Roads and Traffic Authority

Pacific Highway Upgrade -Oxley Highway to Kempsey Flora and Fauna Working Paper September 2010

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8. References

- Adam, P, Urwin, N, Weiner, P & Sim, I 1985, Coastal wetlands of New South Wales: A survey and report prepared for the Coastal Council of New South Wales, Coastal Council of NSW, Sydney.
- Allen, GR, Midgely SH & Allen, M 2003, *Freshwater Fishes of Australia*, TFH Publications, Broookvale, NSW.
- AMBS 1995, Fauna Impact Statement for Gloucester and Chichester Management Areas, Report prepared for State Forests of NSW by Australian Museum Business Services (AMBS).
- AMBS 1997, Fauna usage of three underpasses beneath the F3 Freeway between Sydney and Newcastle, Report for NSW Roads and Traffic Authority.
- AMBS 2001, An Investigation of the use of Road Overpass Structures by Arboreal Marsupials, Report for New South Wales Roads and Traffic Authority.
- AMBS 2002, Fauna underpass monitoring, Stage two, Episode five. Bulahdelah to Coolongolook, Prepared for NSW Roads and Traffic Authority.
- Andrews, A 1990, 'Fragmentation of habitat by roads and utility corridors: a review', *Australian Zoologist* 26: 130-142.
- ANZECC 2000, Australia and New Zealand Guidelines For Fresh and Marine Water Quality, Australia and New Zealand Environment and Conservation Council and Agriculture and resource Management Council of Australia and New Zealand, Canberra.
- Ayers, D, Nash S & Baggett K 1996. *Threatened Species of Western New South Wales*. National Parks and Wildlife Service, Hurstville.
- Bali, R 2005, *Discussion paper Compensating for Edge Effects*, Report for the NSW, Roads and Traffic Authority, Ecosense Consulting.
- Ball, T & Goldingay, R 2008, 'Can wooden poles be used to reconnect habitat for a gliding mammal?' *Landscape and Urban Planning* 87:140–146.
- Barrett, G, Silcocks, A, Barry, S, Cunningham, R and Poulter R 2003, *The New Atlas of Australian Birds*, Royal Australasian Ornithologists Union.
- Bax, D 2006, *Karuah bypass fauna crossing report*, Report for New South Wales Roads and Traffic Authority.
- Biolink 2008, Area 13 UIA Koala Plan of Management, Report prepared by Biolink Pty Ltd Ecological Consultants, Uki, NSW, January 2008.
- BIOSIS Research 2004, Oxley Highway Deviation: Species Impact Statement, Prepared for the RTA 23 December 2004.
- Bond, A & Jones, D 2008, 'Temporal trends in use of fauna-friendly underpasses and overpasses', *Wildlife Research* 35: 103–112.
- Briggs JD and Leigh JH 1995, *Rare or Threatened Australian Plants,* CSIRO Publishing, Melbourne.
- Churchill, S 1998, Australian Bats, Reed New Holland, Sydney.

- Clancy, GP 1991, *The Biology and Management of the Osprey* (Pandion haliaetus) *in New South Wales*, National Parkes and Wildlife Service, Sydney.
- Cogger, HG 1992, Reptiles and Amphibians of Australia, Reed Books, Sydney.
- Connell Wagner 2000, Draft Koala Plan of Management Coastal Area. Part A, Hastings Council. December 2000.
- Debus, SJS & Chafer, CJ 1994, 'The Powerful Owl <u>Ninox strenua</u> in New South Wales', in *Aust. Birds* 28 supplement pp. 21 - 39.
- Department of Environment and Climate Change (DECC) 2007, DECC Atlas of NSW Wildlife Database.
- Department of Environment and Climate Change (DECC), DECC threatened species profiles, http://threatenedspecies.environment.nsw.gov.au/tsprofile/index.aspx
- Department of Environment and Climate Change (DECC) 2008, NSW Threatened Species Information – Scented Acronychia.
- Department of Environment, Climate Change and Water 2009. Draft Northern Rivers Regional Biodiversity Management Plan, National Recovery Plan for the Northern Rivers, DECCW NSW Sydney.
- Department of Environment and Conservation (DEC) & Department of Primary Industries (DPI), 2005, *Draft Guidelines for Threatened Species Assessment*. NSW Department of Environment and Conservation and Department of Primary Industries.
- Department of Environment and Conservation (DEC) 2004, *Threatened Biodiversity Survey and* Assessment: Guidelines for Developments and Activities, Working Draft, NSW Department of Environment and Conservation.
- Department of Environment and Conservation (DEC) 2006 Recovery Plans for the Large Forest Owls: Powerful Owl, Sooty Owl, Masked Owl, NSW Department of Environment and Conservation, October 2006.
- Department of Environment and Heritage (DEH) 2004, Tiger quoll (southeastern mainland the use of 1080: EPBC population) and Act policy statement 3.4 ecological Nationally threatened species and communities guidelines Department of the Environment and Heritage, May 2004.
- Department of Environment and Heritage (DEH) 2006, Significance Impact Guidelines 1.1- Matters of National Environmental Significance.
- Department of Environment, Water, Heritage and the Arts (DEWHA) 2007, Agreement between the Commonwealth of Australia and the State of New South Wales Relating to environmental impact assessment, Department of the Environment and Water Resources, 18 January 2007.
- Department of Environment, Water, Heritage and Arts (DEWHA) 2007, Protected Matters Search Tool- Matters of National Environmental Significance.
- Department of Environment, Water, Heritage and Arts (DEWHA) 2009, Draft Northern Rivers Regional Biodiversity Management Plan, National Recovery Plan for the Northern Rivers, Canberra.

- Department of Industry and Investment (DII) 2010, *Mapping the estuarine habitats of NSW*. Mapping available online http://www.dpi.nsw.gov.au/research/areas/systemsresearch/aquatic-ecosystems/estuarine-habitats-maps (date accessed 5 January 2010).
- Department of Land and Water Conservation (DLWC) 2002, *The NSW State groundwater dependent ecosystems policy*, NSW Department of Land and Water Conservation, Sydney
- Department of Primary Industries (DPI) 1999, Policy and Guidelines for Aquatic Habitat Management and Fish Conservation.
- Department of Primary Industries (DPI) 2003, *Policy and Guidelines for Fish Friendly Waterway Crossings.*
- Department of Primary Industries (DPI) 2005, *Oxleyan Pygmy Perch Recovery Plan,* prepared for the NSW Department of Primary Industries, Fisheries Management Branch, Nelson Bay.
- Dwyer, PD 1995, 'Common Bent-wing Bat', in Strahan, R (ed.), *The Australian Museum Complete* Book of Australian Mammals, Angus & Robertson, Sydney.
- Eamus, D 2009, *Identifying groundwater dependent ecosystems. A guide for land and water managers*. Report prepared for Land and Water Australia.
- Eamus, D, Froend, R, Loomes, R, Hose, G and Murray, B 2006, 'A functional methodology for determining the groundwater regime needed to maintain the health of groundwater-dependent vegetation', *Australian Journal of Botany*, vol. 54, pp. 97-114.
- Ecotone Ecological Consultants 2007, *Pacific Highway Upgrade- Oxley Highway to Kempsey. Advanced Terrestrial Flora and Fauna Report for the Preferred Route*, Report prepared for GHD on behalf of NSW Roads and Traffic Authority, June 2007.
- Ecotone Ecological Consultants 2006a, Preliminary Terrestrial Flora and Fauna Assessment for the Proposed Pacific Highway Upgrade from Oxley Highway to Kempsey – Advanced Investigations, Prepared for GHD Newcastle Pty Ltd on behalf of Roads and Traffic Authority.
- Ecotone Ecological Consultants 2006b, *Flora and Fauna Assessment Maria River Northbound Bridge Replacement, Pacific Highway, Kempsey.* Prepared for Roads and Traffic Authority.
- Edgar, R & Belcher, C 1995, 'Spotted-tailed Quoll', pp. 67 69 in *The Mammals of Australia*. ed. R. Strahan, Australian Museum and Reed, Sydney.
- Environment Australia 2000, *EPBC Administrative Guidelines on Significance*, Department of Environment and Heritage, Canberra.
- Fairfull, S and Witheridge, G 2003, *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings.* Prepared for NSW Fisheries, Cronulla, Sydney.
- Falk, NW, Graves, HB & Bellis, ED 1978, 'Highway right-of-way fences as deer deterrents', *Journal of Wildlife Management* 42:646-650.
- Fitzgerald, M 2006, *Survey for the Giant Barred Frog* <u>Mixophyes iteratus</u> *at Maria River New South Wales*, Report prepared for Ecotone Ecological Consultants by Mark Fitzgerald Ecological Consultant (17/05/2006), Mullumbimby, NSW.
- Fitzgerald, M, Shine, R, Lemckert, F & Towerton, A 2005, 'Habitat requirements of the threatened snake species <u>Hoplocephalus stephensii</u> (Elapidae) in eastern Australia', *Austral Ecology* 30: 465-474.

- Forman, RTT, Sperling, D, Bissonette, JA, Clevenger, AP,Cutshall, CD, Dale, VH, Fahrig, L, France, RL, Goldman, CR, Heanue, K, Jones, J, Swanson, F, Turrentine, T and Winter, TC 2003, Road ecology: science and solutions, Island Press, Washington.
- Foster, ML & Humphrey, SR 1995, 'Use of highway underpasses by Florida panthers and other wildlife', *Wildlife Society Bulletin* 23: 95-100.
- Fox, BJ 1983, 'Eastern Chestnut Mouse <u>Pseudomys gracilicaudatus'</u>, pp 400-401, in R. Strahan (ed.) *The Australian Museum Complete Book Of Australian Mammals*, Angus and Robertson, Sydney.
- Garnett, S & Crowley, GM 2000, *The Action Plan for Australian Birds*, Published by Environment Australia. Canberra, ACT.
- GHD 2007a, Oxley Highway to Kempsey: Addendum to OHK Pacific Highway Upgrade Project Advanced Terrestrial Flora and Fauna Report, Report prepared on behalf of RTA, December 2007.
- GHD 2007b, Pacific Highway Upgrade Oxley Highway to Kempsey: Preferred Route Aquatic Ecology Report. Report prepared on behalf of RTA, July 2007.
- GHD 2010, Oxley Highway to Kempsey Upgrading the Pacific Highway Environmental Assessment. Report prepared on behalf of RTA, September 2010.
- Glista, DJ, DeVault, TL & DeWoody, AJ 2009, 'A review of mitigation measures for reducing wildlife mortality on roadways'. *Landscape and Urban Planning* 91: 1-7.
- Goosem, M, Weston, N & Bushnell, S 2006, 'Effectiveness of Rope Bridge Arboreal Overpasses and Faunal Underpasses in providing connectivity for rainforest fauna', in *Proceedings of the* 2005 International Conference on Ecology and Transportation, Eds. Irwin, CL., Garrett, P, McDermott, KP, Center for Transportation and the Environment, North Carolina State University, Raleigh, NC: pp. 304-316.
- Hatton, T & Evans, R 1998, Dependence of ecosystems on groundwater and its significance to Australia, LWRRDC Occasional Paper No. 12/98.
- Hobby, AJ, & Minstrell, ML 2008, 'Distribution and abundance of roadkill on Tasmanian highways: human management options'. *Wildlife Research* 35: 712-726.
- HWR Ecological 2005a, Advanced Aquatic Ecological Assessment Report- Floodplain Investigation. Pacific Highway Upgrade- Oxley Highway to Kempsey. Report to Roads and Traffic Authority.
- HWR Ecological 2005b, *Pacific Highway upgrade, Oxley Highway to Kempsey preliminary aquatic flora and fauna assessment report*, Report to Roads and Traffic Authority, May 2005.
- HWR Ecological 2006, 'Aquatic Flora and Fauna Assessment Working Paper', *Proposed Pacific Highway Upgrade Oxley Highway to Kempsey*, Report to GHD Pty Ltd on behalf of Roads and Traffic Authority.
- Ingram GJ & MacDonald KR 1993, 'An Update on the Decline of Queensland's Frogs', pp. 297 -303 in *Herpetology in Australia - A Diverse Discipline.* ed. D. Lunney & D. Ayers. Transactions of the Royal Zoological Society of New South Wales.
- Jackson, SM 1999, 'Glide angle in the genus Petaurus and a review of gliding in mammals', *Mammalian Review* 30: 9-30.

- Johnston, PG 1995, 'Long-nosed Potoroo', pp. 301 302, in *The Mammals of Australia*, ed. R Strahan, Australian Museum and Reed, Sydney.
- Kavanagh, RP & Murray, M 1996, 'Home range, habitat and behaviour of the Masked Owl <u>Tyto</u> <u>novaehollandiae</u> near Newcastle, New South Wales' in *Emu* 96., pp. 250 - 257.
- Keith, D 2004, Ocean shores to desert dunes: the native vegetation of New South Wales and the ACT, NSW Department of Environment and Conservation, Hurstville.
- Klippel, K 1992, *Wildlife Data Search threatened animal species of New South Wales*, Total Environment Centre, Sydney.
- Knight, JT 2000, *Distribution, populations structure and habitat preferences of the Oxleyan pygmy perch Nannoperca oxleyana (Whitley 1940) near Evans Head, northeastern New South Wales,* Hons. Thesis, Southern Cross University, Lisomrore, Unpublished.
- Koehn, J & Nicol, S 1998, 'Habitat and movement requirements of fish', pp. 1-6 in: Banens, RJ and Lehane, R (eds.) 1996 Riverine Environment Research Forum. *Proceedings of the inaugural Riverine Environment Research Forum, Brisbane, October 1996.* Murray-Darling Basin Commission: Canberra.
- Laurance, WF, Nascimento, HEM, Laurance, SG, Andrade, A, Ewers, RM, Harms, KE, Luizao, RCC & Ribeiro, JE 2007, 'Habitat Fragmentation, Variable Edge Effects, and the Landscape-Divergence Hypothesis', *PLoS ONE* 2(10): e1017.
- Mallen-Cooper, M 2000, 'Taking the mystery out of migration', in: Hancock, DA, Smith, DC and Koehn, JD (eds), *Fish Movement and Migration. Workshop Proceedings, Bendigo, Victoria, September 1999*, Australian Society for Fish Biology, Sydney. Pp. 101-112.
- Mata, C, Hervas, I, Herranz, J, Suarez, F & Malo, J 2008, 'Are motorway wildlife passages worth building? Vertebrate use of road-crossing structures on a Spanish motorway', *Journal of Environmental Management* 88: 407–415.
- McDowall, RM (ed.) 1996, *Freshwater Fishes of South-Eastern Australia*, revised edn, Reed, Syndey.
- Menkhorst, PW 1995, 'Large Footed Myotis- <u>Myotis adversus</u>', pp 182-183 in *Mammals of Victoria*, Oxford University Press, Melbourne.
- Morcombe M 2000, Field Guide to Australian Birds, Steve Parish Publishing, Archerfield, QLD.
- National Parks and Wildlife Service (NPWS) 1999. Forest ecosystem classification and mapping for the upper and lower north east Comprehensive Regional Assessment, NSW National Parks and Wildlife Service, Coffs Harbour, NSW.
- National Parks and Wildlife Service (NPWS) 2000. *Threatened Species of the Lower North Coast of New South Wales*. NPWS, Sydney.
- National Parks and Wildlife Service (NPWS) 2001, *Hygiene protocol for the control of disease in frogs*, Information Circular Number 6. NSW National Parks and Wildlife Service, Hurstville NSW.
- NSW National Parks and Wildlife Service (NPWS) 2002. *Threatened Species of the Upper North Coast of NSW: Fauna*. NSW NPWS, Coffs Harbour, NSW.
- National Parks and Wildlife Service (NPWS) 2003a, *Cooperabung Creek Nature Reserve Plan of Management*, NSW National Parks and Wildlife Service.

- National Parks and Wildlife Service (NPWS) 2003b, *Draft Recovery Plan for the Barking Owl*, New South Wales National Parks and Wildlife Service, Hurstville, NSW.
- National Parks and Wildlife Service (NPWS) 2003c, *Draft Recovery Plan for the Koala*, NSW National Parks and Wildlife Service, Hurstville, NSW.
- National Parks and Wildlife Service (NPWS) 2003d, *Recovery Plan for the Yellow-bellied Glider* (<u>Petaurus australis</u>), NSW National Parks and Wildlife Service, Hurstville.
- National Parks and Wildlife Service (NPWS) 2004, *Rawdon Creek Nature Reserve Plan of Management*, NSW National Parks and Wildlife Service.
- National Parks and Wildlife Service (NPWS) 2005, 'Key habitats and corridors in north east NSW', National Parks and Wildlife Service, http://maps.nationalparks.nsw.gov.au/keyhabs/default.htm.
- NSW Fisheries 2002, *Fishfacts, threatened species in New South Wales Oxleyan Pygmy Perch. Fishfacts NSWF108*. NSW Fisheries, Sydney.
- NSW Scientific Committee 2004a, 'Final Determination Swamp Oak Floodplain Forest', *Endangered Ecological Community Determination- final*, Department of Environment and Conservation, Sydney.
- NSW Scientific Committee 2004b, 'Final Determination Subtropical Coastal Floodplain Forest of the NSW North Coast bioregion', *Endangered Ecological Community Determination final*, Department of Environment and Conservation, Sydney.
- NSW Scientific Committee 2004c, 'Final Determination Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions', *Endangered Ecological Community Determination – final*, Department of Conservation, Sydney.
- NSW Scientific Committee 2004d, 'Final Determination Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions', *Endangered Ecological Community Determination – final*, Department of Conservation, Sydney.
- NSW Scientific Committee 2004e, 'Final Determination Black-necked Stork', *Endangered Species Listing*, Department of Environment and Conservation, Sydney.
- O'Gara, E, Howard, K, Wilson B & GE StJ Hardy 2005, *Management of Phytophthora cinnamomi* for Biodiversity Conservation in Australia: Part 2 National Best Practice Guidelines, A report funded by the Commonwealth Government Department of the Environment and Heritage by the Centre for Phytophthora Science and Management, Murdoch University, Western Australia.
- Parsons Brinckerhoff (PB) 2008, *Kempsey to Eungai : upgrading the Pacific Highway : submissions report*, prepared for the Roads and Traffic Authority.
- Phillips, WR 1990, *Koalas the little Australians we would all hate to lose*, National Parks and Wildlife Service, Canberra.
- Port Stephens Council 2002. *Comprehensive Koala Plan of Management*. Prepared by Port Stephens Council with the Australian Koala Foundation, June 2002.
- Pyke, GH & Osborne, WS 1996, 'The Green and Golden Bell Frog (<u>Litoria aurea</u>): biology and conservation', *Aust Zool.*, 30(2).

- Quin, DG 1995, 'Population Ecology of the Squirrel Glider (<u>Petaurus norfolcensis</u>) and Sugar Glider (<u>P. breviceps</u>) (Marsupalia : Petauridae) at Limeburners Creek, on the Central North Coast of New South Wales' in *Wildl. Res.* 22., pp. 471 - 505.
- Readers Digest 1979, *Readers Digest Complete Book of Australian Birds*, Readers Digest Services Pty Ltd, Sydney.
- Regent Honeyeater Recovery Team 1999, *Regent Honeyeater <u>(Xanthomyza phrygia)</u> Recovery Plan 1999-2003*, Department of Natural Resources and Environment.
- Robinson, M 1993, A Field Guide to Frogs of Australia: from Port Augusta to Fraser Island including Tasmania, Australian Museum/Reed New Holland, Chatswood.
- Rowland, SJ 1996, 'Threatened fishes of the world: Maccullochella ikei Rowland, 1985 (Percichthyidae)', *Environmental Biology of Fishes* 46:350.
- Russell, R 1995, 'Yellow-bellied <u>Glider Petaurus australis'</u>, pp. 226-228. in R.Strahan (ed.), The Mammals of Australia, Australian Museum and Reed Books, Sydney.
- Russell, TC, Herbert, CA & Kohen JL 2009. 'High possum mortality on urban roads: implications for the population viability of the common brushtail possum and the common ringtail possum'. *Australian Journal of Zoology* 57: 391-397.
- Sattler, P & Creighton, L 2000, *Australian Terrestrial Biodiversity Assessment*, National Land and Water Resources Audit 2002, Australian Government.
- Schulz, M 1997, 'The Little Bent-wing Bat Miniopterus australis roosting in a tree hollow', *Aust. Zool.* 30(3)., pg. 329.
- Schulz, M 2000, 'Diet and Foraging Behaviour of the Golden-tipped Bat, <u>Kerivoula papuensis</u>: a Spider Specialist?', *Journal of Mammalogy* **81** (4): 948-957.
- Scotts, D 2003, *Key Habitats and Corridors for Forest Fauna: A Landscape Framework for Conservation in North-east New South Wales*, NSW NPWS. Occasional Paper 32, NSW National Parks and Wildlife Service, Sydney.
- Seebeck, JH 1996, 'Long-nosed Potoroo', pp. 131 133 in *Mammals of Victoria distribution,* ecology and conservation by Menkhorst, PW (ed.), Oxford University Press, Melbourne.
- Selonen, V & Hanski, IK 2003, 'Movements of the flying squirrel <u>Pteromys volans</u> in corridors and in matrix habitat', *Ecography* 26: 641-651.
- Simpson, K & Day, N 2003, *The Claremont Field Guide to the Birds of Australia*, Penguin Books Australia.
- Sinclair Knight Merz 2001, Environmental Water Requirements of Groundwater Dependent Ecosystems Environmental Flows Initiative Technical Report Number 2, Commonwealth of Australia, Canberra.
- Singer, FJ & Doherty, JL 1985, 'Managing mountain goats at a highway crossing', *Wildlife Society Bulletin* 13: 469-477.
- Smith, AK, Holliday, JE & Pollard, DA 1997, 'Management of Seagrasses habitats in NSW estuaries', *Wetlands (Australia)* 16(2), 48-55.
- Soderquist, TR, Lowe, KW, Loyn, RH & Price, R 2002, 'Habitat quality in Powerful Owl (<u>Ninox</u> <u>strenua</u>) territories in the Box-Ironbark forest of Victoria, Australia', in Newton, I, Kavanagh,

R, Olsen J & Taylor, I (eds) *Ecology and Conservation of Owls*, CSIRO Publishing, Collingwood.

Strahan, R 1995, The Mammals of Australia, Reed Books and Australian Museum, Sydney.

- Swift Parrot Recovery Team 2001, Swift Parrot (Lathamus discolor) Recovery Plan 2001-2005, Tasmanian Department of Primary Industries, Water and Environment.
- Taylor, BD & Goldingay, RL 2009. 'Can road-crossing structures improve population viability of an urban gliding mammal?'. *Ecology and Society* 14(2): 13-32.
- Thackway, R & Cresswell, ID (Eds.) 1995, *An Interim Biogeographic Regionalisation for Australia*, ANCA Canberra.
- Traill, BJ & Coates, TD 1993, 'Field observations of the Brush-tailed Phascogale <u>Phascogale</u> <u>tapoatafa</u> (Marsupalia : Dasyuridae)' in *Aust. Mamm.* 16., pp. 61 - 65.
- Van der Ree, R, Bennett, AF & Gilmore, DC 2003, 'Gap-crossing by gliding marsupials: thresholds for use of isolated woodland patches in an agricultural landscape', *Biological Conservation* 115: 241-249.
- West, RJ, Thorogood, CA, Walford, TR & Williams, RJ 1985, 'An estuarine inventory for New South Wales', *Fisheries Bulletin 2*. NSW Department of Agriculture, Sydney.
- White, A 1994, Frog Survey Gloucester and Chichester Management Areas Environmental Impact Statement Supporting Document No. 7, Report prepared for SFNSW (Central Region).
- Williams, CR 1990, 'Possums and Gliders', pp. 97-108 in *The Care and Handling of Australian Native Animals by Hand*, Royal Zoological Society and Surrey Beatty & Sons, Sydney.
- Woodside, DP 1995. Golden-tipped Bat *Kerivoula papuensis*. Pp. 490-1 in Strahan, R. (ed.) *The Mammals of Australia*. Reed Books, Sydney.
- Worley Parsons 2010, Pacific Highway Upgrade OHK, Updated Preliminary Hydrology and Hydraulics Report For Concept Design, Final.
- Yanes, M, Velasco, JM & Suarez, F 1995, 'Permeability of roads and railways to vertebrates: the importance of culverts', *Biological Conservation* 71: 217-222.