A		ESTABLISHMENT RISK ASSESSMENT	RESPONSE		
			NO	YES	UNSURE
	1	**History of spread and climate match**			
	1.1	Has the species a history of establishment outside its natural range?	0	1	1
	1.2	Is it native to, or established in regions with similar climates to New Zealand?	0	1	1
	1.3	Does it tolerate a wide climate range?	0	1	1
	1.4	Is there a good climate match or overlap with waterways that are common in New Zealand?	0	score 1-3 for L/M/H match	3
	2	**Reproduction possible in NZ**			
	2.1	Can imported stocks produce viable gametes (e.g., sterile or triploid fish do not)	-4	1	1
	2.2	Does the species have specific requirements to complete its life cycle (e.g., spawning habitat types or conditions) that are rare/absent in NZ?	1	if requirements are rare in NZ score -1; if absent score -4	1
	2.3	Is its reproductive habitat present within New Zealand?	0	1	1
	2.4	Is its reproductive habitat widespread in NZ?	score -3 if highly localised, -2 if rare, -1 if scarce	1	1
	2.5	Does the species have a long (> 10 yr) life-span?	score -1 for less than 2 yr, otherwise 0	1	1
	2.6	Is it a group spawning species?	1	0	1
	3	**Risk of spread by vectors (human & natural), & via high propagule pressure**			
	3.1	Is it likely to be intentionally translocated to natural waters. Probability will be higher for species used in some way (e.g. bait, aquaculture, bio-control, forage fish, angling, bycatch, ornamental)	0	score 1 to 3 depending on probability (H/M/L) of spread	3
	3.2	Can large numbers of stocked adult fish (or their larvae) readily escape confinement and spread naturally to new waterways?	0	score 1 for low spread, 2 for high natural dispersal rate	1
		ESTABLISHMENT RISK SCORE			

B		IMPACT RISK ASSESSMENT	NO	YES	UNSURE
	4	**Reported impacts from other countries**			
	4.1	Are there reported impacts on other fish species?	0	score 1 to 3 depending on severity of impacts (L/M/H)	2
	4.2	Are there reported impacts on aquatic fauna other than fish?	0	score 1 to 3 depending on severity of impacts (L/M/H)	2
	4.3	Are there reported impacts on aquatic plants?	0	score 1 to 3 depending on severity of impacts (L/M/H)	2
	4.4	Are there reported impacts on water quality or fish habitats?	0	score -1 if positive, or 1 to 3 depending on severity (L/M/H) of adverse impacts	2
	5	**Feeding & Competition**			
	5.1	Does the species eat live aquatic plants? (excluding planktonic algae and plant detritus)	0	small part of diet= 1; voracious herbivore= 3	1
	5.2	Does it eat or kill other fish?	0	score 1, 2, 3 for L/M/H and 4 for piscivorous	2
	5.3	Are adults pelagic planktivores (feeding on Daphnia)?	0	small part of diet =1 major planktivore =3	2
	5.4	Is it likely to compete with any native fish species for food or space?	0	score 1, 2, 3 for L/M/H overlap	2
	5.5	Does its feeding or other behaviour reduce habitat quality for native species? (e.g., change substrate, supress macrophytes)	0	score 1, 2, 3 for L/M/H effect	2
	5.6	Are its main natural predators present in New Zealand?	no major predators = 2; some major predators = 1	0	2
	5.7	Does it have a reputation for aggressive, agonistic behaviour to other fish?	0	1	1
	5.8	Is its feeding strategy widely adaptable? (opportunistic omnivores are typically more adaptable)	0	1	1
	6	**Reproductive rate**			
	6.1	Does it have a plastic reproductive strategy (e.g., low age-at-maturity, flexible spawning habitat, adaptable larval feeding strategy)	0	1	1

	6.2	Does it have the potential to hybridise with native species? (or use males of native species to activate eggs)	0	1	0
	6.3	Is the species able to change sex?	0	1	1
	6.4	Is fecundity high? (>10,000 eggs/kg, multiple spawnings per year)	0	1	1
	6.5	Does it mature early (e.g. at age 1+ or less)?	0	1	1
	6.6	Does it produce live young (e.g., poeciliid), or exhibit parental care of eggs and/or young (e.g. mouth brooding, egg guarding)?	0	1	1
	7	**Dispersal mechanisms**			
	7.1	Are any life stages hardy and prone to unintentional release from boat bilge water, nets, trailers etc.?	0	1 for low risk, 2 for high risk	1
	7.2	Are life stages likely to be dispersed intentionally by people? (e.g., potential game fish, biocontrol, baitfish)	0	1 for mild risk, 2 for high risk	1
	7.3	Are eggs able to disperse widely (e.g., bouyant eggs, or eggs attached to weeds, boats)?	0	1	1
	7.4	Are larvae/juveniles able to disperse widely (e.g., pelagic larvae, juvenile migrants)?	0	1	1
	7.5	Are juveniles or adults known to move large distances (e.g., spawning/feeding migrations, diadromous species, prone to flood displacement)?	0	1	1
	7.6	Are juveniles or adults able to climb or jump migration barriers (e.g., culverts and weirs) or move overground?	0	1	1
	7.7	Are eggs or larvae likely to be dispersed by other animals (e.g. birds)?	0	1	0
	7.8	Does the fish have a wide salinity tolerance? (e.g., can it survive estuarine or marine conditions to reach other catchments)	score 0 for little tolerance, 1 for moderate tolerance and 2 for good tolerance	2	1
	8	**Physical and chemical tolerances**			
	8.1	Are any life stages able to survive extended periods out of water? (days)	0	survives in mud &/or wet ground score=1; survives in shaded &/or humid conditions score=2	1
	8.2	Is the species tolerant of a wide range of water quality conditions (low oxygen, high temperature, low pH)	0	1	1
	8.3	Can the species occupy a wide range of habitat types? (e.g., slow and fast water; deep and shallow water; weed/silt/rock substrates)	0	1	0
	8.4	Is it likely to tolerate or benefit from environmental disturbance/eutrophication?	0	1	1
	9	**Invasive relatives and special quarantine requirements**			
	9.1	Does its taxonomic family or genus include any pest species, races, varieties, transgenics, or sub-species? (NB. if very difficult for quarantine staff to distinguish from target species then include all variants in evaluation)	0	2	1

	9.2	Does it have a reputation for hosting and/or transmission of parasites and pathogens that may affect other fish or humans?	0	1	1
	10	**Undesirable traits**			
	10.1	Is the species poisonous or does it pose other risks to human health? (e.g., poison spines, toxic substances)	0	1	1
	10.2	Is it likely to reduce people's use of waters? (e.g. recreation, fishing, abstraction)	0	1	1
	10.3	Is it a host and/or vector for undesirable pests and pathogens affecting humans or other fish (and not already present)?	0	1	1
		Environmental Impact Risk Score			
		+ Establishment risk score from Section A			
		= Overall Impact Risk Score			