

FINAL ALUM Version 7 detailed classification 26 November 2009

The main aim of ALUM is to record land use and is hoped as other classifications and datasets develop will be able remove the cover and management aspects to have a pure land use classification.

The classification

(i) Conservation and natural environments

A relatively low level of human intervention, with the anticipated consequence of little change to natural ecosystems. There may be change in the condition of the land in response to natural processes in isolation from any imposed use. The land may be formally reserved by government for conservation purposes, or conserved through other legal or administrative arrangements. Areas may have multiple uses, but nature conservation is the prime use. Some land may be unused as a result of a deliberate decision of the government or landowner, or due to circumstance.

1.1 Nature conservation. Tertiary classes 1.1.1–1.1.6 are based on the Collaborative Australian Protected Areas Database (CAPAD) classification (Cresswell and Thomas 1997).

1.1.1 Strict nature reserve. Protected area managed mainly for science. An area of land possessing outstanding or representative ecosystems, geological or physiological features and/or species, which is available primarily for scientific research and/or environmental monitoring.

1.1.2 Wilderness area. Protected area managed mainly for wilderness protection. A large area of unmodified or slightly modified land, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.

1.1.3 National park. Protected area managed mainly for ecosystem conservation and recreation. A natural area of land, designated to: a) protect the ecological integrity of one or more ecosystems for this and future generations; b) exclude exploitation or occupation detrimental to the purposes of designation of the area; and c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.

1.1.4 Natural feature protection. Protected area managed for conservation of specific natural features. Area containing one or more specific natural or natural/cultural features which are of outstanding value because of their inherent rarity, representative or aesthetic qualities or cultural significance.

1.1.5 Habitat/species management area. Protected area managed mainly for conservation through management intervention. Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species. This may include areas on private land.

1.1.6 Protected landscape. Protected area managed mainly for landscape conservation and recreation. Area of land where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, cultural and/or ecological value, and often with high biological diversity.

1.1.7 Other conserved area. Land under forms of nature conservation protection that fall outside the scope of the CAPAD classification, including heritage agreements, voluntary conservation arrangements and registered property agreements.

1.2 Managed resource protection. Tertiary classes 1.2.1–1.2.4 are based on the CAPAD classification. These areas are managed primarily for the sustainable use of natural ecosystems. This includes areas with largely unmodified natural systems managed primarily to ensure the long-term protection and maintenance of biological diversity, water supply, aquifer or landscape while providing a sustainable flow of natural products and services to meet community needs.

1.2.1 Biodiversity. Managed for biodiversity.

1.2.2 Surface water supply. Managed as a catchment for water supply.

1.2.3 Groundwater. Managed for groundwater.

1.2.4 Landscape. Managed for landscape integrity.

1.2.5 Traditional indigenous uses. Managed primarily for traditional indigenous use.

1.3 Other minimal use. Areas of land that are largely unused (in the context of the prime use) but may have ancillary uses. This may be the result of a deliberate decision by the manager or the result of circumstances. The land may be available for use but remain 'unused' for various reasons.

1.3.1 Defence land – natural areas. Natural areas allocated to field training, weapons testing and other field defence uses. These will predominantly be in rural areas.

1.3.2 Stock route. Stock reserves under intermittent use or unused.

1.3.3 Residual native cover. Land under native cover, mainly unused (no prime use) or used for non-production or environmental purposes (eg to conserve native vegetation and wildlife or for natural resources protection).

1.3.4 Rehabilitation. Land under rehabilitation which has been restored to a near natural state. Land which is degraded or undergoing rehabilitation but still substantially modified should be mapped under 3.6.2, 4.6.2, 3.6.3, 4.6.3 or 5.8.4.

(ii) Production from relatively natural environments

Land generally subject to relatively low levels of intervention.

The land may not be used more intensively because of its limited capability. The structure of the native vegetation generally remains intact despite deliberate use, although the floristics of the vegetation may have changed markedly. Where the native vegetation structure is, for example, open woodland or grassland, the land may be grazed. Where the native grasses have been deliberately and extensively replaced with improved species, the use should be treated under (iii) Production from dryland agriculture and plantations.

2.1 Grazing native vegetation. Land uses based on grazing by domestic stock on native vegetation where there has been limited or no deliberate attempt at pasture modification. Some change in species composition may have occurred. Refer to decision rule for guidance. For ALUM purposes, this class is used when there are >50% dominant native species. Need to include something about this is what states have agreed to and if issue arises should refer to specific native/non-native veg datasets if want to get an accurate breakdown. If livestock is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

2.2 Production forestry. Commercial production from native forests and related activities on public and private land. Environmental and indirect production uses associated with retained

native forest (eg prevention of land degradation, windbreaks, shade and shelter) are included in an appropriate class under (i) Conservation and natural environments.

2.2.1 Wood production. Managed for sawlogs and pulpwood.

2.2.2 Other forest production. Managed for non-sawlog/pulpwood production, including oil, wildflowers, firewood and fence posts.

(iii) Production from dryland agriculture and plantations

Land used principally for primary production, based on dryland farming systems.

Native vegetation has largely been replaced by introduced species through clearing, the sowing of new species, the application of fertilisers or the dominance of volunteer species. The range of activities in this category includes plantation forestry, pasture production for stock, cropping and fodder production, and a wide range of horticultural production.

3.1 Plantation forestry. Land on which plantations of trees or shrubs (native or exotic species) have been established for production or environmental and resource protection purposes. This includes farm forestry. Where planted trees are grown in conjunction with pasture, fodder or crop production, class allocation should be made on the basis of either prime use or multiple class attribution.

3.1.1 Hardwood plantation. Managed for hardwood sawlogs or pulpwood.

3.1.2 Softwood plantation. Managed for softwood sawlogs or pulpwood.

3.1.3 Other forest plantation. Managed for non-sawlog/pulpwood production, including oil, wildflowers, firewood and fence posts.

3.1.4 Environmental forest plantation. Environmental and indirect production uses (eg prevention of land degradation, windbreaks, shade and shelter). This can also include trees planted for carbon credits.

3.2 Grazing modified pastures. Pasture and forage production, both annual and perennial, based on significant active modification or replacement of the initial vegetation. Refer to decision rules for guidance. For ALUM purposes, this class is used when there are >50% dominant exotic species. Need to include something about this is what states have agreed to and if issue arises should refer to specific native/non-native veg datasets if want to get an accurate breakdown. Land under pasture at the time of mapping may be in a rotation system, so that at another time the same area may be, for example, under cropping. Land in a rotation system should be classified according to the land use at the time of mapping. Suggested tertiary classes for legume and grass pasture types can be fitted to the pasture attributes collected through the ABS Agricultural Commodity Census (AgStats). If livestock and/or pasture type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

3.2.1 Native/exotic pasture mosaic. Pastures in which there is a substantial native species component despite extensive active modification or replacement of native vegetation. This class may apply where native and exotic pasture is patterned at a relatively fine spatial scale. If there is greater than 50% native pastures then should be coded to 2.1.0 Grazing native vegetation. Refer to decision rules for guidance.

3.2.2 Woody fodder plants. Woody plants used primarily for the purpose of providing forage for livestock grazing. Examples include tagasaste, leucaena and salt bush.

3.2.3 Pasture legumes

3.2.4 Pasture legume/grass mixtures

3.2.5 Sown grasses. This includes saline pastures.

3.3 Cropping. Land under cropping. Land under cropping at the time of mapping may be in a rotation system, so that at another time the same area may be, for example, under pasture. Land in a rotation system should be classified according to the land use at the time of mapping. Cropping can vary markedly over relatively short distances in response to change in the nature of the land and the preferences of the land manager. It may also change over time in response to market conditions. Fodder production, such as of lucerne hay, is treated as a crop as there is no harvesting by stock.

At the tertiary level, it is suggested that classes be based on commodities/commodity groups that relate to ABS Level 2 agricultural commodity categories (see Appendix 4 for ABS agricultural commodity levels). If crop type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

3.3.1 Cereals

3.3.2 Beverage & spice crops

3.3.3 Hay & silage

3.3.4 Oil seeds

3.3.5 Sugar

3.3.6 Cotton

3.3.7 Alkaloid poppies. Where it is known that poppies are grown for alkaloid purposes map under this class rather than 3.3.4.

3.3.8 Pulses

3.4 Perennial horticulture. Crop plants living for more than two years that are intensively cultivated, usually involving a relatively high degree of nutrient, weed and moisture control. Suggested tertiary classes are based on the ABS Level 2 commodity categories that relate to horticulture (see Appendix 4). If crop type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

3.4.1 Tree fruits

3.4.2 Oleaginous fruits

3.4.3 Tree nuts

3.4.4 Vine fruits

3.4.5 Shrub nuts, fruits & berries

3.4.6 Perennial flowers & bulbs

3.4.7 Perennial vegetables & herbs

3.4.8 Citrus. Where citrus can be detected map under this class rather than 3.4.1.

3.4.9 Grapes. Where grapes can be detected map under this class rather than 3.4.4.

3.5 Seasonal horticulture. Crop plants living for less than two years that are intensively cultivated, usually involving a relatively high degree of nutrient, weed and moisture control. Suggested tertiary classes are based on the ABS Level 2 agricultural commodity categories that relate to horticulture (see Appendix 4). If crop type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

3.5.1 Seasonal fruits

3.5.2 Seasonal nuts

3.5.3 Seasonal flowers & bulbs

3.5.4 Seasonal vegetables & herbs

3.6 Land in transition. Areas where the land use is unknown and cannot reasonably be inferred from the surrounding land use. This class should be used sparingly. Land must previously have been used for agriculture/plantations as it falls under class 3 Production from agriculture and plantations.

3.6.1 Degraded land. Land that is severely degraded (eg from soil erosion, salinity or weed/shrub invasion) and is not under active rehabilitation.

3.6.2 Abandoned land. Land where a previous pattern of agriculture may be observed but which is not currently under production.

3.6.3 Land under rehabilitation. Land in the process of rehabilitation for agricultural production (ie not for purposes under (v) Intensive uses or (i) Conservation and natural environments).

3.6.4 No defined use. Land cleared of intact native vegetation where the proposed land use is not known.

3.6.5 Abandoned perennial horticulture. Land previously used for perennial horticulture which has not been cleared (eg an orchard where trees remain but the site has been invaded by woody shrubs, with trees unpruned or dying).

(iv) Production from irrigated agriculture and plantations

Need to have better instructions on when to use irrigated classes. Irrigation in Australia is in a state of flux and so now need to rely more heavily on ancillary data than in the past. Land should be mapped according to its use at the time, if there is no evidence of irrigation (infrastructure, active irrigation) than the area should be mapped to the appropriate dryland class.

Includes agricultural land uses where water is applied to promote additional growth over normally dry periods, depending on the season, water availability and commodity prices.

This includes land uses that receive only one or two irrigations per year, through to those uses that rely on irrigation for much of the growing season. Baxter and Russell (1994) argue that the degree of intervention involved in irrigation and its potential impacts on hydrology and geohydrology are sufficient to warrant creation of this primary class.

4.1 Irrigated plantation forestry. Land on which irrigated plantations of trees or shrubs have been established for production or environmental and resource protection purposes. This includes farm forestry.

4.1.1 Irrigated hardwood plantation. Managed for hardwood sawlogs or pulpwood.

4.1.2 Irrigated softwood plantation. Managed for softwood sawlogs or pulpwood.

4.1.3 Irrigated other forest plantation. Managed for non-sawlog/pulpwood production, including oil, wildflowers, firewood and fence posts.

4.1.4 Irrigated environmental forest plantation. Environmental and indirect production uses (eg prevention of land degradation, windbreaks, shade and shelter). This can also include trees planted for carbon credits.

4.2 Grazing irrigated modified pastures. Irrigated pasture production, both annual and perennial, based on a significant degree of modification or replacement of the native vegetation. Refer to decision rules for guidance. This class may include land in a rotation system that at other times may be under cropping. Land in a rotation system should be classified according to the land use at the time of mapping. Cropping/pasture rotation regimes are treated as land management practices. If livestock and/or pasture type is known, record

this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

4.2.1 Irrigated woody fodder plants. Irrigated woody plants used primarily to provide forage for livestock grazing.

4.2.2 Irrigated pasture legumes

4.2.3 Irrigated legume/grass mixtures

4.2.4 Irrigated sown grasses

4.3 Irrigated cropping. Land under irrigated cropping. This class may include land in a rotation system that at other times may be under pasture. Land in a rotation system should be classified according to the land use at the time of mapping. Cropping/pasture rotation regimes are treated as land management practices. If crop type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

4.3.1 Irrigated cereals

4.3.2 Irrigated beverage & spice crops

4.3.3 Irrigated hay & silage

4.3.4 Irrigated oil seeds

4.3.5 Irrigated sugar

4.3.6 Irrigated cotton

4.3.7 Irrigated alkaloid poppies. Where it is known that poppies are grown for alkaloid purposes map under this class rather than 3.3.4.

4.3.8 Irrigated pulses

4.3.9 Irrigated rice. Where rice can be detected map under this class rather than 4.3.1.

4.4 Irrigated perennial horticulture. Irrigated crop plants living for more than two years that are intensively cultivated, usually involving a relatively high degree of nutrient, weed and moisture control. If crop type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

4.4.1 Irrigated tree fruits

4.4.2 Irrigated oleaginous fruits

4.4.3 Irrigated tree nuts

4.4.4 Irrigated vine fruits

4.4.5 Irrigated shrub nuts, fruits & berries

4.4.6 Irrigated perennial flowers & bulbs

4.4.7 Irrigated perennial vegetables & herbs

4.4.8 Irrigated citrus. Where citrus can be detected map under this class rather than 4.4.1.

4.4.9 Irrigated grapes. Where grapes can be detected map under this class rather than 4.4.4.

4.5 Irrigated seasonal horticulture. Irrigated crop plants living for less than two years that are intensively cultivated, usually involving a relatively high degree of nutrient, weed and moisture control. If crop type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

4.5.1 Irrigated seasonal fruits

4.5.2 Irrigated seasonal nuts

4.5.3 Irrigated seasonal flowers & bulbs

4.5.4 Irrigated seasonal vegetables & herbs

4.5.5 Irrigated turf farming.

4.6 Irrigated land in transition. Areas where irrigated production may be carried out but land use is unknown and cannot reasonably be inferred from the surrounding land use. Evidence or knowledge of irrigated use or of existing irrigation infrastructure should be present. This class should be used sparingly. Land must previously have been used for agriculture/plantations as it falls under class 3. Production from agriculture and plantations.

4.6.1 Degraded irrigated land. Land is severely degraded (eg from soil erosion, salinity or weed/shrub invasion), with evidence of irrigation or irrigation infrastructure. Not under active rehabilitation.

4.6.2 Abandoned irrigated land. Land where a previous pattern of irrigated agriculture may be observed but which is not currently under production. There is evidence of irrigation or irrigation infrastructure.

4.6.3 Irrigated land under rehabilitation. Land in the process of rehabilitation for irrigated agriculture (ie not for purposes under (v) Intensive uses or (i) Conservation and natural environments). Evidence of irrigation or irrigation infrastructure.

4.6.4 No defined use (irrigation). Land cleared of intact native vegetation where the proposed land use is not known. Evidence of irrigation or irrigation infrastructure.

3.6.5 Abandoned irrigated perennial horticulture. Land previously used for irrigated perennial horticulture which has not been cleared (eg an orchard where trees remain but the site has been invaded by woody shrubs, with trees unpruned or dying). Evidence of irrigation or irrigation infrastructure.

(v) Intensive uses

Land uses involving high levels of interference with natural processes, generally in association with closer settlement.

The level of intervention may be high enough to completely remodel the natural landscape — the vegetation, surface and groundwater systems, and the land surface. If crop type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

5.1 Intensive horticulture. Intensive forms of plant production.

5.1.1 Shadehouses

5.1.2 Glasshouses

5.1.3 Glasshouses (hydroponic)

5.1.4 Abandoned intensive horticulture

Comment [r1]: Should be provide an explanation?

5.2 Intensive animal husbandry. Intensive forms of animal production (excludes associated grazing/pasture) or animal holding yards. Agricultural production facilities (feedlots, piggeries, etc) may be included as tertiary classes. If the livestock type is known, record this in the ABS commodities field (refer to Section X for mapping specifications and Appendix X for ABS commodities codes).

5.2.1 Dairy farms. Dairy pastures should either be mapped under 3.2.0 Grazing modified pastures or 4.2.0 Grazing irrigated modified pastures or their relevant tertiary classes.

5.2.2 Cattle feedlots

5.2.3 Sheep feedlots

5.2.4 Poultry sheds and yards. This includes chickens, ducks, ostrich, etc

5.2.5 Piggeries

5.2.6 Aquaculture. This includes crocodiles.

5.2.7 Horse studs. This class should be for intensive horse farming. Adjustments should be classed under the relevant grazing class while pony clubs should go under 5.5.3 Recreation and culture.

5.2.8 Stockyards/saleyards. Designed for the yarding and selling of stock. This class should be used for holding yards that are not part of the farm enterprise.

5.6.9 Abandoned intensive animal husbandry. Dairy sheds, feedlots, poultry sheds, piggeries, etc that have been abandoned and not replaced with another land use.

5.3 Manufacturing and industrial. Factories, workshops, foundries, construction sites, etc. In the urban setting, manufacturing and industrial areas should be mapped to this secondary code. In the rural/agricultural setting the following tertiary classes may be used if desired.

5.3.1 General purpose factory. Manufacturing/assembly/repairs, some specialised improvements/purpose built.

5.3.2 Food processing factory. Principle use is food processing, may include sales area. Building may be purpose built or have extra amenities installed, eg freezers, etc.

5.3.3 Major industrial complex. Large concerns, car plant, food manufacturing (e.g. Cadbury's), paper mill etc, may require specialised infrastructure, milk factory.

5.3.4 Bulk grain storage. Silos, special purpose grain storage sheds, etc.

5.3.5 Abattoirs. Special improvements for the slaughter of stock and preparation of meat for wholesale market.

5.3.6 Oil refinery

5.3.7 Sawmill. Special improvements for the milling and curing of timber

5.3.8 Abandoned manufacturing and industrial. Factories, silos, tanneries, etc that have been abandoned and not replaced with another land use.

5.4 Residential and farm infrastructure

5.4.1 Urban residential. Houses, flats, hotels, etc within urban areas.

5.4.2 Rural residential with agriculture. Rural allotments with agricultural activity at the sub-commercial and/or hobby scale (excluding backyard/domestic garden areas or livestock as pets). Refer to decision rules for guidance

5.4.3 Rural residential without agriculture. Rural allotments with no agricultural activity present. Can still have backyard/domestic garden areas or livestock as pets. Refer to decision rules for guidance.

5.4.4 Remote communities. Small isolated community, generally less than 20 residences/buildings (without the facilities associated with even small towns) that lies within an area defined by the Australian Bureau of Statistics as remote. In the Northern Territory these are typically, but not always, indigenous communities or families in homeland areas. They may be permanent or semi-permanent residences.

5.4.6 Farm buildings/infrastructure. Houses, buildings, sheds and other infrastructure associated with farm enterprises. Actual supply channels or aqueducts should be mapped under 6.4.0 channel/aqueduct. If the building/infrastructure is smaller than the minimum mapping unit it can be incorporated into the surrounding land use.

5.5 Services. Land allocated to the provision of commercial or public services, resulting in substantial interference to the natural environment. Where services are provided on land that retains natural cover, an appropriate classification under (i) Conservation and natural environments should be applied (eg 1.1.7, 1.3).

5.5.1 Commercial services. Shops, markets, financial services, etc.

5.5.2 Public services. Education, community services, etc.

5.5.3 Recreation and culture. Parks, sportsgrounds, camping grounds, swimming pools, museums, places of worship, etc.

5.5.4 Defence facilities - urban. Defence infrastructure, buildings, bases, research and development establishments, etc. Only Defence areas in an urban setting should be mapped to this class unless they are solely infrastructure. Defence lands of significant area retaining natural cover should be mapped under 1.3.1 Defence land – natural areas.

5.5.5 Research facilities. Government and non-government research and development areas.

5.6 Utilities

5.6.1 Fuel powered electricity generation

5.6.2 Hydro electricity generation. Water, wave power generation.

5.6.3 Wind farm electricity generation

5.6.4 Electricity substations and transmission

5.6.5 Gas treatment, storage and transmission. Facilities associated with gas production and supply.

5.6.6 Water extraction and transmission. Extraction, purification, treatment or supply of fresh water for public, domestic and commercial use. Excludes supply for agricultural uses, this should be mapped under 6.4.0 channel/aqueduct.

5.7 Transport and communication

5.7.1 Airports/aerodromes

5.7.2 Roads

5.7.3 Railways

5.7.4 Ports and water transport

5.7.5 Navigation and communication. Radar stations, beacons, etc.

5.8 Mining

5.8.1 Mines

5.8.2 Quarries

5.8.3 Tailings.

5.8.4 Extractive industry not in use. Set aside for mining or extractive industry use, may include structures of limited or no added value. This includes sites undergoing rehabilitation (sites

5.9 Waste treatment and disposal. Waste material and disposal facilities associated with industrial, urban and agricultural activities.

5.9.1 Effluent pond

5.9.2 Landfill. Disposal of solid inert wastes (but not including overburden).

5.9.3 Solid garbage. Disposal of wastes, including waste from processing plants.

5.9.4 Incinerators

5.9.5 Sewage

(vi) Water

Water features are regarded as essential to the classification because of their importance for natural resources management and as points of reference in the landscape. However, the inclusion of water is complicated because it is normally classified as a land cover type. At the secondary level, the classification identifies water features, both natural and artificial. Tertiary classes relate water features to intensity of use.

Because water is a land cover rather than a land use, water classes may not be mutually exclusive with other land use classes at particular levels in the classification. Generally, water classes should take precedence so that, for example, a lake in a conservation reserve will be classed as Lake (6.1) or Lake — conservation (6.1.1) rather than Nature conservation (1.1). Water features to which a conservation tertiary class applies may be attributed using multiple-use attribution procedures (see Sections F and G for technical details).

6.1 Lake. A naturally occurring body of mainly static water surrounded by land (GA definition)

Comment [sj2]: Should we include or man-made (e.g. Lake Burley Griffin isn't a reservoir but it is held behind a dam wall)

6.1.1 Lake — conservation. Feature relates to uses included in (i) Conservation and natural environments.

6.1.2 Lake — production. Feature relates to uses included in (ii) Production from relatively natural environments.

6.1.3 Lake — intensive use. Feature relates to uses included in (v) Intensive uses. This includes man-made lakes created for use as residential canals.

6.1.4 Lake – saline

6.2 Reservoir or dam. A body of water collected and stored behind a constructed barrier for some specific use (GA definition)

6.2.1 Reservoir. Water stored for use outside a farm.

6.2.2 Water storage — intensive use/farm dams. Water stored for onsite, immediate use on farm. Feature may relate to uses included in (v) Intensive uses. This class can also include graded scrapes and plastic sheeting.

6.2.3 Evaporation basin. Disposal of irrigation drainage waters.

6.3 River. A natural channel along which water may flow from time to time (GA definition).

6.3.1 River — conservation. Feature relates to uses in (i) Conservation and natural environments.

6.3.2 River — production. Feature relates to uses in (ii) Production from relatively natural environments.

6.3.3 River — intensive use. Feature relates to uses in (v) Intensive uses. This includes man-made alterations to rivers for use as residential canals.

6.4 Channel/aqueduct. An artificial open channel which provides the supply, distribution or removal of water for irrigation purposes, or for a significant infrastructure function (such as salt interception, land reclamation, or drainage between water features for environmental management purposes). (GA definition)

6.4.1 Supply channel/aqueduct

6.4.2 Drainage channel/aqueduct

6.4.3 Stormwater

6.5 Marsh/wetland. Land which is so saturated with water that it is not suitable for agricultural or pastoral use and presents a barrier to free passage (GA definition of a swamp). Wetlands are areas of permanent or periodic/intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed 6 metres (QLD EPA definition)

6.5.1 Marsh/wetland — conservation. Feature relates to uses in (i) Conservation and natural environments.

6.5.2 Marsh/wetland — production. Feature relates to uses in (ii) Production from relatively natural environments.

6.5.3 Marsh/wetland — intensive use. Feature relates to uses in (v) Intensive uses.

6.5.4 Marsh/wetland – saline. Definition

6.6 Estuary/coastal waters. That part of the seabed or estuarine areas, between mean high water and the line of lowest astronomical tide (GA definition)

6.6.1 Estuary/coastal waters — conservation. Feature relates to uses in (i) Conservation and natural environments.

6.6.2 Estuary/coastal waters — production. Feature relates to uses in (ii) Production from relatively natural environments.

6.6.3 Estuary/coastal waters — intensive use. Feature relates to uses in (v) Intensive uses. This includes estuaries which have had banks altered for use as residential canals

A ALUM Classification V6 — Decision rules

It is inevitable that there will be areas of uncertainty in the application of the ALUM Classification. For example, it may be unclear which land use class applies to a particular activity, or an appropriate class may not be available. Alternatively, it may not be possible to confidently determine land use on the basis of available data or from field observations.

The purpose of this section is to identify currently known areas of uncertainty associated with the ALUM Classification, and to provide advice on how this uncertainty may be handled. In most cases, suggestions are developed from the experience gained in Australian national, state and territory land use mapping programmes. These suggestions provide a common basis for handling areas of uncertainty, and for promoting consistency and comparability between different mapping programmes.

The list of class allocation issues presented here is not exhaustive — more will be identified as mapping expands into new regions with previously unmapped land uses. Any questions that arise, and suggestions for handling them, should be forwarded to BRS for inclusion in future editions of this handbook (see Further information).

Need comment here on if remapping an area, unless you are sure the land use has changed, keep as is. Qld - Unless you are confident that a cropping area has actually changed, and is not simply a rotation (between cropping and grazing modified pastures for example), then leave the area as cropped in update. This approach needs to be mentioned in the metadata, outlining what cropping means for period mapped i.e. it also includes areas that are usually cropped but may be under a rotation of another land use class for all or part of the period.

Currently being collated

IUCN Guidelines for Protected Area Management categories

BRS comments:

Category	Description	ALUM Code
Category Ia	Strict Nature Reserve: Protected area managed mainly for science	1.1.1
Category Ib	Wilderness Area: Protected area managed mainly for wilderness protection	1.1.2
Category II	National Park: Protected area managed mainly for ecosystem conservation and recreation	1.1.3
Category III	Natural Monument: Protected area managed for conservation of specific natural features	1.1.4
Category IV	Habitat/Species Management Area: Protected area managed mainly for conservation through management intervention	1.1.5
Category V	Protected Landscape/Seascape: Protected areas managed mainly for landscape/seascape conservation and recreation	1.1.6
Category VI	Managed Resource Protected Areas: Protected area managed mainly for the sustainable use of natural ecosystems	1.2.0

1. Nature Conservation

QLD comments: Currently we clip the Estates layer into our working land use map. Some Estates have corridor regions - for want of a better description - in between blocks and we keep these in the mapping. We code these corridors as **18** (NRW) or 1.3.3 (ALUM) Residual Native Vegetation.

Reserves

Qld - The decision we've made with reserves is that anything under government tenure as a "Reserve" goes to "Other Conserved Area" 1.1.7; **except for** Reserves for Park and Recreation or similar which go to "Services - Recreation & Culture" 5.5.3.

1.2.5 Traditional indigenous uses

Handbook: This class should be used when traditional indigenous uses are the current prime use. If they are not the prime use, the area should be mapped based on the current prime use, with indigenous uses mentioned in the work code.

1.3.1 Defence land - natural areas vs Defence land -urban

Need to add a decision rule.

1.3.3 Residual native cover

Agreed need decision rule for this class. TWG to discuss further

Handbook: All land uses involving conservation of, or production from, relatively natural environments retain native cover to a greater or lesser extent. However, the 'Residual native cover', class is only appropriate where there is no applicable prime use, or where land use is indeterminate. For example, livestock may occasionally graze residual native cover, but where grazing is regular or semi-regular and this is the intended prime use for the land, 2.1 (or 3.2.1) is the appropriate class. This class also includes unusable land, such as cliffs, rock faces, boulders and tors.

NSW metadata: Mapping of remnant native vegetation raises particular problems because of the differing perceptions of such terminology to potential users of the data. For this project, a number of criteria have been used to distinguish the different categories of native vegetation. Blocks of trees where the canopy cover is greater than 50% are classified as 'grazing modified pastures' when the following circumstances apply:

- the blocks are less than 100 ha in size and occur within a paddock or landscape where clearing is widespread
- the sites are not fenced allowing livestock to move at random into the forested areas
- tracks leading to or within the blocks can be observed
- the blocks were previously burned or cut over and may now include extensive regeneration
- dams have been constructed within these blocks as watering points for livestock
- there is a complete absence of lower canopy and understorey species and ground litter.

Blocks of trees where the canopy cover is greater than 50% are classified as 'remnant native cover' when the following circumstances apply:

- the blocks are greater than 100 ha in size
- there is no apparent disturbance of the site, either by burning or previous logging, cutting over or thinning
- the crowns of the trees are large and mature
- very steep, broken or rocky terrain, offering very low to nil grazing capacity
- absence of constructed dams
- it is part of a contiguous unit classified as a forest or National Park.

Sites less than 100 ha in size are classified as 'remnant native cover' if field observations confirm that the understorey and ground cover species and/or ground litter are intact, with relatively low levels of disturbance.

1.3.4 Rehabilitation

Need a decision rule to distinguish this between 3.6.3, 4.6.3, 5.8.4

2.1 Grazing native vegetation

Agreed need a decision rule for this and to

Handbook: Difficulties may be encountered distinguishing livestock-grazing in relatively natural environments from grazing on modified pastures. For example, some pastures can be dominated either by native species or exotics depending upon the season. Generally, where an exotic or native pasture component has been deliberately introduced or actively promoted, 3.2.1 'Native/exotic pasture mosaic' is most appropriate class. If native pasture is irrigated, it should be allocated to class 4.2 'Irrigated modified pastures'.

Comments from the Grazing Mapping TWG:

"Is it possible to use the following logic for determining differences between ALUM classes 2.1.0 and class 3.2.0? "If there is >50% of dominant native species at a site then it is alum class 2.1.0 grazing natural vegetation. If there is < 50% of dominant native species at a site then it is 3.2.0 grazing modified pastures."

All participants discussed the logic in agenda item 1 described above

Paul Novelty suggested that this logic was problematic as it would be defeated by scale limitations, along with along with the temporal nature of this work, he considered any attempts to apply this rule in WA would be dubious.

Queensland had previously used IBRA subregions defined as being native or modified to distinguish between grazing natural vegetation and grazing modified pastures, however they did not want these results made publicly available.

The group then discussed the possibility of using the native vegetation extent 2004 to distinguish between the two classes, again this was problematic given land use was an input to the native vegetation extent. This reason also precluded VAST as well.

3.6 Land in transition

Handbook: This class should only be used when the current/predicted land use is unknown and cannot reasonably be derived from the dominant land use nearby.

Need to add more description so is a better decision rule.

3.6.5 and 4.6.5 Abandoned (irrigated) perennial horticulture

Need a decision rule so known to use these classes and when to use 3.4.0 and 4.4.0. Include examples from NSW, Vic and NT.

4 Production from irrigated agriculture and plantations

Handbook: Because of seasonal or market conditions, land that is developed for irrigation might not always be actively irrigated. In such circumstances, land may be left unused or put to alternative uses, such as livestock grazing. Notwithstanding the general principle that land use classes should be determined on the basis of use at a particular point in time, it is suggested that areas be assigned to the Irrigation classes if permanent infrastructure for irrigation is present. [copied from above] Need to have better instructions on when to use irrigated classes. Irrigation in Australia is in a state of flux and so now need to rely more heavily on ancillary data than in the past. Land should be mapped according to its use at the time, if there is no evidence of irrigation (infrastructure, active irrigation) than the area should be mapped to the appropriate dryland class.

4.6 Irrigated land in transition

Handbook: This class should only be used when the current/predicted land use is unknown and cannot reasonably be derived from the dominant land use nearby and when evidence or knowledge of irrigated use is present.

5.2 Intensive animal production

Handbook: Intensive animal production should be mapped as the infrastructure that is identifiably connected to the production rather than the surrounding pastures. Areas can also be mapped as points if smaller than the minimum mapping unit.

QLD comments - Intensive Animal Production is really only for agricultural production facilities (e.g. feedlots, piggeries, dairy sheds).

Horse studs are classed at the secondary level since there's no tertiary code for horses.

Kennels, catteries and "Pet Resorts" go under "Commercial Services" 5.5.1

5.2.1 Dairies

QLD comments: This is a major turn around from the way we have mapped dairies in the past.

Previously we mapped a dairy as being the whole property, including modified and non-modified pastures.

To bring it into line with national standards we now:

- only map dairy sheds/infrastructure as “Dairy” 5.2.1;
- map modified/irrigated/improved pastures as “Grazing Modified Pastures” 3.2.0;
- map all other grazed areas on the property as “Livestock grazing” 2.1.0;

NSW comments: A number of dairies are still in production in the project area. They were confirmed during the field inspections. The currency of this land use class is therefore set at the date of field inspection. Dairies are not visible in the satellite imagery and the older aerial photographs of 1998 are not reliable, even for 2000, as many dairies have ceased production over the last few years. Gate notices for tankers are the easiest way to confirm that the dairies are still producing.

5.2.7 Horse studs

Need a decision rule for this

5.4.0 Residential

QLD comments - The best layers to use for determining residential and rural residential are the DCDB_QVAS layer (using the area and QVAS codes as below), the imagery and the QLD_builtenviron_feat_25k_a layer from SIRQRY.

5.4.2 Rural residential with agriculture

Handbook: If rural land is managed as a hobby farm, it should assigned to 5.4.2 ‘Rural residential with agriculture’; if not, it should be assigned to another use. The sizes of rural allotments or local government zoning plans may be useful indicators of rural residential land use.

QLD comments (out of date now that have changes rural residential to either with or without agriculture) - Rural residential “zones” seem to vary between local councils. This information is not always easy to acquire or land zoned as rural residential may not actually be used for that purpose yet. The way we interpret Rural Residential is a combination of the following characteristics:

1. **Area is bigger than 1ha;**
 2. There is a house on the block;
 3. Residential area in rural setting, ie. away from main urban setting;
 4. The individual block must be between 0.2ha (2000sqm - ie bigger than large urban block) and 16ha (160000sqm - ie upper limit of rural block), but small blocks can only be mapped if their area is at least 1ha;
 5. Agriculture not likely to be the primary source of income (can be hard to determine this but think whether what they're doing on the property would be commercially viable as a sole income).
- **NOTE:**
 1. if the block size is greater than 16ha but there is a cleared area around the house that is greater than 1ha, then map the cleared area as rural residential.
 2. if there is perennial horticulture (ie. tree crop of some sort) on a rural res block, only map it out if it's bigger than 2ha, otherwise include it as part of the rural res block.

Rural living is where:

- the block size is 2000sqm to 160000sqm (0.2ha to 16ha);
- there is a house on the block;
- there is a substantial (~>80%) amount of vegetation.
- refer to NOTE as above also.

Also check with local experts whether larger blocks are generally grazed or not.

5.4.3 Rural residential without agriculture

Handbook: This class is distinguished from 5.4.2 'Rural residential with agriculture' where most of the land parcel comprises native vegetation. The land parcel is not cleared for any agricultural activity.

5.9.5 Sewage

Handbook: The individual effluent processes (eg pastures, lagoons) can be mapped out if they meet the appropriate mapping scale. Otherwise, they can be grouped together under 5.9.5 'Sewage'.

6 Water

Need decision rules for seasonal water features. Best to refer to ancillary datasets and if still unsure, map to use at the time. Can note seasonal inundation in the comments field.

6.5.0 Wetlands

We use the EPA (now DERM) Wetlands Mapping to help us determine land use for wetland areas.

Below is the table of decision rules that was determined on 18/5/2009 by Dan Tindall, Simone Grounds and Sharon Turner to help class land use in relation to wetland areas.

Wetlands code	ALUM code	Decision rules
H1	6.5	If outside conservation area
	1.X	If inside conservation area
H2M1	6.2	
H2M2	6.2	If WtrRegime = Commonly (WR3)
	2.1	If WtrRegime <> Commonly (WR3)
H2M3	3.2	
H2M4	6.2	
H2M4a	6.2	
H2M5		As interpreted Primary land use at the site

H2M6	6.2	
H2M7	6.4	If for agricultural use
	6.1.3	Simone to confirm
	6.3.3	Simone to confirm
	6.6.3	Simone to confirm
H3C1	6.2	
H3C2	6.4	

Other decisions:

1. If a polygon is classed Estuarine by the Wetlands Mapping but is titled a Lake and is used for no other purpose (e.g. Lake Weyba, Noosa), then call it an Estuary, so we align to a standard definition.
2. If a polygon is classed Lacustrine by the Wetlands Mapping, is titled a Lake but is used as a reservoir/dam (e.g. Lake Wivenhoe, Brisbane River), then call it a Reservoir (6.2.1) because it is actually being used for a purpose.

Other issues

Re-order alphabetically

Cemeteries and crematoria

Assign to 5.5.2 'Public services'.

Christmas tree plantations

Assign to 3.1.2 'Softwood plantation'.

Eucalyptus oil plantations

Assign to 3.4 'Perennial horticulture' or 4.4 'Irrigated perennial horticulture' where trees are more intensively managed (eg coppiced and therefore in a shrub form); otherwise assign to 3.1.3 'Other forest plantation' or 4.1.3 'Irrigated other forest plantation'.

Fallow or ploughed land

Agreed need to expand this decision tute.

Rely on context in assigning fallow or ploughed land to a particular land use: make a judgment of the most likely land use option based on the dominant activity conducted in comparable nearby areas. Make note of fallowed or ploughed status in the 'work_code' field (see Section F for catchment scale data specifications).

Holiday shacks

Assign to 5.4 'Residential and farm infrastructure'.

Oil and gas field wells

Wells associated with oil and gas fields can be assigned to either 6.2.2 'Water storage — intensive use/farm dams' or 5.9.1 'Effluent pond'.

Recreation areas

Assign to 1.1.7 'Other conserved area' if primarily native cover; if primarily cleared of native vegetation, assign to 5.5.3 'Recreation and culture'.

Rehabilitated land

Land that has been rehabilitated to or near its natural state should be assigned the code 1.3.4 'Rehabilitation'. Land rehabilitated to a state suitable for agricultural production should be assigned to 3.6.0 'Land in transition'. Land where an intensive use applies should be assigned an appropriate intensive use class.

Tea-tree plantations

Assign to 3.4 'Perennial horticulture' or 4.4 'Irrigated perennial horticulture'.

Tourist developments

Assign to 5.5.3 'Recreation and culture'.

Truffle farming

Can be assigned to 3.4 'Perennial horticulture', but this is dependent on how structured the truffle farming is.

Turf farming

Assign to 4.45 'Irrigated turf farming'.

Cropping of pasture species for seed

Assign to 3.3.8 'Pulses' or 4.3.8 'Irrigated pulses' if pulses, otherwise assign to 3.3.0 'Croppin'.

Strip cropping

Use multiple attribution at the tertiary level, or map to the secondary level 3.3.0 'Cropping'.

Zoos (includes butterfly farms, etc)

Assign on a class-by-class basis, depending on what the zoos operators see as their prime use; for example, either 5.5.5 'Research facility' or 5.5.3 'Recreation and culture'.

Aquaculture

Assign to 5.2.6 'Aquaculture' under 5.2 'Intensive animal husbandry'.

Straw

Need to look at this decision rule. In NSW hay is deliberately sown as a fodder crop

Add a decision rule stating that straw is not hay and so paddocks full of straw bales should not be coded as hay, SA coded them as hay

Canals

Need decision rule that refers to canal estates

Coal seam gas

Need to add a decision rule. If smaller than the minimum mapping unit, combine with surrounding prime use (e.g. grazing) and make a note in the comments field. If can be isolated than can map under 5.6.5 Gas treatment, storage and transmission (?). Note that unless large

areas, these features will only be sporadically mapped and so other datasets should be used to determine their location.

DRAFT FINAL