fishing lines

The magazine of Victoria's Peak Recreational Fishing Body

WINTER 2014

UNDERSTANDING Fish Habitat

More Habitat = More Fish

Rehabilitating rivers

Tackling climate change

April Vokey

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Fishing Lines
Published by VRFish
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Chair: Russell Conway
Executive Officer: Dallas D'Silva
Operations Manager
& *Fishing Lines* Editor : Simon Kinniburgh

First Floor, 24 York Street
South Melbourne, Vic 3205
Ph: 03 9686 7077
Fax: 03 9682 1066
Email: info@vrfish.com.au
Web: www.vrfish.com.au

Advertising
Ph: 03 9686 7077
Email: info@vrfish.com.au

Graphic design / production by Grant Nelson Design
Original design by Sarah Saridis

Welcome

Welcome to the Winter 2014 edition of VRFish's *Fishing Lines* magazine.

The theme for this issue is "Habitat". The articles presented in this edition highlight a wide range of habitat protection, habitat restoration and habitat conservation projects currently being undertaken across Victoria.

The concept of habitat enhancement has been understood and adopted by concerned recreational fishers across the world and Victorian recreational fishers are embracing the benefits of habitat revitalisation with enthusiasm.

A healthy aquatic habitat leads to healthy fish populations and health fish populations lead to healthy fisheries. However, habitat is not only for fish but also for the myriad of aquatic organisms that are part of a healthy and sustainable ecosystem.

This edition showcases some of the innovative protection and restoration initiatives supported by the Victorian "Recreational Fishing Licence Trust Fund" and the Victorian government's $16 million "Recreational Fishing Initiative Fund" to preserve and protect vital freshwater and saltwater habitat in Victoria.

This investment by recreational fishers and the Victorian government demonstrates a vision for Victoria that will provide a strong basis for exciting recreational fishing opportunities for future generations.

This edition showcases some of the innovative protection and restoration initiatives supported by the Victorian "Recreational Fishing Licence Trust Fund" and the Victorian government's $16 million "Recreational Fishing Initiative Fund" to preserve and protect vital freshwater and saltwater habitat in Victoria.

VRFish has been at the forefront of habitat remediation efforts for many years and we have partnered with local Councils, community groups and government departments to identify high priority areas for conservation, management, or research because they are rare, sensitive, stressed by development or important to ecosystem function. Fish need healthy surroundings to survive and reproduce and habitat is the vital ingredient needed to ensure that fish can successfully live, feed, reproduce and grow to maturity.

VRFish's key long-term strategy for delivering community-wide benefits to Victorian recreational fishers includes the development of habitat remediation policies and practical involvement in developing innovative solutions to habitat degradation.

Many millions of recreational fisher licence funds have been invested across Victoria to construct fish-ways and fish ladders to allow fish to move past man-made barriers in order to spawn. Also, the installation of in-stream habitat structure, re-snagging of rivers and the construction of new artificial reefs at Frankston, Altona and Port Arlington (funded by the government's Recreational Fishing Initiative Fund) will have tremendous long term benefits for both recreational fishers and the greater Victorian community.

The majority of recreational fishers understands the long term benefits of healthy habitat and make exceptional environmental stewards. Productive recreational fisheries are inextricably linked to healthy marine habitats; protecting and restoring them will help support fishing communities now and for generations to come.

The VRFish mission is to increase participation in recreational fishing across Victoria and we are delivering on this outcome by ensuring that investment is targeted towards improving fish habitat, increasing the efficiency and effectiveness of fish stockings and ensuring appropriate access to fishing locations.

VRFish will continue to work to ensure habitat remediation and habitat enhancement is a high priority for Victoria.

Tight Lines

Russell Conway
Chair

Welcome to the 1st edition of *Fishing Lines* for 2014. I have now been in the job for 7 months and it has been a challenging and rewarding period.

In the last 9 months I have put together a plan to restructure our team at VRFish and this has been approved by the Board. The new structure revised my role from Executive Officer to General Manager and broadens the Finance Officer position to also include administration and business support. The biggest change involves creating a new Senior Program and Partnerships Manager (SPPM) position that replaces the Operations Manager role and creation of a Recreational Fisheries Liaison Officer role to increase engagement with grass roots fishers, angling clubs and our culturally diverse community. The structure will be progressively implemented subject to available funds.

We are currently in the process of recruiting for the SPPM role. Simon Kinniburgh has decided to leave VRFish after more than 2 years with us. Simon will be pursuing other interests aligned with his sports and recreational background. I would like to take this opportunity to thank Simon for his contribution to the organisation and wish him well for the future.

I would like to take this chance to remind our readers about 'what makes VRFish tick' and the democratic and transparent process used by VRFish in developing policy on complex fisheries issues, whether it be trout stocking in our rivers or commercial netting in Victorian bays and inlets.

We are accountable to our members through the State Council, which meets 4 times per year and is comprised of more than 50 delegates from angling and diving clubs across Victoria. The fishing clubs and associations comprise more than 40,000 recreational fishers. VRFish has members from outside the well established clubs and associations and we include grass roots fishers that are not members of clubs. Our members also have experience in the tackle and retail industries.

Our membership base is ever evolving and includes fishers from diverse cultural backgrounds. On this note, we are thrilled to have a new unaffiliated member in Quy Van. Quy is a Deakin University fisheries science graduate and Fishcare volunteer. Check out the member profile of Quy in this edition. VRFish is made up of fishers from Victorian offshore, coastal, inshore, estuarine, inland and highland fisheries. We have more than 1000 years of fishing knowledge at our finger tips and this intellectual property is invaluable. Our members are both metropolitan and regional based, while our Board is determined annually by an election process and meets 6 times per year.

We are committed to an equitable system where our limited resources are spent on important programs across the above fisheries. We endorse concerns that commercial netting in popular recreational areas can adversely impact the quality of recreational fishing experiences. Our current policy on commercial netting is that we do not support it, unless it is sustainable and responsible. This was developed through an inclusive process at a Regional State Council meeting at Torquay in March 2013. VRFish is mindful of maintaining our fish stocking, habitat improvement, enforcement/ education, infrastructure and access programs now and into the future. These are well established priorities identified by recreational fishers.

How we share our fisheries resources with other users is a sensitive and challenging issue. We agree with the concerns from recreational fishers that the balance is not right (eg - abalone regulations that unfairly restrict legitimate access). This needs constant attention by VRFish to ensure Victoria is recognised as a premier fishing destination. We have been instrumental in securing an agreement in East Gippsland that will help minimise the impact of commercial fishing on recreational beach fishers. The licence holder who operates the F.V.Maasbanker acknowledges that transiting close to shore can 'spook' schools of salmon and has agreed to transit at least one mile from the shore to minimise this risk. We have also achieved some success by working with commercial fishers in Port Phillip Bay to voluntarily restrict seine netting in the inner harbor over Easter. These are all positive outcomes that are the result of hard work and at times difficult negotiations with other user groups.

The major theme of this edition is fish habitat. This issue ... always rates highly in any survey of where recreational fishers would like to see their licence money invested.

The major theme of this edition is fish habitat. This issue is of utmost importance to recreational fishers and always rates highly in any survey of where recreational fishers would like to see their licence money invested. After all, healthy habitat = healthy fisheries. There is now greater recognition of the importance of fish habitat at a national level thanks to agencies such as the Fisheries Research Development Corporation and the Department at a State level. It is particularly pleasing to see new partnerships being forged between recreational fishers and catchment management authorities.

Finally, we encourage constructive debate and discussion by our members and all recreational fishers on issues in accordance with our code of conduct.

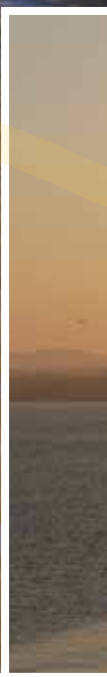
Until our next edition - good fishing....stay safe on or near the water.

Dallas D'Silva
General Manager

UNDERSTANDING Fish Habitat

More Habitat =

by RENAE AYRES
Arthur Rylah Institute



Diverse, healthy fish habitat helps provide fish with everything needed to survive, grow and breed. (Photo: Michael Nicol)

Fish need healthy habitat to survive and thrive. Improving fish habitat helps make more fish and that means better fishing.

What is 'fish habitat'?

Fish habitat is where fish live. It is their home or surrounding environment.

Fish habitat includes water: freshwater, estuarine or saltwater. Water quality, as well as its depth, flow and temperature are all important. Fish habitat encompasses all aquatic environments, such as wetlands, creeks, rivers, estuaries, bays and oceans. Connections between these aquatic environments are essential for healthy fish habitat.

Physical features in the water, such as pools, riffles and reefs, as well as living and non-living structures including fallen trees ('snags'), rocks, mud, sand, coral, reeds, mangroves and seagrass, are all fish habitat. Even plants along the bank and overhanging the water contribute to fish habitat!

More Fish

Why do fish need habitat?

Fish need habitat to survive, grow and breed. Healthy habitat provides fish with everything they need to complete their lifecycle: shelter, food and areas to spawn.

Habitats need to be connected so fish can move freely to access spawning grounds, seasonal feeding areas or escape poor conditions. This is particularly important for fish species that migrate large distances, such as Murray Cod, Mulloway and Australian Grayling.

A variety of habitat is needed as different fish species prefer different habitats. In addition, the habitat required for fish eggs and larvae is usually much different to the habitat needed for adults!

The number and diversity of fish that an area can support is limited by the type and quality of habitat available. By maintaining healthy fish habitats, we can ensure healthy and sustainable fish populations into the future.

Healthy fish habitat supports healthy fisheries and recreational fishing! (Photo: Arthur Rylah Institute)

Threats to fish habitat

Processes and activities that degrade the health of fish habitat threaten our fish populations and our fishing success. Threats to habitat include:

- Damage to instream habitat, e.g. removal of logs, channelisation
- Clearing of native vegetation
- Invasion by weeds and pests
- Erosion and sedimentation
- Altered water flows and temperatures
- Degraded water quality
- Pollution and rubbish
- Loss of connection between habitats
- Constructed barriers that prevent fish passage, e.g. weirs, dams
- Unpermitted estuary entrance openings

How can we improve fish habitat?

- Rehabilitate river banks, manage weeds, replant native vegetation, control erosion
- Restore instream habitats, introduce logs, reinstate pools and riffles, revegetate native aquatic plants
- Maintain or reinstate natural flow regimes,mimic natural flows, introduce tidal flushing
- Manage livestock access,fence waterways, provide off-stream water supplies
- Improve fish passage, construct fishways, remove redundant barriers
- Enhance water quality,manage storm water, clean up litter

Get involved!

- Stay informed: link with the Fish Habitat Network, local angling clubs, VRFish, Fisheries Victoria, the Arthur Rylah Institute or Catchment Management Authorities.
- Support improving habitat: be a voice for fish! Talk to your family, friends, neighbours and even your local member of parliament about how important healthy fish habitat is for fish and fishing.
- Be a Habitat Hero: get your hands dirty for fish! Work alone, with your mates or link with a local club. Let people know what you're doing and why it's important for fish.
- Apply for grants to improve fish habitat e.g. through the Commonwealth and State governments, Catchment Management Authorities or local councils and shires.
- Fish responsibly: adhere to fishing regulations, e.g. closed seasons, bag, gear and size limits, and carefully release all unwanted catches back to the water. Refer to the Victorian Recreational Fishing Guide and VRFish Recreational Fishing Code of Conduct.

For further information please visit the Fish Habitat Network at www.fishhabitatnetwork.com.au or contact Victorian representatives:

- **Arthur Rylah Institute (Renae Ayres, 03 9450 8600, renae.ayres@depi.vic.gov.au),**
- **VRFish (Dallas D'Silva, 03 9686 7077) or**
- **Fisheries Victoria (Anthony Forster, 03 9658 4375)**

Helping make more fish... Naturally

80% of adult Murray cod live within 1 metre of a snag. (Photo: Craig Copeland)

by RENAE AYRES

Arthur Rylah Institute

What is the Fish Habitat Network?

The Fish Habitat Network is a network of people and organisations from around Australia who are dedicated to making more fish naturally by improving fish habitat. The Fish Habitat Network began in 2009 as an informal partnership between New South Wales State government and local fishers.

Since then, the Fish Habitat Network has expanded to other Australian States and Territories and now operates nationally. Recreational fishers, peak bodies, trade, government and research institutions are all working together to bring the fish back and ensure that our aquatic environments and fish communities are healthy, diverse and sustainable for future generations.

Why we exist

Recreational fishing is a popular activity in Australia. It provides social, health and well-being benefits and contributes significantly to the Australian economy. Healthy waterways with diverse and abundant habitats are fundamental for productive and sustainable fisheries - and good news for recreational fishing!

The reality, however, is that the condition of Australian catchments and waterways is degraded. This is reflected in the abundance of fish and how well fish populations can cope with droughts and floods. There are nowhere near the numbers of fish around that there once were.

Habitat rehabilitation can realistically increase the abundance and resilience of key target fish species. It has the added benefit of improving the overall health of our waterways and estuaries.

Habitat rehabilitation can realistically increase the abundance and resilience of key target fish species. It has the added benefit of improving the overall health of our waterways and estuaries. By ensuring fundamental habitats are healthy and available for fish, we are providing the basics that enable fish to survive and thrive.

Recreational fishers have an important role to play in ensuring the long-term sustainability of the fisheries upon which our sport depends. The Fish Habitat Network encourages and supports recreational fishers who are putting something back into their sport and making more fish, naturally.

UNDERSTANDING Fish Habitat
More Habitat = More Fish

What we are aiming for

Our vision

A recreational fishing community that is actively involved in managing fish habitat across Australia

Mission

To harness the skills, experience and projects within each of our organisations to promote and support the involvement of recreational fishers in all aspects of fish habitat management.

Objectives

- To collectively pursue national initiatives and activities related to improving fish abundance and biodiversity through habitat management.
- To share knowledge and support inter-jurisdictional collaboration.
- To make things happen on the ground in each jurisdiction across Australia.

Join us!

In Victoria, your Fish Habitat Network partners include VRFish, Fisheries Victoria and the Arthur Rylah Institute. We would love to hear from recreational fishers who are keen to learn more about fish habitat or are interested in habitat rehabilitation activities. There are opportunities to get involved throughout Victoria! Please contact Renae Ayres at the Arthur Rylah Institute on (03) 9450 8600 or renae.ayres@depi.vic.gov.au

For more information on the Fish Habitat Network, please visit www.fishhabitatnetwork.com.au, follow us on Facebook www.facebook.com/fishhabitatnetwork, or email us at fishhabitatnetwork@gmail.com. Sign-up for our e-newsletter '*Newstreams*' via the Fish Habitat Network website to keep up with the news, stories and information about fish habitat happenings in Australia and around the world.

Recreational fishers from New South Wales planting trees as part of the ongoing work to rehabilitate the Kooragang wetlands, near Newcastle. (Photo: Liz Baker)

Recreational fishing matters!

- About 3 - 5 million Australians fish each year (1, 2)
- Recreational fishing directly contributes an estimated $2.5 billion each year to the Australian economy (3)
- Recreational fishing supports 90,000 Australian jobs (2)
- Retail sales in the tackle and bait industry in 2003-04 was valued at $665 million (4)
- The recreational boating industry annual turnover related to fishing is around $300 million (2)
- International tourists spend over $200 million on fishing in Australia (2)

Fish matter!

- Up to 90 % of Australia's recreational fish spend part of their life cycle within estuaries and inshore wetlands (5)
- 50 % of Australian estuaries are in near-pristine condition, whilst 22 % are largely unmodified, 19% modified and 9% extensively modified (6)
- 86 % (161,764 km)of Australian rivers are degraded (6)
- Fish stocks in the Murray-Darling Basin are estimated to be at 10 % of pre-European levels (7)
- The total annual economic value of mangroves for fisheries, tourism and shore protection is estimated at ~ $US 900,000 per km^2 (8)
- 1 m^2 of seagrass adds 1 kg fish per year, equivalent to ~$A230,000 ha per year (9)

So what?

- Investment in fish habitat rehabilitation provides social, economic and environmental dividends
- Improving fish habitat will make more fish naturally and sustainably

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Habitat Habitat Habitat

UNDERSTANDING Fish Habitat
More Habitat = More Fish

by BOB PEARCE

Recreational fishers can often find things to disagree on and debate ad infinitum, but the one thing that we all seem to be in violent agreement on, is that if you want good, sustainable fishing, you must have good habitat.

Just ask VRFish Board Member, Rob "Woody" Loats. Whether it is fresh water, brackish, or salt water, the rules do not seem to change. However, this article concentrates on Port Phillip Bay.

According to a document prepared for the Fisheries Research and Development Corporation (FRDC), revitalising Australian estuaries will increase fisheries productivity and all aspects of coastal ecosystem biodiversity. The report indicates that any such investment in estuarine habitat would be recouped in increased fisheries in less than five years.

Much work has been done over recent years with re-snagging of rivers and artificial reefs in bays and estuaries. All seem to have been successful to one degree or another. More recently, however, it has become feasible to restore lost/degraded reefs more naturally. The ability to produce mussel and oyster spat to enable this is now well established at DEPI labs at Queenscliff.

As many would know, some parts of Port Phillip Bay that were once rich in shellfish reef structures, have become degraded in some cases, or completely eradicated in others. There are a variety of reasons for this, two of the main reasons being over exploitation and environmental degradation. Some of the over exploitation dates back as far as the 1870's, when oysters were being taken in large numbers by dredging activities. Large scale scallop and mussel dredging commenced on or about the mid 1960's and this also resulted in a lot of damage to shellfish reefs over a period of about 20 years.

As many would know, some parts of Port Phillip Bay that were once rich in shellfish reef structures, have become degraded in some cases, or completely eradicated in others.

Until the early 1980's, the reefs in Northern Port Phillip Bay were so abundant, that when a storm occurred, millions of mussels and oysters (mainly mussels) would be broken off the reefs and washed ashore. Because of the widespread reef degradation that has occurred, this phenomenon has not been evident for many years. While fishing for snapper on these reefs in the past, snag ups were common and would sometimes result in retrieving a clump of mussels and, perhaps, an oyster or two.

Albert Park Yachting and Angling Club (APYAC) has been working with DEPI/Fisheries Victoria for about two years on a project aimed at achieving the natural regrowing of reef areas with mussels and native oysters (ostrea angasi). The club's long established members have unique knowledge of the locations of many of the lost shellfish reefs of northern Port Phillip Bay, so are well placed to be able to assist with any project to rehabilitate lost reefs in the area.

Oyster reef restoration project in USA.

Industry operated shellfish culture facilities at DEPI Queenscliff.

In recent times, more and more people seem to have heard about this project and the club has received a great deal of encouragement and compliments about this initiative. There has even been interest from overseas, with the potential for assistance being offered in support for the project.

Currently, APYAC has a Grant Application with the Recreational Fishing Grants Working Group. If successful, the funding obtained would enable a trial to commence at three sites within Port Phillip Bay. Once the trial starts to show some promise, APYAC believes there is a strong chance that further funding would be attracted to expand the project. This is not a flippant prediction and is based on the amount of interest expressed in the project by other parties who are in a position to provide further funding. If the project is able to commence in the not too distant future, it would probably be the first such project in Australia.

A similar project at Chesapeake Bay, USA, has been highly successful and there will be opportunities to draw on the expertise of the managers of this project during the course of the Port Phillip Bay project.

APYAC have previously worked to get funding of $10,000.00 to enable some preliminary work on the project. A major outcome of this was a document prepared by DEPI's Dr Paul Hamer, entitled Towards reconstruction of the lost shellfish reefs of Port Phillip Bay. It is an excellent report and has under-pinned the ability to move into the next stage of the project. The report is highly recommended reading and is available from DEPI.

Although I am not in any way scientifically qualified, I feel safe in saying that the three critical rules that apply in enabling optimised bio diversity are: Rule 1, Habitat. Rule 2, Habitat and Rule 3, Habitat. That is what this project is all about.

We can all look forward to seeing this exciting project get under way in the not too distant future.

Recreational Fishing Code of Conduct

REPRESENTING
Victorian Recreational Fishers

A code of conduct for recreational boat, shore, river, stream and jetty fishers in Victoria.

Recreational fishers have a responsibility to look after fisheries resources for the benefit of the environment and future generations of fishers. Recreational fishers should also show respect for other users of the aquatic environment. This Code of Conduct provides guidelines to minimise conflicts on the water, and should be adopted by all recreational fishers.

1

Awareness of and compliance with fishing regulations

2

Respect the rights of other anglers and users

3

Protect the environment

4

Carefully return undersized, protected or unwanted catch back to the water

5

Fish species and other organisms must not be relocated/ transferred into other water bodies

6

Always seek permission when entering private property

7

Use established access roads and tracks

8

Attend to your fishing gear and value your catch

9

Education - pass on your knowledge

10

Respect indigenous sites and values

For a full version of the Code of Conduct, please go to
www.vrfish.com.au/Code_of_Conduct.htm

Marine House 1st Floor 24 York Street South Melbourne Vic 3205
Ph 03 9686 7077 **Fax** 03 9682 1066 **Email** info@vrfish.com.au **Web** www.vrfish.com.au

Instream Woody Habitat Assessment: *Our rivers need wood!*

By ZEB TONKIN

The 2012 winter edition of Fishing Lines featured the article "*Where is the wood? Mapping snags to benefit fish*" which highlighted a project being undertaken to prioritise river restoration programs aimed at improving river health and fish populations across Victoria.

This article presents the key findings of this project, highlighting many of our rivers fall well short of essential habitat to maintain stream health and support the sustainability of our all-important fish stocks.

A rehash on snags and the impact of their removal

Snags (instream woody habitat) play a vital role in a range of ecological, structural and chemical functions essential for maintaining the health of a waterway, and in turn support recreational fisheries and other social and cultural values.

In the past, snags were removed from many Victorian rivers for boating purposes, property protection and to facilitate flows. Research has since shown that their removal has minimal impact on flood mitigation, and that such works impair river stability and degrade river health. The removal of snags has been identified as a major contributing factor in the decline of many freshwater fish populations. River restoration programs help improve instream habitat and fish populations in Victorian rivers. These programs involve the re-introduction of wood (resnagging), and revegetating river banks to encourage long-term, natural snag input. To identify and prioritise areas where snags need protection and augmentation, baseline information on the level of wood in rivers is required.

The project

The Victorian Investment Framework funded this project in 2012 to help the Government prioritise the protection and rehabilitation of snags in Victorian rivers. Researchers from the Department of Environment and Primary Industries' (DEPI) Arthur Rylah Institute (ARI) have been working with Fisheries Victoria, Catchment Management Authorities, the University of Melbourne and Melbourne Water to investigate past and present snag densities in Victorian rivers.

We mapped snags in 38,000 river reaches across Victoria, equalling 27,700 km. Field assessments of natural snag densities were undertaken in "pristine" river reaches using hand-held GPS and underwater sonar. This information was used in a predictive modelling approach to determine natural snag densities in rivers across Victoria. Current densities of snags across Victoria were then calculated using a combination of high resolution aerial photographs, field assessments and measures of riparian overhang.

A simple comparison of the predicted natural and the current snag densities enabled researchers to assess the condition of snags in rivers throughout Victoria.

What were the findings?

The predicted natural snag densities in Victorian rivers were on average 0.03 m^3 / m^2 and varied according to slope, stream width and climatic variables. In general, natural snag densities were higher in lowland river reaches compared to upland river reaches, most likely a result of decreasing stream power. Current densities of snags in river reaches across Victoria are on average 0.01 m^3 / m^2 which equates to an average reduction of 41% below estimated natural levels.

Over 20,000 (53%) Victorian river reaches, equalling 17,000 km, have severely or highly depleted snags densities. 30% of river reaches were estimated to have snag densities more than 80% below natural levels.

Snag condition in some regions of Victoria fared better than others. The South Western Floodplains, Glenelg and North Central Floodplain river regions were in very poor condition (90%, 83% and

79% snag reductions respectively). The Alpine, North East Uplands and East Gippsland Uplands river regions displayed relatively minor variations from predicted natural snag densities.

What work will be done in the future?

Prioritising areas for resnagging is important, particularly to achieve best value for money. Managers are already using this broad-scale assessment to identify areas in most need of rehabilitation activities. Further refinement of these reaches should encompass site-specific, field-based assessments; consideration of river bank vegetation condition and; likelihood of ecological response to achieve a best "bang-for-buck" approach to resnagging. For example, the project team are currently investigating the relationship between snag loads and fish populations across Victoria. This will ultimately allow estimates of the levels of wood

The removal of snags has been identified as a major contributing factor in the decline of many freshwater fish populations.

required to maximise the benefits for particular fish species in a specific river reach. Research is also being undertaken to investigate the rates of natural accumulation of snags, and how this relates to the condition of river bank vegetation and bank stabilisation works.

For further information please contact Zeb Tonkin at the Arthur Rylah Institute on (03) 9450 8600

Anglesea River *instream habitat works*

Recreational fishers and the Anglesea River are set to benefit from a grant the Corangamite Catchment Management Authority (CMA) received through the State Government's $16 million Recreational Fishing Initiative.

The Corangamite CMA received the grant from the Department of Environment and Primary Industries (DEPI) to carry out works that will improve fish habitat for the long term health of the system.

The first stage of works has been completed, with the second stage to be finished during autumn. The works should help support higher numbers of fish in the estuary and assist in offsetting previous modifications to the river including the removal of snags.

This first stage completed before Christmas, involved placing limestone and small clumps of locally-sourced trees into deeper sections of the river, away from areas used for recreation.

Corangamite CMA Estuary Planning Coordinator, Tom Scarborough, said historical records indicated that snags had been removed from the river, which had resulted in the loss of important fish habitat.

Mr Scarborough said DEPI's Arthur Rylah Institute had completed sonar mapping of the river and provided the Corangamite CMA with a detailed report that included recommendations for improving in-stream habitat at key locations.

The Corangamite CMA is working in partnership with the Surf Coast Shire Council to ensure the instream habitat works are carried out safely and with minimum disruption along the river.

Signs will be placed at relevant locations explaining the works.

Creating Opportunities in the... Upper O

by ANDREW BRIGGS

Catchment Coordinator - Ovens & King

In 2010 the North East Catchment Management Authority commenced a project to improve recreational fishing in the Ovens River near Bright in North East Victoria.

Funded through the Recreational Fishing Licence program, the project aims were to install in-stream habitat structures (namely constructed hardwood log jams and bed seeding with large granite boulders), construction of a walking track for improved access and signage to increase awareness and inform the community of the project.

This particular reach of the Ovens River was drastically altered early in the last century by extensive gold dredging activity. This resulted in a stream with high volumes of mobile river gravels and very low levels of coarse habitat.

Coarse habitat is critical to fish populations for many reasons: it breaks up the current of the river, promotes scouring for deep pools, provides physical homes for fish, ambush sites for predatory species and velocity refuges for fish to retreat to in times of high flows.

This project enabled the North East CMA to showcase different approaches to introducing coarse habitat into a waterway. Over time, recreational fishers and river managers will be able to observe these structures and how they interact with the waterway.

Education was another key element of the project. In total over 2km of the Ovens River was divided up into four distinct runs, each one signposted and pitched at varying levels of competency.

UNDERSTANDING Fish Habitat

More Habitat = More Fish

vens River

Habitat, Access & Education

The first, "Jacks Run", combines detailed signage on when, where and how to fish, possible species to be encountered and explanations of the different types of habitat that have been created.

This reach has been specifically tailored to meet the needs of people who are new to fishing, or where future coaching clinics might be able to be carried out. The three other runs each contain a mix of natural and artificial habitats and walking tracks to help access the area.

This project was strongly supported by the Upper Ovens Landcare Group, who have carried out extensive woody weed management activities in the area, the Alpine Fly Fishers and the Council of Victorian Fly Fishing Clubs.

This particular reach of the Ovens River was drastically altered early in the last century by extensive gold dredging activity. This resulted in a stream with high volumes of mobile river gravels and very low levels of coarse habitat.

In 2013, this project was awarded the Council of Victorian Fly Fishing Club's Conversation Award. This award is given in recognition of the enhancement of waterways and impoundments with particular reference to riparian redevelopment, in stream habitat regeneration and foreshore protection.

VRFish Strategic Plan 2012–2017

COMMUNITY

Grow participation, membership and experience

- Ensure recreational fishing is promoted as a healthy and positive experience.
- Encourage greater participation from Culturally and Linguistically Diverse (CaLD) communities.
- Promote participation in recreational fishing to young people and families.
- Develop retention and recruitment strategies to grow the VRFish membership.

SUSTAINABILITY

Preserve, grow and enhance the fish resource, infrastructure and access

- Support sustainable fishing and fisheries through proactive and responsible policy development and projects.
- Work with fisheries management to identify opportunities for improvement and growth.
- Build on existing, and develop new conservation partnerships to enhance our role in supporting healthy, resilient recreational fisheries.
- Advocate for improved fishing infrastructure to support growth in recreational fishing.

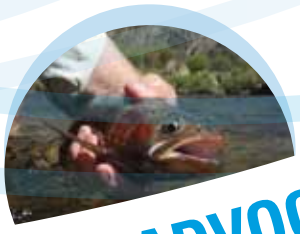
AWARENESS

Strengthen and grow our communication and collaboration

- Ensure that the recreational fishing community are informed of issues that may impact on recreational fishing.
- Provide effective communication channels.
- Develop and refine engagement programs and activities across key communities.
- Provide sound advice and guidance on strategies and policies which will contribute to a sustainable future Victorian Fishery.

Five Key Pillars

The VRFish Strategic vision is supported by five key pillars and is underpinned by our core values. VRFish is committed to producing the following outcomes:



ACCOUNTABILITY **ADVOCACY**

Ensure VRFish delivers best practice governance and management principles

- Improve our extension and adoption practices to be more accountable to recreational fishers.
- Support data collection and research that matches our organisational needs.
- Implement review process of governance structures.
- Report regularly to our stakeholders on our actions to ensure a sustainable and vibrant future fishery.

Provide effective representation of our members' interests

- Promote recreational fishing as a major contributor to economic growth in Victoria, particularly in rural and regional areas.
- Ensure VRFish members have appropriate best practice and educational resources.
- Influence policy and direction across all levels of government.
- Develop further recognition of VRFish as the legitimate conduit of recreational fishers.

REPRESENTING
Victorian Recreational Fishers

VRFish
Representing Your Interests

As the peak body representing a community of over 721,000 Victorians, VRFish works to provide fishers with support through facilitation, advocacy, education strategies and policy development. We consult broadly with the recreational fishing community to represent their views in an accurate and timely manner to Government and their agencies, as well as communicate effectively with the recreational fishers of Victoria.

VRFish Charter

…is to consult broadly with the recreational fishing community to represent the views of recreational fishers in an accurate and timely manner to Government and their agencies, as well as communicate effectively with the recreational fishers of Victoria.

VRFish Vision

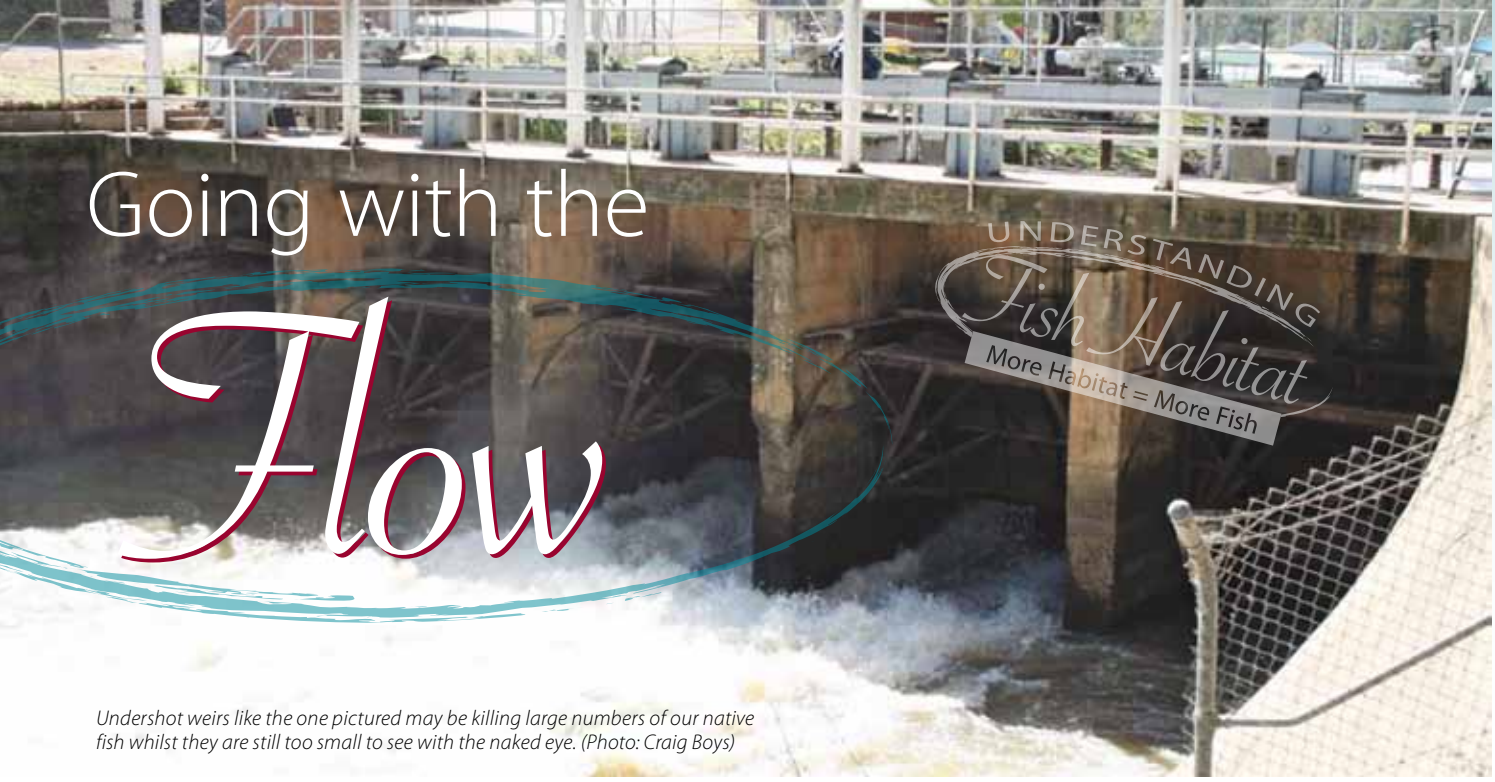
…is to ensure full access to a diverse and healthy Victorian recreational fishery.

VRFish Mission

…is to represent and advocate the interests of the Victorian Recreational fishing community.

Going with the Flow

UNDERSTANDING Fish Habitat
More Habitat = More Fish



Undershot weirs like the one pictured may be killing large numbers of our native fish whilst they are still too small to see with the naked eye. (Photo: Craig Boys)

by MATT BARWICK

Recfishing Research

When Isaac Newton first said 'what comes up must come down' in the sixteen hundreds we all thought we was talking about apples. But perhaps he was talking about fish?

As fishers, we rely on our ability to anticipate where fish will be. In seeking to understand where freshwater fish go and why, most of us at one time or another have probably observed native fish aggregating below waterfalls/ weirs and other barriers, and worked out that certain cues trigger a desire to move upstream among many species.

The importance of these movements is now well established for a number of our freshwater fish species, enabling them to access spawning habitat, find food, and disperse to new areas. Many millions of dollars have been invested throughout Australia to construct fishways so fish can move past barriers such as dams and weirs as they travel upstream.

These fishways have proven to be fantastically effective too; up to 6000 juvenile fish were recorded moving upstream through a fishway on the Mary River in a single day. However researchers from NSW DPI are helping us to realize that we may only be addressing half of the problem, and it may be just as important that we ensure their safe passage downstream as well…

During a recent chat with Dr Craig Boys, a researcher from the NSW Department of Primary Industries, he explained, "The issue we face is that we have created a complex system of weirs, dams, irrigation pumps and hydropower facilities to provide a consistent supply of water and electricity for our communities. And unfortunately our studies are showing that they may be impacting on native fish trying to move downstream in a number of ways".

In the Murray-Darling Basin alone there are over 40,000 known barriers to fish movement. Many of these are what they call 'undershot weirs', which release water underneath steel gates as opposed to over a fixed crest. These weir designs have been shown to be particularly harmful to Golden Perch and Murray Cod: with a recent study estimating that as many as 95% of Golden Perch larvae and 52% of Murray Cod larvae are killed as they move downstream through these structures.

There are also irrigation pumps and canals along many of our rivers, and research undertaken by NSW DPI staff has shown that native fish are being sucked into them in very large numbers, and are either killed or transported into artificial waterbodies used for irrigation, unable to return to the river. This is a particular concern for young fish (eggs, larvae and juveniles), and particularly species such as Murray Cod, Golden Perch, Silver Perch and Trout Cod, which drift downstream as larvae after hatching, making them particularly vulnerable. Their drifting phase also coincides with peak irrigation periods (November and December).

Another emerging threat for fish moving downstream is hydropower facilities, which utilize water flow to turn large turbines, generating energy in the process. Unfortunately overseas examples are highlighting that these hydro facilities can seriously impact on fish travelling downstream, exposing them to dramatic changes in pressure (the equivalent of travelling from sea level to the top of Mount Everest in less than one second), risk of injury from hitting turbine blades or other solid components as fish are swept downstream, and exposure to violent shearing conditions when water rapidly changes speed or direction.

Recfishing RESEARCH

On the Columbia River approximately US$7 Billion has been spent attempting to prevent loss of migrating salmon in the region, however the impact of hydropower infrastructure on downstream-migrating fish has resulted in an ongoing reliance on hatcheries to bolster flagging populations. As both State and Federal Governments in Australia attempt to tackle climate change and meet their own renewable energy targets, hydropower is again being explored as a potential component of the future 'green' energy mix throughout Australia.

There is no doubt that many of our freshwater fish species are not doing too well; of the 46 native fish species in the Murray-Darling Basin, 26 (over half) are now listed as threatened under state or commonwealth legislation. Researchers have recorded larval Murray Cod from the lower Murray-Darling Basin during surveys (confirming spawning is occurring), but have failed to find one year old fish for the last 15-20 years. Where are these larvae disappearing to? Could our water infrastructure be contributing to this problem? It is generally accepted that the biggest losses have coincided with the rapid growth of water resource development and river regulation over the past century.

Many of our native fish species including the iconic Murray Cod undertake migrations up and downstream at various stages in their lifecycle. (Photo Jamin Forbes)

Where are these larvae disappearing to? Could our water infrastructure be contributing to this problem?

Whilst discussing these issues with Dr Boys he made the point "when you consider how much is spent annually on stocking programs, instream rehabilitation and the purchase of environmental water throughout Australia to support Australia's valuable recreational fisheries, it seems crazy that we continue to allow such large volumes of wild fish to be injured, killed and extracted needlessly every year. But the ray of light is that in most cases, there are practical solutions, which have proven effective elsewhere in the world, but have yet to be applied within Australia".

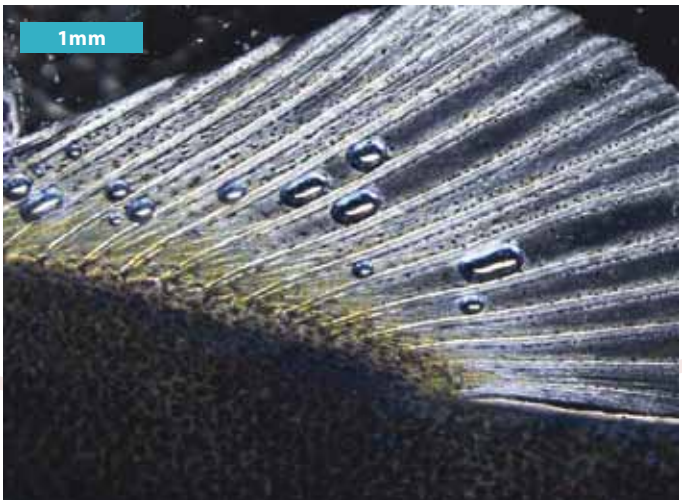
The irrigation sector has been proactive in working with NSW DPI researchers to establish the first design criteria for fish screens at water diversions within the Murray-Darling Basin. But unfortunately, although in a position to start rolling out pilot screening projects, there is currently no coordinated screening program or funding scheme to assist irrigators upgrade their diversions.

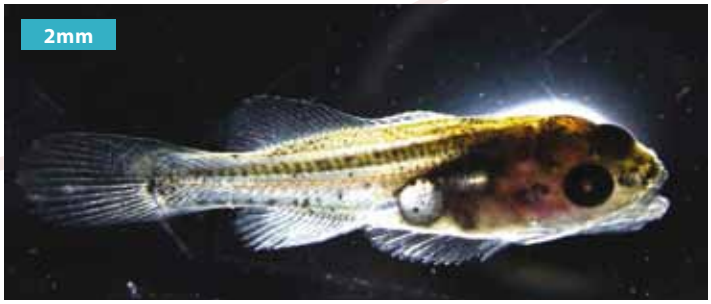
Fisheries managers are already working with river operators to promote the use of more conventional top spilling weir design (which are far less damaging to fish), rather than continuing with the construction of undershot weir designs. Research is also underway to determine the hydraulic conditions most conducive to fish survival at river infrastructure, with the view of designing more 'fish-friendly' options.

Fact Box:

- Many species of native fish, including Murray cod, Golden perch and Trout cod, drift downstream during their early life stages. They also undertake repeated downstream movements throughout their lives. This behaviour makes them vulnerable to injury or death when passing weirs, dams and irrigation diversions.
- Millions of larvae have been retrieved from individual irrigation canals and huge numbers (as many as 95%) of larvae can be killed when they pass downstream through weirs.
- There is currently no coordinated and funded screening program to prevent the loss of fish at water diversions in Australia, despite the fact that programs in North America have been hugely successful for close to a century.
- NSW DPI researchers are currently using state-of-the-art barometric chambers and swimming flumes to determine the hydraulic conditions required at dams, weirs and hydropower facilities to ensure the safe downstream passage of native fish.

If you have a question relating to science and recreational fishing simply email Recfishing Research at matt.barwick@recfishingresearch.org





Barotrauma injuries such as this air bubble within a 22 day-old Murray cod (below) and these bubbles in the dorsal fin of a 65 day old Murray cod (left) can result from rapid decompression experienced whilst passing through undershot weirs, or hydropower facilities, and can result in mortality. (Photo: Craig Boys)

by DR. SCOTT RAYMOND

Releasing a Murray Cod collected during fish surveys back into the Ovens River.

UNDERSTANDING Fish Habitat

More Habitat = More Fish

Victorian Demonstration

...rehabilitating rivers to enhance native fish populations

History

Since European settlement, it's estimated that native fish populations in the Murray-Darling Basin (MDB) have declined by 90 percent. This decline is largely attributed to the removal of woody habitat 'snags' from rivers, damage to river-side (riparian) vegetation, river bank degradation, barriers to fish passage (such as dams and weirs), and impacts of introduced fish species (such as Common Carp).

To improve native fish populations in the MDB, a river restoration program known as a demonstration reach was developed through the Murray-Darling Basin Authorities' (MDBA) Native Fish Strategy. Demonstration reaches are stretches of river where a combination of river rehabilitation techniques are used to rebuild native fish communities. The demonstration reach program has three major components:

1. promoting community involvement;

2. initiating the rehabilitation works; and

3. monitoring the response of fish communities.

Victorian Demonstration Reaches

Two demonstration reaches were established in Victoria in 2007; on the Ovens River near Wangaratta and on Holland's Creek near Tatong. The Ovens River is home to the mighty Murray Cod and its endangered cousin the Trout Cod, while Holland's Creek is home to the elusive and endangered Macquarie Perch. Both waterways also contain a variety of small-bodied fish species integral to the structure and functioning of these ecosystems. In light of the difficulty of angling (and landing) a monster smelt, gudgeon or galaxiid, we will focus on the native large-bodied angling species in this article.

Getting started - Community

Partnering with various stakeholders commenced at the beginning of the program and was essential to demonstrate the value of working together to improve river health and foster ownership of the local environment. Community involvement was facilitated through community reference groups that included representatives from various local clubs and landholders.

Regular engagement events were held, including on-site meetings with school kids and program partners, participating in fishing and camping shows, and conducting electrofishing demonstrations. Signs were also installed along each demonstration reach to inform people about the project.

Project updates were communicated during face to face meetings, as well as more broadly on the internet, in the media, and at conferences.

Rehabilitation Works

The rehabilitation works programs were complex, large-scale, long-term investments conducted and managed by the North East and Goulburn Broken Catchment Management Authorities (CMA's). Over the seven year program from 2007 to 2014, multiple rehabilitation activities were undertaken in the Ovens River and Holland's Creek demonstration reaches for the purpose of enhancing the native fish communities, including:

- Re-introducing 350 large snags, 50 bank-shoring snags and 25 fish hotels to improve instream habitat
- Stocking 250 Macquarie Perch fingerlings into Holland's Creek
- Managing stock by erecting 20 km of fencing and providing 6 off-stream watering points
- Building and installing two fishways to improve fish passage
- Managing weeds along 30 km of river bank
- Stabilising river banks with 20 rock-seeding placements
- Planting 1000s of native trees and shrubs
- Removal of 1000s of Common Carp via carp musters, professional carp removal, other angling and community programs

Reaches

Monitoring fish responses

Electrofishing (boat and backpack) and fyke netting surveys were conducted annually between 2008 and 2014 by research scientists from the Arthur Rylah Institute for Environmental Research (ARI) to determine the impact of rehabilitation works on the abundance, distribution and population ecology of fish assemblages. Ten monitoring sites within each demonstration reach were surveyed before and after the rehabilitation works were implemented. These findings were compared with data collected from surveys on nearby control reaches to ensure the integrity of our data.

Inserting fish hotels into the Ovens River.

Holland's Creek Demonstration Reach sign.

Is river rehabilitation working? Yes!

There were several results which demonstrate an improvement in the fish community since the rehabilitation works were implemented in the Ovens River demonstration reach, as follows:

- A 4.6x increase in the abundance of Murray Cod
- A 2.7x increase in the abundance of Trout Cod
- Successful natural breeding of Trout Cod recorded for the first time in the reach since their stocking in the mid-90's
- A broader range of size classes in large-bodied native fish
- A change in the fish community from one dominated by introduced fish (such as Common Carp) to a healthier fish community dominated by large-bodied native fish.

Results from Holland's Creek demonstration reach are equally impressive:

- A 12x increase in the abundance of Macquarie Perch
- An increase in Macquarie Perch distribution in the demonstration reach
- First record of successful natural breeding Macquarie Perch in 2013 and again in 2014
- A decline in the abundance of introduced fish
- The demonstration reach is now dominated by native fish populations.

The success of the Ovens River and Holland's Creek demonstration reach programs was supported by a relationship between angling clubs, funding bodies, research scientists, CMA's, private consultants, environmental groups, land holders and the broader community. Over the seven year program, these groups came together to provide advice, concerns, interest and many lasting friendships have been developed. Fostering these relationships resulted in the clear relay of information, improved community interest and participation in the project, and understanding that this program was for the benefit of everyone.

Thanks are extended to all the individuals and groups that contributed to the resounding success of this and related projects that provide better fishing opportunities and healthier native fish populations for the future. This project was jointly funded by the MDBA, North East and Goulburn Broken CMA's and the Victorian Government's Recreational Fishing Licence Large Grants program.

If you would like more information about the Victorian Demonstration Reach program please contact Dr. Scott Raymond from ARI on (03) 9450 8600, or visit www.depi.vic.gov.au/ari

Recreational Fishers

= helping to improve fish habitat throughout Victoria

by RENAE AYRES

Arthur Rylah Institute

In a way, it's simple: healthy, productive fisheries need healthy, productive habitat. One of the simplest, most effective things we can do to support great recreational fisheries is help create healthy habitat. Yet there's also a lot of complexity in what healthy habitat really means.

Australian recreational fishers are increasingly becoming better informed about what constitutes healthy habitat. We know that healthy fish habitat includes diverse and complex structures in and around the water, good water quality, and the right water flow regimes.

Australian recreational fishers are also becoming more active as advocates for improving fish habitat. In a 2009 survey, recreational fishing licence holders in Victoria acknowledged that 'repairing where fish live' was the most important way to improve recreational fishing. In 2012, Fisheries Victoria conducted a subsequent survey and asked fishers about their preferred fishing locations, catch species and suggestions for improving habitat. Many people indicated they were interested in participating in projects to improve habitat.

Some Victorian recreational fishers and angling clubs are already actively involved in projects working to improve fish habitat and the health of local fish populations. For example, the Nicholson Angling Club has taken on projects along the Nicholson River over several years, fencing river frontage to manage stock access, revegetating riverbanks with native trees, installing instream woody habitat (snags), and monitoring water quality under the Waterwatch program. Also, the Alpine Fly Fishing Club and Council of Victorian Fly Fishing Clubs partnered with the North East Catchment Management Authority and Upper Ovens Landcare Group to rehabilitate instream habitat and riverbanks of the Ovens River near Bright to support popular angling species including Murray cod and trout. There are many other examples of recreational fishers playing a significant role in habitat rehabilitation projects. The success of such projects stems from people sharing a passion for healthy local fisheries and environments, and working together to achieve a common goal.

Recreational fishers are encouraged to support and participate in other similar projects across Victoria. Here are some current ways you can get involved!

Native revegetation along shores of the Hopkins River estuary has helped improve habitat for fish. (Photo: Glenelg Hopkins Catchment Management Authority)

Improvements to the fishway at Wangaratta has aided passage of Murray cod and other fish.

(Photo: Scott Raymond)

UNDERSTANDING Fish Habitat
More Habitat = More Fish

Anglers on Estuaries:

There are opportunities for recreational fishers to get involved in fish habitat rehabilitation activities planned for the estuaries of the Merri River, Gellibrand River, Werribee River, Tarwin River, and Mitchell, Nicholson or Snowy River. This work is part of a broader collaborative project undertaken by the Arthur Rylah Institute (ARI) together with VRFish, Australian Trout Foundation, Native Fish Australia, Fisheries Victoria, coastal Catchment Management Authorities, Melbourne Water, the Fish Habitat Network, and the Department of Environment, through funding from the Australian Government, Fisheries Revenue Allocation Committee, and in-kind contributions. Likely activities include: installing in-stream habitat, revegetating riverbanks, weed management, and improving fish passage. There will also be education and engagement events. Any local recreational fishers and clubs keen to be involved please contact, Renae Ayres at ARI on (03) 9450 8600.

Victorian F4FH:

The Victorian Fishers for Fish Habitat (F4FH) Program enables Victorian recreational fishers to get more actively involved in fish habitat rehabilitation. The program aims to: raise awareness of the Fish Habitat Network and the critical role of fish habitat; facilitate collaboration between recreational fishing organisations, Fisheries Victoria and other government agencies (e.g. Catchment Management Authorities) on fish habitat projects; and encourage fisher involvement in on-ground actions to improve fish habitat. ARI researchers, who lead the project, deliver presentations at community events and angling club meetings about the importance of healthy fish habitats and local fish research projects, and have helped waterway managers and angling clubs prepare funding applications for habitat rehabilitation. The project is funded by the Victorian Government using recreational fishing licence fees with support from VRFish, the Australian Trout Foundation and Native Fish Australia. Again, contact Renae Ayres at ARI on (03) 9450 8600 if you'd like to be involved.

Regional Waterway Strategies:

Victorian Catchment Management Authorities undertake strategic planning, on-ground works and monitoring programs to manage and improve waterways, and they are keen for community participation. Currently, Catchment Management Authorities are renewing their regional waterway strategies that outline regional approach for river, estuary and wetland management for the next eight years. Recreational fishers have been involved by recommending regional fisheries management priorities relating to protecting key fisheries assets and fish habitat recovery works. The public consultation phases for the draft regional waterway strategies invite recreational fishers to have further input and comment. There is clearly mutual benefit in working together on fish habitat projects that lead to better fishing outcomes. To get involved or provide feedback, please contact your local Catchment Management Authority.

Grants:

Each year, the Victorian Recreational Fishing Licence Grants Program funds projects that help improve recreational fishing in Victoria, including habitat improvements. Recreational angling clubs have successfully received funding through this program in the past, often working with regional waterway managers and community groups on habitat projects. To learn more, please visit www.depi.vic.gov.au/fishinggrants.

The Victorian Government's Communities for Nature grants support the Victorian community to contribute to practical on-ground solutions for local environmental issues. Funds are provided for projects that address, for example, revegetation, weed and pest animal control, threatened species recovery, cleaning up waterways (e.g. fencing, replacing logs in stream, constructing fishways, etc.). To learn more, please visit www.depi.vic.gov.au/c4n

Catchment Management Authorities and Councils/Shires may also offer similar natural resource grants.

Recreational fishers can actively support fish habitat and healthy fish populations by getting involved in, or supporting, any of the programs above. Other simple things which recreational fishers can also do include: looking after existing habitat, advocating for habitat, and teaching new fishers about the importance of fish habitat.

For more information, please contact Renae Ayres at ARI on (03) 9450 8600, or visit www.depi.vic.gov.au/ari

Spot anything unusual?

Share with REDMAP your photos of marine life that aren't usually found at your local fishing, swimming or diving spots.

Help REDMAP track marine species that may be shifting into new areas in response to changes in your local seas, such as ocean warming.

Check out all the fish, rays, sharks, octopus, turtles and more spotted by Australians around the country at:

WWW.REDMAP.ORG.AU

Snap and log your sighting using our App on your smartphone.

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SPOT. LOG. MAP.

EstuaryWatch

know what's taking the bait

by ROSE HERBEN

Victorian EstuaryWatch Coordinator

Local knowledge helps fishers discover what's biting, and chatting to your local **EstuaryWatch** volunteer is a great way to find out what's taking the bait.

The Anglesea EstuaryWatch group, one of the four pilot groups established in 2007, love sharing what they know about the river with people they chat to when they're out monitoring.

EstuaryWatchers conduct monitoring when an estuary opens or closes to the sea, after heavy rainfall and storm surges, and capture low pH events caused by acid sulphate soils. The volunteers receive training and support from an EstuaryWatch Coordinator, and with the knowledge gained from their monthly monitoring they're able to share their knowledge with people they chat with along the river.

And volunteers said the best conversations were with fisher people and sharing information about what fish are biting.

Anglesea EstuaryWatch Team Leader Gabriel Fuller said what excited her most about EstuaryWatch was getting outdoors and being part of a quality local community environment study.

EstuaryWatch was initiated as part of the Large Scale River Restoration Initiative - Managing Our Great Ocean Road Estuaries at Corangamite Catchment Management Authority (CMA). The program's guiding vision is to:

- Raise awareness and provide educational opportunities to the community in estuarine environments
- Enable communities and stakeholders to better inform decision making on estuary health.

An estuary is the place where freshwater from a river mixes with salt water from the sea. Estuaries are a great spot to spend time fishing, swimming, walking, canoeing, or having a picnic with friends and family. Importantly they also act as a nursery for a variety of fish and provide essential food and habitat for birds and other wild life.

Three other EstuaryWatch groups were established as part of the Corangamite CMA pilot program at the Gellibrand River in Princetown, Painkalac Creek in Aireys Inlet and Spring Creek in Torquay. This included developing a framework for community monitoring of estuaries and involved volunteers, staff and Deakin University. Following the success of the Corangamite CMA pilot the program expanded in 2010 and there are now active EstuaryWatch volunteers, supported by EstuaryWatch Coordinators at Glenelg Hopkins CMA, West Gippsland CMA and Melbourne Water.

Wye River EstuaryWatchers.

Spring Creek EstuaryWatchers.

There are 19 active EstuaryWatch groups in Victoria. They meet monthly to conduct estuary mouth condition monitoring and physical/chemical monitoring. Estuary mouth condition monitoring involves taking a series of referenced photos at the estuary mouth, recording mouth state (open or closed), wind direction, wind strength, sea state, tides and estuary water level.

On average there are four physical/chemical monitoring sites on an estuary. At each site volunteers record important indicators of estuary health such as dissolved oxygen concentration, temperature, salinity, pH and turbidity at depth. Salinity records taken along the length of the estuary can help determine the extent of a salt wedge and can give an indication of what species of fish are likely to inhabit the estuary at any point in time.

The data volunteers collect has proven to be a valuable source of information for river health staff managing waterways. The data volunteers collect is often referred to in regions of Victoria where the Estuary Entrance Management Support System has been adopted to assist waterway managers in determining when an estuary is artificially opened to the sea.

Corangamite CMA Estuary Planning Coordinator Tom Scarborough refers to the EstuaryWatch Online database daily. EstuaryWatchers work closely with waterway managers keeping them informed of river health works on their estuary and the role waterway managers and land managers have in conserving their estuary. This includes works that will improve fish habitat like work improving the health of the Anglesea River system.

All of the information collected by EstuaryWatch volunteers is available to the public at www.estuarywatch.com.au.

Feel free to take a look next time you are thinking of throwing a line in at your local estuary. Regional EstuaryWatch programs host community seminars, workshops and field trips throughout the year on Victoria's estuaries.

If you'd like to know about upcoming events or are interested in becoming an EstuaryWatch volunteer please contact Rose Herben, EstuaryWatch Coordinator estuarywatch@ccma.vic.gov.au

Tackling Climate Change

by MATT BARWICK

Recfishing Research

If you live in eastern Australia you have probably been shaking your head at the weather we have been experiencing over the last couple of months, and wondering if it's a sign of things to come. Whether a result of climate change or just intense weather, there's no doubt that the incredible rainfalls, waterspouts, phenomenal seas and strong winds in recent months have made it difficult to wet a line at times.

Climate change is definitely starting to impact on our marine systems in a number of ways; researchers have reported that sea surface temperatures off Maria Island in southeastern Australia have increased by 1.5°C since the 1950s, and that sea levels have continued to rise at a rate of 1.7 ± 0.3mm per year during the 20th century. The pH of seawater has also been noted to drop by 0.1 units since the industrial revolution.

These and other environmental changes appear to be causing shifts in populations of some species, with consequent affects on the ecosystems they inhabit. For example, a combination of strengthening of windspeed and the East Australian Current in the Southern Ocean may be resulting in the range extension of the long-spined sea urchin Centrostephanus rogersii, which previously was not known to be common in Tasmanian waters, but is now creating expansive urchin barrens, or areas grazed so heavily by these voracious urchins that practically nothing else can live there.

So exactly how will climate change impact on recreational fishing in Australia? Will it all be bad news? Or will there be some opportunities created by a changing climate? And how should we adapt to climate change?

A study funded under the National Recreational Fishing Industry Development Strategy has been looking into these questions to help the fishing community to adapt to the impacts of climate change, and mitigate their contribution to climate change by reducing carbon emissions through changing their practices.

The study has revealed that for recreational fishers, climate change may bring about changes in fisher satisfaction (both in terms of catch and experience), which may result from changes in catch or quality in fishing experience. This, in turn may cause changes to participation levels, and/or expenditure over time.

Many of the human variables associated with a changing climate are difficult to quantify as it can be difficult to determine how people will behave. However we can look at the biology of fish species that we target and get an understanding of how they might respond.

Project team members examined likely impacts for important recreational species in northern, south-east and western Australia regions separately. Black Bream was considered vulnerable to climate change impacts as a predicted change in the frequency and intensity of rainfall events is expected to present less ideal conditions for spawning and recruitment of this species.

Roe's Abalone was also considered vulnerable to climate change in the Western region as the species spends most of its life in shallow water on reef top habitat, and so may be exposed to extreme heat waves, with increased mortality resulting. Other species such as Mangrove jack and Dusky Flathead in the Northern Region and Yellowtail Kingfish and Mahi Mahi in the South-East region were considered fairly resilient to climate change impacts (*see table below for a full account of likely risks*).

So what can we do to adapt and/or mitigate impacts of climate change? Well, the study identified a need for good quality data to enable future trends in fishery productivity to be predicted. Anglers can play a role in collecting this data through getting involved in angler diary and tagging programs. The research team also highlighted the need for managers to start managing fish populations as an entire stock, rather than breaking them up by jurisdictional boundaries (which fish don't abide by). The need was also highlighted to look for ways to make bag and size limits more flexible, to respond to increasing/decreasing fishery productivity as rainfall and nutrient levels fluctuate.

Unfortunately we currently don't have an understanding of the contribution of recreational fishing to greenhouse emissions, or whether emissions from rec fishers are increasing or decreasing. Nevertheless, there are opportunities for the fishing community to contribute to reductions in emissions through moving to lower emission and more fuel efficient outboards and adoption of methods with minimal emissions such as use of kayaks, shore-based fishing etc.

In terms of mitigation, researchers highlighted that repairing our coastal ecosystems provides the greatest potential benefits, as seagrasses, mangroves and salt marshes are the highest per hectare carbon sequesters of all Australian landscapes. More abundant healthy habitat would also offer the added benefit of helping to increase resilience of the populations of fish species that we target as well.

Further Reading:

http://eprints.utas.edu.au/6290/

http://www.climatechange.gov.au/publications/fisheries/fisheries.aspx

Research indicates that Black Bream (below) might be in trouble under a changing climate, but Dusky Flathead (above) are expected to be resilient. (Photos: Matt Daniel)

Northern region	South East region	Western region
Mangrove Jack (Lutjanus argentimaculatus)	Black Bream (Acanthopagrus butcheri)	West Australian Dhufish (Glaucosoma herbaicum)
Spotted Mackerel (Scomberomorus munroi)	King George Whiting (Sillaginodes puntatus)	Baldchin Groper (Cheorodon rubescens)
Red Emperor (Lutjanus sebae)	Mahi Mahi (Coryphaena hippurus)	King George Whiting (Sillaginodes puntatus)
Barred Javelin (Pomadasys kaakan)	Yellowtail Kingfish (Seriola lalandi)	Spanish Mackerel (Scomberomerus commerson)
Dusky Flathead (Platycephalus fuscus)		Australian Salmon (Arripis truttaceus)
		Roe's Abalone (haliotis roei)

KEY

Considered to be resilient to climate change

Vulnerability to climate change uncertain

Considered to be vulnerable to climate change

Quy Van

VRFISH MEMBER PROFILE

> From my first time catching a pilchard, which was in turn bait for a kingfish ... I learnt about the food chain, the oceans bounty and how we should respect it.

From a boy of a very young age, I have had fishing and diving ingrained into me. I am a very keen recreational angler and diver who is a sucker for catching anything from a garfish right up to game species like southern blue fin tuna, marlin and everything else in-between, with the odd crayfish thrown in.

Whether it be fresh water, saltwater or estuarine fishing, I don't discriminate. It is no secret that I skimped out on exams and classes during my time at Deakin University to go fishing because the "tuna" were on, or the "seas are pancake flat" and went fishing or diving instead…priorities!!

My passion for the ocean started when my family moved to New Zealand, along the picturesque coastline of the Bay of Plenty. Being allowed to explore the ocean at my free will through diving and playing rock pools as a curious boy, along with a father who also lived and breathed fishing – for survival and nowadays recreation – has permanently embedded a strong infatuation of the ocean into me.

I owe it to my father for his excellent guidance and introduction to fishing. From my first time catching a pilchard, which was in turn bait for a kingfish (which was in turn consumed by my family) it was on this very day I learnt about the food chain, the oceans bounty and how we should respect it.

I have worked in the tackle retail industry for six or so years and I have seen many trends in recreational fishing come and go. Due to my geographical location (South West Victoria, Warrnambool and surroundings) I am living in a "poor man's paradise!". There are many fishing and diving options here and I predominantly chase the

charismatic estuary perch, black bream and sea run trout, with the occasional cray dive when weather permits.

Originally, I started out my career as a nurse, with the plans to travel and work as a nurse, and fish along the way. However, my passion and obsession for recreational fisheries and the marine environment lead me to do a degree in environmental science (marine biology), with a focus on fisheries management and recreational fisheries, and further progressing to do an honours research year focusing my study on the physiological stress levels in a key Victorian recreational fish species (black bream) from capture and confinement – as it is becoming common practice to live hold and release fish after tournament fishing as well as recreational fishing for black bream.

With my strong desire to enhance recreational fisheries, I look forward working with VRFish.

VRFish
REPRESENTING
Victorian Recreational Fishers

April Vokey

PROMOTING PARTICIPATION FOR **WOMEN & CHILDREN**

April Vokey has agreed to assist VRFish in its quest to increase fishing participation rates amongst women and children. April has extensive international experience in implementing engagement and participation strategy models for women in recreational fishing. Whilst there are some programs in place to teach children how to fish in Victoria and NSW, there is nothing in place to address the current issue that fishing is largely a male dominated activity.

April shares her time between British Columbia and Sydney, Ausralia, and is an avid angler and steelhead, salmon and trout guide. She was born with an unexplainable passion for fishing. As a young girl she coaxed her father into going fishing and by the age of sixteen, when she was old enough to drive, she was devoting all of her free time to her local rivers.

She is passionate about Spey casting to wild steelhead, the environment and tying Salmon/Steelhead flies. She has made it her mission to encourage and introduce aspiring anglers to the sport, in hopes that it will bring them as much pleasure as it has brought her. She takes pride in being an eternal student of fly-fishing and an active conservationist.

In 2007 she founded B.C. based guiding operation, Fly Gal Ventures, where she presently guides and instructs anglers on some of B.C.'s best steelhead destinations. Fly Gal's trips and events can be found at www.flygal.ca.

April is a Federation of Fly Fishers Certified Casting Instructor and fly-fishing columnist. She is a member of the Northwest Outdoor Writers Association and is the Canadian field editor for *Chasing Silver* magazine and the steelhead columnist for *Fly Fusion* magazine. Her works and photos can also be found in *Fly Fisherman Magazine*, *Salmon Trout Steelheader* (STS), *Field and Stream*, *Canadian Fly Fisher*, *Flyfishing and Tying Journal* and several other international publications.

April sits on the board of directors for the Steelhead Society of BC and the BC Federation of Fly Fishers.

She is the founder and director of the popular fundraiser, Flies for Fins (www.flies4fins.com), and in 2011 she proudly joined the Patagonia ambassador team, where she continues to assist in the design and direction of an upcoming women's line of fishing apparel.

VRFish is looking to commission a credible scoping study to:

- identify the current barriers and constraints;
- identify current drivers and opportunities; and
- develop an action plan for the future.

The study would examine international case studies and draw on the successes in places such as Canada and USA. The project would also run a scoping workshop with relevant stakeholders to help develop the action plan and form an advisory group, made up of female anglers, would provide a lasting legacy from the project and give women who fish, of all ages and backgrounds, a voice at fishing roundtables, state councils and discussion groups and serve as a focal point for growing participation.

VRFish is thrilled to have April's expertise on board as we unearth this exciting initiative.

Fishing in Victoria – something for everyone

Victorian fishers are a blessed lot – the fisheries across the State provide ample opportunities to ply your skill and feed your family.

Over 721,000 Victorians share a passion for recreational fishing, and there are fishing clubs scattered all over the State catering to fishers whether they be hooked on feeding 'old man' cod or like to chase the big reds as they come into our bays to spawn.
There are many reasons a large segment of VRFish members belong to fishing clubs:

- Fishing clubs give fishers access to a fantastic group of people who love to talk about fishing as much as they do.
- They give a sense of contributing to the local community.
- Club membership provides an opportunity to participate in social and competitive events.
- They give the ability to improve fishing by learning from more experienced fishers or to share your own knowledge.
- Club membership also provides a means to contribute to the political landscape of fishing, and have your say in issues that affect you and your favourite fisheries.

Contact one of our member clubs opposite for more information.

VRFish
REPRESENTING
Victorian Recreational Fishers

Member directory

Albert Park Yachting & Angling Clubs Association
Contact: Patrick Hutchinson
Phone: 03 9329 8200
Email: info@apyac.org.au
Web: apyac.org.au

Association of Geelong & District Angling Clubs
Contact: John Hotchin
Phone: 03 52486817
Email: jhotchin@bigpond.net.au
Web: fishinggeelong.com

Australian Anglers Association (VIC)
Contact: Tim Hose
Phone: 0428 521 449
Web: aaavic.org

Australian National Sportfishing Association (VIC)
Contact: Brian Hayes
Phone: 0408 559 663
Email: waynez62@hotmail.com
Web: ansavic.com.au

Ballarat & District Anglers Association
Contact: Geoff Cramer
Phone: 0418 320 139
Email: gcaramer@chw.net.au

Beaumaris Motor Yacht Squadron
Contact: Brian Wright
Phone: 0421 764 370
Email: bwgardening@optusnet.com.au
Web: bmys.com.au

Boating Victoria
Contact: Wallace Nicholson
Phone: 03 9585 1330
Email: boating@yachtingvictoria.com.au
Web: boatingvictoria.com.au

Council of Victorian Fly Fishing Clubs
Contact: Doug Braham
Phone: 03 5174 4606
Email: ddbraham@bigpond.com

Fishcare Victoria
Contact: Lachie Hetherington
Phone: 0468 300588
Email: lachie.hetherington@gmail.com
Web: fishcare.org.au

Game Fishing Association of Victoria
Contact: Geoff Fisher
Phone: 0412 005 850
Email: secretary@gfav.com.au
Web: gfav.com.au

Gippsland Angling Clubs Association
Contact: Robert Caune
Phone: 03 5155 1505
Email: robert@net-tech.com.au

Goulburn Valley Association of Angling Clubs
Contact: Wally Cubbin
Phone: 0428 942 744
Email: wcubbin@bigpond.net.au

Howqua Angling Clubs Fish Protection Association
Contact: Steven Relf
Phone: 0417 553 249
Email: srelf@optusnet.com.au

Metropolitan Anglers Association
Contact: William Richards
Phone: 03 9337 5113
Email: fishomaa@hotmail.com

Midland & North Central Angling Association
Contact: Greg Hellsten
Phone: 0401 984 323
Email: gregh.ogp@hotmail.com

Mid Northern Association of Angling Clubs
Contact: Alan Digby
Phone: 03 5492 2822
Email: alasue@hotmail.com

Native Fish Australia
Contact: Tim Curmi
Phone: 0417 419 765
Email: timbo42b@yahoo.com.au
Web: nativefish.asn.au

North East Angling Association
Contact: Stafford Simpson
Phone: 0419 564 319
Email: vk2ast@tpg.com.au

Scuba Divers Federation of Victoria
Contact: Priya Cardinaletti
Phone: 0414 310 727
Email: priya@sdfv.org.au
Web: sdfv.org.au

South Gippsland Angling Clubs Association
Contact: Allister Dowling
Phone: 0429 001 984
Email: Jodie_dowling@bigpond.com

South West District
Association of Angling Clubs
Contact: Gary Cronin
Phone: 0417 125 127
Email: gbear@hotmail.com

Southern Freedivers
Contact: Clint Engel
Phone: 0409 613 804
Email: info@brimbosports.com
Web: southernfreedivers.org.au

Torquay Angling Club
Contact: Steve Burton
Phone: 0412 101 225
Email: fishing@torquayfish.com.au
Web: www.torquayfish.com.au

Victorian Fishing Charters Association
Contact: John Willis
Phone: 0407 053 484
Email: john@beachmarine.com.au

Victorian Piscatorial Council
Contact: Peter Milley
Phone: 0419 537 082
Email: pmilley@bigpond.net.au

Wimmera Anglers Association
Contact: Barry Williams
Phone: 0402 352 006
Email: barry3422@bigpond.net.au


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