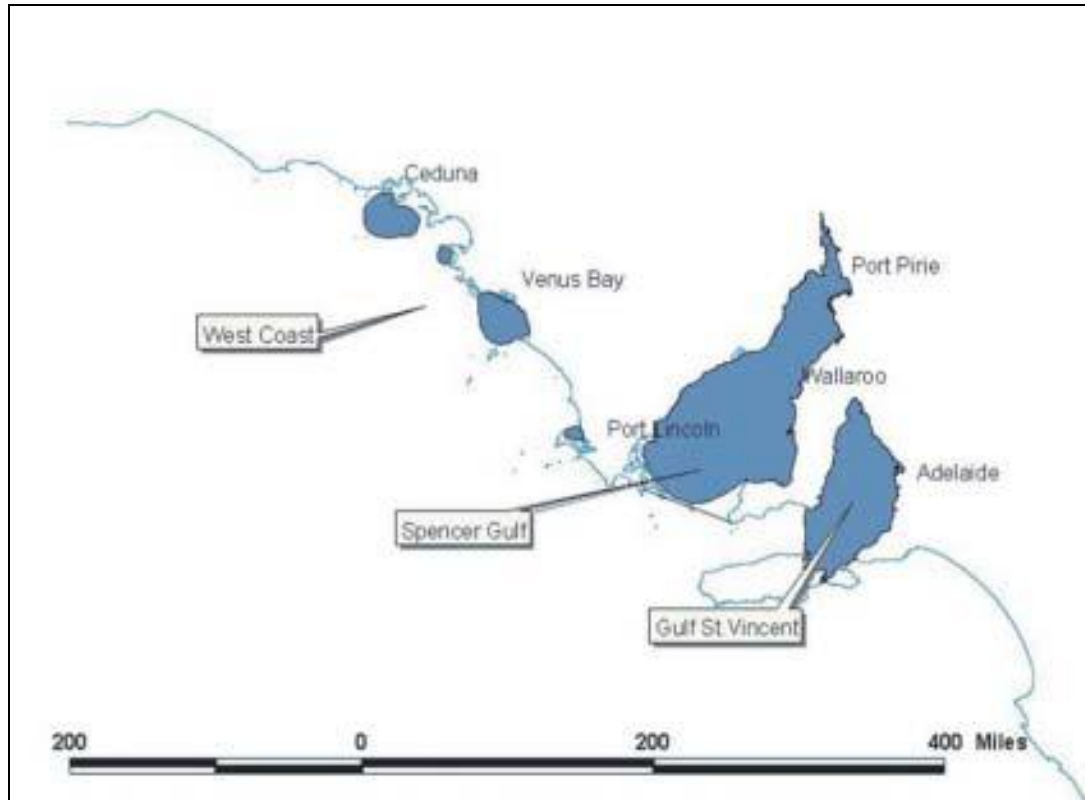
- Development and implementation of management Plans for the GSVPF and SGPF, including structured decision making frameworks in formal harvest strategies (Dixon and Sloan, 2007a, b).
- A comprehensive fishery-independent survey of the species distribution and abundance in Spencer Gulf has been undertaken to determine by-catch implications (Currie, Dixon, Roberts, Hooper, Sorokin and Ward 2009).
- By-catch surveys have commenced in the GSVPF.
- Demonstrated stock recovery in the GSVPF (Roberts, Dixon and Hooper 2009).
- Strong evidence of improvements in the prawn stocks supporting the WCPF (Hooper, Dixon and Roberts 2009).
- Commercial fishery logbook for the WCPF and the GSVPF were reviewed and updated in 2007 to include prawn size information.
- A size limit and prohibition on retention of berried females for slipper lobster was introduced in 2008.
- Development of formal co-management arrangements with the Spencer Gulf Prawn Fishery. PIRSA Fisheries has entered two contracts with the Spencer Gulf and West Coast Prawn Fishermen's Association Inc. (SGWCPFA) to formalise a "co-manager" position in the Association and a "coordinator at sea" position in the Association.
- Progress towards development of a preferred co-management model for the Spencer Gulf Prawn Fishery through the FRDC project (Competition to Collaboration: Exploring co-management models for the Spencer Gulf Prawn Fishery).
- A representative system of Marine Parks is being implemented in South Australia – the outer boundaries have been declared.
- The SGPF has been through the pre-assessment phase of the Marine Stewardship Council certification process.
- The SGPF has been recognised by the UN Food and Agriculture Organisation as one of the best managed fisheries in the world.

In accordance with the DEWHA guidelines for ecological assessment, the level of submission requirement for the South Australian Prawn Fisheries is *standard plus ancillary*. All changes and progress in the recommendations provided by DEWHA have been communicated to DEWHA through the annual report provided for all South Australian Managed fisheries.

## 4. Fishery

### 4.1 The commercial fishery

There are three prawn fisheries in South Australia; The SGPF, GSVPF and WCPF (See figure 1). Prawn stocks in each South Australian prawn fishery are managed separately, with management measures specifically tailored to the particular fishery (Dixon & Sloan, 2007a,b).



**Figure 1.** The South Australian Prawn Fisheries.

South Australian Prawn fisheries contribute significantly to the State's economy. In 2007/08 the total Gross Value of Production (GVP) for all South Australian Prawn Fisheries was \$35.9m. The prawn fisheries collectively directly employed a total of 252 people (Econsearch, 2009).

**Table 2:** 2007/08 production and value figures for the South Australian prawn fisheries (Econsearch, 2009).

Fishery	CATCH	VALUE
	Whole wt tonnes	(\$A,000)
Gulf of St Vincent	229	2924
Spencer Gulf	2028	32163
West Coast	60	787
Total	2317	35874

The South Australian prawn fisheries are based on the capture of western king prawn (*Penaeus (Melicertus) latisulcatus*). Trawling is undertaken at night (from sunset to sunrise) using the demersal otter trawl technique. This consists of towing a funnel shaped net which leads into a bag over the sea bottom. Otter boards are used to keep the trawl nets open whilst being towed (PIRSA, 2003).

The South Australian prawn fisheries are managed predominantly through real time management of catch and effort levels, over specified time periods. The following input control methods have been implemented in the management of the fishery; limited entry, seasonal and area closures, daylight and moon closures, 10m minimum trawl depth, and gear and vessel restrictions. In recent times, direct limits have been placed on the total catch of prawns prior to the spawning season in the GSVPF and the SGPF, through decision rules set out in the management plans. Similar limitations have been placed on the WCPF pre-spawning season catch, through less formal fishing effort limitations.

The fisheries in Spencer Gulf and Gulf St Vincent are generally closed in January and February, and from July to October each year. Fishing periods in other months last a maximum of 18 nights from the last quarter to first quarter of the moon phase. Harvest strategies for each fishing period are determined on the basis of data collected during regular fishery-independent and fishery-dependent surveys. The Management Plans describe the harvest strategy development in detail (Dixon and Sloan 2007). The previous PIRSA ecological assessment report submission provided detailed descriptions of fishing operations (PIRSA 2003).

Fishing on the West Coast is more opportunistic, but generally occurs each month of the year except for January, May and October. Unlike the gulf fisheries, the highest catch rates in the West Coast fishery are generally obtained during winter.

Licensed prawn fishers in South Australia are permitted to take a small number of other species as by-product, which are not targeted during the fishing operations. The Spencer Gulf and Gulf of St Vincent fisheries are permitted to retain slipper lobster (*Ibacus* spp) and southern calamary (*Sepioteuthis australis*). The West coast prawn fishery is permitted to retain these species, as well as octopus (*Octopus* spp), scallops (Family *Pectinidae*) and arrow squid (*Nototodarus gouldii*).

Management Plans for the Spencer Gulf and Gulf St Vincent Prawn Fisheries were revised in 2007. The management approach for the West Coast Prawn Fishery was also revised in 2008 to follow similar management criteria to the SGPF (PIRSA, 2003), however a formal management plan has not been developed for the WCPF – a process is underway to develop a set of more formal decision rules for management of the WCPF, which recognises the size of the fishery, its current status and the differences with the other prawn fisheries.

**Table 3.** Management summary for the South Australian Prawn Fisheries.

Management tool	Spencer Gulf	Gulf of St. Vincent	West Coast
Limited entry	39 (transferable)	10 (transferable)	3 (transferable)
Method of capture	- Demersal otter trawl - Single or double rig.	- Demersal otter trawl - Single, double or triple rig (small boats only)	Demersal otter trawl - Single or double rig
Closed season	No trawling during daylight hours January to February July to October	No trawling during daylight hours January to February July to October	No trawling during daylight hours Jan, May and Oct
Maximum vessel length	22m	Large - 15.2-22m Small - less than 15m	22m
Maximum vessel power	272 kW	Large – 272 kW Small – 224 kW	272 kW
Closed areas	Adjusted based on survey results- No trawling in waters shallower than 10m. No fishing in aquatic reserves Other informal industry based closures		
Catch and effort data	Daily recording in logbooks – submitted monthly		
Minimum mesh size	4.5cm	4.5cm	4.5cm
Landing locations	Anywhere in the state		
Landing times	Any time during the open season		
Vessel Monitoring System (VMS)	None	None	None

#### 4.1.1 The Spencer Gulf Prawn Fishery

The SPGF is the largest prawn fishery in South Australia, in terms of area, production and number of licence holders. Trawling in the Spencer Gulf covers approximately 10% of the total area of the Gulf (PIRSA 2003). There are areas of the fishery that are both closed and open to fishing which have never been trawled. No additional areas in the gulf are currently being considered for trawling (PIRSA, 2003; Dixon and Sloan 2007a).

Under limited entry regulations, there are 39 licence holders in the SGPF. A vessel used in the prawn fishery must be registered, must not have an overall length exceeding 22 meters and the main engine must not exceed 365 continuous brake horsepower<sup>1</sup>. Both, single and double rigs are permitted to be used in the fishery with a minimum mesh size of 4.5 cm and a maximum headline length of 29.26 meters (Dixon & Sloan, 2007a).

The fishery is managed over 5-6 fishing periods using real time adaptive methods, through a management committee, a committee at sea comprised of prawn vessel skippers and a fleet coordinator. Spatial and temporal effort levels for each fishing period are established following the stock assessment and spot survey processes and set in proportion to prawn catch rates (used as an index of relative biomass), prawn size, annual recruitment strength, the amount of effective spawners (females >42 mm carapace length (CL)), the maturation and spawning status and size composition of prawns over the fishing grounds.

The Management Plan for the SGPF was revised in 2007 and outlines four main management goals for this fishery. Each goal is actioned through a series of objectives and strategies (Dixon & Sloan, 2007a, p.30). The goals for the fishery are as follows:

1. maintain ecologically sustainable stock levels,
2. ensure optimum utilisation and equitable distribution,
3. minimise impacts on the ecosystem, and
4. enable effective management with greater industry involvement.

The Management Plan includes a formal harvest strategy (section 5.2). This section describes the mechanisms for managing fishing effort using spatial and temporal closures. For the pre-spawning fishing period (November/December), a direct control is placed on the catch, in proportion to the relative biomass estimate obtained from the fishery-independent survey process. The harvest strategy is developed through a process coordinated by the management committee of the Spencer Gulf and West Coast Prawn Fishermen's Association Inc. (SGWCPFA), in partnership with PIRSA Fisheries and SARDI Aquatic Sciences.

The harvest strategy aims for the fleet to target areas of high catch rates of target sized prawns, ensuring biological sustainability and promoting economic efficiency (Dixon & Sloan, 2007a). Once the harvest strategy is developed by the management committee, it is formalised by PIRSA Fisheries through notices published daily in the government gazette. The committee at sea manages the harvest strategy and makes adjustments to the area being fished in real time under the guidance of the coordinator at sea.

PIRSA Fisheries has formal contractual agreements with the SGWCPFA to formalise a co-management approach to managing the SGPF. The

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<sup>1</sup> The horsepower restrictions and the process for monitoring fleet fishing power is currently under review in the Spencer Gulf Prawn Fishery.

SGWCPFA Inc. is currently working in partnership with PIRSA Fisheries and the Conservation Council of South Australia on a project funded by the Fisheries Research and Development Corporation (FRDC) to develop a co-management model for the SGPF. The project is entitled "Competition to collaboration: exploring co-management models for the Spencer Gulf Prawn Fishery."

The current management plan is the first to provide formal decision-making guidelines for the development and real time management of harvest strategies, based on data obtained from surveys and commercial fishing (Dixon & Sloan, 2007a).

The management plan also outlines a range of performance indicators which relate directly to the fishery's goals. Management objectives have been developed to measure the performance of the fishery. An explicit management response is also documented in the management plan, should the limit reference points for performance indicators not be achieved (Management Plan p. 36).

#### **4.1.2 Gulf of St. Vincent Prawn Fishery**

Under limited entry regulations, there are currently 10 commercial fishery licences issued for the GSVPF. A vessel used in the prawn fisheries needs to be registered and endorsed upon the licence being used. There are two size categories of licensed vessels in the GSVPF. Different vessel restrictions apply to large and small vessels in terms of their maximum length, main engine power, trawl net configuration (double or triple rig) and trawl net headline length. A minimum mesh size of 4.5 cm applies to all nets used in the fishery (Dixon & Sloan, 2007b).

A revised management plan was introduced in September 2007. The plan outlines four main goals for the fishery to guide fisheries management activities over the five year life of the plan (p28). Each goal has clear objectives, and strategies for the fishery. The management goals for the GSVPF are:

1. stock recovery,
2. to ensure optimal utilisation and equitable distribution within the constraints of stock recovery,
3. to minimise impacts on the ecosystem, and,
4. cost effective and participative management of the fishery.

A fishery-independent survey process is used in the GSVPF, similar to the process operated in the SGPF. Survey results are used to guide the decision making process for setting harvest strategies for each fishing run. The management plan includes a harvest strategy with structured management decision rules, which are explicitly focussed on stock recovery. Harvest strategies are determined in a two-step process. The first step involves using survey results to determine relative prawn biomass and the extent of stock

recovery since the previous survey. This result is used to set the exploitation rate for the fishing run, in accordance with the guidelines in the management plan (refer to the management plan for details). The next step is to determine the area(s) to be fished and the timeframe over which fishing is to occur, using the prawn size criteria outlined in the management plan (Dixon & Sloan, 2007b; p.30).

Performance indicators (PI) have been developed in the management plan to measure the annual performance of the fishery. Each PI is measured against a limit reference point. If performance falls below limit reference levels, management measures to improve performance must be developed, following the management responses guidelines outlined in section 5.3.1 of the management plan (Dixon & Sloan, 2007b).

The GSVPF has recently demonstrated signs of stock recovery, through sustained increases in fishery-independent survey catch rates and recruitment indices (Roberts, Dixon and Hooper, 2009). The sustained annual increases in catch rates and recruitment indices across the fishery demonstrate that the approach adopted in the management plan has been effective at achieving the management goal of stock recovery.

#### **4.1.3 West Coast Prawn Fishery**

Under the limited entry regulations, there are 3 licences issued in the WCPF. The WCPF is a different fishery to the GSVPF and SGPF, in that the fishery predominantly operates in a more oceanic deepwater environment. There are three main fishing grounds in the WCPF – Ceduna, Venus Bay and Coffin Bay. Venus Bay is the most significant area used in the fishery.

The WCPF is currently managed through less formal arrangements than the SGPF and GSVPF. The WCPF arrangements are outlined in the Management Plan for the Spencer Gulf and West Coast Prawn Fisheries (McDonald 1998; now considered outdated). Fishery independent surveys are also undertaken in the WCPF.

During the 2008 fishing season, the fishery was managed using two key performance indicators and reference points (average nightly prawn size determined from bucket counts from every trawl shot and the average catch per boat for each night of fishing). PIRSA Fisheries is in the process of developing a set of updated and more formal arrangements for the WCPF, in partnership with the WCPF.

The fishery is currently emerging from an extended phase of decline, with low levels of effort since the 2002/03 season and fishery closure in 2006-07. In 2007/08 catches have started to show signs of improvement, and the fishery has shown signs of recovery. The fishery has a history of dramatic declines and recoveries. Since 1996, catch has declined from 200 t to about 20 t in 2005.

This fishery is currently managed using survey data to inform harvest strategy development, and commercial fishing data on prawn size and minimum daily catch to manage fishing activities in real time.

#### **4.2 Non-commercial Fishing**

Recreational fishing for western king prawns is negligible, as fishers are only permitted to use hand-held nets in waters greater than 10 m depth (the same depth limitation that applies to commercial fishers). Whilst prawns exist in low abundance in South Australia's rivers and estuaries, productive prawn areas are generally in waters deeper than 10 m. A comprehensive recreational fishing survey was undertaken in South Australia in 200/01 (Henry and Lyle 2003). This survey process was repeated in 2008 (Jones 2009, *in review*). Both surveys have confirmed negligible recreational catches of prawns in South Australia. There is no recorded Aboriginal traditional fishing for western king prawns in South Australia.

### **5. External Influences**

The health of South Australian populations of western king prawns and the potential effects of coastal pollutants, parasites and disease on growth, survival and reproduction is poorly understood.

In the Spencer Gulf, there is a concern about the potential for a proposed desalination plant outlet in upper Spencer Gulf to have an impact on western king prawn stocks. This concern is being investigated through an environmental impact statement (EIS) being undertaken by BHP. If the project goes ahead, BHP has indicated that environmental monitoring programs will be funded for the area surrounding saline outflow.

In GSV, anecdotal evidence suggests that juvenile prawn abundances at Barker Inlet have declined since the early 1970's, possibly due to human factors such as nutrient loading (Roberts et al. 2009).

### **6. Interaction with Protected Species.**

All Commercial fishers must report any wildlife interaction to PIRSA Fisheries and to DEWHA. PIRSA Fisheries introduced a separate wildlife interaction logbook for commercial fisheries in South Australia in 2007. All commercial fishers are required to record any wildlife interactions in the logbook and return the records to SARDI Aquatic Sciences for collation and analysis.

All interactions as well as those that relate to a species actually being landed onboard a vessel during a fishing operation are required to be reported. Interactions are defined to include collision or capture (hooked, netted or entangled). To assist fishers with identification and recording of wildlife interactions, PIRSA Fisheries has distributed identification guides to fishers.

The data collected through the wildlife interaction logbook are collated by SARDI aquatic sciences and will be reported in a data summary.

## **7. Ecosystem impacts**

Each fishery has a management goal aimed at minimising impacts on the ecosystem, outlined in the management plans. To this effect, there are limits on the number of vessels, the amount and type of gear used in each fishery, and there are permanent closed areas (ie. no trawling in waters less than 10m). Significant research efforts have been made over an extended period of time to minimise the impacts of prawn fishing on non-target species. In 1998, significant work was undertaken to modify trawl net design features to minimise by-catch and improve efficiency (Broadhurst et al 1998) FRDC Project 98/226).

A comprehensive study has been undertaken to determine the effects of fishing on non target species in the SGPF (Currie, et al. 2009). This study will be used to inform a semi quantitative risk assessment of by-catch in the SGPF. PIRSA Fisheries has adopted a process utilising the national ESD risk assessment framework developed under the FRDC ESD sub-program (Fletcher et al 2002). A by-catch sampling program has commenced in the GSVPF to inform a similar risk assessment process in the GSVPF.

In addition, considerable technological advances have been made in the way the catch is handled. Crab bags are also used in the WCPF and One of the three WCPF vessels also uses a 'hopper'. After each trawl shot, the target catch is emptied into the hopper and the crab racks, or if no hopper system is fitted, the catch is emptied onto sorting trays. The catch is then removed from the hopper by a conveyor system and rapidly sorted. By-catch is directed along a chute with rapid return to sea (PIRSA 2003; Dixon & Hooper, 2008).

The crab bags allow larger crabs and mega fauna to be separated from target catch and results in rapid return of by-catch to sea. The crab rack is raised and by-catch is returned to sea within minutes of landing the trawl nets (Dixon & Hooper, 2008). Crab bags, crab racks and hoppers are used to minimise by-catch, improve sorting efficiency and maximise survivability of by-catch through rapid return to sea. Prawn graders are then used to sort the prawns into marketable size categories. Finally, prawns are processed and placed in on-board freezing facilities (PIRSA, 2003; Dixon & Hooper, 2008).

## **8. Target Stock Status**

Penaeid shrimps are predominantly tropical, and are distributed throughout Southeast Asian waters and around Australia. Although they are capable of swimming, prawns spend most of their life on, or close to, the seabed. They

are largely nocturnal and burrow into the seabed during the day and emerge at night to feed (King, 1997).

Western King Prawns live up to about four years of age. At about 12 months of age (25mm), females mature and spawn in offshore waters at depths ranging from 15-50 m. The proportion of female prawns with fertilized eggs increases with size, and may spawn on multiple occasions during a season. Spawning times within the Spencer Gulf and West Coast waters occur between November and March, whilst spawning can commence as early as October in Gulf of St Vincent. Peak spawning occurs in two periods late November through to early December, and late January through to early February (PIRSA, 2003).

Annual differences in growth rate also occur, which can affect the annual harvest from fisheries. There are large inter-annual differences in survival and density dependent mortality, which may be important in limiting stock population numbers (PIRSA, 2003).

SARDI Aquatic Sciences has recently completed detailed stock assessment reports for the Spencer Gulf, West Coast and Gulf St Vincent fisheries, incorporating detailed analysis of historical data. These reports are available from the SARDI websites, [www.sardi.sa.gov.au](http://www.sardi.sa.gov.au).

### **8.1.1 The Spencer Gulf Prawn Fishery**

The most recent fishery assessment report provided by SARDI Aquatic sciences provides an assessment of the 2007/08 fishing season (Dixon et al 2009) and can be sourced on the SARDI website [www.sardi.sa.gov.au](http://www.sardi.sa.gov.au).

The report concludes that trends in fishery-independent and fishery-dependent data suggest that the fishery is being harvested within sustainable limits and within the benchmarks established in the Management Plan. The fishery-independent survey process is used to determine stock status, together with the information collected through commercial logbooks. Catches have been relatively stable throughout the fishery's history. Further, effort has reduced to ~40% of peak effort and the size of prawns harvested today is substantially larger than those harvested in 1978/79 (Dixon et al 2009).

There are several lines of evidence to suggest that the fishery has performed well in recent years. The 2,028 t catch harvested during 2007/08 was the highest recorded since 2001/02 and above the five year average. Estimates of relative biomass, obtained from fishery-independent surveys conducted during November, February and April each year suggest that the average biomass during the last four years has stabilised. This is consistent with increased stability in recruitment, and is likely to be a result of the investment in constraining catch in the pre-spawning period. Commercial CPUE has successively increased during the past four fishing years and it is now

approaching the peak observed during 200/01. Mean prawn size has also increased during the last 4 years (Dixon et al 2009).

The Management Plan details the Strategic research and monitoring plan tailored to achieve the goals and objectives of the management plan in page 39.

### **8.1.2 Gulf of St. Vincent Prawn Fishery**

The most recent fishery assessment report was produced by SARDI aquatic sciences in 2009 (Roberts et al., 2009) and can be sourced on the SARDI website [www.sardi.sa.gov.au](http://www.sardi.sa.gov.au). Fishery performance has improved demonstrably in recent years under the current stock recovery strategy established in the Management Plan (Dixon and Sloan 2007).

Fishery-independent survey data (2003 to 2008) and fishery-dependent catch and effort data provide information to determine the current status of the biomass on which the fishery is based. These data suggest the biomass has increased since 2004/05 and that the stock recovery strategy set out in the management plan has been effective over this period. Evidence for this conclusion includes: annual increases in catch rates from surveys conducted in December, March, April and May between 2004/05 and 2007/08; annual increases in survey catch rates of recruits between 2004/05 and 2007/08, and increases in commercial catch in 2007/08 (Roberts et al., 2009).

### **8.1.3 West Coast Prawn Fishery (WC)**

SARDI Aquatic Sciences produced a Fisheries Status Report in 2009 (Hooper, Dixon and Roberts 2009), which can be sourced on the SARDI website [www.sardi.sa.gov.au](http://www.sardi.sa.gov.au).

In recent years, the WCPF has shown signs of stock recovery following a stock collapse in 2002 and six consecutive years of low commercial catch. The reasons for the stock collapse are not well understood, although Carrick (2008) suggested that environmental factors were a contributing factor in stock decline. The latest fisheries status report suggests the following signs of recovery for the fishery:

- mean annual survey catch rates in 2007 and 2008 were approximately 50% higher than those in 2003-06;
- commercial CPUE was 64 kg/h during 2008, which is the second highest CPUE observed for the fishery and;
- catch increased to 11.7 t in 2007, and 84.0 t in 2008 (highest since 2001)

During 2008, real time management measures of prawn size and catch per vessel were established for the WCPF. Guidelines for mean daily prawn size were set at <240 prawns per 7 kg in Venus Bay and <250 prawns per 7Kg in Ceduna. The guideline for minimum catch was 300 kg (Hooper et. al. 2009).

A revised management approach is currently being developed by PIRSA Fisheries, the WCPF licence holders and the SGWCPFA Inc.

## **9. By-product and by-catch stock status**

A strategic goal for the prawn fisheries, outlined in the management plans, is to minimise impacts on the ecosystem. A number of specific objectives and strategies have been developed to assist each fishery in achieving the overall goal. As part of the management plans, the SGPF and GSVPF have well defined strategic research and monitoring strategies, to address key information gaps.

PIRSA Fisheries has established a process to improve understanding and management of non-target species interactions in the prawn fisheries that incorporates the following steps:

1. structured by-catch surveys;
2. data analysis; and
3. risk assessment<sup>2</sup>.

The SGPF has completed the survey and data analysis phase (Currie et al 2009) and has commenced the risk assessment phase (Roberts et al 2009). The GSVPF has only recently started to show signs of prawn stock recovery and has commenced the by-catch data collection phase. There has been a low level of fishing in the WCPF due to a prolonged period of stock decline. In the past season, the fishery has started to show signs of stock recovery. PIRSA Fisheries will work with the licence holders in the WCPF to develop a by-catch monitoring program appropriate to the scale and intensity of the fishery.

During 2005, SARDI completed a report that reviewed independent by-catch information collected for a number of years in the SGPF. An outcome of the report was that monitoring long-term trends in key indicator by-catch and by-product species - by establishing statistically meaningful performance measures - was likely to be an unattainable goal for any of South Australia's three prawn fisheries. As a result, PIRSA Fisheries has developed a new strategy to address critical issues for the assessment of the by-catch and by-product species for these prawn fisheries.

In February 2007, the SGPF conducted a comprehensive survey of the distribution and abundance of all species located inside the SGPF (Currie et al 2009). The results from this survey will be used to inform a semi-quantitative risk assessment for the fishery that will identify levels of risk for individual species. The survey identified that the fishery has interactions with a number of protected syngnathid species (Currie et al 2009). The risk assessment process will be used to evaluate level of risk posed to these

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<sup>2</sup> Ecological risk assessment is a formal requirement in section 43(2) of the Fisheries Management Act 2007.

species in Spencer Gulf, and the monitoring and management responses required to address the level of risk.

The national ESD risk assessment framework, developed by the FRDC ESD Sub-program (Fletcher et al 2002), is being modified for use in undertaking the risk assessment process. Appropriate management responses and mitigation strategies will be developed for high risk species. This new approach will replace the previously suggested approach of monitoring long-term trends in abundance for the SGPF.

Following data collection and analysis stages in the GSVPF and the WCPF, risk assessments will be conducted for both fisheries (as per recommendation 9). Appropriate management responses and strategies will be developed for high priority issues. As previously advised, under this new strategy, recommendations 8 and 11 will not be further pursued.

The Management Plans for each fishery have objectives aimed at minimizing impacts on by-product species (Dixon and Sloan 2007). PIRSA has implemented regulations to protect berried female slipper lobsters, and is in the process of considering a minimum legal size limit for this species (Roberts, 2008). By-catch of the catch of squid (*Sepioteuthis australis*) is monitored through logbook records and stock assessment work is periodically undertaken as part of the assessment program in the marine scalefish fishery.

The ESD risk assessment framework has already been applied to the South Australian blue crab, abalone and charter boat fisheries. The ESD risk assessment process utilizes a stakeholder workshop to ensure expertise based stakeholder input to the risk assessment process. These workshops were held for the three fisheries mentioned above and were well attended by stakeholders. Reports from the ESD risk assessment process will be used to inform the development of revised management plans for these fisheries. The ESD risk assessment reports will be finalized, late 2009 and posted on the PIRSA Fisheries website [www.pir.sa.gov.au](http://www.pir.sa.gov.au)

## 10. Additional Information:

**South Australian Wild Fisheries Information and Statistics Report, May 2008 (Knight et al 2008):** Provides an estimate of catch, effort and landed beach price of the commercial fish catch in South Australian waters up to the financial year ending June 2006. It also provides a statistical overview highlighting key information and points of interest. This report can be sourced on the SARDI website [www.sardi.sa.gov.au](http://www.sardi.sa.gov.au)

**South Australian Fisheries Resources, Current Status and Recent Trends, 2006:** This report is currently being updated. It brings together all the available information of key fish stocks managed by the South Australian Government. It provides detail on the biological status of the major fish stocks in South Australian waters and describes the management measures in place

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to ensure their long term sustainability (published every three years). This report can be sourced on the PIRSA Fisheries website [www.pir.sa.gov.au](http://www.pir.sa.gov.au)

## **11. Recommendations**

## 10.1. Progress Summary on Recommendations from DEWHA

**Table 4:** DEWHA recommendations progress.

No	Recommendation	Progress	Target
1	PIRSA to advise DEH of any material change to the management arrangements for the Spencer Gulf Prawn Fishery, Gulf St Vincent Prawn Fishery and the West Coast Prawn Fishery that could affect the criteria on which EPBC decisions are based, within 3 months of that change being made.		Ongoing
2	The current review of South Australia's <i>Fisheries Act 1982</i> should provide for the inclusion of general community and conservation interests on fisheries management committees. PIRSA to ensure that recreational, general community and conservation interests are provided the opportunity to engage regularly with the Prawn Fisheries Management Committee. Greater efforts should also be made to increase conservation and general community involvement in any additional stock assessments and research priority setting processes.	Complete	June 2007
3	By December 2005, PIRSA to develop and implement a compliance strategy for the South Australian Prawn Fisheries that is reviewable and publicly available, to address compliance and enforcement risks identified in the compliance risk assessment of the prawn fisheries.	Complete	December 2005
4	By the end of 2005, PIRSA to ensure that information on the size composition of prawn catch is collected and monitored on an ongoing basis in the Gulf St Vincent Prawn Fishery and the West Coast Prawn Fishery.	Complete	December 2005
5	By December 2005, PIRSA to review the performance indicators and performance measures used in the assessment of Western King prawns stock status in the Gulf St Vincent Prawn Fishery and the West Coast Prawn Fishery to ensure that they are appropriately precautionary and sufficient to detect significant changes in stock status.	Complete (GSV and SG)  Partial and ongoing (WC)	December 2005
6	PIRSA to ensure that the recreational harvest of Western King prawns is monitored and factored into the management of the Spencer Gulf Prawn Fishery and the Gulf St Vincent Prawn Fishery.		Ongoing

<b>7</b>	PIRSA to develop and implement harvest strategies for all by-product species taken in the Spencer Gulf Prawn Fishery, Gulf St Vincent Prawn Fishery and the West Coast Prawn Fishery within 2 years. Harvest strategies should clearly articulate performance indicators and performance measures and any specific management arrangements to be applied to by-product species permitted in the fisheries.	Substantial	December 2006
<b>8*</b>	By December 2006, PIRSA to develop a system for the ongoing collection and monitoring of information on bycatch and by-product species taken in the Gulf St Vincent Prawn Fishery and the West Coast prawn Fishery sufficient to enable identification of long-term trends in bycatch and by-product. In the event that catch levels of any bycatch or by-product species change, PIRSA will investigate suitable management responses.	Substantial	December 2006
<b>9</b>	PIRSA to conduct a bycatch risk assessment in the Gulf St Vincent Prawn Fishery and the West Coast Prawn Fishery and develop suitable management responses for any species identified as high risk.	Moderate	June 2010
<b>10</b>	PIRSA to continue to pursue reduction in the amount of bycatch taken in the Spencer Gulf Prawn Fishery, Gulf St Vincent Prawn Fishery and West Coast Prawn Fishery through the adoption and refinement of bycatch mitigation technology and to investigate methods for increasing the survivability of bycatch species. Any suitable methods identified will be implemented in a timely manner.		Ongoing
<b>11*</b>	By December 2008, PIRSA to specify bycatch indicator species for the Gulf St Vincent Prawn Fishery and the West Coast Prawn Fishery to be used to monitor the impact of the fisheries of bycatch species and/or species groups.	Moderate	December 2008
<b>12</b>	By December 2005, PIRSA to introduce mandatory structured reporting of all interactions between the Spencer Gulf Prawn Fishery, Gulf St Vincent Prawn Fishery and the West Coast Prawn Fishery and endangered, threatened or protected species. To complement such a reporting system, PIRSA to also ensure that an education program for fishers is developed and implemented to promote the importance of protected species protection and accurate incident reporting.	Complete	December 2005

\* This recommendation will not be pursued. A modified approach to by-catch monitoring has been developed, as per previous agreement with DEWHA.

**Table 5:** Wester King Prawn Fisheries: Strategies and Actions

No	Proposed Strategies	Actions	Target
1	New Management Plans for the SGPF and GSVPF were approved by the Minister for Agriculture, Food and Fisheries in August 2007. The plans do not substantively change management arrangements but explicitly document harvest strategies and decision rules for the fishery.	Revised Management plans are available on the PIRSA Fisheries website at <a href="http://www.pir.sa.gov.au">www.pir.sa.gov.au</a> and have been provided to DEWHA. Other noteworthy management changes are outlined in the body of this report.	September 2007
2	Implement proposed changes to co-management process through development and implementation of the Fisheries Management Act 2007 (proclaimed on 1 September 2007).	<p>The <i>Fisheries Management Act 2007</i> establishes a formal co-management framework through the Fisheries Council of South Australia. The council is an expertise based advisory body for the Minister.</p> <p>PIRSA Fisheries has established formal consultative agreements with industry associations.</p> <p>Develop a co-management framework for the SGPF involving input from industry, PIRSA and the community (Conservation Council of South Australia) through an FRDC funded project designed to explore co-management frameworks for the fishery. Details on this project are provided in the body of this report.</p>	<p>January 2008</p> <p>July 2010</p>
3	Review and develop compliance strategy	Compliance Operational plan developed and incorporated into the Management Plan. The compliance risk assessment is reviewed every 2-3 years. The 2009/10 compliance master operational plan is attached, for information, at Appendix A.	August 2007

4	Develop catch return information pertaining to size composition	Commercial logbooks modified for both the GSV and West Coast fisheries to include size composition data.	January 2007
5	Review performance indicators	New performance indicators, reference points and decision rules have been developed in the revised management plans for the Spencer gulf and the Gulf St Vincent. Work in West Coast fishery is pending stock recovery and development of Management Plan	December 2008
6	There is currently no known recreational harvest of prawns in South Australia Consult with SARDI to ensure that if new information suggests a recreational take of prawns that the estimates are factored into stock assessment reports	A comprehensive survey of the recreational fishery catch and effort for all South Australian commercially important species was undertaken during 2008/09. The results of this survey confirmed negligible recreational harvest of prawns in South Australia (Jones, 2009, <i>in review</i> )	December 2008
7	Include analyses of available data on by-product into stock assessments. Develop harvest strategies that minimise impacts on by-product species.	Data on by-product species are included in stock assessments and in separate by-product reports. Harvest strategies have been developed and are included in the revised management plans. These include regulations introduced to protect egg-bearing female slipper lobsters and size limits. A stock assessment report on squid is undertaken periodically through the Marine Scalefish Fishery.	December 2006 September 2007
8	Update logbooks to include reporting of retained by-product.	Commercial logbooks have been modified for both the GSVPF and the WCPF to include by-product data	December 2006
9	Review available bycatch data. Implement by-catch risk assessment process in the SGPF, GSVPF and WCPF to identify and prioritise high risk species for further management and/or continued	Implement use of standardised qualitative risk assessment process across all of PIRSA's fisheries, using the National ESD risk assessment framework developed by the FRDC ESD research sub-program (Fletcher et al 2002). ESD risk	June 2010

	<p>monitoring.</p>	<p>assessments have been undertaken for the blue crab, abalone and charter fisheries. These reports are in the final review stage and will be posted on the PIRSA Fisheries website when finalised <a href="http://www.pir.sa.gov.au">www.pir.sa.gov.au</a></p> <p>By-catch database developed for the SGPF.</p> <p>Report on historic by-catch data collection completed for the SGPF (Dixon, Svane and Ward 2005b).</p> <p>SGPF fishery conducted a fishery independent by-catch survey in 2006/07 to inform risk assessment of the SGPF. The ESD risk assessment framework (Fletcher et al 2002) will be used to conduct a qualitative risk assessment of the SGPF in 2009/10.</p> <p>By-catch surveys will be conducted in the GSVPF in 2009/10 to inform data analysis and qualitative risk assessment, as per the process followed for the SGPF. A similar approach will be investigated in the WCPF, following stock recovery.</p>	<p>Done</p> <p>Done</p> <p>2009/10</p>
<p>10</p>	<p>Review suitable and available bycatch mitigation technology</p> <p>Investigate survival of bycatch species from existing bycatch mitigation technology</p> <p>Investigate methods to increase survivability of non-retained species</p>	<p>Analysis of by-catch survival data is underway. Risk assessment process will be used to inform priority issues requiring further research.</p> <p>Prawn fishery by-catch research work was undertaken in 1999/2000 to minimise by-catch in the GSVPF (Broadhurst et al 1999/2000).</p> <p>A research proposal has been developed by SARDI Aquatic</p>	<p>Ongoing</p>

		<p>Sciences to further investigate prawn trawl mesh selectivity in the GSVPF. This proposal will be submitted to the SA Fisheries Research Advisory Board (FRAB) for consideration.</p> <p>SARDI conducted a FRDC research project 2003/023 'Prawn Fishery By-catch and Discards: marine ecosystem analysis – population effects' by Ib Svane, Kate Rodda and Philip Thomas 2007. The results of this research project will also serve to inform the ERA process for the fishery.</p>	
<p><b>11</b></p>	<p>Introduce commercial TEPS interaction logbook.</p> <p>Distribute information material on TEPS to commercial fishers and industry associations</p>	<p>All SA commercial fisheries have been issued with a Wildlife interaction logbook to facilitate recording of TEPS interactions.</p> <p>TEPS ID cards and pamphlets distributed to commercial fishers and industry associations</p>	<p>Done</p>

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**Appendix A: Prawn Fisheries Compliance Master Operational Plan**

<b>RISK / ISSUE</b>	<b>STRATEGIES</b>	<b>OUTCOMES</b>	<b>INITIATIVES</b>
<p><b>TAKE NON PERMITTED SPECIES</b> Rating Moderate/High  incl By-catch</p>	<p><b>1. EDUCATION &amp; AWARENESS</b></p> <ol style="list-style-type: none"> <li>1. All interested parties understand their respective obligations.</li> <li>2. Develop Industry communication and relationship program</li> </ol>	<p><b>MINIMISE THE TAKE OF NON PERMITTED SPECIES.</b></p>	<ol style="list-style-type: none"> <li>1. One on one interactions</li> </ol>
	<p><b>2. DETERRENCE</b></p> <ol style="list-style-type: none"> <li>1. All aspects of fishing activity monitored</li> <li>2. Enforcement Plan Communication Strategy</li> <li>3. Enforcement Outcomes Communication Strategy</li> </ol>		<ol style="list-style-type: none"> <li>1. Fishery induction package</li> </ol>
	<p><b>3. ENFORCEMENT</b></p> <ol style="list-style-type: none"> <li>1. Maximise successful prosecutions outcomes</li> </ol>		<ol style="list-style-type: none"> <li>2. Establish liaison and contact.</li> </ol>
	<ol style="list-style-type: none"> <li>1. Random checks at sea and landings</li> </ol>		
	<ol style="list-style-type: none"> <li>2. Pre-Operation Media</li> </ol>		
	<ol style="list-style-type: none"> <li>3. Post-Operation Media</li> </ol>		
	<ol style="list-style-type: none"> <li>4. Prosecution outcome Media</li> </ol>		
	<ol style="list-style-type: none"> <li>1. Intelligence</li> </ol>		
	<ol style="list-style-type: none"> <li>2. Intelligence driven Operations</li> </ol>		
	<ol style="list-style-type: none"> <li>3. Policy Review &amp; Revision</li> </ol>		
<ol style="list-style-type: none"> <li>4. Brief Quality Assurance</li> </ol>			
<ol style="list-style-type: none"> <li>5. Compliance Training</li> </ol>			
<ol style="list-style-type: none"> <li>6. Prosecution Steering Committee</li> </ol>			

<b>RISK / ISSUE</b>	<b>STRATEGIES</b>	<b>OUTCOMES</b>	<b>INITIATIVES</b>
<b>FISH CLOSED AREAS</b> Rating Moderate	<b>1. EDUCATION &amp; AWARENESS</b> <ol style="list-style-type: none"> <li>1. All interested parties understand their respective obligations.</li> <li>2. Develop Industry communication and relationship program</li> </ol>	<b>MINIMISE INCIDENTS OF FISHING IN CLOSED AREAS</b>	<ol style="list-style-type: none"> <li>1. One on one interactions</li> </ol>
	<b>2. DETERRENCE</b> <ol style="list-style-type: none"> <li>1. Enforcement Plan Communication Strategy</li> <li>2. Enforcement Outcomes Communication Strategy</li> </ol>		<ol style="list-style-type: none"> <li>2. Fishery Induction package</li> </ol>
	<b>3. ENFORCEMENT</b> <ol style="list-style-type: none"> <li>1. Maximise successful prosecutions outcomes</li> </ol>		<ol style="list-style-type: none"> <li>3. Established Liaison &amp; Contact</li> </ol>
	<ol style="list-style-type: none"> <li>1. At sea monitoring</li> </ol>		
	<ol style="list-style-type: none"> <li>2. Pre-Operation Media</li> </ol>		
	<ol style="list-style-type: none"> <li>3. Post-Operation Media</li> </ol>		
	<ol style="list-style-type: none"> <li>4. Prosecution outcome Media</li> </ol>		
	<ol style="list-style-type: none"> <li>1. Intelligence Probe</li> </ol>		
	<ol style="list-style-type: none"> <li>2. Intelligence driven Operations</li> </ol>		
	<ol style="list-style-type: none"> <li>3. Policy Review &amp; Revision</li> </ol>		
<ol style="list-style-type: none"> <li>4. Brief Quality Assurance</li> </ol>			
<ol style="list-style-type: none"> <li>5. Compliance Training</li> </ol>			
<ol style="list-style-type: none"> <li>6. Prosecution Steering Committee</li> </ol>			

<b>RISK / ISSUE</b>	<b>STRATEGIES</b>	<b>OUTCOMES</b>	<b>INITIATIVES</b>
<p align="center"><b>ELIMINATE USE OF ILLEGAL FISHING GEAR</b> Rating Moderate</p>	<p><b>1. EDUCATION &amp; AWARENESS</b></p> <ol style="list-style-type: none"> <li>1. All interested parties understand their respective obligations.</li> <li>2. Develop Industry communication &amp; relationship program</li> </ol>	<p align="center"><b>ELIMINATE USE OF ILLEGAL FISHING GEAR</b></p>	<ol style="list-style-type: none"> <li>1. One on one interactions</li> </ol>
	<p><b>2. DETERRENCE</b></p> <ol style="list-style-type: none"> <li>1. All aspects of fishing activity monitored</li> <li>2. Enforcement Plan Communication Strategy</li> <li>3. Enforcement Outcomes Communication Strategy</li> </ol>		<ol style="list-style-type: none"> <li>2. Fishery Induction package</li> </ol>
	<p><b>3. ENFORCEMENT</b></p> <ol style="list-style-type: none"> <li>1. Maximise successful prosecutions outcomes</li> </ol>		<ol style="list-style-type: none"> <li>3. Establish Industry liaison &amp; contact</li> </ol>
	<ol style="list-style-type: none"> <li>4. Participate in gear tag programme</li> </ol>		
	<ol style="list-style-type: none"> <li>1. Random checks at sea and port for compliance tags</li> </ol>		
	<ol style="list-style-type: none"> <li>2. Pre-Operation Media</li> </ol>		
	<ol style="list-style-type: none"> <li>3. Post Operation Media</li> </ol>		
	<ol style="list-style-type: none"> <li>4. Prosecution Outcome Media</li> </ol>		
	<ol style="list-style-type: none"> <li>1. Intelligence</li> </ol>		
	<ol style="list-style-type: none"> <li>2. Intelligence driven Operations</li> </ol>		
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