The Proposed Murray Darling Basin Plan

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INTRODUCTION

The Murray Darling Basin Plan must include a strategy to restore the Murray River's Estuary. To claim that a lack of fresh water is entirely responsible for all the Lower Lakes environmental problems, completely ignores the environmental impact that 7.6 km of Murray Mouth Barrages have wrought by blocking tidal influence into the Lower Lakes over the last seventy years.

It is also wrong to claim that the Lower Lakes were once predominately fresh and therefore to suggest the sea should be kept out of the lakes. The Lakes were once part of an estuary and both seawater and freshwater are important to the functioning of estuaries.

In developing the Proposed Basin Plan, the Murray Darling Basin Authority has not explored an ever growing body of estuarine science and estuary restoration projects that aim to restore tidal influence to degraded wetlands and estuaries for improved environmental outcomes.

There are similarities between the problems we face here in South Australia with those in Oregon, Washington and California when it comes to our estuaries.

Environmental degradation as a direct result of blocking tidal influence is a known and recognized problem in estuaries where settler farmers have built 'dikes' to reclaim land or block seawater intrusions.

Currently over 50 estuary restorations are underway in the Pacific Northwest of America in a focused effort to improve habitat for the endangered salmon. Dams, many of them built in the 1920's, are either being outfitted with fish ladders or are being removed, while dikes (barrages) are being removed or made smaller. The goal: to restore to the fullest extent possible the natural habitats within the estuary and rivers so that connectivity between river and sea is improved and that salmon numbers are restored to historical levels.

The first step is to acknowledge that the Lower Lakes were once part of an estuary. That requires broadening the current historians' agrarian view of Lower Lake history, only then can we accurately restore the Lakes to what they once were, and in doing so improve the health and sustainability of the River Murray, restoring it's connectivity to the sea.

BEFORE EUROPEANS, NGARRINDJERI FISHED THE ESTUARY

Prior to the construction of the River Murray Barrages in the 1930s, the Murray Mouth and Coorong were connected with the Lower Lakes forming a great estuary. The mix of fresh and salt water, and its movement in response to both tidal and seasonal influences, created a vibrant and productive ecosystem.

Ngarrindjeri folklore abounds with references to *"the meeting place of the two waters - the salt and the fresh water"*. Today, we call that an estuary and it was very important to the Ngarrindjeri.

The diet of the Ngarrindjeri is reflected in the estuarine nature of the Lakes.

This is documented in the book, "A World that Was" by Ronald and Catherine Berndt and John Stanton,

> *"Freshwater fish were procurable through spring, summer and autumn, while salt and freshwater shellfish were collected from the end of spring to the end of summer; crustacea from the sea and River were most plentiful during the summer months. Salt-water fish were mostly caught during the summer period through to autumn, and land reptiles were caught in the summer."*[1]

From the 2006 Sea Country Plan of the Ngarrindjeri people,

> *"The barrages were built at the request of European landowners and without the consent of Ngarrindjeri people. For the last 65 years we have witnessed the decline in the health, wildlife and other resources of the lakes and the river, made worse by the deliberate introduction of exotic species, such as the European Carp and destructive farming practices such as dairy farming, irrigation, land clearing and cattle and sheep grazing."*[2]
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> *"The Coorong and Lakes Fisheries Management Plan describes the impact of construction of barrages and other developments on the Coorong and Lakes environments, but there is no acknowledgement of the impact of these devastating environmental changes on Ngarrindjeri access to traditional resources, and the wider impacts on Ngarrindjeri life and culture*.[3]

EUROPEANS ALSO FISHED THE ESTUARY

Mulloway (butterfish) were seasonal visitors to the Lakes prior to construction of the barrages. Adult mulloway spawn in the marine waters and juvenile mulloway grow up in the estuarine waters for about 3-4 years.

In 1865, George Taplin of Point Macleay advocated that the people of Adelaide should be enjoying the bounty of cheap fish in their diets: if only they had ice and transport. He mentions that 'mullowe' can be caught in the Lakes as well as other estuarine species.[4]

Below are just a few excerpts from newspaper articles with quotes from South Australian Lower Lake fishers between 1902 and 1943.

> *1902 - "They handed to the Minister a petition, signed by 39 fishermen, in which it was stated that if the proclamation were enforced the best part of their means of livelihood would be gone; that they only fished in the lake when the water was either brackish or salt, and did not in any way interfere with fresh water fish;"*[5]
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> *1933 - "Contending that the proposed Murray barrage scheme will not benefit settlers higher up the river, that low-lying country will be flooded and that the livelihood of many licensed fishermen between Tailem Bend and Goolwa will be jeopardised, the Woodrow brothers of this town strongly oppose it. "*
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> *1933 - "The scheme is to deal with the salinity of the water to safeguard dairymen and blockers." Mr. Woodrow said."* [6]
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> *1933 - "Local fishermen have arranged it to support their evidence against building barrages. Nine cutters have been anchored near the jetty, and hundreds of nets have been hung on*

seven drying lines on the shore at the lake. Probably 200 more have been draped over the railing at the shore end of the jetty. "[7]

1933 - Mr. Bruce said that there were about 40 to 44 men at Goolwa dependent on fishing for their sole livelihood, 20 to 30 at Milang, four at Langhorn's Creek, who fished at Mulgundawa, and about four at Narrung. If the barrage were built it would practically wipe out the butterfish, and men would be thrown out of employment at Milang, Mulgundawa, and Narrung, and twelve to fourteen men would be affected at Goolwa."[8]

1933 - "Opening of the gates in the barrages in winter would not help, because it was only between December and March that butterfish from the sea entered the lake."[9]

1946 - "It is only within the last four years that fish have become scarcer than usual, mainly because two of the most important fish have dropped back 80 per cent; mullet and butterfish. The Coorong is the only place for these fish to enter now, but owing to Government interference with the water and lack of consideration for the fishing industry they have become scarce and are likely to remain so. Fishermen have been robbed of their living to help the landowner, who so far has done nothing with the fresh water locked by the barrages."[10]

A flourishing mulloway fishery in the Lower Lakes is documented in the late Director of Fisheries A.M. Olsen 1991 report, that while other fisheries may have been affected and survived, the "mulloway fishery was decimated by the barrages".[11] Currently, it is a sad testimony to our stewardship of the Lower Lakes that the Lower Lake Coorong fishery catches more carp now than it used to catch mulloway.

According to a recently published report in 2011 on mulloway by G.J. Ferguson and T.M. Ward,

"The population of mulloway in south-eastern South Australia has been depleted by reduced/degraded estuarine habitat resulting from flow regulation in the Murray River system. Construction of barrages reduced estuarine habitat by 89% and annual catches by 83% in the early 1940s and subsequent abstraction of water for irrigation has reduced the frequency and severity of flood events, with complete closure of the Murray River mouth in several years."[12]

To deny the Lower Lakes were estuaries and pretend the Lakes used to always be full of exclusively freshwater, as the popular history tells us, is to deny the evidence that mulloway (butterfish) routinely entered the lakes as part of their life cycle. It also labels fishermen with decades of experience as opportunists. To say the 'Lakes have always been fresh' also shows a lack of respect to the Ngarrindgjeri who clearly know this was not the case.

The history that should be acknowledged is that settlers and squatters found the natural rythym of the fresh and salt water cycles of the Lakes to be incompatible with intensive agriculture and irrigation schemes, and so they changed it.

AMERICANS DIKED AND CHANGED THEIR ESTUARIES TOO

Estuarine degradation from agrarian pursuits from the late 1800's is not unique to Australia. Along the West Coast of the United States there are over 50 estuarine sites that were previously 'diked' in the late 1800's that are now in the process of being restored. Americans use the term 'dike' for 'barrage'.

Scientists in Oregon and Washington are finding ways to restore estuaries. From the University of Washington, School of Fisheries, "Restoration Potential of Diked Estuarine Wetlands":

> *"Restoring tidal circulation to historically-diked estuarine wetlands represents one of the most available and effective means of rehabilitating large areas of degraded coastal wetlands (Frenkel and Morlan 1990; Kusler and Kentula 1990; NRC 1992)"*

Habitat restoration primarily to protect the salmon means upgrading old dams with fish ladders, or taking the dams out. The federal 'Endangered Species Act' requires that National Oceanic and Atmospheric Administration Fisheries develop recovery plans for conservation and survival of listed species. Projects have included removal of sea dikes and dams that impede the movement of fish between marine and freshwater habitats. The National Estuarine Research Reserve coordinates a network of project in over 28 regions around the United States. [13]

A few of these projects are listed below:

Brown Farm Dike in Washington State was removed after a century of blocking tidal flow. This allowed the tides to return to over 760 acres of the Nisqually National Wildlife Refuge. Together with 190 acres of wetlands restored by the Nisqually Indian Tribe, the Nisqually Delta represents the largest estuary restoration project in the Pacific Northwest to assist in recovery of Puget Sound salmon and wildlife populations. The restoration team won a national in 2011.[14]

At Port Susan Bay Preserve, in the Stillaguamish River estuary south of Stanwood, the Nature Conservancy will remove nearly 1.4 miles of existing sea dike and build nearly 1 mile of new setback dike to protect neighboring farmlands. [15]

At Little Quilcene Estuary, which is 12.2 miles in length, the project aims to restore more natural estuarine function, removing approximately 700 feet of sea-dike from the eastern portion of the estuary and 1,500 feet of dike on the north side of the river. The tidal and wave action, after the restoration, was allowed fuller access to the entire northern portion of the larger Quilcene estuary.[16]

Padilla Bay, north of Seattle, is also being restored.[17]

> *"Since the arrival of settlers in the late 1800s and the initiation of logging, diking, and agriculture, significant changes to the margins of the bay and the surrounding lands have occurred. .. Other diking proposals were considered, such as the one to* ***dike the entire bay*** *(this was actually started in the early 1920s), but were abandoned due to financial or physical problems."*[18]

Farmer settlers at the end of the 19th century used dikes to secure freshwater sources and reclaim 900 acres of land for agriculture. This land was protected behind dikes that were created to keep saltwater from intruding onto the farmland. The projects goal is to gain conservation easements or other controls on these lands to allow farming to continue while not allowing more intensive uses of the land.

ESTUARINE SCIENCE STILL DEVELOPING

According to Paul Hooybar of Oregon State University, estuarine science is still developing. In his paper, "SALMON AND ESTUARIES Vital linkages learned at Salmon River", he says,

> *"Research into how healthy estuaries and watersheds function is still nascent. This is partly due to the perception that estuaries are simply marshlands of little benefit unless they are dredged or diked for more utilitarian uses. Partly, too, estuaries don't neatly fit the traditional research interests of oceanographers or river scientists. But neglect of estuaries also refiects a bias that technology is a panacea for many environmental challenges. In many ways, management of estuaries and salmon fisheries over the past 150 years provides a case study in the unintended consequences of an exuberant reliance on technology to fix complex ecological problems."*[19]

The Murray River did not have a salmon run, but it did once have a vast estuary and species like mulloway once moved between the Southern Ocean and the Lakes using the Lower Lakes as habitat for juveniles. An 'unintended consequence' of the barrages is that they have destroyed prime habitat for mulloway and estuarine fish.

The other iconic species missing from the Lower Lakes is murray cod. Despite the Lower Lakes now being permanently fresh, this species has also disappeared from the Lakes.

THE ELWHA DAM REMOVAL

The Elwha Dam removal project in Washington State is the largest dam removal in United States history. [20] It has taken thirty years to reach this point with environmentalists teaming up with the local native american tribes and government to restore historic salmon habitat. The project has been underway with one of the two dams already removed.

While circumstances are different to the issues faced here in arid South Australia, what this project shows is that 1920 concrete structures, when they have outlived their usefulness, can be taken out for the good of the environment.

While the dams and weirs upstream in the Murray Darling Basin change the flow of the river, dikes across the *tidal part of an estuary* carry additonal risks due to their unique location near the sea. This risk was anticipated in 1903 before the barrages were built. In this report 'The Murray Barrage Report by Experts' [21] prepared in 1903 by T. W. Keele (Principal Engineer of Harbors and Rivers of New SouthWales), W. Davidson (Inspector-General of Public Works of Victoria), and A. B. Moncrieff (Engineer-in-Chief), on the proposed Murray River barrage, the experts warn of 'Disquieting Possibilities' such as:

> *"The construction of a weir or dam in the* ***tidal compartment of a rive****r has invariably been found to result in the shoaling not only of the portion of the river immediately above the dam, but also below it. "*

> *"In view of the experience of the recent drought, there can be no doubt that if the barrage referred to had been erected five years ago it would have required nearly the whole available flow of the river to keep the lakes sweet and open for navigation."*

These are just a couple of the 'disquieting possibilities' that we are facing today and into the future.

CONCLUSION

Based on the success of estuary restoration projects overseas, the restoration of the estuary of Australia's largest river should be a major national goal.

The Lower Lakes history needs to be written more broadly to include the voices of fishermen and the Ngarrindjeri and to acknowledge the Lower Lake's estuarine past. This would require an acknowledgement of past mistakes, acknowledging that the Lower Lakes hydrology has been modified by early 20th century agrarian influences and that blocking the tides has impacted on the Lower Lakes 'health' just as much as fresh water diversions upstream.

Modern day reports, modelling, and other scientific theories need to be modified to incorporate this information.

There needs to be an Environmental Impact Statement developed that explores the possibility and advantages of restoring the River Murray Estuary - including just how much fresh water that would take independent of other agricultural and urban water requirements.

One important goal of the Murray-Darling Basin Plan should be the restoration of the mulloway and estuarine fishery.

Only then can we move forward from a common point of agreement on what constitutes a 'healthy river'.

Susan Myers has owned a shack along the Goolwa Channel of the River Murray in South Australia for the last ten years. She visits Oregon and the Columbia River Gorge frequently and hopes someday to see mulloway finding their way back to their old hunting grounds just as the salmon have found their rivers restored.

ENDNOTES

[1] A World that Was: The Yaraldi of the Murray River and the Lakes, South Australia, Berndt and Stanton, pg 79

[2] http://www.ngarrindjeri.org.au/wp-content/uploads/2010/11/ngarrindjeri-sea-country.pdf

[3] Ibid.

[4] MURRAY FISH AND ADELAIDE MEAT. (1865, November 16).*South Australian Register* (Adelaide, SA : 1839 - 1900), p. 2. Retrieved April 14, 2012, from http://nla.gov.au/nla.news-article41020171

[5] PROTECTING FISH. (1902, January 14). *The Advertiser*(Adelaide, SA : 1889 - 1931), p. 3. Retrieved April 14, 2012, from http://nla.gov.au/nla.news-article4923601

[6] WILL BARRAGE BENEFIT BLOCKERS?. (1933, July 28). *The Advertiser* (Adelaide, SA : 1931 - 1954), p. 23. Retrieved September 30, 2011, from http://nla.gov.au/nla.news-article74025373

[7] (1933, October 13). The Advertiser (Adelaide, SA : 1931-1954), p. 20. Retrieved June 30, 2011, from http://nla.gov.au/nla.news-article36449223

[8] "BARRAGES WOULD KILL BUTTERFISH". (1933, October 25).The Advertiser (Adelaide, SA : 1931 - 1954), p. 22. Retrieved August 16, 2011, from http://nla.gov.au/nla.news-article36452028

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[10] Points From Letters. (1946, July 24). *The Advertiser* (Adelaide, SA : 1931 - 1954), p. 10. Retrieved April 14, 2012, from http://nla.gov.au/nla.news-article35706152

[11] The Coorong - A Multi-species Fishery. Part 1 – History and Development", Olsen 1991

[12]http://www.sardi.sa.gov.au/__data/assets/pdf_file/0003/159852/Mulloway_Argyrosomus_japonicus_Fishery._Fishery_Stock_Assessment_Report_for_PIRSA_Fisheries_and_Aquaculture.pdf

[13] http://nerrs.noaa.gov

[14] http://yosemite.epa.gov/opa/admpress.nsf/0/cc07f56fcf16c1218525796400729c72?OpenDocument

[15]http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/washington/placesweprotect/portsusanbay_08.pdf

[16] http://www.kitsapsun.com/news/2009/sep/19/massive-effort-under-way-to-take-back-the-little/#ixzz1mWkMRKIy

[17] http://nerrs.noaa.gov/Doc/PDF/Reserve/PDB_MgmtPlan.pdf (14 MB)

[18] ibid

[19] http://seagrant.oregonstate.edu/sites/default/files/sgpubs/onlinepubs/g07003.html

[20] http://seattletimes.nwsource.com/html/localnews/2016083904_elwhaoverview18m.html

[21] THE MURRAY BARRAGE. (1903, August 20). *The Advertiser*(Adelaide, SA : 1889-1931), p. 8. Retrieved June 29, 2011, from http://nla.gov.au/nla.news-article4987833