Southern Seabird Solutions

Southern Seabird Solutions Trust Trawl Workshop Summary

27 – 28 September 2006
Nelson, New Zealand

Deepwater Group Limited

Department of Conservation
Te Papa Atawhai

Albert Times

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Ministry of Fisheries
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Introduction

In September 2006, fishermen, scientists, government officials, observers, environmentalists and others gathered for a two-day workshop in Nelson, New Zealand to look at ways to reduce seabird bycatch in trawl fisheries.

Representatives from Argentina, South Africa, New Zealand, Australia, the United States and the United Kingdom discussed the successes and challenges of current mitigation measures and considered additional ways to address this global issue. The workshop offered skippers and other fishing industry representatives, scientists and government officials the opportunity to discuss what practices have worked over the past year and what haven't, along with where we go from here.

The trawl workshop was sponsored by WWF-US, Ministry of Fisheries, Deepwater Group Limited, Clement and Associates, the Seafood Industry Council, and the Department of Conservation.

Moral and business imperatives of avoiding seabird interactions, with a focus on New Zealand trawl fisheries

Richard Wells, Deepwater Group Ltd, Clement and Associates Ltd

The first issue in the New Zealand trawl fishery was making people aware that there was a problem. After that it has become a way of identifying how we manage the issue:

-We can manage people not seabirds.
-It will require behavioural and engineering solutions.
-It's an operational management problem, not a biological or scientific one.

As with any operational management issue, on behalf of the trawl fisheries, Deepwater Group Ltd (DWG) has undertaken the following approach:

1) Recognise the issue: This issue received heightened awareness both within the fleet and in public through political awareness and legislative action.

2) Understand the issue: Operators and vessel crews were not aware that there was a seabird bycatch issue within the fishery. This awareness had to come through one-on-one conversations, using information available from autopsy data and other sources, and finally getting people to look off the back of the vessel and see what was happening.

3) Inform stakeholders: DWG worked with leaders first, then operators and finally vessel crews so that everyone was aware of the issue and understood how it impacted them.

4) Develop a plan: Decided what to do, when, who and how much time and resources would be committed to it.

5) Document: Defined the action plan, developed a timeline and set-up Vessel Management Plans (VMPs) (John Cleal discusses VMPs in more depth in his presentation later in the workshop).

6) Implement: Communication has played an important role in implementation and DWG lived by the creed of just getting on with the task at hand. Our philosophy has been "lead, follow, or get out of the way".

7) Communicate: First we had to ensure everyone had the same information at the same time and then we made sure to follow-up and work with those who have specific problems.

8) Reporting: We looked at reporting as an entire fleet with every vessel responsible for keeping us apprised. In the beginning a lot of follow-up was necessary but by the middle of the season we had reporting compliance. We compiled the reports into useful information and got that back out to the operators and managers so that everyone knew what was happening within the fleet all season. This turned out to be a really effective approach because it helped people learn from other people's successes and mistakes, it made some people feel more accountable and stakeholders got the information immediately so they could make changes.

9) Manage: We used information to solve issues in real time. The role of managing is much greater than just administering, it means ensuring there are no surprises over the course of the season and it offers real fixes.

10) Measure: This has been a frustrating issue this past year. When the question is asked are we on the right track? We can't give a definitive answer. Government information processes are too

slow, too onerous and too expensive and are focussed on process as opposed to outcomes. From an industry perspective we need feedback to get continued support from stakeholders.

11) Review: For the 2006/2007 season we've changed the VMPs based on issues that arose last year, we've documented areas where we're making changes or improvements, and we're continuing to meet and communicate with leaders, operators and vessel crews to ensure the programme continues to be effective.

What made the process hard? It's a politicised issue and we were introducing change during a legislative fix. Last season we had very little time to respond and because of the issue around measuring success it's a cryptic problem.

What made it easy? Support from industry, in the form of both funding and empowerment, along with solid information from Chris Robertson and others. The attention and commitment of operators and vessel crews—it's something they want to fix.

What's next? We're going to build on successes by continuing to reduce big bird captures on warps, refining our reporting methods, and improving our VMPs. It's also critical that we sort how we measure our success in real time.

The next phase will include improved offal management, working to reduce the number of small birds caught in nets, and push seabird bycatch reduction to all deepwater trawl fisheries.

Some of the ways we'll know we've succeeded is when there are no more government levies (esp. biological studies), there's no more negative media attention, no more meetings on this topic, and a revocation of netsonde cable regulations.

Reduction in seabird mortalities in the Falkland/Malvinas trawl fishery

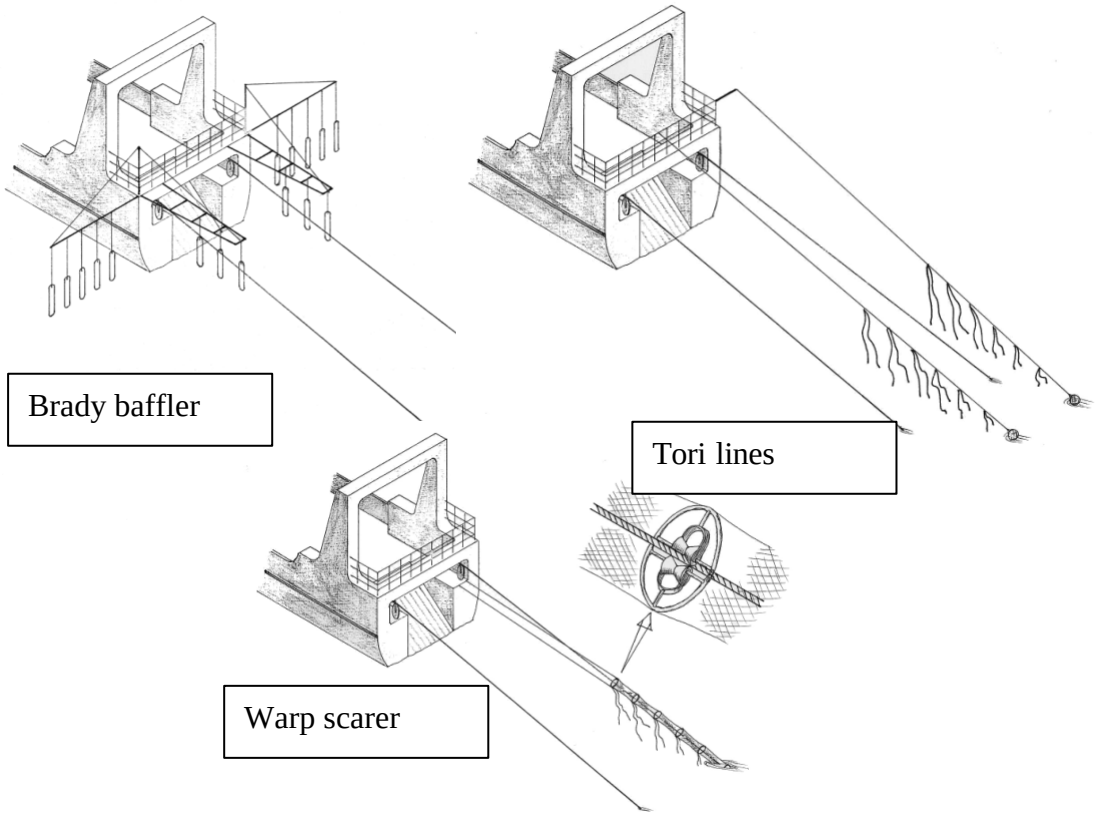
Ben Sullivan, Falklands Conservation/BirdLife Seabirds-at-Sea Team

The Falkland Island finfish fleet is comprised of 12 to 16 Spanish vessels that fish year round and primarily target kingclip, hake and blue whiting.

During the 2002/2003 fishing season 1500 birds were killed and of these about 1400 were black-browed albatrosses (157 days of observer coverage to make this estimation). The average mortality rate was 0.48/vessel/day with a peak of 6.71/day and a maximum of 28 black-browed albatross in one day and 18 in a single haul (Sullivan *et al.* 2006*a*).

The team identified two primary mitigation options: bird scarers and discharge management. In 2.5 years of at-sea data collection by specifically tasked seabird observers no mortality was recorded when offal discharge wasn't present. Discharge elimination is not necessarily the way to go. There are a wide range of discharge management options as outlined in Munro 2005. A desk-top study was commissioned to investigate various discharge management options in the Falkland Island finfish fleet (e.g. maceration, storage, Munro 2005).

This presentation focussed on the bird scarers. Experimental trials were conducted over three months to identify the relative efficacy of three emerging mitigation measures: tori lines, warp scarers, the Brady bafflers, and a control. Trials were conducted in the 2003 austral spring when there is a peak in mortality with black-browed albatrosses returning, rough seas, and increased discharge all combining to increase fish catches, and associated seabird mortality.



Based on the treatment (number of trawls ranged between 17 and 22 for each treatment) the number of confirmed mortalities for the control group was 14, for the baffler is was 3, for the warp scarer it was 1, and for tori lines it was 0.

Given the relatively low number of mortalities recorded for each treatment during the short experimental period, data analysis was based on a combination of confirmed mortalities and contacts between seabirds and the warp cable. This relationship was based on a previously established significant correlation between heavy contact rates and the level of mortality (Sullivan *et al.* 2006*a*). Total contact rates per hour of observation were significantly lower for tori lines and the warp scarer than it was for the control. The hourly rate of heavy contacts for the control was over 16, for the baffler just under 10, for the warp scarer under one and the tori lines nearly nil.

There was a clear hierarchy in performance with tori lines and warp scarer performing significantly better than the baffler. Tori lines represented a significant improvement on all mitigation methods trialled (see Sullivan *et al.* 2006*b*).

The Falkland Island National Plan of Action called for the mandatory deployment of tori lines under FIFD licensing conditions from August 2004 for all finfish trawlers in Falkland Island waters.

Pre-tori lines
2002/03 – estimated 1,500 birds killed at 0.47 birds/day

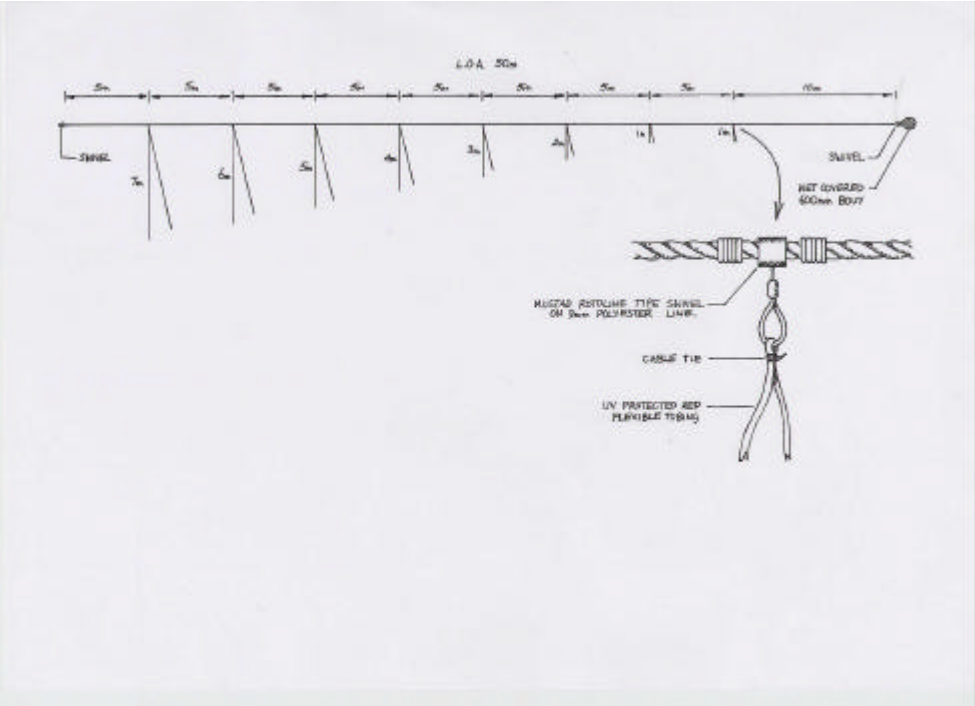
Post tori lines
2004/05 - 89% reduction, estimated 169 at 0.07 birds/day

Tori Line Specifications:

-Twin 50 m long mainlines of 8-10mm polyprop rope
-8 double streamers at 5m spacing-10m space before the buoy
-600mm buoy, covered in netting
-Lines attached at fantail height, 2m outboard
-Lines deployed once net fully deployed
-Lines retrieved once hauling commences

During the question and answer period Ben noted that three birds had been killed on impact with the tori lines in the first year of their adoption, although given that dramatic reduction in estimated mortality across the fleet the overall benefit of the tori lines greatly outweighed these strikes.

He also noted that even in heavy winds the tori lines reduced bird interactions – even if not directly placed over the warp.



Conclusions from the trials:

-Trials highlight the need and utility of experimental mitigation research.

-Trials in other countries can be informed by the results of the Falklands trials (and other findings), but need specific information for fisheries and regions.

-Tori lines designed specifically for vessel types are an effective interim mitigation measure.

-Offal discharge management is the long-term solution.

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Warp-strike mitigation trials in the New Zealand squid trawl fishery

Ed Abraham, Dragonfly

In the NZ squid trawl fishery, nearly 40 per cent of the bird mortalities are due to birds being hit by the trawl warps. A trial in the 2006 squid trawl fishery compared the ability of three mitigation devices (warp scarers, Tori lines and bird bafflers) to keep birds away from the warps.

Observers counted collisions between birds and the warps over 15-minute intervals. They were able to achieve over 600 hours of observations (2570 good observation periods). They noted heavy contacts on both the mitigation devices and the warp cable. The trial covered 18 vessels with 17 different observers. Tori lines and warp scarers were used on all vessels. The least well tested device was the bird baffler, which was only used on seven vessels.

Warp strikes for large birds (albatrosses, mollymawks or giant petrels) were only seen during 15 per cent of the observations. At times, however, there were large numbers of strikes and the overall warp strike rate, when no mitigation was used, was 3.6 birds per hour.

Although quantifying amounts and types of discharge is difficult, these trials showed a clear link between large bird strikes and offal discharge. Average strike rate across the whole experiment ranged from close to zero when there was no discharge, to over 5 strikes per hour when offal was being discarded continuously.

For large birds, the Tori lines reduced warp strikes by a factor of 10. The bird bafflers and warp scarers were less effective, reducing strikes by around half the number seen when no mitigation was used. In this study, strikes were often noted on the Tori lines themselves. When these strikes were added to the count, the total number of strikes when a vessel was using Tori lines was similar to having no mitigation measures at all.

Strikes for other smaller birds were similar to what was found for large birds. Overall, the mitigation measures proved less successful at reducing small bird strikes.

During the trials there were 53 dead or injured birds reported to have been caught in the warps (35 of these were from a single trip). During the same trawls, 65 dead or injured birds were caught in the nets. No birds were recovered from any of the mitigation devices. There were also 14 other dead or injured birds that the observer was unable to identify where they were caught. Across the whole trial, only one bird was caught on the warps when offal was not present.

The experiment raises the question of whether the strikes with the Tori lines can injure or kill the birds? Comments made by observers show that these strikes can be dangerous, but it is not clear how a strike on a Tori line compares with a strike on a trawl warp. The warp scarers were difficult to use, and to prevent them from tangling they often had to be deployed so that they didn't reach the water. More work is needed to improve their design.

Practicalities of offal management and use of mitigation devices – experiences from the New Zealand squid fishery

John Cleal, Deepwater Group Ltd, Clement and Associates Ltd

John walked us through the actual vessel management plan (VMP) of the *Aleksey Slobodchikov*, a Ukraine BATM class freezer trawler.

The VMP clarifies who will manage the company's requirements, who is responsible for checking mitigation equipment in on board and functioning, how offal discards are controlled, who is educating the crew, and what auditing systems are onboard, along with how corrective action will be taken if required. The person responsible for the vessel management plan also needs to know current government requirements and explore alternative mitigation measures. Another person, in this case the Captain, is responsible for ensuring vessel and crew compliance, documenting required information, and ensuring crew awareness is maintained.

Another aspect of the VMP is showing the type of mitigation methods that will be used, where they are located, and relevant details about the methods. For example on this vessel tori lines, warp deflectors, an overboard skirt, and an acoustic device were used. A general management plan of how the mitigation methods will be used is also included—everything from ensuring that the vessel deploys mandatory mitigating devices and when other devices might be deployed to ensuring that all appropriate personnel are adequately trained to use the devices.

The VMP also covers offal/discard control methods. This part of the plan is fairly detailed and discusses not only the factory, but also other relevant areas on the vessel where offal discharge might pose a problem. This part of the plan also has a general management discussion on how the vessel plans to operate while at sea.

An important part of the VMP is the contingency plan. The contingency plan covers everything from extraordinary events to an equipment breakdown. Reporting requirement for these contingency plans is also included in this section.

The Deepwater Group Ltd developed a VMP rating system for every vessel. The VMP rates the vessel effectiveness to mitigate the risk of seabird capture. Vessel class, offal control methods and warp mitigation devices used are all included in the rating system.

The Seabird Liaison Officer does a pre-sailing audit with each vessel. From there the vessels are required to give a weekly reporting that includes information on warp strikes, net captures, week and season totals., days at sea and the strike rate.

Showing the need to work on a one-by-one basis, even with the crew's commitment and the number of mitigation methods in place, the *A. Slobodchikov* initially had a higher than average seabird strike rate. Because the VMP is a living document and reporting occurs weekly the crew and captain were able to make critical adjustments, which in the case of the *A. Slobodchikov* meant reducing the amount of accidental offal spillage to the factory floor and increasing the use of the warp deflectors. This nimble and real-time planning resulted in a significant reduction in seabird bycatch for the rest of the season on this vessel.

The final part of the VMP process includes a season review that notes and evaluates mitigation and offal control methods used and corrective actions taken.

Seabirds in trawl nets: the next challenge
workshop discussion

Ben Sullivan, Birdlife International introduced the session by describing several emerging measures trialled in the South Georgia trawl fishery to reduce seabird deaths in nets. These included:

1) Net binding – tying organic binding around the net at points along its length to keep the net together until it sinks. The binding breaks once tension comes onto the net. This brought mortality down 60-70 per cent during shooting of the net.
2) Changing net structure to reduce size of net mesh for white-chinned petrel 120-200mm and for black-browed albatross 200-800mm.
3) Reducing surface time during shooting (add weights) and hauling (increase winch power).

Break out discussions

The break out groups brainstormed ideas, and were encouraged to suggest anything, including seemingly crazy ideas, because they may spawn other ideas.

Summary of outcomes from groups

Seabird Behaviours

Sooty shearwaters are not interested in the offal stream, but will wait for the net to come to the surface so are very vulnerable to net captures. In contrast, white chinned petrels seem to stay with the vessel and feed on small sump pump discards. Albatrosses tend to sit on the net and are vulnerable to getting their feet trapped in the mesh.

Seabirds are tuned in to the sound of the winches and congregate behind the vessel

Ideas

Mesh
- -Changing the mesh size is complicated, not an easy solution
- -Square mesh instead of diamond shape would not open and close to the same extent (causing seabirds to become trapped)
- -Use chafing gear (usually on the bottom of nets to protect it from wear) on top of cod-end
- -Colour of netting – does colour have an effect?

Binding
- -Binding mid-water nets (also help fur seals and sea lions)

Net rollers
- -Use vessels with net roller to speed up (and even out) the hauling process

Turns
- -On haul, use slight turn to close net mouth
- -20 degree turn (hauling and shooting)

Offal
- -Hold all offal during shooting and hauling
- -Strategic dumping – provides an alternative attractant

Weighting Net
- -Incorporate weights into bottom bridal
- -Weighting at cod-end and headline

Communications
- -Effective communications between vessel crew to ensure smooth shooting and hauling

Acoustics

-Acoustics at time of shoot/haul (directed) – birds do habituate so only use at critical times

-Acoustic devices on net to stop birds diving into the net or sitting on it

Housekeeping/rating system for vessels

-Incorporate a rating system for different net capture reduction measures – ensure points weighted appropriately – most critical bycatch measures awarded > / < score.

-Housekeeping – deck, nets etc.

-Remove stickers (fish stuck in mesh)

Other

-Bottom trawl nets sink fast

-Water cannons

-Reduce lighting on the water (use night vision goggles)

-Tori line "Kontiki" – with motor

-Fish oil sprayed on surface during shoot/haul

-Glad wrap/shade cloth towed on water above where net will surface

Seabirds and Trawl Fisheries: Expectations, Opportunities, and Collaboration

Tom Chatterton, Ministry of Fisheries, New Zealand

Tom's presentation focussed on what has happened in the New Zealand trawl fisheries in terms of bycatch over the past few years, along with what the Government wants to see happening in the fishery. He also emphasised the importance of being able to measure success.

In the last 30 months:

-National Plan of Action (NPOA) approved (April 2004). Under the National Plan of Action fisheries are required to develop Codes of Practice (COP) to address seabird bycatch. The hoki and squid fisheries were included in the first group requiring a COP because of their known interaction with seabirds. As part of the COP, key performance indicators were required to be in place for the fishery to attain and report back on. The NPOA encourages voluntary action first and implementing regulations only when objectives are not being met. The Ministry also began to look at a more collaborative approach to bycatch reduction.

-COP were prepared for squid, hoki, joint venture tuna, ling (2004-2005).

-The "squid incident" of March 2005 occurred when unacceptable numbers of seabirds were caught in the squid fishery. The Minister of Fisheries called part of New Zealand's squid fishing fleet back to port to prevent seabird deaths. His action was meant to address an apparent lack of commitment by the industry to voluntarily implement COP to protect seabirds. At that time, the Minister also directed the Ministry of Fisheries to place observers on all vessels known to be not following industry best practice and announced plans to introduce regulations. Impacts and outcomes from this incident included recognition that bycatch is not just a squid issue but a deep-water fleet issue, there needs to be mechanisms in place to take urgent action when needed, mandatory mitigation measures were put in place and offal became recognised as a key issue to be addressed.

-Measures to reduce bycatch implemented October 2005 – January 2006. Initially the Minister of Fisheries introduced a mandatory requirement to use tori lines to manage seabird bycatch in middle depth trawl fisheries. The measures were put in place through a Gazette notice, to act as an interim measure. But to develop a long-term solution, the Ministry recognised the importance of getting the mitigation specifications right and working in a collaborative effort to accomplish this. The Ministry joined with industry, DOC and WWF-NZ to undertake mitigation trials that tested tori lines, warp scarers and bafflers (preliminary results can be found in Ed Abraham's presentation summary).

-Offal management initiatives were developed, i.e. trials undertaken to learn whether or not mincing discharge reduces seabird activity around trawlers (refer to Johanna Pierre's presentation summary).

Through the research and work done over the past 30 months it's become clear that there is a need for clear objectives and timelines, to work collaboratively to solve the problem, and to encourage innovation and industry solutions and only regulate when necessary. Also it is clear that offal management is a key part of the long-term solution and that measuring success is as important as achieving success.

A look at seabird bycatch in recent years

Suze Baird, NIWA

Much of the longline and trawl fishing around New Zealand is in the same continental shelf waters that albatrosses and petrels use as their main foraging areas from their breeding colonies on the mainland and our offshore islands. The breeding seasons of the seabirds overlap with the main fishery seasons; for example, albatross species that breed on sub-Antarctic islands over summer when major trawl fisheries for hoki and squid and tuna longline fisheries occur.

This overlap of distribution results in the capture of albatrosses and petrels in nets and on warps during trawl fishing and on hooks during bottom and surface longlining. Many species are caught by all methods.

NIWA collates the Ministry of Fisheries observer data, including the number of tows or hooks and seabird counts, with the seabird autopsy results and the commercial fishing data to summarise the seabird and fishery interactions by target fishery and method, area, and season. Seabird captures vary in number and rate each year (dependent on observer coverage, target fishery, and vessel) and captures represent an unknown proportion of birds caught because some may fall off the warp or hook before the gear is hauled on deck.

Comments made by observers describe some of the possible reasons for some captures. Some examples from trawl fisheries include: stickers in the net, sprags on warps, slow hauling (large captures of petrels when the net is close to the surface), turns with the net at the surface, and how albatrosses are the most competitive and some species are more dominant when feeding at the stern of the vessel.

In 2003–04 and 2004–05, NIWA compared the frequency of captures in observed trawl fisheries. Seabirds were more likely to be caught during squid target fishing, with seabirds reported from 9–11% of observed squid tows compared with 1–2% of observed hoki tows. Fewer seabirds were reported from observed tows in deepwater fisheries for oreos and orange roughy — less than1% of these observed tows caught seabirds.

More seabirds are caught when fishing activity is close to the breeding locations and the fishing and breeding seasons overlap, as occurs during summer squid trawling off the Stewart-Snares shelf and Auckland Islands Shelf. Many more seabirds are caught in this fishery than the winter fishery for hoki off the South Island west coast. Not all vessels catch seabirds, and vessels in a fishery can vary from one year to the next in their seabird catch rates.

In the last five years in New Zealand's EEZ, 1476 seabirds were returned by observers for autopsy and confirmation of the species identification: 10 species of albatross (54% of returns) and 15 species of petrels and shearwaters. Some fisheries catch more species than others; for example, the 368 birds returned from hoki fisheries in the last five years represented 16 species compared with 10 species from the 992 birds from squid fisheries.

Two species make up over 70% of all the returned seabirds from trawlers in the last five years: white-capped albatross (44%) and sooty shearwater (32%). The rest were white-chinned petrel (10%), Salvin's albatross (5%), Buller's albatross (3%), and all other species (6%).

Seabird Interactions & Mitigation in the deep-water Hake Trawl Fishery: South Africa

Barry Watkins, Birdlife International & WWF Responsible Fisheries Programme

Barry showed the trawling areas and trawling intensity found within the South African EEZ.

Data collected 2004-05 suggests that a total of 18,000 birds are killed each year in the trawl fishery. Research indicates that 85% are killed on warps and 15% are entangled in nets.

In South Africa three large bird species are most impacted – shy albatrosses, black-browed albatrosses and Cape gannets. Observers estimated the maximum numbers of all seabird species attending vessels in relation to fishing activity, recording the number of birds in a 0-50m and 50-200 m semi-circle extending from the stern of the vessel. Mortalities were greater in winter, when more birds attended fishing vessels, and most occurred during dumping of fishery wastes. Numbers for both black-browed albatrosses and Cape gannets significantly increase in the winter and are highest with dumping. Shy albatross are similar in both winter and summer.

Of birds killed in the fishery 39% are shy/white-capped albatrosses and 29% are black-browed albatrosses. Another 14% are Cape gannets and 9% are petrels and shearwaters. All seabird interactions with one warp (side of vessel where the majority of offal was discharged) were recorded in 5-minute observation periods and included numbers of birds touching or colliding with the warp and being dragged under by the warp.

Based on these observations the following numbers were extrapolated:
0.56 birds killed/hr offal release/winter
0.21 birds killed/hr offal release/summer
0.09 birds killed/hr no offal release/winter
0.00 birds killed/hr no offal release/summer

Average mortality rates through net entanglement: 302 birds per 100 trawls. In South Africa there are 79 vessels operating within the EEZ equalling about 60,000 trawls per year.

Barry gave an overview of shy albatross and black-browed albatross ecology and distribution.

-Shy albatross are widespread on the continental shelf, with an estimated 110,000 birds in winter and 60,000 in summer. Of this off West Cape 85-90% of these are juveniles and immature birds in the summer and 60-70% juveniles and immature birds in the winter. There is a correlation between local abundance and trawler activity, with autopsy results suggesting that 40% of shy albatross diet consists of trawler bycatch and offal.

-Black-browed albatross are found throughout the continental shelf and to south Angola and south Mozambique. The continental shelf population is put at 170,000 in the winter and drops to 45,000 in the summer. In the summer 90-95% of the species in the area are juveniles and immature birds. That percentage drops to 40-60% juveniles and immature birds in the winter. Most of the black-browed albatross come from South George with a few coming from Falklands/Malvinas and Kerguelen. Adults are mostly present between May and September with juveniles arriving mid-May. It's believed the juveniles are probably residents for the first three to four years. Diet breakdown includes 80% fishery discards, 10% hunted prey and 10% squid.

Part of what Barry and his team do to reduce bycatch is to meet with fishermen to discuss the issue. They start with a skipper questionnaire that includes questions like "Do you think the vessel is killing birds by entanglement with the warp?" and "What is your opinion of *tori* lines?"

The questionnaire not only opens up dialogue it allows for Barry and his team to clear up a number of misconceptions. His presentation then describes how seabirds are most likely to get into trouble in the warp area and what steps can be taken to reduce seabird interactions.

Longliners may be more effective by adding weights to the line, but trawlers must become less attractive to seabirds, i.e. *tori* lines, warp scarers, Brady baffler, water jets, and audio means. In his presentation to fishermen he graphically illustrated the use of a number of these mitigation measures and discussed the findings of a study conducted in the Falkland Islands/Malvinas in 2003 (please see summary of Ben Sullivan's presentation for results of this study). The study compared mitigation measures (baffler, warp scarer and *tori* line) with *tori* lines showing a significant reduction in seabird bycatch. Mitigation trials are under way to test the efficacy of *tori* lines and early data suggests that *tori* lines could reduce mortality by as much as 80%.

In South Africa, since 1 July 2006, inshore trawlers operating in the "offshore area" i.e. offshore of the 110m isobath, must fly two *tori* lines conforming to permit specifications: one from each side of the stern such that the *tori* lines are deployed on the outside of both warps. Vessels operating in waters shallower than the 110m isobath or within 20 nautical miles of the coast are not required to fly *tori* lines. Permit conditions include splices trimmed and whipped, *tori* line deployed outside both warps at maximum practical height, *tori* lines of 30-50m with tension device 10m behind warp/water interface, and at least six pairs of streamers (garden hose) at 2.5m apart and 5m from attachment. *Tori* lines are to be deployed on all trawls and no offal discard to take place during shooting away. Vessels not complying with permit conditions may be fined up to a maximum of R2500.

To assist fishermen and ensure compliance, *tori* lines could be ordered at a subsidised rate.

Mitigation of Seabird Interactions in the Pollock CP Fleet

Ed Melvin, Washington State Sea Grant Program

The Alaska trawl fishery consists of a fleet of over 200 vessels targeting multiple species. Law requires that all discharge from processors (with a few exceptions) must be minced. According to estimates derived from fishery observer data, seabird mortality averaged 1057 birds per year from 2002 to 2004. Northern fulmars and short-tailed shearwaters were caught most often. Takes of albatrosses averaged 62 per year. The short-tailed albatross, listed as endangered under the US Endangered Species Act, drives seabird conservation concerns in Alaska fisheries. The bycatch of two short-tails in five years could mean a disruption or closure of this US$500 million trawl industry. To date there are no known takes of short-tails in Alaska trawl fisheries. The Bering Sea pollock factory trawl fleet is a subset of the Alaska trawl fleet and consists of 19 vessels, 14 of which have meal plants on board. Their primary products are fillets and surimi. This component of the fleet decided to take a proactive approach to seabird conservation to be involved in research and development of mitigation to seabird cable strikes.

In 2004, a pilot study identified streamer lines, snatch block and warp booms as potentially effective mitigation measures. During the pilot study deterrents affixed to cables, such as streamer sleeves and buoys, were quickly proven to be unsafe and impractical. The warp boom deterrent, which supported lines that extended to the water, reduced seabird warp strikes by creating a barrier between the offal discharge and the warp cables. Paired streamer lines also worked as a deterrent by precluding birds from the wake area out to 80 m. The snatch block lowered the third wire to the water's surface at the stern thus minimizing the aerial extent of the wire to inside the warps, where there was less risk of seabird interaction. With results from the pilot study in hand, full scale trials contrasting seabird interaction rates without mitigation to interaction rates when paired streamer lines, snatch block and warp booms were used began in 2005. Preliminary results were presented at the workshop. The research was staged on two catcher processors – one with and one without a meal plant in order to bracket the vessels in their fleet.

Without mitigation, on average there was more than twice the number of seabirds around the vessel without a meal plant (over 1,000) than the meal plant vessels (about 400 birds). Most birds were northern fulmars. However, the rates of heavy seabird strikes with the third wire and warps were greater with the meal plant vessel than the non-meal plant vessel. The aerial extent or distance astern of the cables proved more important in terms of bird interactions than the number of birds attending fishing operations. In general, interactions were quite variable, and this variability was attributed to increased interactions during turns, which can reposition the cables to the outside of the discharge plume where seabirds are most dense. The relationship between cable strikes and mortality, especially for small winged birds typical of this fishery, emerged as a major question.

The mitigation techniques tested were effective at reducing cable strikes, but this too varied by vessel. Paired streamer lines, with a 60 m aerial extent, reduced heavy strikes with the third wire by 99% on both vessels, while the snatch block reduced heavy strikes by 78% to 96%. The warp boom was less effective at reducing warp strikes (43% to 47%) than were paired streamer lines (94% to 99%). The researchers concluded that both paired streamer lines and lowering the third wire with a snatch block successfully reduced seabird strikes with the third wire. Streamer lines were most effective at reducing both third wire strikes and warp strikes on both vessels. Cable distance astern and placement relative to the discharge, and vessel turns were shown to be determinants of seabird interaction rates with and without mitigation.

During these trials there were 21 confirmed bird mortalities. Of these, most (17) were in the net, two were on the third wire, one was in the boom array and one was a vessel collision. Twelve were caught when no mitigation was used.

For now, research and adoption of mitigation measures in this fishery are on hold. Although specific mitigation techniques to reduce seabird cable strikes were successfully identified, several findings in the course of this research question the need for seabird mitigation in this fishery. Albatrosses were exceedingly rare, most documented mortalities were associated with the net entanglements, and the extent to which warp strikes constitute a mortality threat to highly abundant, small-winged birds typical of this fishery is being seriously questioned. The trade offs between potential positive effects of offal discharge and the potential negative effects of bycatch to Alaska seabird populations are poorly understood. Collectively these issues suggest that the management goals with respect to seabird conservation in this specific component of the Alaska trawl fleet merit re-evaluation. A risk assessment of the entire Alaska trawl fleet would allow managers to identify potential "worst case" situations in this highly diverse fleet and focus mitigation research where it is clearly needed.

Out of bite, out of mind? Does mincing discharge reduce seabird activity around trawlers?

Johanna Pierre, Marine Conservation Unit, Department of Conservation

The project reported on here has been done jointly with the following people and organisations, in addition to the presenter:

Edward Abraham (Dragonfly)
John Cleal (Deepwater Group)
David Middleton (SeaFIC)
Caren Schröder (WWF)
Nathan Walker (WWF)
Susan Waugh (MFish)
Fisheries observer (MFish/DOC)
Sealord

Introduction

- Seabirds have long fed on the waste from fishing operations, and that includes both offal (processing waste), and discards (e.g. whole fish)
- Seabirds can compete aggressively when feeding around vessels, sometimes to the extent that they become effectively oblivious to their surroundings and focus only on the food available
- When this happens, birds can come into contact with fishing gear, e.g. trawl warps and also trawl nets
- Unfortunately, when seabirds interact with trawl gear, they can be injured or killed
- Seabird necropsy programmes conducted by DOC have shown that a significant proportion of seabirds returned from trawl fisheries as bycatch have consumed fisheries waste. (e.g. in the fishing year 2002-03, 53-68% of returned birds, and in 2004/05, 60% of returned albatrosses and giant petrels and 34% of shearwaters and smaller petrels)[1]
- In addition, the average number of seabirds recovered from trawl warps has been found to be > 10 times higher when offal is discharged than when no offal is discharged.[2]

[[1]Robertson *et al.* 2004, 2005; [2]Abraham 2006, (references available on request)]

How to solve the problem?

Many options have been suggested for managing fisheries waste in order to reduce the risk of seabird bycatch. Examples include:

- Holding waste onboard while fishing
- Discharging waste in an unattractive form
- Mealing everything to minimize discharge
- Developing and implementing effective Vessel Management Plans
- Seabird liaison officer
- Fisheries Interactions Taskforce (FIT) workshop (held by DOC in 2005)
- Research discharge management methods

The discharge management trial

This project examines the effects of discharging slurried offal/discards on seabirds.

There are three main aims:
-Sort out slurrying technology with an at-sea trial
-Gather preliminary data while testing the experimental protocol
-Produce outcomes that can be used to develop next steps in offal/discard management programmes

The concept behind mincing is that the size of discharged pieces may be too small for birds to eat, and therefore less attractive to them. If the attraction to the food is removed, interactions between birds and fishing gear may reduce, leading to reductions in seabird injuries and bycatch. However, it is important to note that responses to minced waste will very likely differ between large seabirds and small seabirds.

The project is being conducted on one vessel, with three waste treatments:
-No solid discharge
    -All offal and discards going to the meal plant
-Discharge of offal and discards
    -Unprocessed offal discharge directly from filleting machine(s)
-Minced, subsurface discharge
    -Minced offal from filleting machine(s) discharged underwater

Three responses are to be recorded:
-Seabird warp strikes
-Seabird numbers in defined zone to vessel stern
    -Counts by species groups
-Seabird behaviours categorised
    -Three groups of behaviours scan-sampled

Video footage of the trial is also being taken.

Data analysis will be completed by April/May 2007, with the possibility of preliminary findings being reported earlier.

DRAFT

Seabird bycatch and mitigation in South America with focus on trawl fisheries

Marco Favero, Universidad Nacional de Mar del Plata, Argentina

The South American Shelf is a very important area for a large number of top predator species. It covers 1.5 million square kilometres where sub-Antarctic waters and frontal systems equal high productivity.

A map showing what albatrosses and petrels use the South American Shelf includes white-chinned petrels, Buller's albatross, Chatham albatross, Salvin's albatross, northern royal albatross, southern royal albatross, Antipodean albatross and southern giant petrel from New Zealand. Waved albatross, Tristan albatross, spectacled petrel, black-browed albatross, wandering albatross and grey-headed albatross are some of the other species that frequent the Shelf.

As of July 2006 there were 11 Parties to ACAP. Five of these are from South America including Argentina (ratified May, 2006), Brazil (not yet ratified), Chile (ratified September, 2005), Ecuador (ratified February 2003) and Peru (ratified May, 2005).

A look at fishing and bycatch per country:

Peru

-The Peruvian artisanal fishery contains 6,250 vessels and 29,000 fishermen and growing. Vulnerable and critically endangered seabird species taken in these fisheries include waved albatross and Chatham albatross (Alfaro-Shigueto & Mangel 2003).
-Between 2,370 - 5,610 albatross annually killed by longliners (based on land-based interviews with fishermen).
-Purse seine nets widely used (as in Chile). Although interactions are registered, seabird mortality numbers are not.

Chile

-Main fishing targets for fisheries interacting with seabirds and marine mammals are the Patagonian toothfish, hake and swordfish.
-About 2000 albatross (mainly black-browed albatross) and more than 500 petrels (mainly white-capped petrels) are killed annually in the longlining fleet.
-There is no data in trawl fisheries, but there are informal reports that there are mortalities in hake fisheries.
-Grey-headed albatross, Chatham albatross, Buller's albatross, Salvin's albatross, wandering albatross, giant petrels, white-chinned petrels, shearwaters and Humboldt penguins are all found in these waters.
-Bycatch rates of 0.030 – 0.047 birds/1000 hooks (Moreno et al. 2006). No mitigation is in use, but both fleets use modified longline gears with additional weights that significantly increase sink rates.

Brazil

-Fishing efforts have increased 10-fold in the last 20 years. Although longliners are recognised as a problem there are other potential sources of mortality (i.e. drift nets, demersal gill net).
-In the mid-water longline there is a higher mortality during winter with 0.09-0.12 birds/1000 hooks, mainly black-browed albatross, yellow-nosed albatross and white-chinned petrel).
Source: Neves & Olmos 1998, Olmos & Neves 2003, Neves *et al*. 2006.

-In the demersal longline the count is 0.3 birds/1000 hooks. Species most greatly impacted include great shearwaters, black-browed albatross, yellow-nosed albatross and white-chinned petrel, spectacled petrel.
-It's estimated that between 4000 and 6000 birds are impacted every year in the fisheries. Mitigation devices include tori lines and dyed bait.

Uruguay

-Longline fishing vessels targeting tuna have seabird mortalities as high as 4.7 birds/1000 hooks (Stagi *et al.* 1998 in Robertson & Gales 1998).
-Some pelagic longline fishing vessels have been observed with seabird bycatch between 014-3.06 birds/1000 hooks.
-0.42 birds/1000 hooks, with black-browed albatross and white-chinned petrels having the highest captures. There is a higher capture associated in the convergence of Malvinas and Brazil currents. (Jimenez 2005, Graduate Thesis)
-There is limited information available on seabird mortalities in different fisheries, but mortalities and interactions have been observed with trawlers and jiggers (S. Gimenez, pers. comm.)

Argentina

-There has been a long-term analysis of the mortality of albatrosses and petrels in longline fisheries operating in the Argentine Continental Shelf (UNMDP, INIDEP, FVSA, AA/BirdLife).
-Capture rates 0.04 birds/1000 hooks with an annual mortality of 2100 to 4200 birds (Favero *et al.* 2003, Gomez Laich *et al.* 2006).
-Species most impacted include black-browed albatross and white-chinned petrel.
-Researchers looked at the effect of environment and operative variables and the number of interactions for both black-browed albatross and white-chinned petrels. Seasons, number of hooks, setting times and wind intensity were all considered when looking at bird captures (Gomez, Laich & Favero).
-Conservationists and scientists are working with the industry to introduce mitigation measures including sink rates, IWL and the Spanish system.

Marco also took time to show a video of an inshore Argentine trawler to illustrate the need for mitigation measures and the variety of species caught. In the film there was also a demonstration of a mitigation technique currently being trialled there.

WWF – International Smart Gear Competition

Michael Osmond, WWF-US

The International Smart Gear Competition has been run twice so far. The next competition is scheduled to begin in February 2007 and close in late July.

The global competition was established to combat the issue of bycatch through improving fishing gear and techniques. Initially the competition was based around reducing cetacean bycatch, but has grown to include other marine life as well, based on the fact that millions of tons of marine life are wasted each year in bycatch. This includes 300,000 small whales, dolphins and porpoises, 250,000 turtles (endangered loggerhead turtles and critically endangered leatherback turtles) and more than 300,000 seabirds.

The competition will offer US$30,000 first prize and two US$10,000 runner-up prizes. The idea behind the competition is to not only encourage people who work in this area, but also reward them for their efforts. With the help of the global network of WWF, the competition seeks to attract ideas from all over the world. In 2005 there were 50 entries from 16 countries. In 2006 that number had jumped to 84 entries from 26 countries, including four entries that came from New Zealand, seven from Australia, two from South Africa and 25 from the US.

Recognized internationally, the competition has a number of partners involved. The competition is judged using an international panel with members of industry, scientists, and researchers. In the last competition there were 19 judges from 11 countries, including Malcolm McNeil of New Zealand.

The 2006 winner, Michael Hermann, US, won for his invention to reduce shark bycatch. The invention includes putting magnets on fishing lines. Early tests indicate the magnets repel the sharks. Runner-up Kristina Zacharias, Faroe Islands, designed the Flexi-Grid that is more effective than rigid grids since there's less clogging and is safer for fishermen to use. And New Zealander Chris Carey was a runner-up for his invention, the "flying bottlebrush". The device attaches to trawl warps to scare birds away. The contraption is made up of things that you typically find on a trawl vessel and it's easy to use.

2006 competition winners were presented their awards at the Brussels Seafood Show, which is the largest seafood show in the world.

The competition is also about this new technology being further researched and developed. For example, the 2005 winner, Steve Beverly, New Caledonia, has had a great deal of interest in his deep-setting loglines technique to reduce turtle bycatch. A brochure was translated and distributed regarding his technique, and the US's National Oceanic & Atmospheric Administration (NOAA) has just completed extensive trials.

Caren Schröder, WWF-NZ, met with Chris Carey before the trawl workshop and recorded some of his thoughts about seabirds, how he came up with the idea for the flying bottlebrush, and what it meant to him to win an international award for his invention. This short presentation is available through WWF-NZ.

Next steps in New Zealand and opportunities for international collaboration workshop discussion

Groups considered different topics and reported back on next steps and how to keep in communication after the workshop.

Group 1 - A closer look at some of the net solutions
This group reconsidered:

-Modification to net mesh – square paned instead of diamond
-Pressure sensory device
-On surface – noise/smoke, remote control
-Binding net – net closed off on shooting – reducing float time on surface
-Sheet device to cover net disguising net and content on surface

The ideas were separated into hauling and shooting and ranked

Shoot – ranked A & B	**Haul – ranked A & B**
A - Remove stickers first (deck cleaning)	A – Gear maintenance, use net roller for quicker haul
A – Bind mid water nets (would need to assess net roller problem)	B – Acoustics (below and above water)
A – No offal discharge	A – No offal discharge
B - Acoustics	B – Strategic discharge when problems

Other - ranked B & C
B - Focus lights on deck/other colours
C - Smoke?
C - Tori line "Kontiki"/door

Next steps
Review the NZ trawl fisheries Code of Practice
Trial net binding
Outline steps that will be taken to educate crew in Vessel Management Plans
Incorporate into the NPOA research and policy
DOC lead trials on high-ranked ideas
Research to find out more about the problem, i.e. percentages of seabird captures on the shoot or haul

How will people be kept informed?
Deepwater Group Ltd (NZ), Southern Seabird Solutions, various working groups

Group 2 - Next steps in New Zealand trawl fishery

What do we need?

-Agree on timeline to solve the problem – 2 years
-Agree on a goal for bycatch reduction – stop paying levy (this indicator will mean the problem is solved)
-Agree input tasks and vessel and reporting standards, consistency, uniformity
-Need to accept reality of fishing

-How to monitor - need common methodology for information gathering, and information sharing
-Development of consistent comparable index – supporting information for public
-Identify current total bycatch as benchmark for improvement
-Observer – ensure there is clarity of purpose – i.e. bycatch estimation, mitigation efficacy trials
-Data collection needs to be designed for purpose
-All processes need to be accelerated
-Focus research on engineering, operations and mechanical research
-Communication – (*Albert Times* network, all parties contribute articles)
-Industry working group – coordination to find industry solutions e.g. similar to Sea lion Exclusion Device Group with governance structure

Barriers to progress

-Slow processes
-Needs more collaborative approach
-Needs more solution focus to engagement
-Funding/resources
-Inconsistent approach to delivery
-To date lack of agreed priorities
-Lack of clarity of key contact people by organisation

By Dec 2007 – Trawl fisheries

-Analysis of barriers by all parties/timelines
-Agree on goals (and inputs and outputs)
-Improve information – consistency and relevancy
-Focus resources on mitigation research – involve the right specialists
-Establish working group to focus on solutions and priority identification
-Communication

Group 3 - Warp strike/offal management

Practical Issues

Turns during fishing because protection from mitigation measures reduced (warps not protected)
Implementation of offal management plans required
Housekeeping on vessels important
Training of crew important
Communication between bridge – factory needs to be good
Communication – language issues with foreign vessels/crews
When fishing at full capacity offal discharge is an issue
Legislative restrictions – tori lines but also need to allow new ideas, additions
Mid-season communications/mitigation optimization needed

Next Steps

Training – sharing international experiences and across all crew (combined PowerPoint of this workshop)
Seafood Industry Training Organisation (SITO) NZ Unit Standards for seabirds may need updating
Introduce communications protocol/strategy in VMP and should be in COP
Set benchmarks/goals and objectives

Get tori lines out on all vessels, and then allow individual vessels to tweak and add other measures where appropriate, etc.
Easy enforcement – fly over, observers, anonymous report

Who Involved
Crew
Government
Observers
Company managers

How Kept Informed
Training (SITO)

Group 4 - International cooperation
Region 1
Chile & Argentina
Largest fleets, Government, Companies, Industry
Synergies between countries in terms of education, communication and cooperation, i.e. 2004 Chilean skipper here, Dave Kellian visited Peru, John Bennett & Graham Robertson working with Argentina
Good NGOs in South America
Longline mitigation well advanced through CCAMLR – e.g. Integrated Weighted Longlines
Trawling is the next challenge
Attitude and behaviour change important
Money is an issue
Educate – raise awareness of problem
Exchange of ideas – Web-based information (SSS?)

Region 2
South Africa
High-seas fisheries need addressing
Workshops – use champions and leaders who have mana/respect