

Sustainable Fisheries Strategy

2017–2027

Fisheries Data Validation Plan

Improvement in the accuracy and timeliness of commercial catch and effort information.

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1 Summary

The Queensland Sustainable Fisheries Strategy: 2017-2027 sets out the government's reform agenda for the next ten years. The Strategy sets out clear targets to be achieved by 2020 and 2027 and a range of actions to deliver these targets.

One of these reforms is a commitment to improve commercial fisheries information to improve fisheries management and public confidence in the management of Queensland's fish stocks.

This Data Validation Plan provides a framework for the validation and collection of more accurate fisheries information by implementing:

1. Processes to independently validate catch and effort fishing data including interactions with protected species;
2. Education programs to improve submission of accurate catch data; and
3. Robust systems for checking and forensically analysing incoming data.

This Plan is not a static document. It identifies immediate priorities. Subsequent annual reviews will assess the success of the actions taken and develop a future work plan that will inform deliverables in the Strategy e.g. harvest strategies.

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2 Introduction

The Queensland Sustainable Fisheries Strategy: 2017-2027 sets out the government's reform agenda for the next ten years. The Strategy sets out clear targets to be achieved by 2020 and 2027 and a range of actions to deliver these targets.

Action 1.4 of the *Sustainable Fisheries Strategy* states that Fisheries Queensland will:

Develop and implement a data validation plan to provide:

1. Mechanisms to independently validate data on catch and interactions with protected species
2. Education programs to improve submission of accurate catch data (includes promoting a move to electronic logbooks, eLogs)
3. Robust systems for checking and forensically analysing incoming data.

Fisheries Queensland currently collects data from a wide range of sources, including commercial logbook catch and effort data, recreational survey data (structured phone surveys, boat ramp surveys), and monitoring data on key species.

This Plan focusses on validation of commercial fishing data and links to other key actions within the Strategy, specifically Action 9.6 (the implementation of vessel tracking systems on all fishing platforms by 2020), and Action 1.3 (developing novel technologies for fisheries monitoring).

3 Why is data validation important?

Commercial catch and effort data (i.e. from logbooks) are used to inform management decisions. Validation of commercial fishing data is critical to ensure management decisions are evidence-based.

4 Definitions

Data validation: the process of ensuring that the information within Fisheries Queensland databases are accurate. The process will encompass a range of activities that will include:

Range checks: a form of quality control to ensure that data entered into the databases is within reasonable boundaries determined through an in-depth knowledge of biological, geographical, and operational knowledge (i.e. ensuring incorrect species or fishing locations are not added to the databases).

Cross-checks: ensure the data provided by commercial fishers in logbook returns reflect that in other data collection processes such as the prior reports (where fishers report their catch in numbers and where they will unload their catch), unload reports (accurate weights of the fishers' catch), and catch disposal records (the record of a sale to a wholesaler). Cross-checks will include forensic auditing, and a comparison of location information via vessel tracking systems.

Forensic auditing: specific fishers will be identified and an audit of their logbook data will be implemented. This process will involve the comparison of sales receipts,

catch disposal records, and logbook catch and effort data, using methods common within accounting.

5 Scope

5.1 In scope

All commercial catch and effort data provided to Fisheries Queensland by commercial fishers will be within the scope of the Fisheries Data Validation Plan.

5.2 Out of scope

Data collected by Fisheries Queensland relating to recreational fishing, and monitoring information is out of scope of this Fisheries Data Validation Plan. Quality assurance checks are already undertaken on these datasets.

6 Purpose of this plan

The purpose of the Fisheries Data Validation Plan is to ensure appropriate measures are in place to validate commercial catch and effort data and provide confidence in the reliability and accuracy of that data.

7 Commercial catch and effort data

Currently, the commercial fishing industry provides:

1. Logbook data:
 - a. Daily catch information on species caught, estimated weight and/or numbers of individual species
 - b. Fishing effort – gear type and related information such as the time the gear is in the water, number of gear used, number of vessels operating, number of persons fishing, and days fishing
2. Quota information:
 - a. Where species are managed under a quota, fishers provide Fisheries Queensland with prior landing and unload reports that include information on the number or weight of species and their form
3. Vessel location information:
 - a. The location of fishing vessels is currently supplied to Fisheries Queensland via logbook returns, and automatically via vessel tracking on trawl fishing vessels. Vessel tracking will be required on all commercial and charter boats by 2020 and will provide valuable information to validate catch and effort information.

This information is currently validated through data analysis, limited range checks at the data entry point and outlier reports generated once the data has been entered. Cross checking of logbook data through catch disposal records and prior and unload reporting also occurs where links have been identified.

The Fisheries Data Validation Plan aims to build on current systems and incorporate novel technologies and strategies for improved data validation.

8 Strategies to improve the submission of accurate data

8.1 Education programs of commercial fishers

Education is the foundation to obtaining accurate, reliable and timely data from commercial fishers. Fishers need to understand:

1. The reporting requirements;
2. Why the information is needed; and
3. How the information is used in fisheries management.

Currently, Fisheries Queensland provides education in the form of:

1. Quick Guides (i.e. Net and Crab Effort Guide, AIVR Quick Guide)
2. Species identification guides
3. Customer service (24/7 phone line)
4. Some instructional YouTube videos
5. Media releases
6. Ad-hoc correspondence
7. Logbook Directions (found at the front of every commercial fishing logbook).
8. Provision of aggregated logbook data in near real time (QFish)
9. Provision of standard catch and effort reports on FishNet
10. Provision of personalised reports to individual fishers showing their catch history
11. Provision of personalised reports to individual fishers showing when logbooks returns have been received.

To improve the quality of data received by Fisheries Queensland, and to develop and improve relationships with commercial fishers, a comprehensive review of current education materials and activities will take place. As part of the review, education programs from other jurisdictions both within and outside of Australia will be reviewed.

Fisheries Queensland will consider the following additional education activities:

1. Develop MyLogbooks – an insert to go with commercial fishing logbooks. This will provide fishers with information on changes to logbooks and highlight fields that currently get filled in incorrectly
2. Consider the use of other tools such as social media and YouTube videos
3. Utilise field staff to assist commercial fishers in filling in their logbooks
4. Review existing communication tools
5. Develop a communication plan
6. Develop YouTube videos with regards to VMS, AIVR and Logbooks
7. Develop 'How To' guides with regards to FishNet and QFish
8. Develop a plan for a roadshow to educate fishers on all aspects of reporting
9. Review and enhance current species identification guides
10. Run regional information sessions with commercial fishers

11. Collate information on how internal and external clients use commercial catch and effort data
12. Collate information on how fishers use information and how they would like to receive data
13. Reinstate SOCI training – for both identification of species and techniques to reduce impacts on relevant species.

8.2 Electronic Logbooks (eLogs)

As part of the *Sustainable Fisheries Strategy*, education programs will include promoting a move towards electronic logbooks (eLogs).

Currently, eLogs are available for a limited number of fisheries (trawl and line), however uptake has been low throughout the commercial sector.

A commercial fishing app is being developed as an alternative for the current electronic logbooks. This app will be mobile-enabled and will allow fishers to provide all relevant logbook catch and effort to Fisheries Queensland with a view to moving away from bulky paper logbooks. In turn, a commercial app will increase the accuracy of the information provided to Fisheries Queensland as there will be a reduction in input errors as data will be screened using algorithms and range checks developed as part of the 'Strategies to check and forensically analyse incoming data' (page 5).

The commercial app will also be used to include information such as quota, vessel tracking information (such as which vessel the unit is on), allowing the commercial fisher to identify whether the fishing trip is commercial or non-commercial in nature, and for manual reporting of location should their vessel tracking unit malfunction. The intention will be to transition away from paper logbooks entirely over time.

9 Strategies to check and analyse incoming data

This section relates directly to Action 1.4, point 3 in the *Sustainable Fisheries Strategy*.

9.1 Range checks

Currently there are only a limited number of range checks applied as the logbook data is entered manually into the databases. These are around making sure certain fields are filled before the log can be accepted, relating to fishing methods used, catch weights or numbers of specific species (i.e. maximum numbers), and effort (i.e. maximum number of pots allowed within the crab fishery). However, these range-checks are currently limited and not comprehensive.

To improve the quality of data within Fisheries Queensland databases, a comprehensive review of the range checks will take place. The following actions will be implemented:

1. Identify priority targets in the commercial fishing logbook data for the development of range checks and other data entry criteria

2. Consult and coordinate with industry and other jurisdictions and government agencies on existing or historic project work in this area (PIRSA, FRDC, AFMA, etc.)
3. Review existing documentation and consult with fisheries experts to set boundaries on plausible data values (catch sizes, species distributions, product weights etc.)
4. Review scientific literature and, where possible, adapt statistical techniques to identify outliers, fabricated data, and other anomalies in the commercial logbook data
5. Implement IT changes to deploy range checks and improve the current reporting of range checks

9.2 Cross checking data sources

Fisheries Queensland collects fisheries-related information from a number of different independent sources that can be cross checked with logbook data. These include Automated Interactive Voice Response (AIVR) system (prior and unload data), catch disposal records (CDRs), vessel tracking and gear data from the Survey123 app.

Current cross checking mainly occurs within quota fisheries where there are tighter controls on what needs to be reported, and a higher level of compliance is required from fishers.

For quota species, fishers are required to report catch details prior to landing. Prior landing notices record the number of individuals or containers of catch and its form (i.e. filleted, whole, etc.). Fishers are also required to report where and when catch will be landed.

Prior landing information is cross-checked with information reported in logbooks and CDRs when there is an obvious discrepancy. However, if a fisher undertakes further processing of the catch on landing, prior to sale, the information recorded in the CDR will not reflect the information in the prior notice or logbooks.

After quota species are sold, fishers are required to provide an unload notice. The unload notice records the accurate weight of fish sold. Unload weights are cross-checked against CDRs and the estimated weight reported in the logbook when there are obvious discrepancies in the data.

Current vessel tracking data within the trawl fisheries is validated against fishing locations reported in logbooks, if there is reason to suspect fishing activity has not been reported accurately. Vessel tracking information is also used to identify fishing days where no logbook return has been provided. Additionally gear is validated within the trawl fisheries using data collected by the Queensland Boating and Fisheries Patrol through the Survey123 app.

A similar approach is taken with beche-de-mer where the use of rotational management areas are verified from vessel tracking information.

With the commitment within the Sustainable Fisheries Strategy to have vessel tracking on all vessels by 2020 (with a priority for crab, net and line by the end of 2018), the scope of cross-checking will increase significantly. To improve the quality of data within Fisheries Queensland databases, a comprehensive review of cross-checking will take place. The following actions will be implemented:

1. Review current cross-checking procedures and evaluate the most effective cross checks to implement;

2. Trial the use of vessel tracking data to validate certain logbook fields such as fishing activity (fishing or not fishing), location information, and species caught (based on biological or ecological knowledge of species location);
3. Review the Fisheries Queensland data collection systems within the Fisheries Management System and identify key areas where cross-checking can be automated;
4. Review the use of QBFP and monitoring staff in the field for the collection of commercial catch and effort information that can then be used to cross-check logbook reporting including validation of commercial fishing gear;
5. Include automatic cross checking in the commercial fishing app (e.g. checking against GPS location in phone etc.);
6. Implement new cross checking, ensuring as many are automated as possible

9.3 Forensic auditing of logbook catch records

Currently, Fisheries Queensland conducts forensic auditing of a specific fisher on a case-by-case basis, usually in conjunction with the QBFP. Forensic auditing does not occur on a regular basis, and there is no process currently in place for regular, random, and scheduled auditing to take place.

KPMG were employed to conduct a forensic accounting analysis for a commercial fisher in 2017, and as part of the report outlined recommendations that Fisheries Queensland should take into consideration when planning future audits. The recommendations within this document will be taken into consideration throughout the auditing process.

As part of the Fisheries Data Validation Plan, Fisheries Queensland aims to implement a plan for forensically auditing commercial fishers. The outcome of the forensic auditing project will allow Fisheries Queensland to identify suspicious data and quickly and effectively implement an audit of that fisher's data.

When suspicious 'logbook data is identified, evidence (sale dockets, CDRs etc.) to support the information reported will be requested.

Fisheries Queensland will also undertake random audits of individual fishers. Identification of individuals will be via both a random stratified sampling technique and using information supplied through internal data analyses.

If an audit determines the information reported in the logbook is suspicious, the information will be excluded from the licence's fishing history. The information will also not be displayed publically nor used in stock assessments or determining the status of fish stocks. Fisheries Queensland will also take appropriate compliance action.

To improve forensic auditing within Fisheries Queensland, the following actions will be implemented:

1. A review of current legislation to ensure that Fisheries Queensland has the power to request all relevant information for a forensic audit, and that compliance actions can be legally implemented i.e. removing a fishers' license, issuing FINs.

2. Review current forensic auditing processes with the view of developing a Standard Operating Procedure (SOP) for forensic auditing.
3. Trial forensic auditing processes on the crab fisheries (simpler, single species fishery for which confidence in the data quality is the lowest) – auditing on up to 35 fishers chosen via targeted and random sampling.
4. Based on the trial, roll out random auditing in other priority fisheries, with realistic targets for numbers of fishers to be audited per year (will depend on available resources)

Concurrently enhance systems to streamline forensic auditing process

9.4 Enhancing current data systems

Currently, Fisheries Queensland manages all fisheries information centrally, following industry best practice. All data on species are recorded using the Codes for Australian Aquatic Biota (CAAB) developed and supported by CSIRO Marine Research.

Fisheries Queensland has developed and implemented business within the data mining environment (DME) to provide a single corrected data set for stock assessments, internal and external reports and public presentation (open data portal, QFish and dashboard). Fisheries Queensland has developed a data cube for commercial fisheries information, updated weekly to improve the efficiency of reporting by the open data portal and QFish.

Additionally, an upgrade of all data systems to the Microsoft SQL Server 2016 has taken place. This improves the functionality of SQL reporting services and enhances the systems to be compatible with mobility functions.

However, the database structures were established in 2006 and although integration has been incorporated within the DME where commercial data is stored, there are further opportunities to improve the integration of the various datasets within Fisheries Queensland. Additionally, the KPMG Report identified areas where newer technology may improve data quality and the ability to effectively audit.

The following actions will be implemented:

1. Deliver the IT project “*Fisheries Enhancing Data Capture and Reporting Capability*” to improve data integration

10 Strategies to independently validate data on SOCI

Historically, fishery independent data such as at-sea fisheries observers programs have been used to validate logbook catch and effort information, document interactions with protected species and validated discarded catch.

Due to the high costs involved (\$1,000 per day of observation), and Workplace Health and Safety issues, Fisheries Queensland is not proposing to reintroduce a fisheries observer program as a mechanism to validate catch, discard and interaction with Species of Conservation Interest.

As part of the Fisheries Data Validation Plan, Fisheries Queensland aims to investigate novel methods to implement electronic monitoring to provide a solution for “digital observers” that is efficient and relevant to the intricacies of fisheries in Queensland.

The following actions will be implemented as part of this plan:

1. Continue with the Small Business Innovation and Research (SBIR) Challenge, through Advance Queensland for the development of an affordable automated electronic monitoring system that would record all information required of commercial trawl, net, and crab fishing operations and submit this information to Fisheries Queensland in real, or near-real time
2. Once the technology is available at the completion of the SBIR project, consider requiring the camera systems to be put on a random subset of fishers to validate logbook information and interactions with protected species.

11 Process for identifying data validation priorities

11.1 Stage 1: Identifying data validation needs

Within each of the projects in this plan, processes have been developed to identify, prioritise, and review data validation priorities. This process will be repeated annually, and additionally as necessary, to ensure emerging information needs are incorporated. These are similar to those used within the Monitoring and Research Plan as part of the Strategy.

Table 1: Processes used to identify data validation priorities

Process	Description
KMPG Forensic Audit (2017)	An external audit by KPMG was commissioned by Fisheries Queensland primarily to audit a commercial fisher. The findings of this report are confidential due to privacy reasons. However there were several general recommendations made by KPMG relating to data validation and how Fisheries Queensland can improve their systems, alter regulations, and improve data collection to ensure effective forensic auditing and therefore validation of commercial catch data.
EPBC Approvals	Fisheries that export product and/or interact with listed Species of Conservation Interest (SOCI) within Commonwealth waters require approval under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> . These approvals are subject to conditions, which can include specific requirements for additional data provision in commercial logbooks and/or new logbooks.
Status of Australian Fish Stocks (SAFS)	The SAFS process reviews the sustainability of Australia's Fish Stocks using all available data (commercial and recreational catch data are included). These reports highlight stocks with emerging sustainability concerns. Fisheries Queensland conducts an annual review of the SAFS reports to identify data gaps and prioritise information needs for these species.
Ecological Risk Assessments (ERAs)	Fisheries Queensland prepares ERAs for key fisheries, including risks to target species, by-product species, by-catch, and the environment. The Strategy commits to delivering ERAs for priority fisheries by 2020, followed by the remaining fisheries. The ERAs will clarify risks associated with fishing practices and may identify priority data validation needs to help reduce these risks, particularly in regards to SOCI.
Stock Assessments	Formal stock assessments are currently prepared for some key commercial species within Queensland's fisheries using commercial and recreational catch data. As part of the Strategy, Fisheries Queensland is committed to developing more regular stock assessments for key stocks, and increasing the number of stock assessments completed in general.

	Stock assessments usually identify data gaps and include recommendations as to how data can be better provided going forward, including recommendations to improve data validation.
Fisheries Information Group Workshop	As part of the Strategy, in 2017 the Fisheries Information Group held a workshop to collate ideas and needs for data validation as part of the Data Validation Plan. A member of the Licensing team was present to include data requirements from this area. As part of the Plan, these workshops will be held yearly to incorporate changing priorities.
Fisheries working groups	As part of the Strategy, fishery working groups are being held for key fisheries in 2017 and 2018 to participate in development of harvest strategies. Harvest strategies will define data requirements necessary to set catch limits and develop fishery indicators, including requirements and recommendations for data validation priorities.
Meetings with Fisheries Managers	Separate to the fishery working groups, Fisheries Managers are asked to provide feedback on the data needs for their fisheries, and identify key areas for data validation.

11.2 Stage 2: Prioritise data validation needs

Projects to validate commercial fishing data need to be cost-effective and achievable while providing benefits to the management of fisheries by Fisheries Queensland. To assist in prioritising data validation needs, a benefit versus feasibility analysis has been developed using the validation needs identified in Stage 1. The criteria below aim to deliver on the key objectives of the Plan.

Overall, Data Validation has been identified as a Strategy Priority.

Benefit criteria

High

1. The proposed data validation will provide more accurate data to inform immediate management decisions, for the development of a harvest strategy, or for informing a fisheries performance against an indicator in a harvest strategy.
2. The proposed data validation will provide more accurate data to address a Commonwealth Government Wildlife Trade Operation (WTO) condition imposed under the EPBC Act for maintaining accreditation.
3. The proposed data validation will relate to better data on species assessed as high risk in an Ecological Risk Assessment, which is not a target species for the fishery.
4. The proposed data validation will address information gaps that are required for informed decision making.
5. The proposed data validation will result in an increase in confidence in the validity and importance of providing good data to Fisheries Queensland.

Medium

1. The proposed data validation will offer a high level of public value (i.e. the information is required to satisfy broader stakeholder expectations or information needs).
2. The proposed data validation will address cross-jurisdictional or multiple jurisdiction needs for informed and sustainable fisheries management decisions.

Low

1. Does not fit this criteria.

Feasibility criteria

High

The proposed data validation can be conducted within the current budget and resource allocation, or costs are not prohibitive to effective implementation.

The proposed data validation can be conducted effectively and efficiently with minor changes to the Regulation and/or Legislation.

Medium

The proposed data validation can be conducted with some cost in terms of short-term increases in resourcing.

Low

The proposed data validation will require significant increases to the current budget or resources (i.e. is unlikely to progress).

Table 2: Benefit and feasibility matrix

Benefit	High	High/Low	High/Medium	High/High
	Medium	Medium/Low	Medium/Medium	Medium/High
	Low	Low/Low	Low/Medium	Low/High
		Low	Medium	High

	Feasibility
FQ high priority	
FQ medium priority	
FQ low priority	

11.3 Stage 3: Evaluate, review and set new priorities

This Data Validation Plan will be reviewed in 12 months and updated as necessary, taking into account progress and advances in technology.

An evaluation report will be compiled outlining the progress of data validation, the success of different projects within the Plan, and the development of innovation. The evaluation will also provide recommendations on amendments to this Plan.

A quarterly electronic report via a dashboard will ensure compliance with selected legislative requirements. The dashboard will then be supported with an annual report of the particulars and used to determine priority compliance areas for the following year. The annual report will collate and prioritise investment needs for the next financial year, and the Plan will be updated as necessary.

12 Key actions and timeline for delivery

The following table outlines the key activities and deliverables as part of the Fisheries Data Validation Plan:

Section	Activity	Deliverables	Timeline					
			2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1
Check and forensically analyse incoming data	Range checks	Identify priority targets in commercial logbooks						
		Consult with industry and other jurisdictions. Government Agencies						
		Review existing documentation						
		Review scientific literature and apply statistical techniques to identify inaccurate data						
		Apply, review and implement IT changes to range checks						
	Cross checking	Review current cross checking						
		Trial use of VMS data in cross checking						
		Review FMS and identify key automation priorities						
		Review use of QBFP and monitoring staff in						

		field for collection of data						
		Include automatic cross-checking in commercial app						
		Implementation and review						
	Forensic auditing	Review current legislation						
		Review current auditing processes and develop SOP						
		Trial auditing on crab fishery						
		Finalise SOP based on results of crab fishery audit						
		Review SOP and implement in other fisheries						
		Concurrently enhance systems to streamline process						
	Enhance current data systems	Deliver the IT project " <i>Fisheries Enhancing Data Capture and Reporting Capability</i> "						
	Improve the submission of accurate data	Education programs (VMS, Quota / AIVR, Logbook)	Review current education program					
Collate information on who internal / external clients use data and								

		educational materials					
		Enhance current education materials where possible					
		Develop communication plans and education plans					
		Roadshow / workshops with commercial fishers					
		Implement education programs					
		Review and enhance education programs					
		Reinstate SOCI training					
	Electronic logbooks (commercial app)	Review of current eLogs and manual logbook data entry methods					
		Identification of key issues and requirements					
		Trial of commercial app on specific fishing vessels			Stage1 ¹		
		Review and modification of commercial app					

¹ Stage 1 includes the functions delivered in FishNet Secure and quota reporting

		Release commercial app to fishers			Stage 1			
Independently validate data on SOCI	Electronic monitoring (Novel Solutions)	Continue with the SBIR Challenge through Advance Queensland						
		Consider requiring technology on number of fishers to validate catch information						