

# NORTHERN INLAND BIOREGION

## ABOUT THE BIOREGION

The Northern Inland bioregion, encompassing the northern half of Western Australia, is predominantly a desert area, with few permanent water bodies. As a result of occasional summer cyclones, the various river systems flow at flood levels for short periods before drying-out to residual waterholes. The only exceptions to this are man-made dams, which trap rainfall for water supply purposes and irrigation.

The only significant fishable water body in the region is Lake Argyle, created by the damming of the Ord River. The continuous release of water from the dam has resulted in the Ord River maintaining its freshwater fish populations year-round, as does the lake, where some freshwater native fish populations have expanded.

Populations of reptiles, such as the protected freshwater crocodile, are also supported by the expanded food chain of native fish, and are thought to have increased significantly from their original billabong-based populations.

## SUMMARY OF FISHING AND AQUACULTURE ACTIVITIES

The creation of Lake Argyle has produced a unique inland aquatic environment which is now home to various fishing and tourism-related activities. The lake supports the State's only commercial freshwater fishery – for the silver cobbler or catfish – together with a processing facility supplying predominantly Western Australian and interstate markets. The lake and its associated river system also support recreational fishing for the freshwater component of the barramundi stock and cherabin (freshwater prawns).

Aquaculture development operations in the region have previously included the production of barramundi from a cage operation in Lake Argyle, and a small but growing pond production of redclaw crayfish in the Ord River irrigation system around Kununurra.

The State Government has recently announced funding of a stock enhancement project at Lake Kununurra to create a recreational barramundi fishery in the region.

## ECOSYSTEM MANAGEMENT

As one of the key ecosystem risks is the introduction of non-endemic species, the Department has an approval process in place for assessing proposals to translocate live non-endemic fish species into and within Western Australia, so as to minimise the environmental risks to freshwater ecosystems associated with this activity.

## ECOSYSTEM BASED FISHERIES MANAGEMENT

### Identification of Ecological Assets using the EBFM framework

The Department is now implementing an Ecosystem Based Fisheries Management (EBFM) framework (see How to Use section for more details). In terms of ecological assets, the Department has recognised the following for the Northern Inland Bioregion:

- Ecosystem structure and biodiversity;
- Captured fish species
- Protected species (direct impact – capture or interaction);

The full set of ecological assets identified for ongoing monitoring are presented in Northern Inland Ecosystem Management Figure 1.

### Risk Assessment of Regional Ecological Assets

The EBFM process identifies the ecological assets in a hierarchical manner such that the assets outlined Northern Inland Figure 1 are often made up of individual components at species or stock level. The risks to each of the individual stock or lower level components are mostly detailed in the individual fishery reports presented in this document. The following table (Northern Inland Ecosystem Management Table 1) provides an overview and cumulative assessment of the current risks to the ecological assets of the Northern Inland Bioregion, at a bioregional level and provides a mechanism for reporting on their status and the fisheries management arrangements that are being applied. These bioregional level risks are now used by the Department as a key input into the Department's Risk Register which, combined with an assessment of the economic and social values and risks associated with these assets, is integral for use in the annual planning cycle for assigning priorities for activities across all Divisions in this Bioregion.

### Summary of Monitoring and Assessment of Ecosystem Assets

The Department of Fisheries actively supports a number of studies into the native freshwater fish fauna and their habitats in northern river systems in conjunction with Murdoch University, the Department of Water and the Department of Environment and Conservation, and through involvement with local natural resource management councils. New aquaculture ventures are also subject to strict environmental evaluation under the Department's licensing and on-going arrangements, in conjunction with industry and TAFE.

**NORTHERN INLAND ECOSYSTEM MANAGEMENT TABLE 1  
RISK LEVELS FOR EACH ASSET.**

Risk levels in this table are developed by combining the individual (lower level) elements that make up each of the higher level components. Low and Medium values are both considered to be acceptable levels of risk. High and Significant risks indicate that the asset is no longer in a condition that is considered appropriate and additional management actions are required. Where the value is followed by (non-fishing) this indicates that all, or the majority of the risk value, was not generated by fishing activities.

**Ecosystem Structure and Biodiversity**

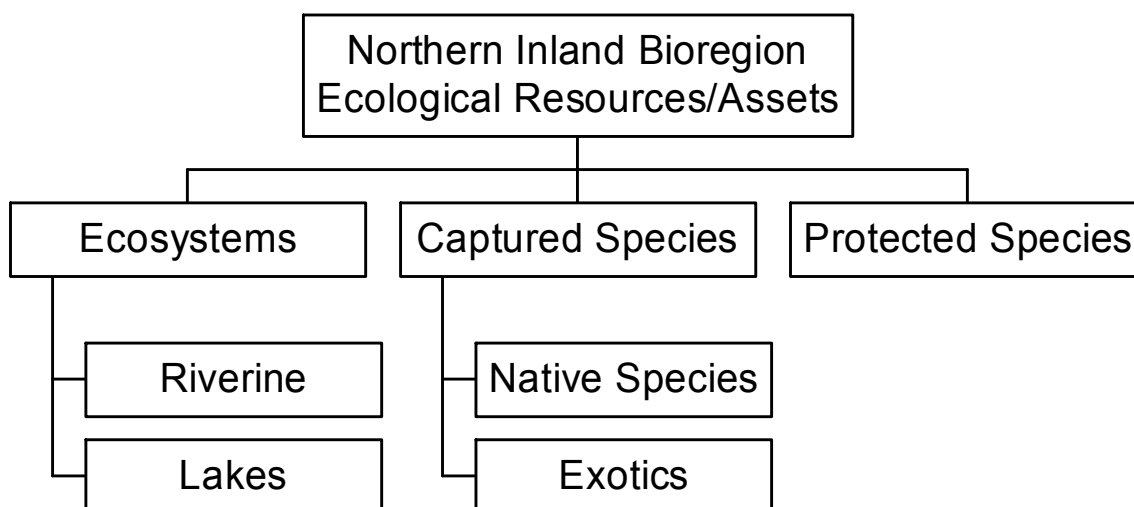
Ecosystem	Risk	Status and Current Activities
Ecosystems	LOW (non fishing)	Minimal threats and these would be due to non fishing activities

**Captured fish species**

Fish species	Risk	Status and Current Activities
Finfish Native	LOW	The stocks of freshwater fish are not under any material threat
Finfish Exotics	LOW	As above

**Protected species**

Protected fish species	Species	Risk	Status and Current Activities
Protected Species	Crocodiles	LOW	A small number of crocodiles have been reported captured in nets in Lake Argyle. The numbers are small and would not affect these stocks.



**NORTHERN INLAND ECOSYSTEM MANAGEMENT FIGURE 1**

Component tree showing the ecological assets identified and separately assessed for the Northern Inland Bioregion

# FISHERIES

## Lake Argyle Silver Cobbler Fishery Report: Statistics Only

*S.J. Newman, C. Skepper, G. Mitsopoulos, R. Mason and P. Carter*

### Fishery Description

#### Commercial

The only commercial freshwater fishery in Western Australia is in Lake Argyle in the north-eastern Kimberley (Lake Argyle Silver Cobbler Figure 1). This gillnet fishery specifically targets the silver cobbler (*Arius midgleyi*).

#### Recreational

A small, but increasing recreational and charter boat fishery for this species exists in Lake Argyle with fishing activities peaking during the dry season (winter months).

#### Boundaries

##### Commercial

The waters of the Lake Argyle Silver Cobbler Fishery (LASCF) include all waters of Lake Argyle between the dam wall and 16° 37' south latitude.

##### Recreational

In addition to the waters of Lake Argyle, recreational anglers can fish in all creeks and tributaries that feed into the Ord River and Lake Argyle.

#### Management arrangements

The LASCF is a limited entry fishery, with six Fishing Boat Licences permitted to operate in the Fishery. A licence condition restricts the net type permitted, with fishers only permitted to use set nets that have a minimum mesh size of 159mm and maximum net drop of 30 meshes.

In June 2012 the *Lake Argyle Fishery Notice 1994* was revoked and replaced with a new notice (Prohibition on Commercial Fishing (Lake Argyle) Order 2012) containing the management arrangements for the Fishery. Under this Order the six Fishing Boat Licences listed are permitted to use no more than 1500 metres of net at any one time, and are prohibited from taking any fish whatsoever by means of nets during the period from 1 November to 31 December in any year. This seasonal closure is aimed at protecting silver cobbler during the spawning season. Furthermore, at this time of the year water temperatures in the lake are high resulting in spoilage of fish in the nets. Fishers in the LASCF operators are not permitted to take barramundi (*Lates calcarifer*) at any time and all nets used by LASCF operators must be suitably marked with licence identification.

In 2001, a voluntary industry Code of Practice was introduced to the LASCF, to implement sustainable fishing practices and to reduce conflict with other stakeholder groups in Lake Argyle. The Code specifies the accepted means of operation in the Fishery and outlines contingency procedures for lost or abandoned fishing gear.

A Bycatch Action Plan has also been developed for the LASCF which aims to minimise the incidental capture of protected species in Lake Argyle (including freshwater crocodiles, freshwater turtles, and birds) during commercial

gillnetting targeting the silver cobbler. The Lake Argyle Silver Cobbler Fishery Bycatch Action Plan and Code of Practice were revised in 2010.

#### Landings and Effort

##### Commercial (season 2011):

**Not reportable due to confidentiality limitations (less than 3 fishers).**

The fishery first developed in 1979 with increasing catches reported until 1989 (143 t). Catches have fluctuated between approximately 70 t and 230 t per year since 1990 (Lake Argyle Silver Cobbler Figure 2). Catches in 2009 to 2010 were less than 70 t, while the 2011 catch was over 100 t and within the acceptable catch range.

Nominal effort in this gillnet fishery is calculated as the total number of fishing days by all boats multiplied by the average daily total net length fished per boat (divided by 100) to give '100 m net days'. Effort from 2003 to 2008 ranged from 5,070 to 6,787 units (100m net days; Lake Argyle Silver Cobbler Figure 2). Effort declined for 2009 and 2010 to approximately 4,000 units (100m net days) per year. However, the effort in 2011 was in excess of 7,000 units (100m net days).

The level of catch in the fishery at present is a reflection of the level of effort expended. Effort in the fishery is variable due to inconsistent fisher participation rates.

##### Recreational:

##### Charter <1 tonne

Limited data are currently available on recreational fishing in this region. The reported charter boat catch for Lake Argyle from 2002 to 2011 was less than 1 t of silver cobbler per annum. There are no data available on general angling catches. There is a bag limit of 8 fish that applies to any species in the Family Ariidae.

### Fishery Governance

#### Commercial

##### Target commercial catch range: 95-155 tonnes

The current target catch range was developed by applying an autoregressive moving average control quality procedure to the annual catches from 1990 to 2002. Confidence intervals were obtained by estimating the variation of the observations compared with the variation of the predictions using the 13 years of catch data.

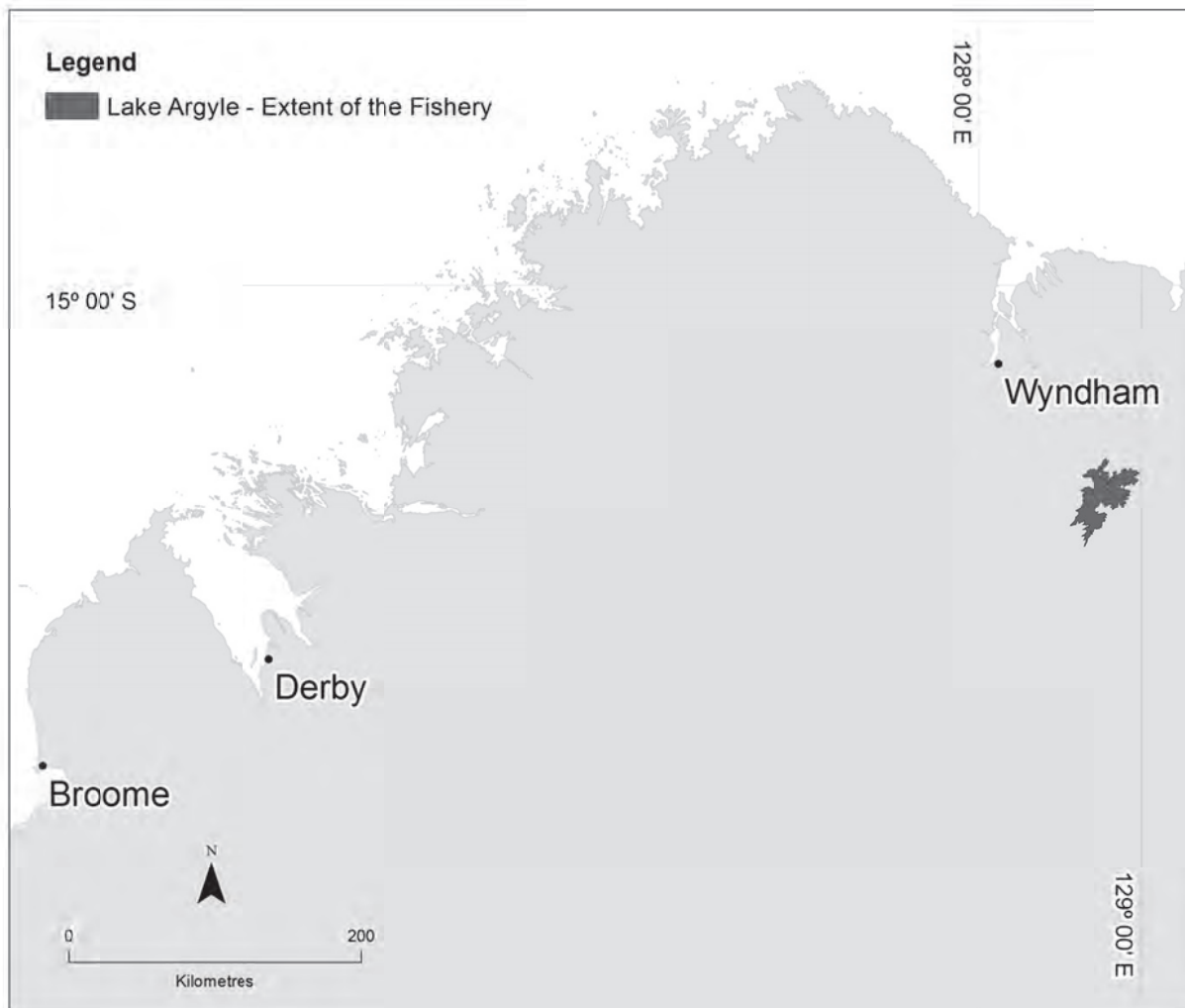
NORTHERN INLAND BIOREGION

**Current Fishing (or Effort) Level      Acceptable**

The level of catch in the fishery in 2011 is within the acceptable catch range. The lower levels of catch in the fishery in 2009 and 2010 should have allowed the breeding stock to rebuild.

**New management initiatives**

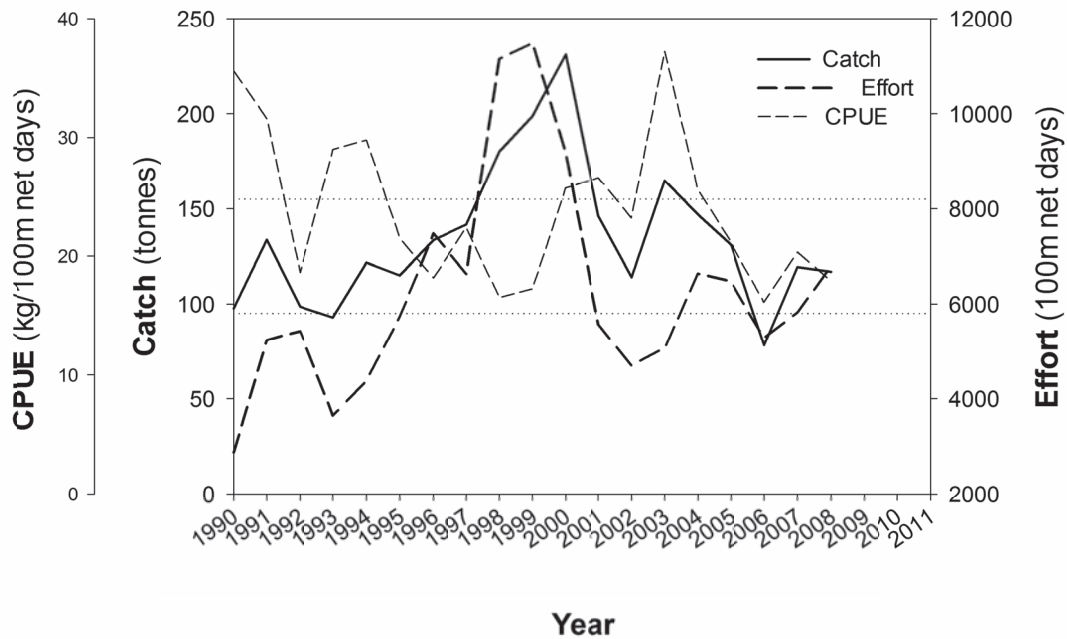
The new Order for this Fishery was gazetted in June 2012 which provided greater clarity around areas permitted to be fished. The next management review for the Fishery is scheduled for 2016/2017



**LAKE ARGYLE SILVER COBBLER FIGURE 1**

Location of the Lake Argyle Silver Cobble Fishery in northwestern Australia illustrating the remoteness and extent of the fishery.

### Lake Argyle Silver Cobbler Fishery



**LAKE ARGYLE SILVER COBBLER FIGURE 2**

The annual catch, effort and catch per unit effort (CPUE, kg/100 m net day) for silver cobbler in the Lake Argyle Silver Cobbler Fishery over the period from 1990 to 2008 (data since 2009 are not shown due to confidentiality requirements). The upper and lower bounds of the target commercial catch range are shown by the dotted lines.

## AQUACULTURE Regional Research and Development Overview

The outlook for significant aquaculture development in the northern inland region remains poor.

The process to identify a site to enable and support aquaculture around Lake Argyle as part of the implementation of the Ord Stage II final agreement continues to progress slowly. The issue of a lease has been delayed while the relevant group reviews its options.

A licence to produce barramundi has been issued, but is currently inactive; the licensee is also pursuing a land based

lease to support its proposed aquaculture activities. For proponents considering aquaculture in Lake Argyle, identifying a site suitable for land based support facilities has proved difficult.

A proposal to formulate a project to use aquaculture in Lake Argyle as a means to sequester carbon is being contemplated.

## COMPLIANCE AND COMMUNITY EDUCATION

The Northern Inland bioregion includes the freshwater rivers, lakes, billabongs and wetlands primarily located in the Kimberley. Commercial fishing is permitted in Lake Argyle (man-made lake) and in the tidal area of the mouth of the lower Ord River.

Compliance and education for the freshwater systems in the North Inland bioregion focuses on:

- translocation inspections of non-endemic freshwater species;
- protected species interaction;
- monitoring of introduced fish species;
- aquaculture lease and licence compliance;
- localised depletion of barramundi as a target recreational species;
- cherabin catches; and
- commercial Silver Cobbler fishery in Lake Argyle.

Patrols continue to focus on the Fitzroy and Ord Rivers, due to the large number of campers and fishers accessing the inland Kimberley rivers during the peak tourism period of May to October and the area-specific barramundi size and possession limit legislation. Both the Fitzroy River and the Ord River are identified as major breeding areas for barramundi.

Officers pay particular attention to catch of any protected sawfish species, disused recreational fishing gear and localised impacts of fishers.

### Activities during 2010/11

During 2010/11, Fisheries and Marine Officers (FMOs) recorded 1588 hours of active compliance patrol time in the Northern Inland bioregion – an increase compared to previous years due to the impact of the Recreational Mobile Patrol (Northern Inland Compliance Patrol Hours Figure 1).

Across the Northern Inland bioregion, personal contact was made with 4118 fishers and non-fishers across the commercial, recreational and other sectors (Northern Inland Compliance Table 1). FMOs focused on freshwater fishing compliance in areas of known high visitation or local complaints regarding illegal fishing activities.

Compliance and education was also undertaken in the Lake Argyle area, where FMOs inspected commercial silver cobbler fishers and aquaculture sites to ensure that compliance with management, protected species interaction

and environmental objectives were being met.

The Community Education Officer develops programs and coordinates delivery of education activities to school-aged children and awareness raising activities with the broader community. In-school and school holiday programs are the main method of reaching students in both the Pilbara and the Kimberley, while attendance at shows and local events target the broader community. An increased emphasis has been placed on developing materials that focus on local issues and their dissemination through regional brochure stockists and local publications.

### Initiatives in 2011/12

Compliance service delivery will continue to target any areas of non-compliance and high levels of recreational fishing pressure. These locations are reviewed during annual risk-assessment processes.

The Department has established a District Office in Kununurra with one FMO who will conduct compliance Patrols with staff from other Government Agencies across the district. This presence will greatly increase the ability of the Department to effectively carry out its compliance and education program in the East Kimberley.

The Department has established a Northern Region Mobile Patrol, the patrol will be staffed by two FMO's and will focus on compliance and education of recreational fishers. A large portion of the mobile patrols time will be spent ensuring that fishers are aware of, and comply with, bag, size and possession limits relating to Barramundi, which is one of the States iconic fisheries that is primarily inland based.

Compliance activities relating to the only freshwater commercial fishery, which targets the Lake Argyle silver cobbler, will continue. The operators in this fishery are inspected to ensure that high levels of compliance and community confidence are maintained.

Improved levels of engagement with visitors, children in regional towns and remote Aboriginal communities are planned, through fishing clinics and school presentations promoting 'fish for the future' messages.

An Inland school tour will visit schools in Tom Price and surrounding towns.

The Department will deliver an extensive school holiday program in Kununurra with emphasis on disadvantaged youth as well as ongoing school initiatives in Kununurra, and a visit to the school and brochure stockists in Kalumburu.

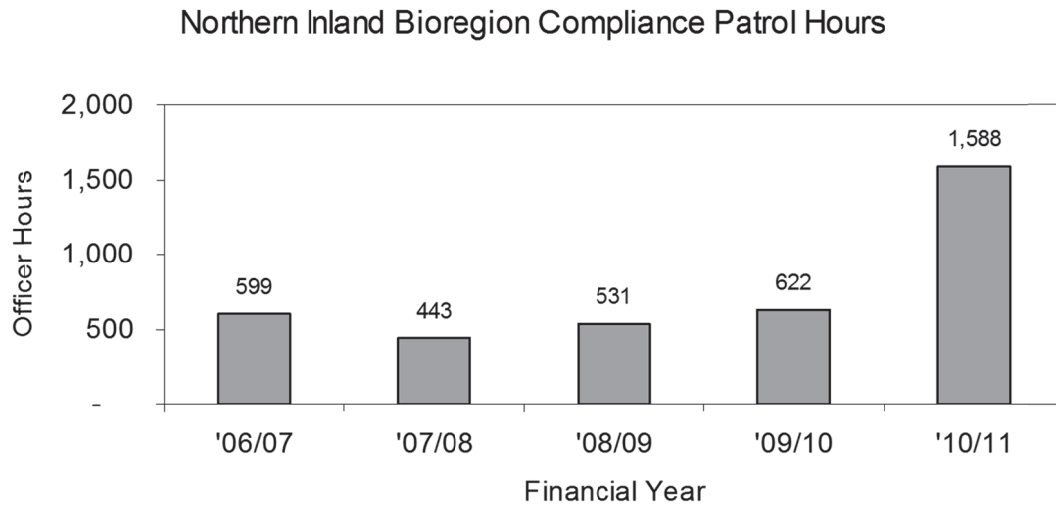
**NORTHERN INLAND COMPLIANCE TABLE 1**

This table gives a summary of compliance and educative contacts and detected offences within the Northern Inland bioregion during the 2010/11 financial year.

PATROL HOURS DELIVERED TO THE BIOREGION	1,588 Officer Hours
CONTACT WITH THE COMMERCIAL FISHING COMMUNITY*	
Field contacts by Fisheries & Marine Officers	41
Infringement warnings	1
Infringement notices	0
Prosecutions	1
CONTACT WITH THE RECREATIONAL FISHING COMMUNITY	
Field contacts by Fisheries & Marine Officers	3,483
Infringement warnings	22
Infringement notices	28
Prosecutions	2
OTHER FISHING-RELATED CONTACTS WITH THE COMMUNITY*	
Field contacts by Fisheries & Marine Officers	635
Fishwatch reports**	4

\* Contacts are classified according to the specific fishery, which is usually clearly delineated as being either commercial or recreational. The "other fishing-related contacts with the community" category is used where multiple fisheries are contacted and it is not possible to accurately classify the contacts into one specific fishery – typically, the majority of contacts are these contacts are recreational in nature (e.g. personal contacts in marine parks), but contacts made in relation to fish kills, shark patrols and inspections of commercial fish wholesale and retail premises, etc, are also included in this category.

\*\* This represents the total number of Fishwatch reports, both commercial and recreational, since the service provider reporting mechanism cannot differentiate between sectors.



**NORTHERN INLAND COMPLIANCE FIGURE 1**

This figure gives the “On Patrol” officer hours showing the level of compliance patrol activity delivered to the Northern Inland bioregion over the previous five years. The 2010/11 total gives the patrol hours in the bioregion that resulted in the contacts detailed in Table 1. The totals exclude time spent on other compliance-related tasks, e.g. travel time between patrol areas, preparation and planning time.