Revised summary of Foveaux Strait ecosystem management workshops

Invercargill, 27 and 28 August 2004.

Two workshops were facilitated by NIWA (Keith Michael and Glen Carbines) to further develop a research proposal to underpin ecosystem management in Foveaux Strait with stakeholder representative from the Southland community. The research aims to provide information on the processes and critical relationships between the impacts of dredging and fisheries production (oysters and blue cod) and the regeneration of benthic habitat, and to develop strategies to mitigate and remedy those effects.

Friday 27 August 2004

Keith welcomed participants and introduced the workshop agenda. Workshop participants (14) introduced themselves and the stakeholder group they represent.

Stakeholder representatives present

Warren Conway	Bluff oyster Management Company
Bill Gold	Commercial oyster skippers
Nigel Scott	TRONT
Hana Morgan	Te Runanga o Awarua
Sumaria Beaton	Te Runanga o Awarua
Jane Kitson	Southland Regional Council
Michael Skerrett	Te Ao Marama Inc
Stewart Bull	Oraka-Aparim Runaka
Peter Topi	Te Runanga o Ruapuke
David Craze III	Non-commercial
Mike Lilly	Commercial blue cod skippers
John Urwin	Urwin & Co
Milton Roderique	Commercial blue cod skippers

Overview

- Welcome and introductions, collectively working towards a new era in the ecosystem management of fisheries
- NIWA presentations provided an initial framework of the research for discussion
- Group discussion of research
- Group review of research questions
- Summary and collective support for programme

Summary

A general overview of historical research in Foveaux Strait on oysters, *Bonamia* and benthic habitat was given by Keith Michael, and for blue cod by Glen Carbines. This included a summary of results and the development of new monitoring tools. An outline of the key research questions and approaches was presented for discussion. It was agreed that future FoRST investigations should be carried out at the scale of the fishery so that results could be directly applied to develop management strategies, in collaboration with the Foveaux Strait oyster and blue cod fishers.

Stakeholder representatives agreed to support the development of a more holistic ecosystem-based approach to managing fisheries for oysters and blue cod in Foveaux Strait and the proposed research to underpin its development. Stakeholder representatives also agreed with the need for a more complete understanding of how the Foveaux Strait system functions, the broad-scale impacts of oyster dredging on (especially benthic) habitat, and the links to oyster and blue cod production, and the need for different fishing strategies based small-scale or "paddock" management. There was also a consensus for structured fishing and the use of good fishery data for management of the oyster and blue cod fisheries and benthic habitat as an ecosystem. The critical factors for success being:

- Cooperation and collaboration between research providers, fisheries and community stakeholders
- Comprehensive quality data acquisition
- Fleet control and structured fishing

Stakeholder representatives discussed the research proposed for Foveaux Strait oysters, Bonamia, benthic habitat and blue cod. Main comments were:

Peter Topi & Dave Craze III
The impact abiotic factors in ecosystem management, specifically the reduced freshwater input to Foveaux Strait from the Waiau River (diverted 1969[1]) was discussed in terms of potential reduced primary production (plankton) and lowered salinity to minimise the impacts of *Bonamia* in Foveaux Strait. A comparison was made with Chesapeake Bay where dammed rivers negatively impacted on oyster production. The possible effect of annual changes in the latitudinal position of the subtropical conversion (usually near Jackson Bay – West Coast) was discussed in terms of historical oyster production and *Bonamia* out breaks. It was suggested that retrospective analysis of historical weather records and *Bonamia* outbreaks be included in the research plan.

Michael Skerrett
The impact of poor primary production (plankton) in Foveaux Strait was then discussed in relation to *Bonamia* outbreaks. It was noted that *Bonamia* outbreaks occurred in corresponding years with starving tiitii (mutton-birds), the El ninó of 1992 was given as an example, but the event coincided with the end of Bonamia mortality. It was agreed that comparisons of proxies for historical primary productivity, such as tiitii condition and the Southern Oscillation Index (El ninó and La nina patterns), could be made with historical oyster mortality and production. The concept of shell enhancement was also discussed and supported. It was also agreed there was little point in closing the oyster fishery at this time.

Bill Gold
Reported on the disappearance of "dogs balls" (nesting mussels) from the Foveaux Strait and raised a discussion on the need for finer scale fishing information; Peter Topi replied there is too much logbook information demanded from busy oyster fishers already. Warren Conway acknowledged the need for streamlining the acquisition of fishery data and that BOMC proposed to adopt a CELR logbook-reporting format, but MFish has held up its implementation. Warren also reported the computerization of fisheries data acquisition is also being considered. Peter Topi points out that the cost of an electronic automated system may be too high for some, but the group generally supported the idea. Milton Roderique added blue cod fishers are prepared to provide fishing information. Mike Lilly and Glen Carbines discussed the practicality of previous

[1] Average annual reduction of 1278.4 million m^3

blue cod log book schemes and agree that such information from the commercial blue cods fleet will be an important part of the research proposed.

Keith Michael compared the volume of data recorded on oyster surveys with the potential volume of data that could be collected from the oyster fleet. Bill Gold suggests that rather than using one boat for five days full time for oyster surveys, it would be better to use the whole fleet part time.

Peter Topi
Suggested that seabed samples should also be taken for chemical analysis - in much the same way farmers test soil in their "paddocks" to test for contaminants.

Michael Skerrett
Population surveys should be done at the beginning of, or early in the oyster season (on oyster boats) - because *Bonamia* can change the oyster population so rapidly. Keith explained the projected mortality from Bonamia would be a key component of any fisheries simulation model.

Sumaria Beaton
Oyster population surveys could be done on several oyster boats with paid observers, and this would also be a good opportunity for young people in Bluff to develop a background in the fishery and to provide future participants to the industry. Logbook data could also be dealt with in a similar way. It was agreed that funding for this option would be investigated, possibly through additional or separate FRST funding.

Hana Morgan
Added her support to the proposed FoRST research plans (including shell return), but warned that it will only be a success if all sectors participate fully. Some discussion on the importance of gaining the cooperation of non-commercial fishers not represented as part of an organisation was also had.

Jane Kitson
Southland Regional Council (SRC) supports the concept of ecosystem management, but is taking more of an observer role. SRC also has no problems with the concept of shell return as part of the fisheries scale research in Foveaux Strait providing it passes through the RMA consent process. It was agreed that fisheries scale shell return needs grater investigation than the pilot study done to date. Warren Conway notes that issues of landing undersized oysters will need to be addressed (there is a $25 000 fine) as part of the trial, and that survivorship studies could be conducted for landed and returned oyster spat.
The group gave general support for the proposed FoRST research collectively.

Copies of the presentation were requested and will be sent to all those who expressed an interest.

Saturday 28 August 2004

Keith welcomed participants and introduced the workshop agenda. Workshop participants (9) introduced themselves and the stakeholder group they represent. The same overview was given as on the previous day.

Stakeholder representatives present

Murray Rhind	South Coast Underwater Club
Brian Dean	Southern Aqualung Divers Club
Peter knight	University of Otago
Nick Hankey	University of Otago
Allen Frazer	Ministry of Fisheries
Peter Moir	South Coast Underwater

Summary

Allen Frazer
Asked if 12% of female oysters brooding larvae is relatively low compared to similar species, Keith Michael confirmed that it is a low proportion, but could be due to dual spawning strategies, i.e., the release of early planktonic larvae or reflect periods of low primary productivity.

Murray Rhind
Asked if there have been exploratory surveys for oyster beds outside of the fishery area, Keith reported there have been surveys outside the current fishery areas, but densities have either been low or oyster patches may be remote populations developed from sporadic settlement of spat and not stable populations. Oyster recruitment processes were discussed in relation to speculation that Foveaux Strait current regimes and hydrological features my produce an eddie system that retains larvae over the main commercial oyster areas in Foveaux Strait.

Discussion moved on to the transmission of Bonamia infection, the possible role of benthic habitat, and sediment movement in Foveaux Strait. Murray reported dive club members observed clumps of oysters buried in the sand from Black Rock to Garden Pt, and that only oysters covered by sand were alive. Keith described observations by Stead that moribund oysters were reported from previously unfished biogenic reefs and that large numbers of oysters were observed on unfished sand and gravel substrates. Murray, Peter, and Brian concurred on observations of moribund or dead oysters on rocks (such as Newtons Rk) that had not been dredged.

Peter Knight
Many oyster fishermen can describe the effect dredging has had on benthic habitat, and he wonders why this information can't be used. Keith suggested that a detailed understanding of processes and critical ecosystem relationships was required to develop strategies to mitigate and remedy the effects of dredging, and to achieve the management goals. Peter Moir emphasised the opinion of non-commercial fishers that dredging in the recreational only area had changed the benthic ecology of the area and that oyster mortality may be an indirect effect of these changes.

Peter Knight suggests that including some community-based goals would strengthen the research. Peter agreed to get back to NIWA with a draft of such a goals.

There was also agreement on running concurrent investigations to investigate the response of oysters and blue together in the FoRST research plan. Non-commercial fishers offered their assistance where possible.

Dredge efficiency was discussed and most are surprised that commercial oyster dredges are only 18% efficient. It was agreed that improvements in dredge efficiency should be included in future research where possible. Keith pointed out that this was an oyster fishery issue, but that the FoRST research programme could test the efficiency and effectiveness of a new dredge design when available.

The concept of shell return was discussed and supported by all present, however many had reservations of how successful the strategy would be in areas of where the sediments were highly mobile. Peter? suggested caging shell in a biodegradable material until the shell was stabilised by benthic fauna. Keith replied that the location of shell reefs would need to take a number of factors into account including the risk of sediment inundation and oyster larval supply for settlement.

Peter Knight
Asked how big the small-scale management areas ("paddocks") will be. Keith points out that this will be determined as part of the fisheries scale experimental approach, but at this stage scale is unknown. Peter Knight noted that many long time oyster fishers he has spoken to feel there is no longer an oyster fishery and it should be closed. Keith responds by pointing out that it is Bonamia driving the oyster population decline and model projections of the impacts of harvesting the TACC of 15 million oysters showed no effect on the projected recovery or decline of the oyster population. To shut down the fishery would have no effect and only create a void of information. Given the information available, if the managers of the fishery choose to continue fishing in a responsible manner, critical information on how the fishery rebuilds could be obtained.

Allen Fraser
Many said the oyster fishery was "stuffed" in 1992 (including Dr John Canfield), but it recovered in the absence of Bonamia mortality. He also stated that dredging effort in 2004 was lower than it was in 1992. The importance of environmental factors was raised again.

Non-commercial fishers were reportedly sceptical about the motivation of the industry, but agree that the effects of fishing need to be determined to develop ecosystem management and the proposed research approach is a good one. They also acknowledged the new direction proposed for managing both blue cod and oyster fisheries was the way forward.

Some discussion was had regarding the effect water temperature on intensifying infection from Bonamia (elevated infection in summer) and Keith pointed out surveys of Bonamia infection were undertaken in January and February. More sampling could be done throughout the year, as Bonamia could be a major factor in small spatial-scale fisheries management. It was also noted that levels of Bonamia are similar both inside and outside the commercial oyster fishery area.

Non-commercial fishers asked if the proposed FoRST research should also focus on the recreational area of Foveaux Strait as Bonamia hit it hard this year. Very little non-commercial take comes from the commercial areas. Non-commercial fishers were also very concerned about the use of large commercial dredges in the recreational area by some charter boats. It was agreed that specifications for a non-commercial dredge needed to be defined in the regulations.

Allen Frazer
Expressed some concerns about the legal issues of structured fishing and the timing of the fisheries scale experiment. The amount of effort in the oyster fishery was also becoming a concern to MFish, but levels were still below those of pre 1993.

The need for better compliance of the commercial oyster fleet in providing quality logbook data was discussed (only 45% at best, 0% at worse). Keith suggest that fleet control and structured fishing would be required to run the FoRST investigations and under this scenario 100% logbook coverage could be achieved. Peter Knight asked if such data collected by BOMC would be available to organisations like the Universities. Allen Frazer responded by stating that any data used in stock assessment would have to be tabled and made public.

The group gave general support for the proposed FoRST research collectively. Copies of the presentation were requested and will be sent to all who attended along with a summary of the workshop discussion.

We would appreciate any comments or on this draft.

Summary of key research questions

How does dredging change benthic habitat and how does it regenerate?
To describe the fish down and regeneration of benthic habitat using structured fishing:

- To investigate physical changes and changes to the species abundance and diversity
- To investigate spatial and temporal variation in regeneration
- To investigate the impact of dredging intensity and frequency on regeneration

At what stage of benthic habitat regeneration is oyster production highest?
To monitor oyster production on regenerating habitat:

- To estimate settlement, survival, and growth of oysters to legal size
- To estimate the prevalence and intensity of infection by B. exitiosa and disease mortality
- To relate production to source oyster densities after dredging
- To monitor blue cod production on regenerating habitat

What are the effects of habitat change on blue cod populations?

- To determine what happens to blue cod after benthic habitat is fished
- To monitor the rebuilding of blue cod populations as the habitat rebuilds

To describe the recruitment and survival of juvenile blue cod, and abundance of large blue cod on regenerating and dredged habitat

Can changes in fishing practice minimise changes to benthic habitat?

- Test new dredges and operational procedures to determine impacts on benthic habitat and their efficiency in catching oysters
- Investigate tow length, tow intensity, tow frequency

Can fisheries data monitor oyster and blue cod production, disease mortality and stages of regeneration of benthic habitat?
To index fishery data:

- To identify bycatch species or clusters of species uniquely indicative of stages of benthic habitat regeneration
- To index recruited and pre-recruit oyster density from catch rates
- To index disease mortality from clock estimates

Can shell return increase oyster and blue cod production and accelerate habitat regeneration?

- To describe the regeneration of benthic fauna on shell reefs and compare to control areas
- To monitor the survival of spat returned on shell
- To estimate recruitment of oysters to shell reefs
- To estimate the recruitment and survival, and immigration of blue cod to shell reefs
- To monitor down stream settlement of benthic fauna

Do shell reefs require brood stock oysters to maximise production (translocation) and can shell reefs establish remote populations?

23 September 2004