Alien Fishes Committee Report - May 2001

Compiled by Tarmo Raadik

State representatives for the sub-committee are listed below. The Sub-committee meets once a year during the Annual Conference, and the meeting is open for all to attend. For further details, ideas, questions or suggestions, please contact your state representative or anyone listed below.

Chairperson

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Members

NSW - David Pollard, Ph: 029 527 8422, Fax: 029 527 8576. E-mail:pollardd@fisheries.nsw.gov.au.
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NT – Andria Marshall, Ph: 08 8999 2126, Fax: 08 8981 2065. E-mail:andria.marshall@dpif.nt.gov.au.
WA - no current member.
SA - no current member.

News

Victoria - by Tarmo Raadik

- **Continuing Spread of Carp in Victoria:** Until recently (1990) there were only eight of the 30 river basins in Victoria, all coastal, which did not contain carp (*Cyprinus carpio*): basin 20 Towamba River, 21 East Gippsland, 22 Snowy River, 35 Otway Coast, 36 Hopkins River, 37 Portland Coast, 38 Glenelg River, and 39 Millicent Coast. Carp were present in Lake Bolac (Hopkins River basin) in the early 1970's but appear to have died out. Then in 1993 a single carp was collected from Lake Burrumbete within the basin, and then in 1997 from Deep Lake near Derrinallum. More recently, carp have been recorded in Rocklands Reservoir at the top of the Glenelg River (February 2001), and

surveys have found one individual (and illegally stocked Australian Bass*Macquaria novemaculeata*) in the river below the reservoir. The method of introduction is currently unknown, but may be from use of live-bait, or movement of carp over the Great Dividing Range from the adjacent Wimmera River basin via water transfer channels. Contact Tarmo Raadik.

- **MDBC Exotic Species Project:** A project is underway for the Murray-Darling Basin Commission to: identify current and potential aquatic pest species within the basin; develop a conceptual model which depicts potential impacts on aquatic environments; develop a risk assessment process to assess and prioritise species and significance of threats; to review currently available educational material, and to develop project briefs to fill knowledge gaps and research needs. Contact pam.clunie@nre.vic.gov.au.
- **AFFA Oriental Weatherloach project: The Potential spread and impact of the alien fish Weatherloach:** Freshwater Ecology Group, Arthur Rylah Institute, with Mark Lintermans (Environment ACT) have begun work on a scoping study to collate and investigate aspects of the species biology, ecology, and distribution of Oriental Weatherloach (*Misgurnus anguillicaudatus*) to determine its potential spread and impact within the Murray-Darling basin. Contact: Tarmo Raadik.
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- **species:** During February to March 2001, Fisheries Victoria undertook a review of species declared as noxious under section 75 of the *Fisheries Act*1995 with the aim to update and amend the list. Currently there are 116 species and species groups listed as noxious in the state. A discussion paper was prepared with a proposed list containing additions and amendments, with a number of freshwater aquarium and recreational species being included which have not as yet escaped or established populations in the wild. One notable exception was the inclusion of Roach (*Rutilus rutilus*), proposed for listing as it is increasingly being used as live bait and moved around the state. Roach have now been spread to the Bunyip River and Barwon River basins in coastal Victoria, and to the Loddon River system in northern Victoria. Self-sustaining populations are now established in each of these basins. Contactjohn.garnham@nre.vic.gov.au.
- **AFFA Carp project update:** Freshwater Ecology, Arthur Rylah Institute have been investigating the biology of carp populations in the wetlands of the Murray River at the Barmah-Millewa forest since 1999 in a three-year “point source management of carp” project funded by the Murray-Darling 2001 Fish Rehab program. Project objectives include identification of the importance of flooded off-stream areas to carp recruitment and also implementation of control measures. To date 47 adult and 10 juvenile carp have been radio tracked to determine movements and habitat preferences. Results indicate that most adult carp inhabit a home area, but others are capable of long distance movements. In spring large numbers of young-of-the-year carp were collected from spawning areas on the Barmah floodplain. It appears that the spawning patterns of carp are part of a successful life history strategy, which they have successfully adapted for Australian rivers. Consequently, wetlands may play a unique role in the management of carp populations. Contact:ivor.stuart@nre.vic.gov.au.

- **Flora and Fauna Translocation Committee:** Parks, Flora and Fauna Division of the Department of Natural Resources and Environment has established a committee to review and make recommendations on all requests for stocking and translocation of aquatic fauna received by Fisheries Victoria. The committee consists of John Koehn (chair), Gary Backhouse, Tarmo Raadik, Bill O'Connor, and Maria Bonfa (secretarial support and committee contact –maria.bonfa@nre.vic.gov.au).
- **Hazelwood Pondage rivals Lakes Victoria and Nicaragua for cichlid diversity?:** Until recently Hazelwood Pondage, a warm-water effluent pondage for the Hazelwood power station in the LaTrobe Valley contained self-sustaining populations of the South American convict cichlid (*Archocentrus*(*Chichlasoma*) *nigrofasciatus*), and the African cichlid spotted Tilapia (*Tilapia mariae*), first reported in 1980. Both species were still present during a survey in March 1994, along with carp, goldfish (*Carassius auratus*), Gambusia (*Gambusia holbrooki*), and the native short-finned eel (*Anguilla australis*) and Australian smelt (*Retropinna semoni*). In February 2000 two additional exotic species had become established: the South American blue acara (*Aequidens pulcher*) and a potential cross between African Lake Malawi cichlids*Labeotropheus* sp. and *Pseudotropheus zebra*(?). More recently in April 2001, the Central American Red Devil from Lake Nicaragua (*Amphilophus*(*Cichlasoma*) *labiatus*) was also discovered, with a breeding pair and nest observed, and young fish from earlier spawning also present. The last three species require final verification against published keys. Contact: Tarmo Raadik.
- **Victorian Freshwater Exotic Species (fish and decapod crustacea established in the wild):** Yellowfin Goby (*Acanthogobius flavimanus*), carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), tench (*Tinca tinca*), roach (*Rutilus rutilus*), Oriental Weatherloach (*Misgurnus anguillicaudatus*), Gambusia (*Gambusia holbrooki*), redfin (*Perca fluviatilis*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchys mykiss*), convict cichlid (see above), spotted tilapia (see above), red devil (see above), blue acara (see above), marron (*Cherax tenuimanus*).
- **Victorian Noxious Species:** Species currently declared noxious in the state under the Victorian *Fisheries Act 1995*: Redclaw crayfish (*Cherax quadricarinatus*), marron (*Cherax tenuimanus*), carp, gambusia, and, Oriental Weatherloach, and an additional 107 species, genera or families of non-established mainly aquarium species, and including marine pests such as starfish, mussels, fan worms, and rice grasses (seehttp://resourceweb/fisheries/fish_policy_desktop.html)

South Australia - by Tarmo Raadik

- **Spread of Gambusia in SA:** Gambusia (*Gambusia holbrooki*) were discovered in Mulcorina Bore, 60 km north of Mare, during July 2000.

Northern Territory - by Andria Marshall and Tarmo Raadik

- **Gambusia in the NT:** A population of Gambusia (*Gambusia holbrooki*) was discovered in June 2000 in a 183 ha wetland in Alice Springs, and appears to be the first record for this exotic species in the Northern Territory. The population was discovered by the local

Waterwatch Coordinator Robbie Henderson. An eradication was conducted during 2000. Further update in next issue. (Contact: robbie.henderson@nt.gov.au).

- **NT Exotic Species:** Currently the following species are listed as noxious under Schedule 1 of the NT *Fisheries Regulations Act* 2000 in force under the NT *Fisheries Act* 2000: Carp, Gambusia (all species), Tilapia (all species in the genus *Tilapia*), Piranha (all species), Walking Catfish (family Clariidae), Chocolate cichlid (*Cichlasoma coryphaenoides*), and tinfoil barb (*Barbus schwanenfeldi*). Under Schedule 4 of the regulations, Black-striped mussel (*Congeria sallei*) is declared an Aquatic Pest (seehttp://www.nt.gov.au/dpif/legislation.shtml).
- **Aquatic Pest Management in the NT:** Prior to 1999 no record of noxious species had been reported in Darwin Harbour waters. On April 1, 1999 Darwin marina was quarantined under the Fisheries and Quarantine Acts as a result of an extensive invasion by the exotic Black Striped Mussel, *Mytilopsis sallei*. The introduced bivalve had the potential to seriously impact on local marine biodiversity and subsequently threaten the social and economic benefits derived from the marine environment including aquaculture, recreational and commercial fishing, domestic and international tourism, and the competitiveness of Territory ports and the shipping industry. Following the discovery, a rapid and coordinated response by the Northern Territory Government successfully contained then eradicated the species, at a cost exceeding $2.2 million dollars. This is the first documented instance in the World of a successful eradication of a marine pest.

In recognition of the vulnerability of Darwin Harbour as a primary port and popular tourist destination to invasion by exotic organisms, an Aquatic Pest Management Program has been established within the Fisheries Division of the Department of Primary Industry. The Program will monitor Territory waters for the appearance of exotic species, liase with sectors of the community to raise awareness of marine and freshwater pest issues, and implement policy designed to minimise the chances of a recurrence of an event similar to the invasion and eradication of the Black Striped Mussel. In undertaking these tasks the Aquatic Pest Management Program has successfully excluded three marine mussel species from entering and establishing in Darwin marina waters: the Asian Green Mussel, *Perna viridis*, the Asian bag mussel,*Musculista senhousia* and the Black Striped Mussel *Mytilopsis sp*; under the auspices of the vessel inspection program. Any internationally travelled vessel destined for any of Darwin's four enclosed marinas are subject to a hull and internal seawater systems inspection vigilant for exotic species. Where exotics are found the vessel is quarantined and treated prior to being permitted entry to the marinas.

In addition to providing a barrier control service to marinas and monitoring coastal waters for the appearance of exotic species, the scope of Aquatic Pest Management also encompasses management of exotic freshwater fishes. In June 2000 a member of the public reported the presence of a previously unseen brightly coloured fish in a suburban waterway. Samples of the fish were collected and submitted to Dr Helen Larson at the Museum & Art Gallery of the Northern Territory for identification. The fish was identified as the noxious jewel cichlid *Hemichromis bimaculatus*. An eradication exercise was planned to coincide with minimal flow in the creek prior to the arrival of wet season rains. In October 2000 Aquatic Pest

Management successfully coordinated the eradication of the jewel cichlid population. The 2 km length of creek was flushed with rotenone and all fish killed collected. In addition to the jewel cichlid, numerous guppies were also removed from the water way. The creek was restocked with endemic rainbow fish, empire gudgeon and macroinvertebrates from a nearby stream in February 2001. Today the creek is a healthy self-sustaining ecosystem devoid of exotic species.

The Territory community have proven extremely cooperative when alerted to the peril that our native fishes face through the introduction of the highly competitive exotic species and are keen to be of assistance. Complementary to our marine based monitoring program, vessel inspection and pubic education programs is the maintenance of an Aquatic Pest Hotline. The Aquatic Pest Management team comprises:

Program Coordinator, Andria Marshall 08 8999 2126 Andria.Marshall@dpif.nt.gov.au
Research Officer, Steve Sly 0417 805208
Technical Officer, Trent Williams

Queensland - by Rachel Mackenzie and Tarmo Raadik

- **Strategy for the Control of Pest Fish:** QDPI launched a *Strategy for the Control of Exotic Pest Fish in Queensland Freshwaters* during February 2001. This strategy was developed to complement the *National Management Strategy for Carp Control*, launched in October 2000. The strategy recognised that eradication of pest fish was almost impossible and therefore focussed on controlling their spread. Contact QDPI for a copy.
- **Spread of Tilapia in Queensland:** In 1998 Mozambique tilapia (*Tilapia mossambicus*) was discovered in West Creek in the upper reaches of the Murray-Darling Basin near Toowoomba. It appears that this species has not become established.
- **Potential spread of Tilapia:** There is the potential for Tilapia, which have been found established in October 2000 in the Tinaroo Falls dam in the coastal Barron River catchment, to spread into the Mitchell River system (Gulf of Carpentaria) via inter-basin transfer of water.
- **Cichlids:** A single specimen of *Cichlasoma synspilum* was collected from Leslie Dam (Condamine Catchment near Warwick) by a recreational angler in 1997.
- **Exotic fishes:** There are seventeen species of exotic fish that have established self-sustaining populations in Queensland. Of these, carp (*Cyprinus carpio*), gambusia (*Gambusia holbrooki*) and Mozambique tilapia (*Oreochromis mossambicus*) are listed as noxious.

Australian Capital Territory - by Mark Lintermans

- **ACT Freshwater Exotic Species (fish established in the wild):** Carp, goldfish, Gambusia, Oriental weatherloach, redfin, brown trout and rainbow trout. There are also continuing illegal stockings of brook trout (*Salvelinus alpinus*).
- **ACT Noxious species:** No species are currently declared noxious under the ACT *Fisheries Act 2000*.

Tasmania - by John Diggle

- **Carp Management Program:** In 1995, carp (*Cyprinus carpio*) were discovered in lakes Sorell and Crescent in Tasmania's Central Highlands region. The Inland Fisheries Service has implemented a State Government funded program since the discovery, with priority given to preventing the spread of carp through the state and population control/eradication. Carp have been contained by screening the outflow from Lake Crescent, and controlling access of the public to infested waters. Annual distribution surveys downstream of Lake Crescent and investigation of fish sightings around the State have found no evidence of carp outside of lakes Sorell and Crescent. Population control has been successful in Lake Crescent where the population has been reduced from over 7000 to an estimated 400 individuals. This was achieved through fishdown using radiotracking to target spawning aggregations and water level management, which has prevented carp from recruiting since summer 1996/97. Control of recruitment has not been as successful in Lake Sorell where carp have recruited every second year. Contact: John Diggle (jdiggle@ifs.tas.gov.au).
- **FRDC project Eradicating European carp from Tasmania and implications for national European Carp eradication:** In summer 2000/01 the Inland Fisheries Service in collaboration with CSIRO Fisheries commenced a 3 year project to examine the feasibility of eradicating carp from Tasmania. The project will be based around the population control activities of the Carp Management Program and will seek to model the population decline and assess the likelihood of achieving eradication. It is hoped that the methods employed may have applicability in other closed systems around Australia. Contact: Nic Bax (Nic.Bax@marine.csiro.au) or John Diggle (jdiggle@ifs.tas.gov.au).
- **Tasmanian Freshwater exotic species (fish and decapod crustacea established in the wild)**: carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), tench (*Tinca tinca*), redfin (*Perca fluviatilis*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss),* brook trout (*Salvelinus fontinalis*), yabby (*Cherax destructor*).
- **Tasmanian Legislation:** Carp (*Cyprinus carpio*) and Yabbies (*Cherax sp.)* are controlled fish under section 149 of the Inland Fisheries Act 1995. This is the highest category of pest fish and there are wide powers to take any action necessary to prevent the spread of fish declared as controlled. In response to the problems created by bait fishers translocating fish, use of fish (alive or dead) as bait has been banned in all inland waters other than estuarine waters. This is covered in the Inland Fisheries (Recreational Fishing) Regulations 1999. Contact: Vic Causby (vicc@ifs.tas.gov.au)

New South Wales - by Tarmo Raadik and Anthony Moore

- **Banded Grunter in NSW:** Banded Grunter (*Amniataba percoides*), native to Queensland, Northern Territory, northern South Australia, and Western Australia, has been introduced into the Clarence River via contaminated fish stocks. This species has recently been declared noxious in NSW.
- **NSW noxious species:** Currently the following fish are listed as noxious under Section 229 of the NSW *Fisheries Management (General) Regulations* 1995: Banded Grunter,

Mozambique tilapia (*Oreochromis mossambicus*), redbelly tilapia (*Tilapia zilii*), and spotted tilapia (*Tilapia mariae*).

- **Other exotics:** swordtail (*Xiphophorus helleri*) have recently been recorded from Lake Ainsworth Contact: Anthony Moore.

Western Australia - by Tarmo Raadik

- **WA noxious species:** Currently the following fish are listed as noxious under Schedule 5 of the *Fish Resources Management Regulations* 1995: Grass carp (*Ctenopharyngodon idellus*), Nile perch (*Lates niloticus*), Parasitic catfish (Family Trichomycteridae), Pike cichlid (*Crenicichla lepidota*), Piranha (*Serrasalmus* spp.), Snakehead (*Channa* spp.), Tiger catfish (*Pseudoplatystoma fasciatum*), Tiger catfish (*Hydrocynus goliath*), Walking catfish (*Clarias batrachus*), and Oriental weatherloach.
  Seehttp://www.wa.gov.au/westfish/hab/broc/import/

National - by Tarmo Raadik

- **National Management Strategy for Carp Control:** The *National Management Strategy for Carp Control 2000-2005* was recently released. This document was produced by the Carp Control Coordinating Group under the Murray-Darling 2001 Fish Rehab Program of the National Heritage Trust. Two other documents were also produced to support the strategy: *Future Directions for Research into Carp* (prepared by the Carp Control Coordinating Group), and *Ranking areas for Action – a guide for carp management groups* (by Mike Braysher and Jim Barrett). All three documents are available as pdf files from the Murray-Darling Basin Commission website (see below).

New Zealand - by Richard Allibone

- **Range extensions of exotic fish:** New populations of the coarse fish species, tench (*Tinca tinca*), rudd (*Scardinius erthrophthalmus*), redfin perch (*Perca fluviatilis*), goldfish (*Carassius auratus*) and koi carp (*Cyprinus carpio*) together with *Gambusia affinis* have been located in a series of ponds in the Nelson region of the South Island by the Department of Conservation (DOC). These are the first records of koi carp and *Gambusia* in the South Island and for the other species the nearest known populations are 300 km or more further south. Therefore, all the occurrences are thought to be the result of illegal introductions. At present, all ponds containing *Gambusia* are being treated with rotenone. Further new occurrences of koi carp have been found in the North Island in Auckland, Bay of Plenty and Wanganui. The two koi populations in the Bay of Plenty are presently being removed. *Gambusia* is now found in many North Island areas with populations now recorded from several areas of the lower North Island. Brown trout (*Salmo trutta*) have again confirmed to be present in Lake Christabel, a faunistic reserve established to protect one of the few remaining lakes without salmonids and a landlocked population of *G. brevipinnis*.
  Contact: lchadderton@doc.govt.nz orngrainger@doc.govt.nz.

- **Aquatic plant impacts:** The Aquatic Plants group at NIWA Hamilton are evaluating the role that coarse fish species have on submerged aquatic plants in NZ lakes. Experiments have already demonstrated that rudd can have a significant direct feeding impact on aquatic vegetation. Feeding selectivity on plants species has been identified. Trials have involved underwater video surveillance in large outdoor troughs and in natural waterbodies, as well as exclosure experiments in Lake Rotoroa as part of a lake restoration project. The next series of experiments will focus on bottom sediment disturbance by coarse fish, initially focusing on brown bullhead (*Ameiurus nebulosus*). Contact: j.clayton@niwa.cri.nz. Macrophyte control studies using grass carp (*Ctenopharyngodon idella*) are also continuing with completion of a joint project between DOC, NIWA and University of Waikato. Contact: r.wells@niwa.cri.nz
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- **impact assessments:** Gordon Glova at NIWA Christchurch is currently investigating the response of native fish species (galaxiids) to the threat of brown trout predation. Contact: g.glova@niwa.cri.nz. Colin Townsend (U. of Otago) and Barry Biggs, (NIWA Christchurch) with Kevin Simon (U. of Otago) have commenced investigations of top down trophic cascade effects of brown trout verses a native galaxiid. The investigation compares the effect of the two fish on invertebrates, algae and nutrient cycling in small relatively pristine streams.
  Contact: colin.townsend@stonebow.otago.ac.nz orb.biggs@niwa.cri.nz. Angus McIntosh at the University of Canterbury has recently completed and published the results of extensive field surveys and experimental trials looking at the occurrence of galaxiids and brown trout in the Canterbury high country rivers. The results show co-existence of galaxiids and trout only occur when the trout do not attain sizes larger than 150 mm. Interactions between the species were also mediated by the frequency of disturbance events in the streams. Contact:a.macintosh@zool.canterbury.ac.nz.
- **Red-finned perch:** Gerry Closs and Ben Ludgate have complete the field work component of the red-finned perch removal experiment. They have attempted to remove perch from three wetland ponds, with comparisons on fish, macroinvertebrates and zooplankton being made with three control ponds. It appears that the perch removal has been successful in two of the three ponds. In these ponds the abundance of common bullies has increased markedly over the past two years relative to the other ponds. Analysis of macroinvertebrate and zooplankton is pending.
  Contact:gerry.closs@stonebow.otago.ac.nz. Permission is being sort, by a private individual in Otago, to start the first red-finned perch farm in New Zealand and the application is presently under review by Fish and Game Otago.
- **NZ exotic fishes:** A number of exotic fishes are known from New Zealand (Table 1).

Table 1. New Zealand exotic fish species, legal status under the Conservation Act and distribution

Species	Sports fish	Introduced	Noxious fish	Unwanted	Islands.

Brown trout (*Salmo trutta*)	*	*			North, South
Atlantic salmon *(Salmo salar*)	*	*			South
Rainbow trout (*Onchorhynchus mykiss*)	*	*			North, South
Chinook salmon (*O. tshawytscha*)	*	*			North, South[1]
Sockeye salmon (*O. nerka*)	*	*			South
Brook char (*Salvelinus fontialis*)	*	*			North, South
Lake char (*S. namaycush*)	*	*			South
Red-finned perch (*Perca fluviatilis*)	*	*			North, South
Tench (*Tinca tinca*)	*	*			North, South
Rudd (*Scardinius erthrophthalmus)*	*[2]	*	*		North, South
Orfe (*Leciscus idus*)		*			North
Silver carp (*Hypophthalmichthys molitrix*)		*			North
Grass carp		*			North, South
Koi carp (*Cyprinus carpio*)		*	*	*	North, South
Goldfish (*Carassius auratus*)		*			North, South
Mosquito fish (*Gambusia affinis*)		*		*	North, South

Caudo (*Phalloceras caudimaculatus*)		*			North
Sailfin molly (*Poecilia latipinna*)		*			North
Guppy (*Poecilia reticulata*)		*			North
Swordtail (*Xiphophorus helleri*)		*			North
Brown bullhead		*			North, South

[1] Possibly also present on Stewart Island, one juvenile collected from a Stewart Island river in 1988.

[2] a sports fish in the Auckland Waikato Fish and Game region, but a noxious fish throughout the rest of New Zealand.

Our Roving Reporter - Patricia Kailola

- **Snakeheads in PNG:** Snakeheads (*Channa* spp.) have become established in the Fly River system.
- **Eradication of Invasive Species from Islands** workshop. The workshop was held during February 2001 in New Zealand. Besides a paper by Nik Bax (CSIRO) on the striped mussel in Darwin Harbour, there were no other aquatic papers presented.

Useful web addresses:

Australia

- AQIS home page
  http://www.affa.gov.au/outputs/quarantine.html
- AQIS Bulletin
  http://www.affa.gov.au/docs/quarantine/about/index.html
- Carp location database
  http://www.recfishoz.com/NCTF/Carpdatabase.htm
- CRIMP (Centre for Research on Introduced Marine Pests)
  http://www.marine.csiro.au/CRIMP/
- *Cyprinus* newsletter
  http://www.recfishoz.com/NCTF/cyprinus_newsletter_of_the_natio.htm
- National Carp Taskforce
  http://www.recfishoz.com/NCTF/

- Pest Animal Control CRC
  http://www.pestanimal.crc.org.au/home.html

International

- Aquatic nuisance species taskforce
  http://www.ANSTaskForce.gov/
- Aquatic species introductions database
  http://www.fao.org/waicent/faoinfo/fishery/statist/fisoft/dias/index.htm
- Database on introductions of aquatic species
  http://www.fao.org/fi/statist/fisoft/dias/MAINPAGE.HTM
- FishBase
  http://www.webcityof.com/mifftitl.htm
- Gambusia control home page
  http://www.gambusia.net/
- Introduced Fish Section, American Fisheries Society
  http://www.afsifs.vt.edu/
- Invasive species program, US Fish and Wildlife Service
  http://invasives.fws.gov/
- IUCN Invasive Species Specialist Group
  http://www.issg.org/
- Non-indigenous species in the Gulf of Mexico
  http://lionfish.ims.usm.edu/~musweb/invaders.html
- US Geological Survey, non-indigenous fish in the US
  http://nas.er.usgs.gov/fishes/fisheslist.htm

Web Publications

Arthington, A. and McKenzie, F. 1997. ***Review of impacts of displaced/introduced fauna associated with inland waters***. Australia: State of the Environment Technical Paper Series (Inland Waters), Department of the Environment, Canberra. .pdf version at: http://www.environment.gov.au/soe/techpapers/pubs/14fauna.pdf

Copies of Cadwallader, P.L. 1996. ***Overview of the Impacts of Introduced Salmonids on Australian Native Fauna***, are still available from Environment Australia - order via the internet at:http://www.environment.gov.au/library/pubs/pubs_subject.html#invasive

National Policy for the Translocation of Live Aquatic Organisms- http://www.affa.gov.au/corporate_docs/publications/pdf/fisheries/translocation.pdf

The *National Management Strategy for Carp Control*, along with *Future Directions for Research into Carp* and *Ranking Areas for Action: A guide for Carp Management Groups,* can be found at: http://www.mdbc.gov.au/education/publications/publications.htm