S.* subg. *Chamaetia Nasarov

alpine, arctic or mountain willows

Subgenus *Chamaetia* Reason for assessment- 1. Subgenus

In Australia, sevral *Chamaetia* taxa have been introduced, including: *S. alpina, S. arctica, S. glauca, S. myrtilloides* 'Pink Tassels', *S. reticulata, S. retusa, S. rotundifolia, S. serpyllifolia & S. yezoalpina. S. glauca* is not included in this subgeneric assessment. It has been assessed separately.

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Includes the prostrate or semi-subterranean half-shrubs [dwarf] of the arctic and alpine tundra (Brayshaw, 1996) low or procumbent, very rarely medium-sized shrubs, their stems sometimes completely submerged in substrate (Skvortsov, 1999). Except for *S.* glauca, generally growing to less than 1m. Unlikely to drop large branches. Most species present in Australia appear to be restricted to stream banks where they occur in riparian areas (Svortskov, 1999; Argus, 2003 & 2004). *S. myrtilloides* & *S. reticulata* may occur in bogs (Svortskov, 1999; Argus, 2003). However, no information was found about their root systems.	**M**	L
2. How much horticultural/ agricultural value does the willow have?	Many taxa were in trade (ARMCANZ, 2001). Not grown for utility (Kuzovkina & Quigley, 2004), but all have horticultural merit. None (except *S. glauca*) are known to be naturalised in Australia. *S. myrtilloides* 'Pink Tassels' is male (Hibbert, 2004). The sex of the other taxa was not found.	**ML**	M
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Includes the prostrate or semi-subterranean half-shrubs [dwarf] of the arctic and alpine tundra (Brayshaw, 1996) low or procumbent, very rarely medium-sized shrubs, their stems sometimes completely submerged in substrate (Skvortsov, 1999). Except for *S.* glauca, generally growing to less than 1m. Unlikely to pose a hazard in riparian areas.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Includes the prostrate or semi-subterranean half-shrubs [dwarf] of the arctic and alpine tundra (Brayshaw, 1996) low or procumbent, very rarely medium-sized shrubs, their stems sometimes completely submerged in substrate (Skvortsov, 1999). Except for *S.* glauca, generally growing to less than 1m. Unlikely to be obvious to the average visitor.	**L**	MH

Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Most species present in Australia appear to be restricted to stream banks where they occur in riparian areas (Svortskov, 1999; Argus, 2003 & 2004). *S. myrtilloides* & *S. reticulata* may occur in bogs (Svortskov, 1999; Argus, 2003). Unlikely to impact on the flow of water in streams.	**L**	M
6. To what degree could the willow cause bed and bank erosion?	Most species present in Australia appear to be restricted to stream banks where they occur in riparian areas (Svortskov, 1999; Argus, 2003 & 2004). *S. myrtilloides* & *S. reticulata* may occur in bogs (Svortskov, 1999; Argus, 2003). *S. glauca* is the only taxon, present in Australia, from this subgenus that has been found to form thickets. Unlikely to cause erosion.	**L**	M
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Includes the prostrate or semi-subterranean half-shrubs [dwarf] of the arctic and alpine tundra (Brayshaw, 1996) low or procumbent, very rarely medium-sized shrubs, their stems sometimes completely submerged in substrate (Skvortsov, 1999). Except for *S.* glauca, generally growing to less than 1m. Most species present in Australia appear to be restricted to stream banks where they occur in riparian areas (Svortskov, 1999; Argus, 2003 & 2004). *S. myrtilloides* & *S. reticulata* may occur in bogs (Svortskov, 1999; Argus, 2003). Unlikely to contribute much leaf litter to waterways.	**L**	M
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Includes the prostrate or semi-subterranean half-shrubs [dwarf] of the arctic and alpine tundra (Brayshaw, 1996) low or procumbent, very rarely medium-sized shrubs, their stems sometimes completely submerged in substrate (Skvortsov, 1999). Except for *S.* glauca, generally growing to less than 1m. *S. glauca* is the only taxon, present in Australia, from this subgenus that has been found to form thickets. Although shrub willows dominate the low alpine belt above the climatic timberline in Scandinavia (Dahl, 1987). However, no members of this subgenus were found to be naturalised outside their native range.	**L**	M
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	See above, unlikely to dominate riparian niches.	**L**	M

10. To what extent could this willow affect other invasive species (flora and fauna)?	Rabbits damage young plants (Newsholme, 1992), however, as dwarf shrubs (Brayshaw, 1996) that don't tend to form thickets, unlikely to harbour pest animals, or provide much forage.	**ML**	M

S.* subg. *Salix* syn. *Amerina

tree willows, true willows

Subgenus *Salix* Reason for assessment- 1. Subgenus

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Trees, often quite large, or tall shrubs (Skvortsov, 1999) and likely to be brittle (Carr, 1994). Large branches dropping into waterways may cause major damage to bridges during floods.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	Can be male or female, and a single *S. sepulcralis* var *chrysocoma* may produce male and female catkins [hermaphrodite catkins] (Cremer, 2003). Weeping trees have aesthetic value (Harman, 2004). Others valued for timber, especially cricket bats, attractive foliage and stem colour (Newsholme, 1992). Others are not valued as ornamental (van Kraayenoord et al, 1995), but can be fodder plants (Carr et al, 1994; Van Kraayenoord et al, 1995). Some horticultural value, however, as they are likely to be brittle and to take root easily (Carr, 1994), probably don't require specialist knowledge to propagate and both sexes may be present, sometimes even on the same tree.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Trees, often quite large, or tall shrubs (Skvortsov, 1999), and likely to be brittle (Carr, 1994). Capable of dropping large branches which pose a threat to walkers and could be fatal obstructions to water skiers and people in boats.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Trees, often quite large, or tall shrubs (Skvortsov, 1999), nearly always with a single trunk (van Kraayenoord et al, 1995), however, they are likely to be brittle and to take root easily (Carr, 1994) which enables them to form thickets that limit access to waterways. Some also able to grow into streambeds, eg S. alba (Cremer, 1995), and to choke up channels and reduce stream flow (Van Kraayenoord et al, 1995), and even blockng them (Webb, Sykes & Garnock-Jones, 1988), preventing boating and swimming.	**H**	MH
Stream Health			

Question	Comments	Score	Conf
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Trees, often quite large, or tall shrubs (Skvortsov, 1999), nearly always with a single trunk (van Kraayenoord et al, 1995), however, they are likely to be brittle and to take root easily (Carr, 1994) which enables them to form thickets that limit access to waterways. Some also able to grow into streambeds, eg S. alba (Cremer, 1995), and to choke up channels and reduce stream flow (Van Kraayenoord et al, 1995), and even blockng them (Webb, Sykes & Garnock-Jones, 1988).	**H**	MH
6. To what degree could the willow cause bed and bank erosion?	The species assessed were usually capable of encroaching into streams, making them shallower and wider.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Trees, often quite large, or tall shrubs (Skvortsov, 1999). Most are capable of encroaching into streams and some are weeping. Able to drop large amounts of leaf litter into waterways.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Trees, often quite large, or tall shrubs (Skvortsov, 1999) that "possess an extensive mat-like root system" (Van Kraaynoord et al, 1995) and, as they are likely to be brittle and to take root easily (Carr, 1994) are capable of forming thickets. Capable of dominating all layers.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Generally capable of dominating instream, stream bank, flood plain and wetland environments.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Trees, often quite large, or tall shrubs (Skvortsov, 1999), nearly always with a single trunk (van Kraayenoord et al, 1995), however, they are likely to be brittle and to take root easily (Carr, 1994) which enables them to form thickets that can harbour pest animals, and can also be fodder plants (Carr et al, 1994; Van Kraayenoord et al, 1995).	**H**	MH

S.* subg. *Vetrix Dumort. **syn. *Caprisalix***
shrub willows, sallows and osiers
Subgenus *Vetrix* Reason for assessment- 1. Subgenus

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and growing to form shrubs or moderate-sized trees (Skvortsov, 1999). Unlikely to drop large branches but many have invasive roots.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Subgenus *Vetrix* are often grown for their decorative catkins, and/or stems (van Kraayenoord et al, 1995) which can be "exceptionally fragrant" in species such as *S. aegyptiaca* (Newsholme, 1992). Many osiers or shrub willows have high salicin content in their leaves and bark, leaving them relatively unpalatable (Van Kraayenoord et al, 1995). Pussy willows/Sallows tend to seed freely (incl. S. caprea, S. cinerea) (Zallar, nd), they can be male and female; and a single *S. aegyptiaca* may produce male and female catkins [hermaphrodite catkins] (Tutin, 1993). Horticultural value, but able to naturalise.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and grow to form shrubs or moderate-sized trees (Skvortsov, 1999). Not usually hazardous to waterway users.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and grow to form shrubs or moderate-sized trees (Skvortsov, 1999). Most are able to form thickets and more than half of those can encroach into streams, preventing boating and swimming and blocking access to waterways.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and grow to form shrubs or moderate-sized trees (Skvortsov, 1999). Most are able to form thickets and more than half of those can encroach into streams, impeding water flow.	**H**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and grow to form shrubs or moderate-sized trees (Skvortsov, 1999). Most are able to form thickets and more than half of those can encroach into streams, making them wider and shallower.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and grow to form shrubs or moderate-sized trees (Skvortsov, 1999). Most are able to form thickets and more than half of those can encroach into streams, contributing large amounts of leaf litter to waterways.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and grow to form shrubs or moderate-sized trees (Skvortsov, 1999). Most are able to form thickets that can dominate ground and shrub layers.	**MH**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and grow to form shrubs or moderate-sized trees (Skvortsov, 1999). Most are able to form thickets and more than half of those can encroach into streams. Capable of dominating instream, streambank, floodplains and wetlands.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Shrub willows, sallows and osiers, form several stems (van Kraayenoord et al, 1995) and grow to form shrubs or moderate-sized trees (Skvortsov, 1999). Most are able to form thickets that can harbour pest animals. Many osiers or shrub willows have high salicin content in their leaves and bark, leaving them relatively unpalatable to possums, rabbits and hares (Van Kraayenoord et al, 1995).	**H**	MH

S. aegyptiaca Forssk. syn. *S. medemii*
Egyptian willow
Subgenus *Vetrix* Reason for assessment- 2. Naturalised (ARMCANZ)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Tall shrub or small tree (Bailey & Bailey, 1976) from the shrub family, growing to 4m. Morphologically similar to S. caprea (Skvortsov, 1999), which is recorded as "useful for swampy places, otherwise usually a nuisance (strong growth and root system)" (Weldon, 1986). Based on its similarity to S. caprea, unlikely to cause major damage, but may require maintenance to keep drains clear.	**MH**	M
2. How much horticultural/ agricultural value does the willow have?	Catkins open early and are "exceptionally fragrant" (Newsholme, 1992), and also used in shelterbelts (van Kraayenoord et al, 1995). May produce male and female catkins (Tutin et al, 1993), produces vigorous seed by selfing, (Cremer, 1999). Easily propagated from cuttings (Skvortsov, 1999). Some horticultural value, but easy to popagate, both sexes present and naturalised in Australia.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Tall shrub or small tree (Bailey & Bailey, 1976) from the shrub family, growing to 4m. Morphologically similar to S. caprea (Skvortsov, 1999), which is unlikely to develop large, brittle branches.	**L**	M
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Appears to be confined to slopes and banks of streams (Skvortsov, 1999), not able to encroach into waterways. Tall shrub or small tree (Bailey & Bailey, 1976) from the shrub family, growing to 4m would be obvious to the average visitor, but unlikely to affect recreation significantly.	**ML**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Appears to be confined to slopes and banks of streams (Skvortsov, 1999), not able to encroach into waterways. Unlikely to impact flow or water availability.	**L**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Appears to be confined to slopes and banks of streams (Skvortsov, 1999), not able to encroach into waterways. May suppress understorey species, allowing erosion of the banks by overland runoff.	**ML**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Tall shrub or small tree (Bailey & Bailey, 1976) growing to 4m. Morphologically similar to S. caprea (Skvortsov, 1999). Large amounts of leaf litter are likely to be dropped into the stream, affecting water quality.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Tall shrub or small tree (Bailey & Bailey, 1976) growing to 4m. Morphologically similar to S. caprea (Skvortsov, 1999). However, impact on vegetation structure is not known.	**M**	L
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Within riparian areas, this willow appears to be confined to lighted forests on slopes and banks of streams (Skvortsov, 1999), perhaps capable of occupying more than one niche, but it is not clear whether it coexists with other vegetation or is the dominant species.	**M**	L
10. To what extent could this willow affect other invasive species (flora and fauna)?	No information found	**M**	L

S. alba L.
white willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (ARMCANZ)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	True tree (Argus, 1986) growing to 20m, that is capable of spreading from rooted branches in US (Cremer, 2003). Variously described as fragile to not very brittle (Beismann et al, 2000; Carr, 1996); clearly capable of dropping large branches, which may damage bridges during floods.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	A palatable species (Carr et al, 1994; USDA, 2006), rated as suitable for use as fodder, timber, windbreaks and with some ornamental value (van Kraayenoord et al, 1995), however, both sexes are present in Australia [S. alba var. vitellina] (Cremer et al, 1995) and it is abundantly recruiting from seed in some locations and mostly vegetatively naturalised (Carr, 1996). Some horticultural value, but both sexes present and naturalised in Australia.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	True tree (Argus, 1986) growing to 20m, that is capable of spreading from rooted branches in US (Cremer, 2003). Variously described as fragile to not very brittle (Beismann et al, 2000; Carr, 1996); clearly capable of dropping large branches, which pose a threat to walkers and a deadly obstruction to water skiers and people in boats.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	"Frequently forms dense, closed stands excluding all other vegetation" (Rodd, 1982). Sometimes with several stems diverging from ground level (Jacobs & Murray, 2000). "A common source of seedlings in rivers" and able to grow in streambeds (Cremer, 1995). This willow may encroach into streams forming dense stands that could block the passage of boats.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Sometimes with several stems diverging from ground level (Jacobs & Murray, 2000). "A common source of seedlings in rivers" (Cremer, 1995). Able to grow in streambeds (Cremer, 1995). Massive adventitious roots formed on white willows inundated for almost a year (Tiner, 1999). Roots and stems capable of growing instream, causing major impact on flow and using large quantities of water.	**MH**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Sometimes with several stems diverging from ground level (Jacobs & Murray, 2000). "A common source of seedlings in rivers" (Cremer, 1995). Able to grow in streambeds (Cremer, 1995). Massive adventitious roots formed on white willows inundated for almost a year (Tiner, 1999). Roots and stems capable of growing instream, creating a wider, shallower stream with a high probability of large scale soil movement as banks erode over time.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	True tree (Argus, 1986) growing to 20m, sometimes with several stems diverging from ground level (Jacobs & Murray, 2000). "Frequently forms dense, closed stands excluding all other vegetation" (Rodd, 1982). Able to grow in streambeds (Cremer, 1995). Most foliage will fall into the water greatly affecting water quality.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	True tree (Argus, 1986) growing to 20m that "frequently forms dense, closed stands excluding all other vegetation" (Rodd, 1982). Able to form virtual monocultures.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	"Frequently forms dense, closed stands excluding all other vegetation" (Rodd, 1982). "A common source of seedlings in rivers" and able to grow in streambeds (Cremer, 1995). Also capable of invading along drains, riverbanks, lakesides, around ponds and streams (Webb et al, 1988; Davis, 1982); Invades riparian vegetation and seasonal and permanent freshwater wetland; warm and cool temperate rainforest, alpine and subalpine vegetation (Carr et al, 1992); Often part of lowland fen or marsh communities (Sommerville). Capable of occurring as the dominant species in in-stream, and along margins and banks of waterways, as well as invading wetlands.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	"Frequently forms dense, closed stands excluding all other vegetation" (Rodd, 1982). A palatable species (USDA, 2006), browsed by wallabies and rated as suitable for use as fodder (Van Kraayenoord et al, 1995). May provide food for serious pests, such as rabbits, and harbour for foxes.	**H**	MH

***S. alba* var. caerulea** (Sm.) Sm.
cricket bat willow
Subgenus *Salix* Reason for assessment- 6. Exempt in Vic (VGG, 2005). Occasionally naturalised in Europe (Tutin et al, 1964)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Tree with single stem (Cremer, 1995) growing to 30m. Planted for Cricket bat production (Newsholme, 1992). Occasionally naturalised in Europe (Tutin et al, 1964). Unlikely to be planted near infrastructure, likely to be in plantations.	**L**	M
2. How much horticultural/ agricultural value does the willow have?	Only females observed in Australia, probably because the wood from the female is better suited to cricket bats (Geoff Carr pers. comm.). Occasionally naturalised in Europe (Tutin et al, 1964) where females only are cultivated, but males exist (Newsholme, 1992). Meikle (1984) illustrates male and female flowers for this taxon. Mostly female (Cremer, 1995). No record of this cultivar naturalising in Australia. Appears to be present as a single-sex clone. Valued for cricket bat wood.	**L**	M
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Tree with single stem (Cremer, 1995) growing to 30m. Planted for Cricket bat production (Newsholme, 1992). Occasionally naturalised in Europe (Tutin et al, 1964). No record of this cultivar naturalising in Australia. Unlikely to be planted on waterways.	**L**	M
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Unlikely to be planted on waterways.	**L**	M
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Unlikely to be planted on waterways.	**L**	M

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Unlikely to be planted on waterways.	**L**	M
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Unlikely to be planted on waterways.	**L**	M
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Unlikely to be planted on waterways.	**L**	M
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Unlikely to be planted on waterways.	**L**	M
10. To what extent could this willow affect other invasive species (flora and fauna)?	"Black Wallabies or Red-necked wallabies may exert considerable browsing pressure on S. alba varieties" (Carr et al, 1994), which could provide fodder for serious pest species, such as rabbits.	**H**	MH

S. babylonica L.
weeping willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	A menace to foundations and drainage systems with far-spreading roots (Newsholme, 1992). Capable of causing major damage to human-built infrastucture.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	Weeping tree has aesthetic value (Harman, 2004). Also a fodder plant (Carr et al, 1994; Van Kraayenoord et al, 1995) and shade tree (van Kraaayenoord et al, 1995). Naturalised in Australia predominantly vegetatively (Cremer et al, 1995; Purtle et al, 2001); females recorded (Spencer, 1997). High horticultural value, but easy to propagate and naturalised in Australia.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Tree growing to 12-18m with brittle branchlets (Argus, 1986). Predominantly reproducing vegetatively (Cremer et al, 1995; Purtle et al, 2001), however it is not clear whether older/larger branches are brittle and likely to drop into waterways.	**M**	L
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Capable of choking up channels and reducing stream flow, (Van Kraayenoord et al, 1995) which could block the passage of boats.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Choke up channels and reduce stream flow, (Van Kraayenoord et al, 1995); A menace to drainage systems, with far-spreading roots (Newsholme, 1992). Capable of the highest threat to stream flows and high water use.	**H**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	A menace to foundations and drainage systems with far-spreading roots (Newsholme, 1992). Choke up channels and reduce stream flow, (Van Kraayenoord et al, 1995). Roots and stems capable of growing instream, creating a wider, shallower stream with a high probability of large scale soil movement as banks erode over time.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Tree, pendulous (Walters et al, 1989) growing to 12-18m and forms dense thickets along streams that shade out native riparian species and affect the invertebrate fauna of wetlands and irvers by changing and reducing the species composition and richness" (Weber, 2003). Capable of releasing large amounts of leaf litter into the stream, greatly affecting water quality.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Tree, pendulous (Walters et al, 1989) growing to 12-18m, and "forms dense thickets along streams that shade out native riparian species" (Weber, 2003). Capable of having a major effect on all layers.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	"Forms dense thickets along streams that shade out native riparian species and affect the invertebrate fauna of wetlands and rivers by changing and reducing the species composition and richness" (Weber, 2003). Choke up channels and reduce stream flow, (Van Kraayenoord et al, 1995). Capable of invading grassland, shrubland, roadsides, wasteland, riverbanks, rocky outcrops (Henderson, 1995); along rivers, on damp valley bottoms (Skvortsov, 1999); heath- and shrubland, riparian habitats, and freshwater wetlands (Weber, 2003). Capable of invading wetlands as well as river banks and margins and floodplains.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	"Forms dense thickets along streams (Weber, 2003). Fodder plant (Carr et al, 1994; Van Kraayenoord et al, 1995). May provide food for serious pests, such as rabbits, and harbour for foxes.	**H**	MH

S. caprea L.
goat willow (pussy willow; great sallow)
Subgenus Vetrix Reason for assessment- 6. 'Pendula' exempt in Vic (VGG, 2005)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	"Useful for swampy places, otherwise usually a nuisance (strong growth and root system) (Weldon, 1986). Multistemmed (Somerville) shrubs or trees (Argus, 1986) growing to 8-25m. Unlikely to cause major damage, but may require maintenance to keep drains clear.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Used for windbreaks (Newsholme, 1992). Catkins used in floristry and the 'Pendula' variety is grafted as an ornamental (Newsholme, 1992). Male known as Kilmarnock Willow and female known Weeping Sally (Newsholme, 1992). Both sexes present in Australia (HIbbert, 1998). Difficult to strike from cuttings (Carr, 1995) as it lacks root primordia that assist vegetative propagation (Kuzovkina & Quigley, 2005). Observed spreading by seed in Tasmania as the offspring of the rootstock (male) and scion (female) of grafted specimens (Baker & Conod, 2003). Cattle grazing suppressed growth (Wilson) and it was rated as unsuitable for use as fodder (van Kraayenoord et al, 1995). Some horticultural value, but the grafted specimens have both male and female parts.	**MH**	M
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Multistemmed (Somerville) shrubs or trees (Argus, 1986) growing to 8-25m. Unlikely to develop large, brittle branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Within riparian areas it is described as occupying river banks, but not encroaching into streams (Davis, 1982); not able to encroach into waterways. Would be obvious to the average visitor, but unlikely to affect recreation significantly.	**ML**	MH

Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Within riparian areas it is described as occupying river banks, but not encroaching into streams (Davis, 1982); not able to encroach into waterways. Unlikely to impact flow or water availability.	**L**	MH
6. To what degree could the willow cause bed and bank erosion?	Within riparian areas it is described as occupying river banks, but not encroaching into streams (Davis, 1982); not able to encroach into waterways. May suppress understorey species, allowing erosion of the banks by overland runoff.	**ML**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Multistemmed (Somerville) shrubs or trees (Argus, 1986) growing to 8-25m. Large amounts of leaf litter are likely to be dropped into the stream, affecting water quality.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Multistemmed (somerville) shrubs or trees (Argus, 1986) growing to 8-25m. Formed almost a complete monoculture on a very waterlogged fen reverted from agricultural use (Wilson). Does not form pure stands in Finland, but this may be due to the presence of a rust (Pohjonen, 1991). Able to form virtual monocultures in wetland environments.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Formed almost a complete monoculture on a very waterlogged fen reverted from agricultural use (Wilson). Does not form pure stands in Finland, but this may be due to the presence of a rust (Pohjonen, 1991). Also grows along streamsides (Davis, 1982). Capable of invading wetlands.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	No information found.	**M**	L

S. cinerea L. syn. *S. cinerea* ssp *oleifolia* = *S. atrocinerea*
grey sallow
Subgenus *Vetrix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	"A multistemmed 'shrub willow' (Cremer, 2001); tall shrub or small tree (Meikle, 1984) growing to 10m. Able to grow in streambeds with their roots in the water (Geoff Carr, pers. comm.). "Develops a relatively deep and not paticularly extensive root system" (Wilkinson, 1946). Unlikely to cause major damage, but may require maintenance to keep drains clear.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Catkins used in floristry (Newsholme, 1992); not bitter, but rated as unsuitable for use as fodder (van Kraayenoord et al, 1995); used for windbreaks (Newsholme, 1992) Both sexes present in Australia (Cremer et al, 1995) and spreads by seed to riparian as well as other moist to wet habitats, and this is of special concern." (Cremer, 1999). Some horticultural value, but no aesthetic value. Easy to propagate, both sexes present and naturalised in Australia.	**H**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	"A multistemmed 'shrub willow' (Cremer, 2001); tall shrub or small tree (Meikle, 1984) growing to 10m. From the subgenus Vetrix, characterised by flexible branches. Unlikely to develop large, brittle branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	"A multistemmed 'shrub willow' (Cremer, 2001); tall shrub or small tree (Meikle, 1984) growing to 10m. Can form monocultures (Cremer, 1999) and dense thickets along rivers (Weber, 2003). Able to grow in streambeds with their roots in the water. As individual plants grow very wide they can recruit to cover the stream bed (Geoff Carr, pers. comm.). Especially adapted to waterlogging and may encroach into streams, trapping silt and reducing channel capacity (Purtle et al, 2001b); accumulate sediment and can alter the shape of riverbanks and streambeds (Weber, 2003). May make waterways to shallow to swim or boat and dense thickets to 10m tall could prevent access to waterways and preclude fishing and sightseeing.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Able to grow in streambeds with their roots in the water. As individual plants grow very wide they can recruit to cover the stream bed (Geoff Carr, pers. comm.). Especially adapted to waterlogging and may encroach into streams, trapping silt and reducing channel capacity (Purtle et al, 2001b); accumulate sediment and can alter the shape of riverbanks and streambeds (Weber, 2003). Capable of causing streams to become shallower and wider.	**H**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Especially adapted to waterlogging and may encroach into streams, trapping silt and reducing channel capacity (Purtle et al, 2001b); accumulate sediment and can alter the shape of riverbanks and streambeds (Weber, 2003). Able to grow in streambeds with their roots in the water. As individual plants grow very wide they can recruit to cover the stream bed (Geoff Carr, pers. comm.). Willow roots and stems encroach instream to create a wider, shallower stream.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Tall shrub or small tree (Meikle, 1984) growing to 10m, especially adapted to waterlogging and may encroach into streams (Purtle et al, 2001b). Affect aquatic invertebrates by reducing their richness and abundance (Weber, 2003). Most foliage will fall into the water.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Tall shrub or small tree (Meikle, 1984) growing to 10m, able to form dense thickets along rivers…and eliminate almost all native vegetation (Weber, 2003). "Stands are mostly monocultures excluding 97% of sunlight and most other species (Cremer, 1999). Able to form monocultures.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Able to form dense thickets along rivers…and eliminate almost all native vegetation (Weber, 2003). "Stands are mostly monocultures excluding 97% of sunlight and most other species (Cremer, 1999). Able to grow in streambeds with their roots in the water (Geoff Carr, pers. comm.), in swamps, riverbanks, wet areas behind coastal dunes (Webb eta l, 1988); "Occurs along streams or near seasonal to permanent swamps and bogs, from sea-level to above the treeline, invasive in both disturbed and undisturbed situations" (Carr, 1996); Invades riparian vegetation, and seasonal and permanent freshwater wetland, alpine and subalpine vegetation (Carr et al, 1992), wet forests and alpine bogs (Cremer, 2003); "Can invade undisturbed herbaceous wetlands…even under dense wet sclerophyll forest…Has invaded steeply sloping, mature pine forest, not just along water courses [and can] establish in undisturbed herbaceous communities above the tree line in National Parks" (Cremer, 1999). Also capable of invading woodland margins, acid or alkaline soils, and in relatively dry, well-drained situations" (Meikle, 1992). Capable of dominating all riparian niches.	**H**	MH

Question	Comments	Score	Conf
10. To what extent could this willow affect other invasive species (flora and fauna)?	"A multistemmed 'shrub willow' (Cremer, 2001) that can form dense thickets along rivers (Weber, 2003). The foliage is not bitter (van Kraayenoord et al, 1995) and possums cause damage to S. cinerea (Carr et al, 1994). May provide food for serious pests, such as rabbits, and shelter for foxes.	**H**	MH

S. daphnoides Vill.
violet willow
Subgenus *Vetrix* Reason for assessment- 3. Naturalised in NZ (Van Kraayenoord et al, 1995).

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Tree or tall shrub (Griffiths, 1992) growing to to 10m and rather brittle (Webb et al, 1988). Being from subgenus *Vetrix*, unlikely to have large branches. May be maintained by pruning.	**ML**	M
2. How much horticultural/ agricultural value does the willow have?	Ornamental catkins and coloured shoots (van Kraayenoord et al, 1995). Used for windbreaks (Newsholme, 1992). Bitter (Webb & Sykes-Garnock, 1988) and rated as unsuitable for use as fodder (Van Kraayenoord et al, 1995). Spreading vegetatively in NZ; rather brittle (Webb et al, 1988). Male only in NZ (Webb & Sykes-Garnock, 1988). Some horticultural value but easy to propagate. Not recorded as naturalised in Australia.	**M**	M
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Tree or tall shrub (Griffiths, 1992) growing to to 10m and rather brittle (Webb et al, 1988). Being from subgenus *Vetrix*, unlikely to have large branches.	**L**	M
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Tree or tall shrub (Griffiths, 1992) growing to to 10m and spreading, often forming dense thickets (Webb et al, 1988). Within riparian areas, appears confined to the banks of rivers, but not encroaching into streams (Skvortsov, 1999), preferring drier sites (than S. cinerea) (White, 1992). May hinder access for swimming and boating and fishing, and reduce pasive enjoyment by obstructing river views.	**MH**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Within riparian areas, appears confined to the banks of rivers, but not encroaching into streams (Skvortsov, 1999), preferring drier sites (than S. cinerea) (White, 1992). Unlikely to impact on stream flow or water availability.	**L**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Within riparian areas, appears confined to the banks of rivers, but not encroaching into streams (Skvortsov, 1999), preferring drier sites (than S. cinerea) (White, 1992). Tree or tall shrub (Griffiths, 1992) growing to to 10m and spreading, often forming dense thickets (Webb et al, 1988). Under flood conditions, water may be diverted behind dense thickets on the banks, scouring out large areas of land with major onsite and offsite implications.	**H**	M
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Within riparian areas, appears confined to the banks of rivers (Skvortsov, 1999), preferring drier sites (than S. cinerea) (White, 1992). Tree or tall shrub (Griffiths, 1992) growing to to 10m and spreading, often forming dense thickets (Webb et al, 1988). Large amounts of leaf litter are likely to fall into waterways and canopy gaps are likely to open up where native vegetation has been replaced by this deciduous shrub.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Tree or tall shrub (Griffiths, 1992) growing to to 10m and spreading, often forming dense thickets. Often forms dominant vegetation in swampy habitats (Webb et al, 1988). Capable of having a major effect on all layers of vegetation.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Spreading, often forming dense thickets. Often forms dominant vegetation in swampy habitats (Webb et al, 1988) and also grows on the banks of mountain rivers, and loose dune sand (Skvortsov, 1999). Prefer drier sites (than S. cinerea) (White, 1992). Capable of becoming the dominant species on river banks and wetlands.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Spreading, often forming dense thickets (Webb et al, 1988) and can grow on the banks of mountain rivers, and loose dune sand (Skvortsov, 1999). May harbour foxes. Varoiusly described as bitter (Webb & Sykes-Garnock, 1988) and not bitter but rated as unsuitable for use as fodder (Van Kraayenoord et al, 1995).	**H**	MH

S. elaeagnos Scop. syn. *S. incana*
hoary willow (bitter willow)
Subgenus *Vetrix* Reason for assessment- 3. Naturalised in NZ (Van Kraayenoord et al, 1995).

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Tall shrub or small tree (Griffiths, 1992) growing to 6m. Rather brittle (Webb et al, 1998). Riverbanks, generally uncommon or rare (Webb et al, 1988). In riverbeds (Davis, 1982). From subgenus *Vetrix* so unlikely to have large branches, but its capacity to grow in riverbeds suggests that the roots of this shrub may require maintenance to prevent them from blocking drains.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Some ornamental value and used for windbreaks (van Kraayenoord et al, 1995). Unpalatable to possums, rabbits and hares, due to bitterness of high salicin content in leaves and bark; rated as unsuitable for use as fodder (Van Kraayenoord et al, 1995). Described variously as not brittle (Beismann et al, 2000) and rather brittle (Webb et al, 1998). However, as it is only present in NZ as and has not hybridised there (Webb & Sykes-Garnock, 1988), its ability to naturalise in riverbeds (Davis, 1982) can only be explained by vegetative reproduction. Some horticultural value, but vegetative spread suggests ease of propagation. Not recorded as naturalised in Australia.	**ML**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Tall shrub or small tree (Griffiths, 1992) growing to 6m. Rather brittle (Webb et al, 1998). Riverbanks, generally uncommon or rare (Webb et al, 1988). In riverbeds (Davis, 1982). From subgenus *Vetrix* so unlikely to have large branches	**L**	M
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Tall shrub or small tree (Griffiths, 1992) growing to 6m, described as not colonial (Argus, 2003) but with a tendency to sucker (White). Riverbanks, generally uncommon or rare (Webb et al, 1988). Willow would be obvious to the average visitor, but given its low densities, may have minor impacts on recreation, such as providing obstacles to boating and swimming and/ro affect the aesthetics of a picnic spot.	**ML**	MH

Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Found by streams but also in river beds (Davis, 1982), generally uncommon or rare (Webb et al, 1988) but with a tendency to sucker (White). Roots and stems may have a major impact on flow of water and water availability.	**MH**	MH
6. To what degree could the willow cause bed and bank erosion?	Found by streams but also in river beds (Davis, 1982), generally uncommon or rare (Webb et al, 1988) but with a tendency to sucker (White). Affect on stream morphology unknown.	**M**	L
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Tall shrub or small tree (Griffiths, 1992) growing to 6m. Found by streams but also in river beds (Davis, 1982), generally uncommon or rare (Webb et al, 1988) but with a tendency to sucker (White). Where the willow encroaches into the stream, most of its leaf litter is likely to enter the waterway. However, given its low densities, may not have a major impact.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Tall shrub or small tree (Griffiths, 1992) growing to 6m. Found by streams but also in river beds (Davis, 1982), generally uncommon or rare (Webb et al, 1988) but with a tendency to sucker (White). Given its low densities, this willow is likely to have a minor effect on the ground and shrub layers.	**ML**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Tall shrub or small tree (Griffiths, 1992) growing to 6m. Found by streams but also in river beds (Davis, 1982), generally uncommon or rare (Webb et al, 1988). Given its low densities, this willow is likely to co-exist with other vegetation in instream and riverbank riparian niches.	**L**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Tall shrub or small tree (Griffiths, 1992) growing to 6m, with a tendency to sucker (White). Generally uncommon or rare (Webb et al, 1988) Unpalatable to possums, rabbits and hares, due to bitterness of high salicin content in leaves and bark; rated as unsuitable for use as fodder (Van Kraayenoord et al, 1995). Low densities unlikely to provide cover for pest animals, and unlikely to be a food source due to low palatability.	**L**	MH

S. eriocephala Michx. syn. *S. rigida*

Subgenus *Vetrix* Reason for assessment- 3. Introduced & naturalised in England (Stace et al)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Shrub from the subgenus *Vetrix* growing to 1.5-7m. Branchlets sometimes brittle at base (Argus, 1986), but unlikely to have large branches. Able to form adventitious and aerenchymatous roots under water (Kuzovkina et al, 2004), which may require maintenance for clearing drains.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Young foliage shows beautiful colour (Newsholme, 1992) and the willow has moderate palatability to browsing animals (USDA, 2006); Branchlets are sometimes brittle at base (Argus, 1986) sometimes forming colonies by stem fragmentation (Argus, 2005). Sexes present in Australia are unknown and there is no record that it has naturalised here. Some aesthetic value, but a history of vegetative spread indicates that it easy to propagate.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Shrub from the subgenus *Vetrix* growing to 1.5-7m. Branchlets sometimes brittle at base (Argus, 1986), but unlikely to have large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Predominantly riparian (Argus, 1986); on river and stream banks and flood plains, in marshy fields, and in mixed mesophytic woods on alluvium (Argus, 2003). Described as rhizomatous (USDA, 2006) but not colonial (Argus, 2003) although sometimes forming colonies by stem fragmentation (Argus, 2005). Three weeks of experimental flooding stimulated adaptive root growth in this species, including adventitious and aerenchymatous roots (Kuzovkina et al, 2004). Appears to be confined to the banks of waterways, however colonies of this shrub growing to 1.5-7m might impede access from the bank for swimming, boating and fishing, and have a visual impact too.	**MH**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Three weeks of experimental flooding stimulated adaptive root growth in this species, including adventitious and aerenchymatous roots (Kuzovkina et al, 2004), however the species appears to be confined to the banks of waterways (Argus, 2003). Roots encroaching into the water may cause a minor impact to flow and would be capable of removing more water than vegetation lacking instream roots.	**ML**	MH
6. To what degree could the willow cause bed and bank erosion?	Appears to be confined to the banks of waterways (Argus, 2003) but capable of forming colonies by stem fragmentation (Argus, 2005). May supress understorey species and allow erosion of the banks by overland runoff.	**ML**	MH

Question	Comments	Score	Conf
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Appears to be confined to the banks of waterways (Argus, 2003) but capable of forming colonies by stem fragmentation (Argus, 2005). May supress understorey species and allow canopy gaps where native vegetation has been replaced by this deciduous shrub. Shrub growing to 1.5-7m, capable of forming colonies by stem fragmentation (Argus, 2005). May contribute large amounts of leaf litter to waterways.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Shrub growing to 1.5-7m, capable of forming colonies by stem fragmentation (Argus, 2005). Large thickets may have a major effect on the ground and shrub layers.	**MH**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	The ability to form colonies by stem fragmentation (Argus, 2005) may allow this species to dominate river and stream banks and flood plains (Argus, 2003).	**MH**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	This species has moderate palatability to browsing animals (USDA, 2006) and the ability to form colonies by stem fragmentation (Argus, 2005). May provide food for rabbits and harbour for foxes.	**H**	MH

S. exigua Nutt. syn. *S. myricoides*
sandbar willow
Subgenus *Salix* Reason for assessment- 4. Invasive traits (Argus, 1973)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	This suckering shrub or small tree (Walters et al, 1989) growing to 0.5-5m tall with flexible branches (Argus, 2003) is unlikely to drop large branches, but its ability to develop adventitious and aerenchymatous roots (Kuzovkina et al, 2004) that are widespreading and shallow (Brayshaw, 1996) might require maintenance to clear drains.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Beautiful silver foliage, some with attractive black stems (Newsholme, 1992). Relished by livestock (Uchytil, 1989). Some horticultural and agricultural value, but probably easy to propagate, given that vegetative reproduction occurs via broken stems and roots (Uchytil, 1989). Not naturalised in Australia, and sexes present unknown.	**M**	L
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	This suckering shrub or small tree (Walters et al, 1989) growing to 0.5-5m tall with flexible branches (Argus, 2003) is unlikely to drop large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	This species is . "a very aggressive coloniser of sandy and silty river bars and islands...spread[ing] rapidly to form large colonies" (Argus, 1973). It is also from Subgenus *Salix* Section *Longifoliae* are thicket-forming, with roots producing suckers (Newsholme, 1992), "spreading underground and forming thickets" (Hitchcock and Cronquist, 1964) several metres thick (FEIS, 2000). Its ability to form adventitious and aerenchymatous roots (Kuzovkina et al, 2004) suggests that this species could block waterways and prohibit boating, swimming and fishing and having an obvious aesthetic affect.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	This species is . "a very aggressive coloniser of sandy and silty river bars and islands...spread[ing] rapidly to form large colonies" (Argus, 1973). It is also from Subgenus Salix Section Longifoliae are thicket-forming, with roots producing suckers (Newsholme, 1992), "spreading underground and forming thickets" (Hitchcock and Cronquist, 1964) several metres thick (FEIS, 2000). Its ability to form adventitious and aerenchymatous roots (Kuzovkina et al, 2004) suggests that this species could block waterways and use large amounts of water.	**H**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	This species is "a very aggressive coloniser of sandy and silty river bars and islands...spread[ing] rapidly to form large colonies" (Argus, 1973). It is also from Subgenus Salix Section Longifoliae are thicket-forming, with roots producing suckers (Newsholme, 1992), "spreading underground and forming thickets" (Hitchcock and Cronquist, 1964) several metres thick (FEIS, 2000). Its ability to form adventitious and aerenchymatous roots (Kuzovkina et al, 2004) suggests that this species could encroach instream, making waterways wider and shallower.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Suckering shrub or small tree (Walters et al, 1989), , this species is "a very aggressive coloniser of sandy and silty river bars and islands...spread[ing] rapidly to form large colonies" (Argus, 1973) with clones up to 325 sq. m found (Douhownikoff et al, 2005). This species could contribute large amounts of leaf litter to waterways.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Suckering shrub or small tree (Walters et al, 1989), growing to 0.5-5m tall and forming colonies by root shoots (Hitchcock and Cronquist, 1964; Newsholme, 1992; Argus, 2003) clones up to 325 sq. m were found (Douhownikoff et al, 2005). Up to 4-6m tall (Argus, 1986). "A very aggressive coloniser of sandy and silty river bars and islands (Cody, 1996), but also able to establish on drier soils (Voss, 1972), in wet sagebrush scrub, creosote bush scrub and deserts (Munz, 1963), and riverbanks (Hitchcock & Cronquist, 1964). Large colonies could have a major effect on the ground and shrub layers.	**MH**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Suckering shrub or small tree (Walters et al, 1989), growing to 0.5-5m tall and forming colonies by root shoots (Hitchcock and Cronquist, 1964; Newsholme, 1992; Argus, 2003) clones up to 325 sq. m were found (Douhownikoff et al, 2005). Up to 4-6m tall (Argus, 1986). "A very aggressive coloniser of sandy and silty river bars and islands (Cody, 1996), and also able to establish on drier soils (Voss, 1972), in wet sagebrush scrub, creosote bush scrub and deserts (Munz, 1963), and riverbanks (Hitchcock & Cronquist, 1964). Could be the dominant species in instream and riverbank environments.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Able to form thickets (Hitchcock and Cronquist, 1964; Argus, 1973; Newsholme, 1992) several metres thick (FEIS, 2000) and up to to 325 sq. m (Douhownikoff et al, 2005). Also a food source for browsing animals and relished by livestock. Provide hide cover for wildlife. (Uchytil, 1989). May harbour and provide food for several pest species, including foxes and rabbits.	**H**	MH

S. fragilis L.
crack willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	A menace to foundations and drainage systems with far-spreading roots (Newsholme, 1992) that "block[s] streams, drains and culverts (Webb, Sykes & Garnock-Jones, 1988). True tree (Argus, 1986) growing to 25m that is fragile/brittle (Beismann et al, 2000; Jacobs & Murray, 2000). Large branches dropping into waterways may cause major damage to bridges during floods.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	Practically no economic value (FAOUN, 1980); not valued as an ornamental (van Kraayenoord et al, 1995), but can be a fodder plant (Carr et al, 1994; Van Kraayenoord et al, 1995). Male only (Cremer, 1995) present in Australia, but this species has no aesthetic value and is naturalised in Australia because it is so fragile/brittle (Beismann et al, 2000; Jacobs & Murray, 2000).	**H**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	True tree (Argus, 1986) growing to 25m. Fragile/brittle (Beismann et al, 2000; Jacobs & Murray, 2000). Capable of dropping large branches which pose a threat to walkers and could be fatal obstructions to water skiers and people in boats.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	This thicket-forming species (Cremer, 1995) with far-spreading roots (Newsholme, 1992) can grow in riverbeds (Maloney et al, 1999; Webb, Sykes & Garnock-Jones, 1988) and is capable of "block[ing] streams, drains and culverts (Webb, Sykes & Garnock-Jones, 1988) and choking channels (Hathaway, 1987). May encroach into waterways preventing boating, swimming and fishing. These large, fragile trees are not valued as ornamental plants (van Kraayenoord et al, 1995) and detract from the aesthetics of waterways too.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	This thicket-forming species (Cremer, 1995) with far-spreading roots (Newsholme, 1992) can grow in riverbeds (Maloney et al, 1999; Webb, Sykes & Garnock-Jones, 1988) and is capable of "block[ing] streams, drains and culverts (Webb, Sykes & Garnock-Jones, 1988) and choking channels (Hathaway, 1987). May encroach into waterways causing streams to become shallower and wider. With extensive roots in the water, also capable of using large amounts of water.	**H**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	This thicket-forming species (Cremer, 1995) with far-spreading roots (Newsholme, 1992) can grow in riverbeds (Maloney et al, 1999; Webb, Sykes & Garnock-Jones, 1988) and is capable of "block[ing] streams, drains and culverts (Webb, Sykes & Garnock-Jones, 1988) and choking channels (Hathaway, 1987). May encroach into waterways causing streams to become shallower and wider.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	True tree (Argus, 1986), growing to 25m, that has been recorded forming continuous stands of up to 9.5 km along the Murray in South Australia (Kennedy et al, 2003).); It can grow in riverbeds (Maloney et al, 1999; Webb, Sykes & Garnock-Jones, 1988), allowing it to drop large volumes of leaf litter into waterways. It "can become the dominant species in riparian vegetation and forms a dense canopy, reducing light levels and...shading out native plants and reducing macroinvertebrate abundance" (Weber, 2003).	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	True tree (Argus, 1986), growing to 25m that can form continuous stands of up to several km (Kennedy et al, 2003). It "can become the dominant species in riparian vegetation...shading out native plants " (Weber, 2003). Capable of forming vast monocultures.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	True tree (Argus, 1986), growing to 25m that can form continuous stands of up to several km (Kennedy et al, 2003). It "can become the dominant species in riparian vegetation...shading out native plants " (Weber, 2003). Has spread [into] mid stream gravel bars (Purtle et al, 2001a) and grows in riverbeds (Maloney et al, 1999; Webb, Sykes & Garnock-Jones, 1988). Often part of lowland fen or marsh communities (Sommerville). Can become the dominant species in instream and riverbank environments.	**MH**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Thicket-forming species (Cremer, 1995) that "can become the dominant species in riparian vegetation and forms a dense canopy, " (Weber, 2003). Fodder plant (Carr et al, 1994; Van Kraayenoord et al, 1995). May harbour and provide food for several pest species, including foxes and rabbits.	**H**	MH

S. glauca L.
Arctic grey willow
Subgenus *Chamaetia* Reason for assessment- 4. Invasive traits (Skvortsov, 1999; Welsh, 1974) not usual in this subgenus

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	No evidence to suggest either way whether this species could damage human-built structures. As a shrub (Argus, 2004) growing to 0.20 to 6m it is unlikely to drop large branches, but no information was found about its root system.	**M**	L
2. How much horticultural/ agricultural value does the willow have?	Horticultural value of this species is unknown. It is propagated (cultivated) by seed in US (Baskin & Baskin, 2002), but it is not known if both sexes are present in Australia.	**M**	L
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	A shrub (Argus, 2004) 0.20 to 6m is unlikely to drop large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	This species usually forms extensive shrublands (Skvortsov, 1999) and is capable of forming thickets on subalpine slopes, creeks and rivers (Welsh, 1974). Growing to 6m tall it may prohibit access to waterways for swimming, boating and fishing, and have a visual impact. It is described in riparian areas as occupying river banks, but not encroaching into streams (Looman & Best; 1979 Skvortsov, 1999).	**MH**	M
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	This willow is described in riparian areas as occupying river banks, but not encroaching into streams (Looman & Best; 1979 Skvortsov, 1999), however no information about the root system of this willow was found.	**M**	L

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	This willow is described in riparian areas as occupying river banks, but not encroaching into streams (Looman & Best; 1979 Skvortsov, 1999), but able to form thickets on subalpine slopes, creeks and rivers (Welsh, 1974). During floods, the stream could be diverted behind the willow thickets, scouring out large areas of land, having major offsite implications.	**H**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	This willow is described in riparian areas as occupying river banks, but not encroaching into streams (Looman & Best; 1979 Skvortsov, 1999),) growing to 0.20 to 6m and able to form thickets on subalpine slopes, creeks and rivers (Welsh, 1974). When streamside thickets of this willow lose their leaves large amounts of leaf litter could enter the stream and the canopy will open up, allowing high light levels to occur instream.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	This shrub (Argus, 2004) grows to 0.20 to 6m and usually forms extensive shrublands (Skvortsov, 1999). It is also capable of forming thickets on subalpine slopes, creeks and rivers (Welsh, 1974). It is capable of having a major effect on the ground and shrub layers.	**MH**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	This shrub (Argus, 2004) grows to 0.20 to 6m and usually forms extensive shrublands (Skvortsov, 1999). It is also capable of forming thickets on subalpine slopes, creeks and rivers (Welsh, 1974). It can grow in wet to mesic thickets, treed bogs, woods, river floodplains, fens, swamps, subarctic thickets, and alpine tundra (Argus, 2003); along rivers, on rocky mountains and in boreal forest (Looman & Best, 1979); wetlands, bog edges; tundras of various types from paludal to rather dry; stone-fields, glacial moraines; banks of mountain and tundra streams, bypasses and channels with sluggish water flow (Skvortsov, 1999). Capable of occurring as the dominant species in riverbanks and wetlands.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Usually forms extensive shrublands (Skvortsov, 1999) to 0.2-6m that could harbour major pests such as foxes.	**H**	MH

S. glaucophylloides Fernald syn. *S. myricoides*
broadleaf willow
Subgenus *Vetrix* Reason for assessment- 2. Naturalised (ARMCANZ)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Shrub or shrubby tree (Newsholme, 1992) growing to 1-5m, described variously as brittle (Van Kraaynoord et al, 1995) or not brittle (Webb et al, 1988). A shrub from the subgenus *Vetrix*, unlikely to have large branches anyway. No specific information was found about its root system, but it is "not a colonial species like some willows…it produces solitary or few-stemmed plants" (Haines, 2004). Unlikely to damage human-built infrastructure either through dropping branches or invasive roots.	**L**	M
2. How much horticultural/ agricultural value does the willow have?	No horticultural value found. Bitter and unpalatable to native and introduced wild animals, as well as to stock (Van Kraayenoord et al, 1995; Webb, Sykes & Garnock-Jones, 1988). Naturalised in Australia. Probably spreading vegetatively in NSW (Jacobs & Murray, 2000), suggesting ease of propagation.	**H**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	A shrub or shrubby tree (Newsholme, 1992) to 1-5m is unlikely to drop large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	This willow is "not a colonial species like some willows…it produces solitary or few-stemmed plants" (Haines, 2004), making it unlikely to inhibit access by humans as they don't tend to form thickets. However, it can naturalise on streamsides (Webb, Sykes & Garnock-Jones, 1988) and, as a deciduous shrub or shrubby tree (Newsholme, 1992) to 1-5m, would be obvious to the average visitor.	**ML**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	This willow can naturalise on streamsides (Webb, Sykes & Garnock-Jones, 1988). No specific information was found about its root system, but it is "not a colonial species like some willows…it produces solitary or few-stemmed plants" (Haines, 2004). It is unlikely to have an invasive root system, but more information is needed.	**M**	L

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Whilst this willow can naturalise on streamsides (Webb, Sykes & Garnock-Jones, 1988) it is "not a colonial species like some willows…it produces solitary or few-stemmed plants" (Haines, 2004). It is unlikely to have an invasive root system, but more information is needed.	**M**	L
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Shrub or shrubby tree (Newsholme, 1992) growing to 1-5m. "Not a colonial species like some willows…it produces solitary or few-stemmed plants" (Haines, 2004). Within riparian areas it appears to grow along the banks (Webb, Sykes & Garnock-Jones, 1988), but not instream. Potential to drop large amounts of leaf litter instream.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Whilst this willow can naturalise on streamsides (Webb, Sykes & Garnock-Jones, 1988) and swamps (Newsholme, 1992) it is "not a colonial species like some willows…it produces solitary or few-stemmed plants" (Haines, 2004). The density of infestations is unknown, however. More information needed.	**M**	L
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Whilst this willow can naturalise on streamsides (Webb, Sykes & Garnock-Jones, 1988) and swamps (Newsholme, 1992) it is "not a colonial species like some willows…it produces solitary or few-stemmed plants" (Haines, 2004). The density of infestations is unknown, however. More information needed.	**M**	L
10. To what extent could this willow affect other invasive species (flora and fauna)?	Bitter and unpalatable to native and introduced wild animals, as well as to stock (Van Kraayenoord et al, 1995; Webb, Sykes & Garnock-Jones, 1988). Whilst this willow can naturalise on streamsides (Webb, Sykes & Garnock-Jones, 1988) and swamps (Newsholme, 1992) it is "not a colonial species like some willows…it produces solitary or few-stemmed plants" (Haines, 2004). The density of infestations is unknown, however. Unlikely to provide a food source to pest animals, but more information needed about its ability to harbour pests.	**M**	L

S. gracilistyla Miq.

Subgenus *Vetrix* Reason for assessment- 4. Invasive traits (Pohjonen, 1991; Webb et al, 1988)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Grows on the banks of streams and rivers (Skvortsov, 1999) with far-ranging root systems that can outcompete other garden shrubs (Paghat, 2006). Able to form adventitious roots easily and abundantly from stem cuttings (Wilkinson, 1946). Rambling shrub (White, 1992) growing to 3m, variously described as not brittle (Webb et al, 1988), but then becoming quite brittle with age (Paghat, 2006). Unlikely to drop large branches, but may need maintenance to keep drains clear.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Variegated leaves; var. 'Melanostachys' has spectacular black male catkins (Newsholme, 1992). Male only present in NZ (Webb & Sykes-Garnock) and, given that the male has the highest horticultural value, likely to be male only in Australia. 'Melanostachys' variety is recorded as male (Hibbert, 1998). Able to form adventitious roots easily and abundantly from stem cuttings (Wilkinson, 1946). High horticultural value, but probably likely to be easy to propagate from stem cuttings.	**M**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Rambling shrub (White, 1992) to 3m. Unlkiely to develop large branches.	**L**	M
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Belongs to a section of *Vetrix* [subviminales] with pioneer characteristics such as vigorous coppicing (Pohjonen, 1991) and forms dense, suckering thickets (Webb et al, 1988) to 3m tall. Likely to be capable of impeding access to waterways and reducing the aesthetic value of riparian areas. Appears to be confined to the banks of streams and rivers (Skvotsov, 1999), but not encroaching into them.	**MH**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Stem cuttings developed abundant root papillae after being in water for 3 days, followed by the development of roots (Wilkinson, 1946), however this willow appears to be confined to the banks of streams and rivers (Skvotsov, 1999), but not encroaching into them. The far-ranging root system (Paghat, 2006) may encroach into waterways, allowing the plant to use more water than vegetation with roots confined within the banks.	**ML**	M

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Stem cuttings developed abundant root papillae after being in water for 3 days, followed by the development of roots (Wilkinson, 1946), however this willow appears to be confined to the banks of streams and rivers (Skvotsov, 1999), but not encroaching into them. Belongs to a section of *Vetrix* [subviminales] with pioneer characteristics such as vigorous coppicing (Pohjonen, 1991) and forms dense, suckering thickets (Webb et al, 1988) to 3m tall. Under flood conditions, the stream may be diverted behind the willow thickets, scouring out large areas of land with major offsite implications.	**H**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Rambling shrub (White, 1992) growing to 3m that forms dense, suckering thickets (Webb & Sykes-Garnock, 1988); appears to be confined to the banks of streams and rivers (Skvotsov, 1999). Capable of contributing a pulse of leaf drop to waterways. Also, as it is the dominant species in some riparian areas in Japan (Sasaki et al, 2007), dense thickets of this species may outcompete vegetation, causing seasonal openings in the vegetation canopy.	**ML**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Rambling shrub (White, 1992) growing to 3m that belongs to a section of *Vetrix* [subviminales] with pioneer characteristics such as vigorous coppicing (Pohjonen, 1991). Forms dense, suckering thickets (Webb & Sykes-Garnock, 1988) and is the dominant species in some riparian areas in Japan (Sasaki et al, 2007). Capable of a major effect on the ground and shrub layers.	**MH**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Rambling shrub (White, 1992) growing to 3m that forms dense, suckering thickets (Webb & Sykes-Garnock, 1988), but appears to be confined to the banks of streams and rivers (Skvotsov, 1999). May occur as the dominant species on riverbanks.	**ML**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Belongs to a section of Vetrix [subviminales] with pioneer characteristics such as vigorous coppicing (Pohjonen, 1991) and forms dense, suckering thickets (Webb et al, 1988) along riverbanks (Skvotsov, 1999). May harbour serious pests, such as foxes.	**H**	MH

***S .humboldtiana* 'Pyramidalis'** Willd. syn. *S. chilensis* 'Fastigiata'
Chilean pencil willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	A tree growing to 6-10m, but fastigate growth (Weldon, 1986) and flexible stems (Jacobs & Murray, 2000) reduces the likelihood that it might drop a large limb. This willow is able to grow into waterways (pers. obs.), so maintenance may be required for keeping drains clear.	**MH**	M
2. How much horticultural/ agricultural value does the willow have?	This male only willow (Newsholme, 1992) with unusual fastigate growth (Weldon, 1986) was in the nursery trade (ARMCANZ, 2001) until it was declared noxious. Its reproduction is predominantly vegetative (ARMCANZ., 2000), suggesting that it is easy to propagate.	**MH**	M
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	A tree growing to 6-10m, but fastigate growth (Weldon, 1986) and flexible stems (Jacobs & Murray, 2000) reduces the likelihood that it might drop a large limb.	**L**	M
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Species tending to a single stem (Cremer, 1995) with fastigate growth (Weldon, 1986). Unsuccessfully controlled specimen observed suckering to form a thicket up to 6m diameter. Single specimen did not impede access, however (pers. obs.). Semi-evergreen (Bodkin, 1990), likely to be less noticeable than other willows, which are deciduous.	**L**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Observed growing instream as a suckering thicket to 6m wide (pers. obs.) Capable of a minor impact on flow by stems. Usually found on banks of watercourses or in moist locations (Howard, 1988); or in swamps and marshes (Standley & Steyermark, 1958).	**ML**	M

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Usually found on banks of watercourses or in moist locations (Howard, 1988); or in swamps and marshes (Standley & Steyermark, 1958). Unsuccessfully controlled specimen observed growing instream as a suckering thicket to 6m wide (pers. obs.), but usually tending to a single stem (Cremer, 1995) with fastigate growth (Weldon, 1986). It is unlikely to contribute to erosion as it is not known to supress vegetation and is unlikely to block floodwater or to invade waterways without human intervention.	**L**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Fastigate tree (Weldon, 1986) growing to 6-10m, tending to a single stem (Cremer, 1995). Semi-evergreen (Bodkin, 1990). Unlikely to contribute much leaf litter to waterways at any one time.	**L**	M
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Fastigate tree (Weldon, 1986) growing to 6-10m and tending to a single stem (Cremer, 1995). Upright form is likely to have a negligable affect on habitat layers.	**L**	**M**
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Fastigate tree (Weldon, 1986) growing to 6-10m and tending to a single stem (Cremer, 1995). Able to grow on the banks of watercourses or in moist locations (Howard, 1988); along streams or in swamps and marshes (Standley & Steyermark, 1958). Upright form is likely to co-exist with other vegetation.	**L**	**M**
10. To what extent could this willow affect other invasive species (flora and fauna)?	Fastigate tree (Weldon, 1986) growing to 6-10m and tending to a single stem (Cremer, 1995). Unlikely to harbour serious pests. Palatability unknown.	**M**	**L**

***S. integra* 'Hakuro-nishiki'** syn. *S. integra* 'Alba Maculata,' 'Fuiji Koriangi,' 'Fuiri-kuroyanagi,' 'Fuiji Nishiki,' Albomarginata,' & 'Hakuro Hishiki.'
Subgenus *Vetrix* Reason for assessment- 5. Possibly low weed risk

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Occupies damp lowlands, never found close to flowing water (Skvortsov, 1999). Similar to S. purpurea (Griffiths, 1992), a shrub willow growing to 1-1.5m. Unlikely to develop large branches and unlikely to grow near drains.	**L**	MH
2. How much horticultural/ agricultural value does the willow have?	Spectacular in all seasons (Paghat, 2006). As a cultivar, this plant is likely to require propagation by cuttings to remain true. Not known which sex is in Australia (ARMCANZ, 2000).	**M**	ML
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Occupies damp lowlands, never found close to flowing water (Skvortsov, 1999). Not likely to occur in riparian areas.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Occupies damp lowlands, never found close to flowing water (Skvortsov, 1999). Not likely to occur in riparian areas.	**L**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Occupies damp lowlands, never found close to flowing water (Skvortsov, 1999). Not likely to occur in riparian areas.	**L**	MH
6. To what degree could the willow cause bed and bank erosion?	Occupies damp lowlands, never found close to flowing water (Skvortsov, 1999). Not likely to occur in riparian areas.	**L**	MH

Question	Comments	Score	Conf
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Occupies damp lowlands, never found close to flowing water (Skvortsov, 1999). Not likely to occur in riparian areas.	**L**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Occupies damp lowlands, never found close to flowing water (Skvortsov, 1999). Not likely to occur in riparian areas.	**L**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Occupies damp lowlands, never found close to flowing water (Skvortsov, 1999). Not likely to occur in riparian areas.	**L**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Similar to S. purpurea (Griffiths, 1992), a shrub willow growing to 1-1.5m. Palatability and ability to harbour animals unknown.	**M**	L

S. matsudana Koidz.
tortured willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (ARMCANZ)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Able to grow in riverbeds, lakesides and swamp margins (Webb, Sykes & Garnock-Jones, 1988). It has a large root system, like other tree willows (Geoff Carr, pers. comm.) that may block drains. It is also fragile (Beismann et al, 2000) and is a small tree (Weldon, 1986) growing to 6m. May also drop large branches that can damage bridges during floods.	**H**	M
2. How much horticultural/ agricultural value does the willow have?	Tortousa' has decorative stems (Newsholme, 1992), useful timber, and is rated as suitable for shelterbelts and for use as fodder (van Kraayenoord et al, 1995). Only female plants (of S. matsudana 'Tortuosa') are known and they produce aborted seed (Carr, 1996). They are naturalised vegetatively (Carr, 1996) and shoots detatch and quickly root in moist ground (Webb et al, 1988). This suggests they are easy to propagate.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Able to grow in riverbeds, lakesides and swamp margins (Webb, Sykes & Garnock-Jones, 1988). It is fragile (Beismann et al, 2000) and is a small tree (Weldon, 1986) growing to 6m. May drop large branches which pose a threat to walkers and could be fatal obstructions to water skiers and people in boats.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Able to grow in riverbeds, lakesides and swamp margins (Webb, Sykes & Garnock-Jones, 1988). Tree tending to form a a few stems, but not thicket-forming (Cremer, 1995), capable of forming large stands (FAOUN, 1980) but sparingly naturalised in Australia (Carr, 1996). This deciduous tree would be obvious to the average visitor and may provide an obstacle for water sports, but unlikely to prevent any recreation on waterways.	**ML**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	A tree tending to form a a few stems, but not thicket-forming (Cremer, 1995) and able to grow in riverbeds (Webb, Sykes & Garnock-Jones, 1988). May have a minor impact on flow and use more water than vegetation confined to the banks.	**ML**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Able to grow in riverbeds (Webb, Sykes & Garnock-Jones, 1988) and has a large root system, like other tree willows (Geoff Carr, pers. comm.). However, this willow is a tree tending to form a a few stems, but not thicket-forming (Cremer, 1995). Large root system may suppress understorey species and allow erosion of the banks by overland flow.	**ML**	M
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Small tree (Weldon, 1986) growing to 6m, tending to form a a few stems, but not thicket-forming (Cremer, 1995). Capable of forming large stands (FAOUN, 1980), but sparingly naturalised in Australia (Carr, 1996). Able to grow in riverbeds (Webb, Sykes & Garnock-Jones, 1988) which would allow a large amount of leaf litter to fall into waterways.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Small tree (Weldon, 1986) growing to 6m, tending to form a a few stems, but not thicket-forming (Cremer, 1995). Capable of forming large stands (FAOUN, 1980), but sparingly naturalised in Australia (Carr, 1996). May have a minor effect on the ground and shrub layers.	**ML**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Small tree (Weldon, 1986) growing to 6m, tending to form a a few stems, but not thicket-forming (Cremer, 1995). Capable of forming large stands (FAOUN, 1980), but sparingly naturalised in Australia (Carr, 1996). Likely to co-exist with other vegetation.	**L**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Tree tending to form a a few stems, but not thicket-forming (Cremer, 1995), capable of forming large stands (FAOUN, 1980), but sparingly naturalised (Carr, 1996). Rated as suitable for use as fodder (van Kraayenoord et al, 1995). May provide food for pest species, such as rabbits.	**H**	MH

S. myrsinifolia Salisb. syn. *S. nigricans*
dark-leaved willow
Subgenus *Vetrix* Reason for assessment- 6. Exempt in Vic (VGG, 2005)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Within wetland and riparian areas, this shrub appears to be confined to the banks (Skvortsov, 1999; Clapham et al, 1952). A shrub (Bailey & Bailey, 1976) with several stems (Martini, 1984) growing to 4m, or spreading and procumbent (Clapham et al, 1952). Unlikely to drop large branches and its root system is unlikely to block drains.	**L**	M
2. How much horticultural/ agricultural value does the willow have?	Shining black stems (Newsholme, 1992) have some horticultural value. Its leaves are rich in phenolglucosides which probably deters vertebrate herbivores (Pasteels & Rowell-Rahier (1992). Sexes present in Australia are unknown (ARMCANZ, 2000). Ease of propagation unknown, but there is no record of this species naturalising.	**M**	M
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	A shrub (Bailey & Bailey, 1976) with several stems (Martini,1984) growing to 4m, or spreading and procumbent (Clapham et al, 1952). Unlikely to drop large branches.	**L**	M
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Within wetland and riparian areas, this shrub appears to be confined to the banks (Skvortsov, 1999; Clapham et al, 1952). A shrub (Bailey & Bailey, 1976) with several stems (Martini,1984) growing to 4m, or spreading and procumbent (Clapham et al, 1952). Ability to impede access to waterways unknown.	**M**	L
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Within wetland and riparian areas, this shrub appears to be confined to the banks (Skvortsov, 1999; Clapham et al, 1952). Unlikely to impact on stream flow.	**L**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Within wetland and riparian areas, this shrub appears to be confined to the banks (Skvortsov, 1999; Clapham et al, 1952). A shrub (Bailey & Bailey, 1976) with several stems (Martini, 1984) growing to 4m, or spreading and procumbent (Clapham et al, 1952). Ability to supress vegetation unknown.	**M**	L
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Within wetland and riparian areas, this shrub appears to be confined to the banks (Skvortsov, 1999; Clapham et al, 1952). A shrub (Bailey & Bailey, 1976) with several stems (Martini, 1984) growing to 4m, or spreading and procumbent (Clapham et al, 1952). May contribute few leaves to waterways.	**L**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Within wetland and riparian areas, this shrub appears to be confined to the banks (Skvortsov, 1999; Clapham et al, 1952). A shrub (Bailey & Bailey, 1976) with several stems (Martini, 1984) growing to 4m, or spreading and procumbent (Clapham et al, 1952). Ability to supress vegetation unknown.	**M**	L
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Within wetland and riparian areas, this shrub appears to be confined to the banks (Skvortsov, 1999; Clapham et al, 1952). A shrub (Bailey & Bailey, 1976) with several stems (Martini, 1984) growing to 4m, or spreading and procumbent (Clapham et al, 1952). Ability to supress vegetation unknown.	**M**	L
10. To what extent could this willow affect other invasive species (flora and fauna)?	Leaves rich in phenolglucosides which can deter vertebrate herbivores (Pasteels & Rowell-Rahier (1992). Ability to harbour pest species unknown.	**M**	L

S. nigra Marshall
black willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	True tree (Argus, 1986), growing to 20m+ with brittle twigs (Argus, 1986; Spencer, 1997). May drop large branches that could damage bridges during floods.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	Some palatability (USDA, 2006) means it may be used for stock fodder. However, this species is abundantly recruiting by seed (Carr, 1996) and both sexes are present in Australia (Cremer et al, 1995).	**H**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	True tree (Argus, 1986), growing to 20m+ with brittle twigs (Argus, 1986; Spencer, 1997). May drop large branches that could be fatal obstructions to water skiers and people in boats.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	May form large pure stands (Argus, 1986), reducing bird life. Seedlings are able to grow in the middle of streams (Ladson et al, 1997 & Cremer, 1999) and this willow can also form a dense mass of adventitious and aerenchymatous roots that reach the surface of the water (Kuzovkina et al, 2004). May encroach into streams, making it too shallow to fish, boat or swim.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Primarily of river margins and floodplains, alluvial soils; edges of ponds and lakes, swamps, marshes, bogs, wet meadows, open fields and roadside ditches, mixed upland deciduous woods along rivers (Argus, 1986); however seedlings are able to grow in the middle of streams (Ladson et al, 1997 & Cremer, 1999) and this willow can also form a dense mass of adventitious and aerenchymatous roots that reach the surface of the water (Kuzovkina et al, 2004). May cause streams to become shallower and wider, and would be capable of using large amounts of water.	**MH**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Seedlings are able to grow in the middle of streams (Ladson et al, 1997 & Cremer, 1999) and three weeks of flooding produced a dense mass of roots that reached the water surface (Kuzovkina et al, 2004). Capable of creating a wider, shallower stream.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	True tree (Argus, 1986), growing to 20m+ that may form large pure stands (Argus, 1986). Usually with a single prominent trunk, sometimes up to 4 stems (Jacobs & Murray, 2000). Capable of contributing large amounts of leaf litter to the waterway at a time.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	True tree (Argus, 1986), growing to 20m+ that may form large pure stands (Argus, 1986). Capable of forming monocultures.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Primarily of river margins and floodplains, alluvial soils; edges of ponds and lakes, swamps, marshes, bogs, wet meadows, open fields and roadside ditches, mixed upland deciduous woods along rivers (Argus, 1986); "Streams in pastoral country…opening in pine and eucalypt forest" (Cremer, 1999). Offstream wetlands (Ladson et al, 1997). Seedlings are able to grow in the middle of streams (Ladson et al, 1997 & Cremer, 1999). May form large pure stands (Argus, 1986). Capable of high impacts in in-stream, rivermargin, floodplain and wetland environments.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	True tree (Argus, 1986), growing to 20m+ that may form large pure stands (Argus, 1986). Deer eat twigs and leaves, rodents eat buds and bark, and palatability rated as fair (USDA, 2006). Able to harbour pests and recorded as a food source for two known pest species.	**H**	MH

S. pentandra L.
bay willow
Subgenus *Salix* Reason for assessment- 3. Naturalised in the US (Argus, 1986)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Twigs and stems variously described as brittle (Van Kraaynoord et al, 1995) or flexible (Argus, 2005); not fragile (Davis, 1982; Clapham et al, 1952). True tree (Argus, 1986) growing to 5-15m. If branches were to drop from this tree they could pose a risk to infrastructure such as bridges, however the literature is not clear about the fragility of this species, nor about the invasiveness of its root system.	**M**	L
2. How much horticultural/ agricultural value does the willow have?	Ornamental (van Kraayenoord et al, 1995) with glossy foliage (Newsholme, 1992). Bitter leaves; rated as unsuitable for use as fodder (van Kraayenoord et al, 1995). Used for windbreaks (van Kraayenoord et al, 1995). Female only in US (Argus, 2005), however, sex and method of reproduction are unknown in Australia. Given the plant's ability to layer (Sommerville), likely to be easy to propagate. Not recorded as naturalised in Australia (APC, 2006).	**M**	M
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Twigs and stems variously described as brittle (Van Kraaynoord et al, 1995) or flexible (Argus, 2005); not fragile (Davis, 1982; Clapham et al, 1952). True tree (Argus, 1986) growing to 5-15m. If branches were to drop from this tree they could pose a risk to waterway users, however the literature is not clear about the fragility of this species.	**M**	L
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Branches frequently reach the ground and can re-root to form a dense habit (Sommerville). Extent of infestations unknown, however. Stem cuttings infrequently developed roots, following 2-3 weeks of submersion in water (Wilkinson, 1946). Appears to be confined to the banks when growing in riparian zones (Voss, 1972; Pohjonen, 1991). Not likely to grow instream, but it is not clear if this species is capable of having a major impact on recreation.	**M**	L
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Stem cuttings infrequently developed roots, following 2-3 weeks of submersion in water (Wilkinson, 1946). Appears to be confined to the banks when growing in riparian zones (Voss, 1972; Pohjonen, 1991). Not likely to have roots that grow instream.	**L**	M

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Stem cuttings infrequently developed roots, following 2-3 weeks of submersion in water (Wilkinson, 1946). Appears to be confined to the banks when growing in riparian zones (Voss, 1972; Pohjonen, 1991). Not likely to grow instream. Branches frequently reach the ground and can re-root to form a dense habit (Sommerville). Extent of infestations unknown, however.	**M**	L
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	True tree (Argus, 1986) growing to 5-15m Branches frequently reach the ground and can re-root to form a dense habit (Sommerville). Grows along riverbanks and shores of lakes (Voss, 1972; Pohjonen, 1991). Stem cuttings infrequently developed roots, following 2-3 weeks of submersion in water (Wilkinson, 1946). Unlikely to encroach into stream but capable of dropping large amounts of leaf litter.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	True tree (Argus, 1986), growing to 5-15m Branches frequently reach the ground and can re-root to form a dense habit (Sommerville). Extent of infestations unknown, however.	**M**	L
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Branches frequently reach the ground and can re-root to form a dense habit (Sommerville). Within riparian niches, capable of growing along streambanks (Voss, 1972; Pohjonen, 1991) and in transitional graminoid wetlands (Skvortsov, 1999).	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Branches frequently reach the ground and can re-root to form a dense habit (Sommerville). May harbour pest species. But not likely to provide a food source as they have bitter leaves and are rated as unsuitable for use as fodder (van Kraayenoord et al, 1995).	**H**	MH

S. purpurea L.
purple osier
Subgenus *Vetrix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Used to stabilise stream banks in New Zealand (Stott, 1992) and to reclaim land alongside estuaries (Newsholme, 1992). Able to "establish on shingle beaches and islands and have a free suckering habit which traps sediment, increasing the size of island blocks in the riverbed" (Zallar, nd). Roots may require maintenance to keep drains clear.	**MH**	M
2. How much horticultural/ agricultural value does the willow have?	Some ornamental value (van Kraayenoord et al, 1995). Unpalatable to stock, possums, rabbits and hares, due to bitterness of high salicin content in leaves and bark (Webb et al, 1988; Van Kraayenoord et al, 1995; Newsholme, 1992); Used for windbreaks (Newsholme, 1992) Although *S. purpurea* 'Booth' is a female that produces infertile seed or very weak seedlings (Zallar, nd), abundant seed is set in some Australian locations (Carr, 1996); and seedlings have been observed in NZ (Webb et al, 1988). Not known if there are male clones in Australia, however the species has naturalised.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Shrub with many (30+) stems (Newsholme, 1992) to 6m that are flexible (not brittle) (Skvortsov, 1999; Beismann et al, 2000) and vegetative reproduction is limited (Carr, 1996). Unlikely to drop large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Shrub with many (30+) stems (Newsholme, 1992) to 6m tall. A thicket-forming species that may grow to more than 10m in diameter (Cremer, 1999) and is able to "establish on shingle beaches and islands and have a free suckering habit which traps sediment, increasing the size of island blocks in the riverbed" (Zallar, nd). May inhibit views, access to waterways, and block the passage of boats and swimmers.	**H**	M
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	A thicket-forming species that may grow to more than 10m in diameter (Cremer, 1999) and is able to "establish on shingle beaches and islands and have a free suckering habit which traps sediment, increasing the size of island blocks in the riverbed" (Zallar, nd). Extensive roots and stems in stream may cause the stream to beome shallower and wider.	**H**	M

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	A thicket-forming species that may grow to more than 10m in diameter (Cremer, 1999) and is able to "establish on shingle beaches and islands and have a free suckering habit which traps sediment, increasing the size of island blocks in the riverbed" (Zallar, nd). Extensive roots and stems in stream may cause the stream to beome shallower and wider.	**MH**	M
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Shrub with many (30+) stems (Newsholme, 1992) growing to 6m that may produce a thicket more than 10m in diameter (Cremer, 1999). Has completely suppressed understorey vegetation at a site on the Tumut River in Kosciukso National Park (Carr et al, 1994). Also able to grow instream (Zallar, nd). May drop large amounts of leaf litter in Autumn and open the canopy substantially.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Shrub with many (30+) stems (Newsholme, 1992) growing to 6m high and more than 10m wide (Cremer, 1999). Has completely suppressed understorey vegetation at a site on the Tumut River in Kosciukso National Park (Carr et al, 1994). Major effect on ground and shrub layers.	**MH**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	This willow has completely suppressed understorey vegetation at a site on the Tumut River in Kosciukso National Park (Carr et al, 1994). It may form a thicket more than 10m in diameter (Cremer, 1999) and can grow along streamsides (Webb et al, 1988), instream (Zallar, nd) and on fens and floodplains (Stott, 1992). Capable of dominating at least 3 of the riparian niches.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	May produce a thicket more than 10m in diameter (Cremer, 1999) that may harbour small pest animals (Dickerson, 2002). Despite several references (Webb et al, 1988; Newsholme, 1992; van Kraayenoord et al, 1995) to high salicin content causing bitterness in the leaves and bark and unpalatability, it is recorded as a food source for rabbits and deer (Dickerson, 2002).	**H**	M

S. triandra L.
almond willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (APNI)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Large shrub or small tree (Butcher, 1961) growing to up to 10m. Twigs variously described as fragile (Beismann et al, 2000) or thin and flexible (Davis, 1982). This may be due to the difference between coppiced and uncoppiced branches. Shrubby habit, unlikely to drop large branches, but no information about root system found. However, an ability to grow in sandy inundated river beds (Niemi, 2006) suggests that the root system may be capable of infesting drains.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Ornamental with fragrant catkins (van Kraayenoord et al, 1995). Rated as unsuitable for use as fodder (van Kraayenoord et al, 1995). Male and female present in Australia (Carr, 2005), however, its method of spread is not known. Its description as one of the easiest rooting willows (Phjonen, 1991) suggests that no specialist knowledge is needed to propagate the species.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Large shrub or small tree (Butcher, 1961) growing to up to 10m. Twigs variously described as fragile (Beismann et al, 2000) or thin and flexible (Davis, 1982). This may be due to the difference between coppiced and uncoppiced branches. Shrubby habit, unlikely to drop large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Forms large continuous stands along rivers over vast areas (Skvortsov, 1999) and grows to 10m. Also has an ability to grow in sandy inundated river beds (Niemi, 2006), suggesting that it may be able to block the passaage of boats and swimmers, as well as obstructing views and access to waterways from the bank.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Has an ability to grow in sandy inundated river beds (Niemi, 2006) which may enable this species to cause streams to become shallower and wider.	**H**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Grows along the banks of waterways (Skvortsov, 1999; Clapham et al, 1952) but also able to grow in sandy inundated river beds (Niemi, 2006). May cause streams to become shallower and wider, causing large-scale soil movement instream.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Able to grow in sandy inundated river beds (Niemi, 2006) and forms large continuous stands along rivers over vast areas (Skvortsov, 1999) and grows to 10m. Large amounts of leaf litter could be deposited into the stream as this species can encroach into waterways.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Large shrub or small tree (Butcher, 1961) growing to up to 10m that forms large continuous stands along rivers over vast areas (Skvortsov, 1999). May be capable of having a major effect on all vegetation layers.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Large shrub or small tree (Butcher, 1961) growing to up to 10m that forms large continuous stands along rivers over vast areas (Skvortsov, 1999). Able to grow instream (Niemi, 2006) and on the banks of rivers and streams, ponds, marshes and flood plains (Skvortsov, 1999; Clapham et al, 1952). Often part of lowland fen or marsh communities (Sommerville; Davis, 1982).	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Rated as unsuitable for use as fodder (van Kraayenoord et al, 1995), but able to form large continuous stands along rivers over vast areas (Skvortsov, 1999). May harbour major pest species.	**H**	MH

S. viminalis L.
common osier
Subgenus *Vetrix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Small tree, or erect shrub, often suckering extensively (Beismann et al, 2000), growing to 8m, with a very big root system (Geoff Carr, pers. comm.). Able to grow in riverbeds (Webb et al, 1988). Described variously as very fragile (Beismann et al, 2000) and flexible (Skvortsov, 1999; Jacobs & Murray, 2000). Shrubby habit makes it unlikely to drop large branches, but may block drains.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Not valued as an ornamental (van Kraayenoord et al, 1995). Not bitter; rated as suitable for use as fodder (van Kraayenoord et al, 1995). Used for windbreaks (Newsholme, 1992). Both male & female trees are present in Australia (Cremer, 1995) and the species reproduces by seedlings (ARMCANZ, 2001; Webb et al, 1988). Some horticultural value, but not aesthetic, both sexes are present in Australia and the species is naturalised.	**H**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Small tree, or erect shrub (Beismann et al, 2000), growing to 8m. Described variously as very fragile (Beismann et al, 2000) and flexible (Skvortsov, 1999; Jacobs & Murray, 2000), but its shrubby habit makes it unlikely to drop large branches,	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Forms dense and often extensive thickets along many river banks in its native range (Newsholme, 1992) that could pose a major impediment to access of waterways. Also able to grow in riverbeds (Webb et al, 1988) and can "establish on shingle beaches and islands and have a free suckering habit which traps sediment, increasing the size of island blocks in the riverbed" (Zallar, nd). May be capable of preventing boating and swimming.	**H**	M
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Many references refer to this species occurring along riverbanks (Newsholme, 1992; Meikle, 1984; Pohjonen, 1991), however it is also recorded as being able to grow in riverbeds (Webb et al, 1988) and can "establish on shingle beaches and islands and have a free suckering habit which traps sediment, increasing the size of island blocks in the riverbed" (Zallar, nd). May create wider, shallower streams.	**MH**	M

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Able to grow in riverbeds (Webb et al, 1988) and can "establish on shingle beaches and islands and have a free suckering habit which traps sediment, increasing the size of island blocks in the riverbed" (Zallar, nd). May create wider, shallower streams.	**MH**	M
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Forms dense and often extensive thickets along many river banks in its native range (Newsholme, 1992). Also observed in fens [wet areas] in the Australian Alpine National Park with *S. purpurea*, forming extremely dense thickets with closed canopy largely suppressing all vegetation and having a major impact on the few species remaining (Carr et al, 1994). Small tree, or erect shrub, often suckering extensively growing to 8m (Webb et al, 1988). Capable of contributing large amounts of leaf litter to waterways in Autumn.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Small tree, or erect shrub, often suckering extensively growing to 8m (Webb et al, 1988). Observed in fens [wet areas] in the Australian Alpine National Park with *S. purpurea*, forming extremely dense thickets with closed canopy largely suppressing all vegetation and having a major impact on the few species remaining (Carr et al, 1994). Forms dense and often extensive thickets along many river banks in its native range (Newsholme, 1992). Capable of having a major effect on all layers.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Small tree, or erect shrub, often suckering extensively growing to 8m (Webb et al, 1988). Observed in fens [wet areas] in the Australian Alpine National Park with *S. purpurea*, forming extremely dense thickets with closed canopy largely suppressing all vegetation and having a major impact on the few species remaining (Carr et al, 1994). Forms dense and often extensive thickets along many river banks in its native range (Newsholme, 1992). Also able to grow in riverbeds (Webb et al, 1988) and can "establish on shingle beaches and islands and have a free suckering habit which traps sediment, increasing the size of island blocks in the riverbed" (Zallar, nd). Grows on the banks of streams, rivers and lakes and on floodplains and marshes (Pohjonen, 1991). Capable of occurring as the dominant species along riverbanks and in wetlands.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Forms dense and often extensive thickets along many river banks in its native range (Newsholme, 1992) that could harbour major pest species. Not bitter and rated as suitable for use as fodder (van Kraayenoord et al, 1995). Could also provide fodder for pest species.	**H**	MH

S. alba* x *matsudana L. - Koidz.
NZ hybrid willow
Subgenus Salix Reason for assessment- 2. Naturalised (Carr, 1996)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Single stem tree (Cremer, 1995) growing to 20m. Some clones are fragile, others slightly to moderately brittle (Jacobs & Murray, 2000). Has naturalised vegetatively (Carr, 1996). Large branches dropping into waterways may cause major damage to bridges during floods.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	Ornamental (van Kraayenoord et al, 1995) with glossy foliage (Newsholme, 1992). Rated as suitable for use as fodder, timber and windbreaks (Van Kraayenoord et al, 1995). However, they can be bisexual and self-fertile, and the other clones breed vigorously with each other (Cremer, 1999). Male, female and bisexual clones were introduced to Australia (Cremer et al, 1995). They have been bred to establish rapidly from stem cuttings (van Kraayenoord, 1995). Some aesthetic value but easy to propagate and naturalised.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Single stem tree (Cremer, 1995) growing to 20m. Some clones are fragile, others slightly to moderately brittle (Jacobs & Murray, 2000). Has naturalised vegetatively (Carr, 1996). Capable of dropping large branches which pose a threat to walkers and could be fatal obstructions to water skiers and people in boats.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Single-stemmed tree (Jacobs & Murray, 2000). Don't form vast thickets like S. fragilis, however large, excluding thickets have been observed in NE Victoria. Also able to grow in the stream bed (Geoff Carr, pers. comm.). May have an aesthetic impact if large thickets impede river views, but unlikely to impede access to waterways. Impact on the flow of water for swimmin or boating unknown.	**M**	L
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Able to grow in the stream bed (Geoff Carr, pers. comm.). The seedlings produced have caused serious problems in the Bega River (Bear, 1999), but impact on water flow unknown. Ability to grow instream allows this willow to use large amounts of water.	**MH**	ML

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Able to grow in the stream bed (Geoff Carr, pers. comm.). Impact on flow unknown.	**M**	L
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Single stem tree (Cremer, 1995; Jacobs & Murray, 2000) growing to 20m. Don't form vast thickets like S. fragilis, however large, excluding thickets have been observed in NE Vic (Geoff Carr, pers.comm.). May contribute large amounts of leaf litter to the stream.	**MH**	M
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Don't form vast thickets like S. fragilis, however large, excluding thickets have been observed in NE Vic (Geoff Carr, pers.comm.). Capable of having a major effect on all layers.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Don't form vast thickets like S. fragilis, however large, excluding thickets have been observed in NE Vic. Able to grow in the stream bed (Geoff Carr, pers. comm.). May have a major impact on vegetation along streambanks. Impact in the stream bed unknown.	**M**	L
10. To what extent could this willow affect other invasive species (flora and fauna)?	Don't form vast thickets like S. fragilis, however large, excluding thickets have been observed in NE Vic (Geoff Carr, pers.comm.). Rated as suitable for use as fodder (Van Kraayenoord et al, 1995). May provide fodder for, and harbour, pest animals.	**H**	MH

***S.* x 'Boydii'** E.F.Linton syn. *S. lapponum* x *S. herbacea* (x? *S. lanata*?)
Subgenus *Vetrix* x *Chamaetia* Reason for assessment- 5. Possibly low weed risk

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). Unlikely to damage structures.	**L**	MH
2. How much horticultural/ agricultural value does the willow have?	Was in trade (ARMCANZ, 2001). "One of the most interesting species for alpine and trough gardens" (Kuzovkina & Quigley, 2004). Propagated horticulturally (Tennant, 2004). Sex uncertain (Kuzovkina & Quigley, 2004). Noted as female in Australia (Hibbert, 1998). As a cultivar, this taxon must be vegetatively propagated to remain true to type. This appears to be difficult due to limited new growth (Steswart, 2007; Cox, 2004).	**L**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). References were only found to this species in cultivation, not as a naturalised taxon. Unlikely to impact on the health and safety of waterway users.	**L**	M
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). References were only found to this species in cultivation, not as a naturalised taxon. Unlikely to impact on recreation in/on waterways.	**L**	M
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). References were only found to this species in cultivation, not as a naturalised taxon. Unlikely to impact on water flow.	**L**	M
6. To what degree could the willow cause bed and bank erosion?	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). References were only found to this species in cultivation, not as a naturalised taxon. Unlikely to cause erosion.	**L**	M

Question	Comments	Score	Conf
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). References were only found to this species in cultivation, not as a naturalised taxon. Unlikely to contribute leaf litter to waterways.	**L**	M
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). References were only found to this species in cultivation, not as a naturalised taxon. Unlikely to impact on riparian/wetland habitat.	**L**	M
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). References were only found to this species in cultivation, not as a naturalised taxon. Unlikely to impact on riparian niches.	**L**	M
10. To what extent could this willow affect other invasive species (flora and fauna)?	Dwarf, erect, bonsai-like shrub (Walters et al, 1989) growing to 0.1-0.3m (Kuzovkina & Quigley, 2004). Unlikely to provide harbour or significant food source for pest species.	**L**	M

S.* x *calodendron. Wimm. syn. *S. caprea* x *S. cinerea* x *S. viminalis*
pussy willow
Subgenus *Vetrix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Recorded as naturalised along streamsides or in swamps in New Zealand near original plantings (Webb, 1988). Has a large mat root system (Geoff Carr, pers. comm.) Multi-stemmed shrub or small tree to 12 m (Conn, 2000) Resembles S. viminalis in habit (Newsholme, 1992). Shrubby habit makes it unlikely to drop large branches, but may block drains.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Not valued as an ornamental. Not bitter, however, rated as unsuitable for use as fodder (Van Kraayenoord et al, 1995). Sterile female. (Cremer, 1995); Two clones 'Balana,' & 'Hybrida' considered sterile, rarely planted and not to have spread (Cremer, 1999), however, suspected as naturalised in Vic and NSW (Conn, 2000). Only males are present in New Zealand, however the plant has naturalised near original plantings (Webb et al, 1988). No aesthetic value. Ability to naturalise in New Zealand suggests ease of propagation by vegetative means.	**H**	M
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Multi-stemmed shrub or small tree to 12 m (Conn, 2000). Resembles S. viminalis in habit (Newsholme, 1992). Shrubby habit makes it unlikely to drop large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Multi-stemmed shrub or small tree to 12 m (Conn, 2000). Resembles S. viminalis in habit (Newsholme, 1992). Large mat root system (Geoff Carr, pers. comm.). Has naturalised along streamsides or in swamps in New Zealand (Webb, 1988). However, no information was found about the ability of this species to grow in the streambed or the extent of infestations.	**M**	L

Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Multi-stemmed shrub or small tree to 12 m (Conn, 2000). Resembles S. viminalis in habit (Newsholme, 1992). Large mat root system (Geoff Carr, pers. comm.). Has naturalised along streamsides or in swamps in New Zealand (Webb, 1988). However, no information was found about the ability of this species to grow in the streambed or the extent of infestations.	**M**	L
6. To what degree could the willow cause bed and bank erosion?	Multi-stemmed shrub or small tree to 12 m (Conn, 2000). Resembles S. viminalis in habit (Newsholme, 1992). Large mat root system (Geoff Carr, pers. comm.). Has naturalised along streamsides or in swamps in New Zealand (Webb, 1988). However, no information was found about the ability of this species to grow in the streambed or the extent of infestations.	**M**	L
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Multi-stemmed shrub or small tree to 12 m (Conn, 2000). Resembles S. viminalis in habit (Newsholme, 1992). Has naturalised along streamsides or in swamps in New Zealand (Webb, 1988). May contribute large amounts of leaf litter to the stream.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Multi-stemmed shrub or small tree to 12 m (Conn, 2000). Resembles S. viminalis in habit (Newsholme, 1992). Large mat root system (Geoff Carr, pers. comm.). Has naturalised along streamsides or in swamps in New Zealand (Webb, 1988). However, no information was found about the extent of infestations.	**M**	L
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Multi-stemmed shrub or small tree to 12 m (Conn, 2000). Resembles S. viminalis in habit (Newsholme, 1992). Large mat root system (Geoff Carr, pers. comm.). Has naturalised along streamsides or in swamps in New Zealand (Webb, 1988). Capable of invading wetlands. However, no information was found about the extent of infestations.	**H**	M
10. To what extent could this willow affect other invasive species (flora and fauna)?	Not bitter, however, rated as unsuitable for use as fodder (Van Kraayenoord et al, 1995). Multi-stemmed shrub or small tree to 12 m (Conn, 2000). Resembles S. viminalis in habit (Newsholme, 1992). However, no information was found about the extent of infestations.	**M**	L

S.* x *mollissima syn. *S. triandra* (*Salix*) x *S. viminalis* (*Vetrix*). Apparantly not the same as *S. mollissima*, syn. *S. hippophaeflolia*, however there is a *S. mollissima* var. Hippophaefolia

Subgenus Salix/Vetrix Reason for assessment- 2. Naturalised (ARMCANZ)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Large tree (Lockton & Whild, 2006) growing to 3-6m. Typically the hybrid plant is female and resembles S. viminalis (Pohjonen, 1991). Resembles S. triandra in Northern Ireland (FNI, 2007). Able to grow in damp places, suggesting that whilst shrubby and unlikely to drop large brances, its roots may infest drains.	**MH**	M
2. How much horticultural/ agricultural value does the willow have?	Clonal hybrids produced from centuries of crossbreeding in osier beds (Newsholme, 1992). Supposedly sterile (Geoff Carr, pers. comm.). Vegetatively reproducing (ARMCANZ, 2001); fairly fragile and establishing very successfully along the Yarra from Chandler Highway to the Johnson St bridge (Geoff Carr, pers. comm.). In finland, typically female; the cultivar 'Hippophaeifolia' is known as both male and female plants (Pohjonen, 1991); however, noted in Australia as female (Carr, 2005) and male (Thorpe et al). No aesthetic value [osier beds for production] and appears to propagate easily vegetatively. Both sexes appear present and the taxon naturalised.	**H**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Large tree (Lockton & Whild, 2006) growing to 3-6m. Typically the hybrid plant is female and resembles S. viminalis (Pohjonen, 1991). Resembles S. triandra in Northern Ireland (FNI, 2007). Shrubby form makes it unlikely to drop large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Large tree (Lockton & Whild, 2006) growing to 3-6m. Typically the hybrid plant is female and resembles S. viminalis (Pohjonen, 1991). Resembles S. triandra in Northern Ireland (FNI, 2007). Not known if infestations are capable of impacting on recreation.	**M**	L

Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Large tree (Lockton & Whild, 2006) growing to 3-6m. Typically the hybrid plant is female and resembles S. viminalis (Pohjonen, 1991). Resembles S. triandra in Northern Ireland (FNI, 2007). Establishing very successfully along the Yarra from Chandler Highway to the Johnson St bridge (Geoff Carr, pers. comm.). Able to grow in damp places (Newsholme, 1992), but it is not known if this taxon could encroach into waterways.	**M**	L
6. To what degree could the willow cause bed and bank erosion?	Large tree (Lockton & Whild, 2006) growing to 3-6m. Typically the hybrid plant is female and resembles S. viminalis (Pohjonen, 1991). Resembles S. triandra in Northern Ireland (FNI, 2007). Establishing very successfully along the Yarra from Chandler Highway to the Johnson St bridge (Geoff Carr, pers. comm.). Able to grow in damp places (Newsholme, 1992), but it is not known if this taxon could encroach into waterways.	**M**	L
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Large tree (Lockton & Whild, 2006) growing to 3-6m. Typically the hybrid plant is female and resembles S. viminalis (Pohjonen, 1991). Resembles S. triandra in Northern Ireland (FNI, 2007). Establishing very successfully along the Yarra from Chandler Highway to the Johnson St bridge; a broad tree, suppressing vegetation when reaching adult proportions (Geoff Carr, pers. comm.). Capable of dropping large amounts of leaf litter into waterways.	**MH**	M
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Large tree (Lockton & Whild, 2006) growing to 3-6m. Typically the hybrid plant is female and resembles S. viminalis (Pohjonen, 1991). Resembles S. triandra in Northern Ireland (FNI, 2007). Establishing very successfully along the Yarra from Chandler Highway to the Johnson St bridge; a broad tree, suppressing vegetation when reaching adult proportions (Geoff Carr, pers. comm.). Likely to have a major impact on ground and shrub layers. Impact on trees unknown.	**MH**	M
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Able to grow in damp places (Newsholme, 1992) and establishing very successfully along the Yarra from Chandler Highway to the Johnson St bridge; a broad tree, suppressing vegetation when reaching adult proportions (Geoff Carr, pers. comm.). A dominant species in at least one riparian niche. No information about ecology of this taxon in other habitats.	**M**	L

10. To what extent could this willow affect other invasive species (flora and fauna)?	Large tree (Lockton & Whild, 2006) growing to 3-6m. Typically the hybrid plant is female and resembles S. viminalis (Pohjonen, 1991). Resembles S. triandra in Northern Ireland (FNI, 2007). Could harbour major pest species	**H**	MH

S.* x *pendulina Wender. syn. *S. babylonica* x *S. fragilis*
Wisconsin weeping willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Tree, pendulous (Walters et al, 1989) growing to 12-18m and fragile (Beismann et al, 2000; Argus, 2005). Large branches dropping into waterways may cause major damage to bridges during floods.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	Tree, pendulous (Walters et al, 1989) growing to 12-18m and fragile (Beismann et al, 2000; Argus, 2005). Both sexes present (Carr, 1996). Sometimes forming colonies by stem fragmentation (Argus, 2005). As a weeping tree, some aesthetic value is likely, but both sexes are present and the taxon has naturalised in Australia.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Tree, pendulous (Walters et al, 1989) growing to 12-18m and fragile (Beismann et al, 2000; Argus, 2005). The possibility of large branches dropping into waterways pose a major hazard to walkers and water skiers.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Trees naturalised along streams, but tending to form a single stem (Carr, 1996); sometimes forming colonies by stem fragmentation (Argus, 2005). May impede access to waterways for swimming and boating and reduce the aesthetic value of recreation areas. Probably confined to the banks though.	**MH**	M
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Trees naturalised along streams, but tending to form a single stem (Carr, 1996); sometimes forming colonies by stem fragmentation (Argus, 2005). Probably confined to the banks, though both parent species have roots that can encroach into waterways.	**M**	L

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Trees naturalised along streams, but tending to form a single stem (Carr, 1996); sometimes forming colonies by stem fragmentation (Argus, 2005). Probably confined to the banks. May cause large scale soil movement if infestations cause flood waters to be diverted behind the bank.	**H**	M
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Tree, pendulous (Walters et al, 1989) growing to 12-18m and naturalised along streams (Carr, 1996). Trees tending to form a single stem (Carr, 1996), but sometimes forming colonies by stem fragmentation (Argus, 2005). Capable of contributing very large amounts of leaf litter to waterways, as this pendulous tree may overhang streams.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Tree, pendulous (Walters et al, 1989) growing to 12-18m and naturalised along streams (Carr, 1996). Trees tending to form a single stem (Carr, 1996), but sometimes forming colonies by stem fragmentation (Argus, 2005). Extent of infestations unknown.	**M**	L
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Tree, pendulous (Walters et al, 1989) growing to 12-18m and naturalised along streams (Carr, 1996). Trees tending to form a single stem (Carr, 1996), but sometimes forming colonies by stem fragmentation (Argus, 2005). Extent of infestations unknown.	**M**	L
10. To what extent could this willow affect other invasive species (flora and fauna)?	Tree, pendulous (Walters et al, 1989) growing to 12-18m and naturalised along streams (Carr, 1996). Trees tending to form a single stem (Carr, 1996), but sometimes forming colonies by stem fragmentation (Argus, 2005). Extent of infestations unknown.	**M**	L

S.* X *reichardtii A. Kern. syn. *S. caprea* x *S. cinerea*
pussy willow
Subgenus *Vetrix* Reason for assessment- 2. Naturalised (APNI)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Large shrub or small tree (Sargent, 1949), few-many-stemmed (Carr, 1996) growing to 12m. Root system tends to resemble S. cinerea, which is shallow and widely spreading (Wilkinson, 1946). Naturalised on banks of rivers and lakes (Jacobs & Murray, 2000), and in streambeds (Geoff Carr, pers. comm.). Unlikely to drop large branches, with shrubby habitat, but roots may infest drains.	**MH**	MH
2. How much horticultural/ agricultural value does the willow have?	Horticultural value in profuse large, furry catkins; used in shelterbelts; not bitter, however rated as unsuitable for use as fodder (van Kraayenoord et al, 1995). Vegetative reproduction (Spencer, 1997; Carr, 1996), but not very fragile (Geoff Carr, pers. comm). Male only (Jacobs & Murray, 2000). Some horticultural value and only male clones present, but naturlaised and easy to propagate.	**M**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Large shrub or small tree (Sargent, 1949), few-many-stemmed (Carr, 1996) growing to 12m. Unlikely to drop large branches, with shrubby habitat.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Large shrub or small tree (Sargent, 1949), few-many-stemmed (Carr, 1996) growing to 12m. Root system tends to resemble S. cinerea, which is shallow and widely spreading (Wilkinson, 1946). Naturalised on banks of rivers and lakes (Jacobs & Murray, 2000), and in streambeds (Geoff Carr, pers. comm.). Studies of *S. cinerea* x *S. caprea* hybrids found that they tend to develop adventitious roots in a similar way to *S. cinerea*, ie easily (Wilkinson, 1946). May, like *S. cinerea*, make waterways too shallow to swim or boat, however extent of infestations unknown.	**M**	L
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Large shrub or small tree (Sargent, 1949), few-many-stemmed (Carr, 1996) growing to 12m. Root system tends to resemble S. cinerea, which is shallow and widely spreading (Wilkinson, 1946). Naturalised on banks of rivers and lakes (Jacobs & Murray, 2000), and in streambeds (Geoff Carr, pers. comm.). Studies of *S. cinerea* x *S. caprea* hybrids found that they tend to develop adventitious roots in a similar way to *S. cinerea*, ie easily (Wilkinson, 1946). May, like *S. cinerea*, make waterways wider and shallower.	**H**	M

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Large shrub or small tree (Sargent, 1949), few-many-stemmed (Carr, 1996) growing to 12m. Root system tends to resemble S. cinerea, which is shallow and widely spreading (Wilkinson, 1946). Naturalised on banks of rivers and lakes (Jacobs & Murray, 2000), and in streambeds (Geoff Carr, pers. comm.). Studies of *S. cinerea* x *S. caprea* hybrids found that they tend to develop adventitious roots in a similar way to *S. cinerea*, ie easily (Wilkinson, 1946). May, like *S. cinerea*, make waterways wider and shallower.	**MH**	M
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Large shrub or small tree (Sargent, 1949) few-many-stemmed (Carr, 1996) growing to to 12m. May drop large amounts of leaf litter into waterways.	**MH**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Large shrub or small tree (Sargent, 1949), few-many-stemmed (Carr, 1996) growing to 12m. Root system tends to resemble S. cinerea, which is shallow and widely spreading (Wilkinson, 1946). Naturalised on banks of rivers and lakes (Jacobs & Murray, 2000), and in streambeds (Geoff Carr, pers. comm.). Extent of infestations unknown.	**M**	L
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Large shrub or small tree (Sargent, 1949), few-many-stemmed (Carr, 1996) growing to 12m. Root system tends to resemble S. cinerea, which is shallow and widely spreading (Wilkinson, 1946). Naturalised on banks of rivers and lakes (Jacobs & Murray, 2000), and in streambeds (Geoff Carr, pers. comm.) & on moist, low-lying ground (Webb & Sykes-Garnock, 1988). Appears capable of invading in-stream, river bank, and flood plain nichse, but the extent of infestations unknown.	**M**	L
10. To what extent could this willow affect other invasive species (flora and fauna)?	Multi-stemmed (Jacobs & Murray, 2000). Not bitter, however rated as unsuitable for use as fodder (van Kraayenoord et al, 1995). May provide harbour and food for pest animals.	**H**	MH

S.* x *rubens Schranksyn. *S. alba* x *S. fragilis*
white crack willow (basket willow)
Subgenus *Salix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Fragile (Beismann et al, 2000) big, coarse shrub (Braywhaw, 1996) to 15+m that can grow in stream and at water's edge (Carr et al, 1994). Large branches dropping into waterways may cause major damage to bridges during floods.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	Not valued as an ornamental however rated as suitable for use as fodder and timber (van Kraayenoord et al, 1995). Both sexes are present in Australia (Cremer et al, 1995) and abundant viable seed is produced (Cremer, 1995) probably by backcrossing (Shafroth et al, 1994). It is also Ffragile (Beismann et al, 2000) and often reproduces vegetatively (Shafroth et al, 1994). Not aesthetic value and easily propagated.	**H**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Fragile (Beismann et al, 2000) big, coarse shrub (Braywhaw, 1996) to 15+m that can grow in stream and at water's edge (Carr et al, 1994). Large branches dropping into waterways pose a significant threat to waterway users.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Thicket-forming species that "typically has several to dozens of stems" (Cremer, 1995) to 15+m tall. Also able to grow in streambeds (Webb et al, 1988; Carr et al, 1994) and has the ability to encroach on and eventually block watercourses with its root system (Parker & Bower, 2005). Large thickets may prevent swimming and boating and impede access for fishing and reduce the aesthetic value of recreation areas.	**H**	MH
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Thicket-forming species that "typically has several to dozens of stems" (Cremer, 1995) to 15+m tall. Also able to grow in streambeds (Webb et al, 1988; Carr et al, 1994) and has the ability to encroach on and eventually block watercourses with its root system (Parker & Bower, 2005).	**H**	MH

Question	Comments	Score	Conf
6. To what degree could the willow cause bed and bank erosion?	Thicket-forming species that "typically has several to dozens of stems" (Cremer, 1995) to 15+m tall. Also able to grow in streambeds (Webb et al, 1988; Carr et al, 1994) and has the ability to encroach on and eventually block watercourses with its root system (Parker & Bower, 2005). Forms shallower, wider streams.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Big, coarse shrub (Braywhaw, 1996) growing to 15+m. Thicket-forming species (Cremer, 1995); able to grow in streambeds (Webb, Sykes & Garnock-Jones, 1988). Observed forming a canopy that was not quite continuous and suppressing almost all of the understorey, except for a few graminiods, in Australian Alps National Park (Carr et al, 1994). May contribute large amounts of leaf litter to waterways, as it is able to encroach into waterways.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Big, coarse shrub (Braywhaw, 1996) growing to 15+m. Observed forming a canopy that was not quite continuous and suppressing almost all of the understorey, except for a few graminiods, in Australian Alps National Park (Carr et al, 1994). Major effect on all layers.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Observed forming a canopy that was not quite continuous and suppressing almost all of the understorey, except for a few graminiods, in Australian Alps National Park (Carr et al, 1994). Thicket-forming species that 'typically has several to dozens of stems (Cremer, 1995); able to grow in stream and at water's edge (Carr et al, 1994; Webb et al, 1988); Has the ability to encroach on and eventually block watercourses with its root system (Parker & Bower, 2005) Abundant along streams (Carr, 1996). Invades riparian vegetation, and seasonal and permanent freshwater wetland, warm and cold temperate rainforest (Carr et al, 1992). Capable of forming large infestations that could have a high impact on all riparian niches, including wetlands.	**H**	MH
10. To what extent could this willow affect other invasive species (flora and fauna)?	Thicket-forming species that 'typically has several to dozens of stems (Cremer, 1995). Brwsed by several (Shafroth et al, 1994; Carr et al, 1994), and rated as suitable for use as fodder (Van Kraayenoord et al, 1995). May provide food and shelter for pest animals.	**H**	MH

S.* x *sepulcralis Simonk. syn. *S. alba* x *S. babylonica*
kemp willow (weeping willow)/golden weeping willow
Subgenus *Salix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Weeping tree (Meikle, 1984) with a single stem (USDA, 2006), growing to 25m, described variously as fragile (Beismann et al, 2000) and not fragile (Jacobs & Murray, 2000), although predominantly reproducing vegetatively (Carr, 1996; Cremer, 1995), suggesting some fragility. Large branches dropping into waterways may cause major damage to bridges during floods.	**H**	MH
2. How much horticultural/ agricultural value does the willow have?	Specimen tree (Newsholme, 1992) that can provide shade for stock (Newsholme, 1992). Despite low palatability (USDA, 2006), rated as suitable for use as fodder (van Kraayenoord et al, 1995). Described variously as fragile (Beismann et al, 2000) and not fragile (Jacobs & Murray, 2000) but reproducing predominantly vegetatively (Carr, 1996; Cremer, 1995). Seeds are also produced (Carr, 1995) and both sexes are present (Jacobs & Murray, 2000); with bisexuality occurring regularly and at all ages, although not necessarily as a result of self-fertilisation (Cremer, 2003). Nothovar chrysocoma is able to cross with nothovar sepulcralis (Geoff Carr, pers. comm.). some horticultural value, but naturalised and both sexes present.	**MH**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Weeping tree (Meikle, 1984) with a single stem (USDA, 2006), growing to 25m, described variously as fragile (Beismann et al, 2000) and not fragile (Jacobs & Murray, 2000), although predominantly reproducing vegetatively (Carr, 1996; Cremer, 1995), suggesting some fragility. Large branches dropping into waterways pose a significant risk to recreational users.	**H**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Trees tending to form a single, or several, stems (Carr, 1996; Cremer, 1995), not colonial (Argus, 2003), however, recently observed to be colonising across waterways by layering in the water and taking root (Geoff Carr, pers. comm.). May encroach into waterways and prevent passage by boats and swimmers. Kennedy et al (2003) states that *S. babylonica* "now rivals the native river red gum…as a dominant riparian tree" and has been recorded forming continuous stands of up to 42 km along the Murray in South Australia. It appears that the taxon referred to in this reference is instead S. x sepulcralis (Geoff Carr pers. comm.). May also reduce birdlife.	**H**	M

Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Trees tending to form a single, or several, stems (Carr, 1996; Cremer, 1995), not colonial (Argus, 2003), however, recently observed to be colonising across waterways by layering in the water and taking root (Geoff Carr, pers. comm.). May make streams wider and shallower.	**H**	MH
6. To what degree could the willow cause bed and bank erosion?	Trees tending to form a single, or several, stems (Carr, 1996; Cremer, 1995), not colonial (Argus, 2003), however, recently observed to be colonising across waterways by layering in the water and taking root (Geoff Carr, pers. comm.). May make streams wider and shallower.	**MH**	MH
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Weeping tree (Meikle, 1984) tending to form a single, or several, stems (Carr, 1996; Cremer, 1995), not colonial (Argus, 2003), however, recently observed to be colonising across waterways by layering in the water and taking root (Geoff Carr, pers. comm.). Kennedy et al (2003) states that *S. babylonica* "now rivals the native river red gum…as a dominant riparian tree" and has been recorded forming continuous stands of up to 42 km along the Murray in South Australia. It appears that the taxon referred to in this reference is instead S. x sepulcralis (Geoff Carr pers. comm.). May contribute large amounts of leaf litter to waterways as this large tree both overhangs and encroaches into waterways.	**H**	MH
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	Kennedy et al (2003) states that *S. babylonica* "now rivals the native river red gum…as a dominant riparian tree" and has been recorded forming continuous stands of up to 42 km along the Murray in South Australia. It appears that the taxon referred to in this reference is instead S. x sepulcralis (Geoff Carr pers. comm.). Major impact on all layers.	**H**	MH
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	Kennedy et al (2003) states that *S. babylonica* "now rivals the native river red gum…as a dominant riparian tree" and has been recorded forming continuous stands of up to 42 km along the Murray in South Australia. It appears that the taxon referred to in this reference is instead *S.* x *sepulcralis* (Geoff Carr pers. comm.). Recently observed to be colonising across waterways by layering in the water and taking root (Geoff Carr, pers. comm.) Able to grow on riverbanks, lakesides, pond margins (Webb, Sykes & Garnock-Jones, 1988). Capable of high impacts instream and along banks.	**MH**	MH

10. To what extent could this willow affect other invasive species (flora and fauna)?	Weeping tree (Meikle, 1984) tending to form a single, or several, stems (Carr, 1996; Cremer, 1995), not colonial (Argus, 2003). Despite low palatability (USDA, 2006), rated as suitable for use as fodder (van Kraayenoord et al, 1995). May provide food and some shelter for pest animals.	**H**	MH

S.* x *sericans Tausch ex A.Kern**.** syn. *S. caprea* x *S. viminalis*
pussy willow
Subgenus *Vetrix* Reason for assessment- 2. Naturalised (APC)

Question	Comments	Score	Conf
Socio-Economic			
1. How much damage could be caused to human-built infrastructure?	Shrub (Griffiths, 1992) growing to 9m that resembles S. x calodendron (Webb et al, 1988). Unlikely to drop large branches, but no information about root system found.	**M**	L
2. How much horticultural/ agricultural value does the willow have?	"A relic of cultivation in Britain, where it was grown for basketry" (Jacobs & Murray, 2000). Male and female are present in Australia (Jacobs & Murray, 2000). No aesthetic value and naturalised in Australia.	**H**	MH
3. To what extent could the willow impact on the health and safety of waterway/riparian users?	Shrub (Griffiths, 1992) growing to 9m that resembles S. x calodendron (Webb et al, 1988). Unlikely to drop large branches.	**L**	MH
4. To what extent could the taxon impact on recreation in/on waterways? eg. Swimming, boating (including canoeing, skiing, rafting), fishing, bird watching, passive enjoyment eg. Picnics	Shrub (Griffiths, 1992) growing to 9m that resembles S. x calodendron (Webb et al, 1988). No information about root systems or extent of infestations found.	**M**	L
Stream Health			
5. To what extent could the willow impact on the flow of water in streams and on water availability?	Shrub (Griffiths, 1992) growing to 9m that resembles S. x calodendron (Webb et al, 1988). No information about root systems or extent of infestations found.	**M**	L
6. To what degree could the willow cause bed and bank erosion?	Shrub (Griffiths, 1992) growing to 9m that resembles S. x calodendron (Webb et al, 1988). No information about root systems or extent of infestations found.	**M**	L

Question	Comments	Score	Conf
7. To what extent could the willow affect water quality (and consequently, instream native biodiversity) as measured by potential leaf fall	Shrub (Griffiths, 1992) growing to 9m that resembles S. x calodendron (Webb et al, 1988). May contribute large amounts of leaf litter to waterways.	**MH**	M
Biodiversity			
8. To what extent could this willow affect riparian/wetland habitat structure/layers? ie ground layer (forbs, grasses, herbs) shrub layer, tree layer	No information about infestations found.	**M**	L
9. To what extent could riparian niches (in-stream, margins, banks, floodplain, wetlands) be impacted by this willow?	No information about infestations found.	**M**	L
10. To what extent could this willow affect other invasive species (flora and fauna)?	Shrub (Griffiths, 1992) growing to 9m that resembles S. x calodendron (Webb et al, 1988). However, no information about infestations found.	**M**	L