



Pond Apple National Strategic Plan Progress Review (2008 – 2009)



Pond Apple infestation (south of Indian Head), north of Cooktown, Cape York Peninsula
(Photo: Cape York Weeds and Feral Animal Group, Cooktown)

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Townsville. November 2009.

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Pond apple control (cut stump) Blueprint for the Bush, Pest Offensive project (Photo: Far North Queensland Regional Organisation of Councils, Yarrabah Aboriginal Community)



Pond apple control is 100% selective and effective—herbicide treatment of stumps

Executive summary

Tourism in the Wet Tropics and Cape York Peninsula relies heavily on nature's aesthetic values where World Heritage listed rainforests meet the Great Barrier Reef.

Pond apple (*Annona glabra*) is a semi-deciduous tree species that produces fruit similar to a smooth-skinned custard apple. Records indicate that pond apple was present in the Cooktown Botanic Gardens in 1886. It was subsequently imported from Central America and west Africa in 1912, as grafting or root stock for custard apple production.

The proliferation of pond apple over the past 90 years has been pinpointed to its use as a human food source during pioneering times and by the horticultural industry. Seeds are dispersed by water movement, including ocean currents.

As a Weed of National Significance (WONS), pond apple's environmental impacts are recognised nationally; it has the ability to form monocultures in Australian tropical fresh and estuarine wetlands.

The history of the Queensland Parks and Wildlife Service (QPWS) protecting national parks and areas of high conservation value from pond apple invasion expands over 30 years. QPWS has passed on its knowledge of controlling pond apple to other stakeholders (e.g. the former Mareeba Shire Council commenced collaborative shire eradication programs in 1997).

Key stakeholders have continued to collate knowledge of this weed through control projects, research, consultation, distribution mapping, planning, release of extension materials and the pond apple management and case study manual.

The review of the pond apple adaptive management manual that has provided for regional direction for the past five years was a key aspect of the Pond Apple Management Working Group for 2008–09. This manual targeted three main catchments in the Wet Tropics; however, it delivered management support to broader stakeholders over the national distribution.

The confidence of key stakeholders in controlling pond apple has increased over the past three years with joint support from Queensland and Australian Government projects. The importance of funding programs cannot be underestimated, evidenced by high levels of key stakeholder commitment to reduce infested areas.

The challenge of how to broaden control effort across all sectors of the community remains. This challenge, combined with labour-intensive control techniques and difficulties of safely accessing infested wetlands and crocodile habitat areas, identifies the ongoing need for improving control efficiencies with new technology.

Engaging and fostering cooperative partnerships with landholders in implementing control across respective industries (e.g. sugarcane, grazing) remains an additional responsibility for authorities.

A pond apple stakeholder forum, held in June 2009, workshopped the review of management strategies and discussed the main issues with many stakeholders. Of particular concern was short-term funding support inconsistencies from concurrent programs (e.g. Defeating the Weed Menace (DWM) and Caring for Our Country) and the availability of funds to continue programs already started.

Introduction

In 2001, a Pond Apple National Strategic Plan was released with a vision to eradicate pond apple from Australia by 2021. This vision is to be realised by implementing action towards achieving four main goals:

1. Alert the community to the impact and seriousness of pond apple.
2. Contain the spread.
3. Systematically control infestations of pond apple.
4. Coordinate management.

Pond apple (*Annona glabra*), is a WONS and is a major environmental weed threatening northern Australia. This small to medium-sized, semi-deciduous tree forms dense stands, particularly in swamp areas.

Pond apple invades fresh, brackish and saltwater areas and its thickets are capable of replacing natural ecosystems. Disturbed flood-prone ecosystems are most at risk from pond apple invasion, particularly in mangrove areas, melaleuca woodlands, riparian areas, along drainage lines, among coastal dunes and on Australian territorial islands. Unlike many weeds, pond apple has an alarming ability to invade relatively undisturbed areas. Pond apple is also a pioneering plant that will opportunistically invade areas after disturbances such as cyclones and floods.

Survey work reveals the national distribution (Queensland only) of pond apple to be 2180 ha. This estimate has not deducted any treated areas and is based on the following information:

- all interstate incursions eradicated
- adaptive management manual (Holloway 2004), Wet Tropics bioregion—2050 ha
- Cape York Peninsula, east coast surveys (2007–09)—80 ha
- Yarrabah Aboriginal Community survey—15 ha
- Hinchinbrook Shire Council survey—30 ha
- other isolated outbreaks in the regions of Townsville (1 ha), Mackay (1 ha), Nambour (2 ha) and Brisbane Botanic Gardens (1 ha)—total 5 ha.

While the environmental impacts of pond apple are highly visible, engaging land managers to recognise and take ownership of the problem is a major challenge for key stakeholders. As a result, natural resource management (NRM) groups and government agencies in North Queensland have formed a partnership to enhance pond apple management from local to national scales through a Pond Apple Management Working Group. This partnership has allowed for the coordination of management to continue in place of the formal National Pond Apple Management Group (NPAMG) that was originally established in 2005, but who has not met since 2006.

Key stakeholders committed to the management of pond apple have continued to draw on vital information in the adaptive management manual (Holloway 2004) produced by the Wet Tropics Management Authority (WTMA).

Since pond apple's listing as a WONS, the Australian Government has committed \$1.7 million to its management with a matching or greater contribution from the Queensland Government and local governments. A percentage of landholders have made significant in-kind contributions.

Environmentally sound target-specific herbicide treatments are providing high levels of control (e.g. 100%) when applied correctly.

This report outlines key achievements during 2008–09 in relation to the goals of the Pond Apple National Strategic Plan.

Goals and achievements

Goal 1: Alert the community to the impact and seriousness of pond apple

Key stakeholders implementing control projects over the past year has continued to improve the level of input from landholders. Hymenachne is a Class 2 declared pest plant under the *Land Protection (Pest and Stock Route Management) Act 2002* (the Act). Under the Act, landholders are obliged to take reasonable efforts to control all infestations on their land.

Local governments rarely enforce legislation, preferring to relate the impacts to all stakeholders and form partnerships through project planning.

Landholder attitudes towards control vary across regions, land uses and individual industries. When pond apple is considered by the landholder to have little or no impact on their land, little control is conducted. This contributes to the risk of spread and points to a lack of knowledge about the weed and how it spreads.

The Pond Apple Extension and Communication Plan identifies the following three objectives to improve community awareness and ownership of managing pond apple:

1. Establish and maintain communication and information flow to all stakeholders.
2. Raise the awareness of pond apple and its identification, impact, spread and control in high priority and other areas with existing and potential infestations of pond apple.
3. Change counter-productive attitudes about pond apple to enable a unified and consistent approach to managing pond apple.

The WONS program and stakeholders have conducted the following activities in 2008–09 that have improved community awareness of pond apple.

- Weed identification workshops—South Johnstone and Atherton
- Weedbuster week promotion with Bunnings Warehouse
- local government control demonstration and monitoring sites
- media releases—impacts of pond apple
- national distribution of 25 awareness banners
- national distribution of 120 information resource kits
- development and release of warning posters for Cape York Peninsula
- stakeholder workshops.

Under a woody weed control criteria associated with the Queensland Government's Blueprint for the Bush, Queensland Primary Industries and Fisheries (QPIF)—part of the Department of Employment, Economic Development and Innovation—has fostered strategic pond apple control since 2007, with funding of \$450 000 (Terrain NRM contributed \$350 000, Cook Shire Council contributed \$100 000).

The Australian Government's DWM program has been completed, which complemented the collaborative effort supporting aerial surveys on the east coast of Cape York. In addition, DWM allowed for a three-year project (July 2006 to June 2009) to develop pond apple education and awareness products and activities.

While responsible for environmental management of national parks, QPWS continues to demonstrate its willingness to promote integrated, collaborative management, even in off-park situations where early intervention is the best approach. Many national parks are affected by pond apple, including Eubenangee Swamp, Kurrimine, Daintree River, Endeavour River, Iron Range and Jardine River National Parks. QPWS staff continue to play a key role by increasing community awareness of weed management through project work and interaction with neighbours and other key stakeholders.

Landcare groups and individual landholders across the Wet Tropics region have implemented limited control in local areas. This activity needs to be supported through promotion and extension materials. Key stakeholders continue to refine best practice control methods through ongoing research. Control methods can be as simple as hand pulling seedlings through to cut stump and/or foliar application of registered herbicides.

Experienced operators controlling pond apple can achieve close to 100% kill rates. Their experiences and knowledge is well documented in order to assist with increasing broader stakeholder confidence in control techniques. QPIF staff at South Johnstone and Atherton conducted weed identification workshops in early 2009. Participant's knowledge of weed species was recorded and sound knowledge was evident for pond apple.

Weeds officers on the Sunshine Coast (south-eastern Queensland) have also held a series of weed identification workshops that have attracted large numbers of NRM field personnel. This will improve the scope for early detection of weeds in the region.

Twenty-five people from 11 stakeholder groups involved with pond apple management in North Queensland attended a workshop in June 2009 to review the adaptive management manual (Holloway 2004). The group agreed that this manual, released by WTMA for control in the catchments of Russell–Mulgrave and Tully–Murray River systems, needs expanding to incorporate other Queensland or national infestations. Far North Queensland Regional Organisation of Councils (FNQROC), with WONS funding support, is overseeing this review in consultation with key stakeholders.

The availability of resource kits with a range of extension products allows for easy access to all relevant information for management. Stakeholders have either mailed or distributed (through displays, field days and workshops) at least 120 kits to the community, which will improve community education and awareness levels.

A percentage of these products, including the adaptive management manual, is available on the Weeds Australia website (www.weeds.org.au/) to assist with key information relating to identification and best practice management.

Warning posters asking people to report pond apple have been developed and released specifically for the Aboriginal and Torres Strait Islander communities and associated Cape York Peninsula communities. These posters, made from thicker, waterproof cardboard, are designed for outdoor display on community and boat ramp notice boards. There is scope to increase exposure of this awareness material to further target recreational fishing, rare fruit groups and historical horticultural areas in all regions.

Pond apple is present at many Indigenous communities in North Queensland, including Yarrabah (south of Cairns). With the guidance of the Yarrabah ranger, this community has made considerable progress towards strategic control by demonstrating correct control techniques and highlighting the impacts of this weed on country and cultural values. Other local stakeholders, including FNQROC, local governments, Conservation Volunteers Australia (CVA) and QPIF officers, have championed this effort.

The Cooktown Landcare coordinator helped on WONS partnerships with WONS funding support of \$5000 to run two events—Laura Wetland Event and the Marine and Coastcare

Workshop. These exposed Indigenous people and key coastal field officers on Cape York Peninsula to the impacts and biology of pond apple and other WONS species.

Key threatening process not nominated

The Adaptive Management Manual extensively documented the environmental impact of pond apple on a range of ecosystems. Site inspections of these areas clearly indicated ecological changes taking place and a formal assessment is required to quantify the cost of this natural landscape degradation. The review of the Adaptive Management Manual will update bioregions threatened by pond apple invasion. No progress has been made on nominating pond apple as a key threatening process under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Cairns Regional Council weeds officer based at Mossman contributes to an effective partnership between council staff and eco-tourism operators (e.g. boat/nature cruises) on the Daintree River. Protection of the environment is paramount for their livelihood and operators are conducting surveillance for isolated pond apple trees along the river by flagging and notifying council staff when plants are detected.

Goal 2: Contain the spread

In northern Australia, education and raising awareness of pond apple's impacts is a critical component for preventing spread and achieving early detection and control.

Pond apple distribution is currently restricted to Queensland; however, research has identified that seeds dropped in February can disperse 100 km either north or south along the coast depending on prevailing weather conditions. While normal weather patterns would pose limited national risk of spread, extreme weather events, such as cyclones or floods, have the potential to increase spread up 1300 km.

This potential for spread, combined with the invasive traits of pond apple (i.e. viable seed bank, saltwater tolerance and seeds' ability to float on water) places large areas of tropical Australia at risk of invasion. Research has shown that seed can remain viable for three years in freshwater and can germinate while in freshwater. Containment strategies therefore need to consider both seed and seedling (propagules) spread.

The preferred habitat of pond apple defines its ability to spread, establish and invade new areas (Holloway 2004). Core infestations in the wet tropics indicate a need for high soil moisture combined with other ecological factors of silty alluvial soils, low altitude and temperatures of above 25 °C for seed germination.

Plants have been controlled in northern New South Wales and the Northern Territory in the past, and a mature tree is present in the Brisbane Botanic Gardens. This tree was planted in 1959 and is currently 8–10 m high, bearing fruit and producing seedlings. During the 2009 winter dormancy period, this tree lost all its leaves. This, combined with the findings above, supports the view that pond apple has a broad climatic tolerance (Holloway 2004).

Infestations in a swamp or freshwater catchment build up the seed bank annually and seeds are dispersed by floodwater into tidal areas to proliferate across catchments. Short-distance dispersal occurs through animals (including feral pigs, cassowaries, mammals, possibly birds and even certain fish species); propagules spread mainly via water.

Key stakeholders understand these varying dispersal pathways and the surveillance factors to consider for early detection and predicting distribution away from riparian areas.

Both the Cape York Peninsula Pest Advisory Group (CYPPAG) meeting and the Far North Queensland Pest Advisory Forum (FNQPAF) provide additional networking forums for the majority of pond apple stakeholders. Each group meets biannually, which allows for analysis and comparison of techniques in all aspects of management and extension methods.

Once strategic areas (on a shire basis) are identified for control, landholders are encouraged to complete a property pest management plan prior to implementing control from the highest catchment point. Landholders are encouraged to participate, monitor and complete follow-up treatment based on a partnership arrangement with labour and other control resources.

A minority of landholders do initiate control for various reasons (relating mainly to environmental and/ or agricultural values). Pond apple is generally viewed as ‘out of mind out of sight’ by most landholders who perceive its impact as low. Sugarcane farmers may implement control where drains and fence lines are infested; however, others are reluctant to conduct control for fear of compromising stream bank stability.

In February 2009, the national management map (Figure 1) was completed. The map clearly identifies strategic infestations for eradication and areas at risk from ocean current of spread from core areas. While Cape York infestations are included in the core area, only 80 ha of pond apple has been surveyed from north of Cooktown.

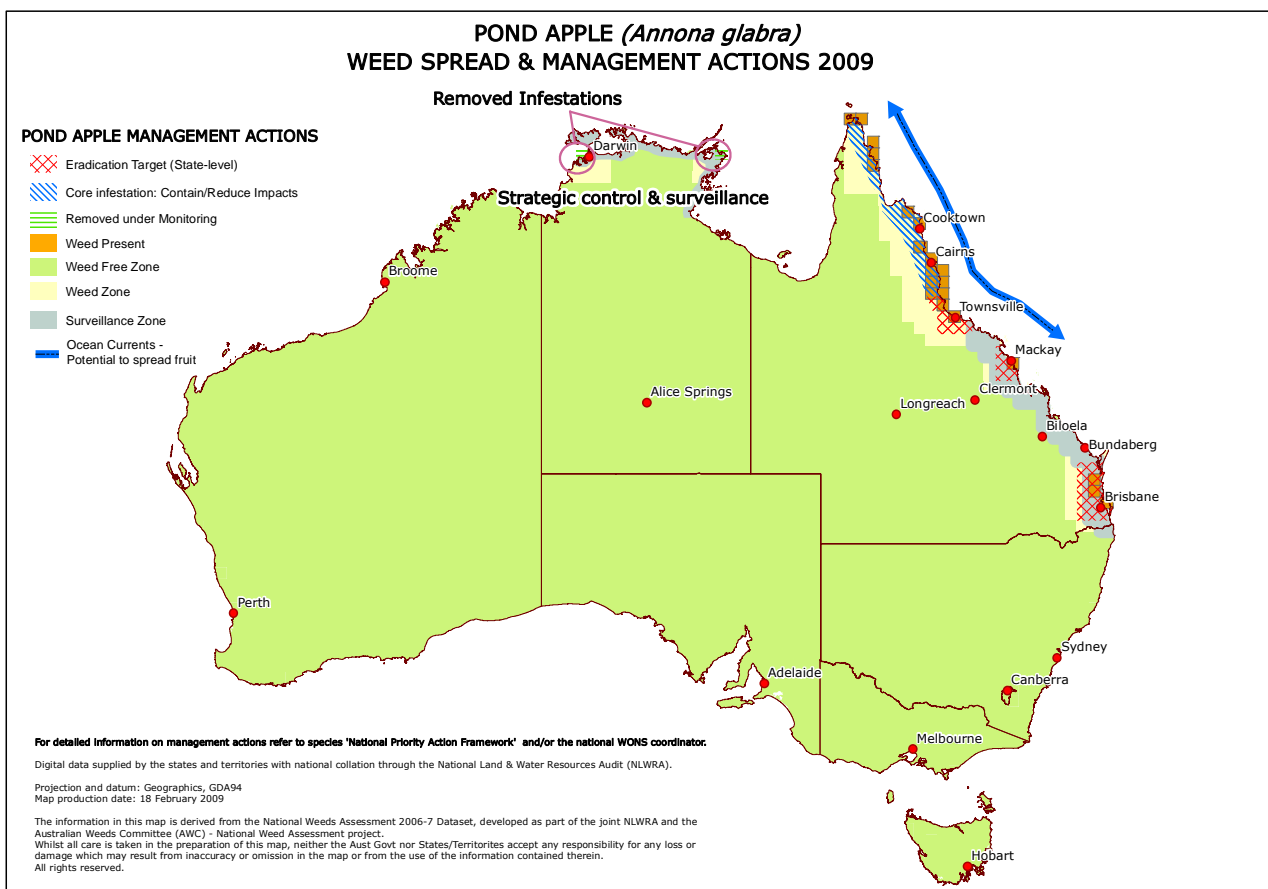


Figure 1. Pond apple distribution and management actions, 2009

In 2008–09, Cape York Weeds and Feral Animal Program (CYWFAP) and the Cook Shire Council completed the aerial survey work of the east coast of Cape York Peninsula with no

additional sightings in the Cape Melville region. This project, funded by Blueprint for the Bush, had approximately \$50 000 remaining in 2009–10 for control of any infestations found.

Initial control of the Mackay infestation was conducted in early 2009 using basal bark application of Access® herbicide and diesel. Monitoring and control of seedling regrowth will be ongoing for a number of years. Through the Mackay Regional Council Area Pest Management Plan, a broader, targeted surveillance of suitable habitats associated with the horticultural industry in the region will help with early detection of any additional outbreaks.

Goal 3: Systematically control infestations of pond apple

The total national distribution of pond apple was estimated in 2007 at 2000 ha (all infestations located in Queensland). The east coast survey of Cape York and extended surveys in the Yarrabah and Ingham regions have identified additional infested areas.

All pond apple infestations can be categorised into three regions that will assist with reporting and maintaining control aims. Table 1 is a national infestation list from the Torres Strait Islands to south-eastern Queensland. An indication of control status is based on the National Coordinator’s understanding as at 30 June 2009. Wet Tropics information is taken from the adaptive management manual (Holloway 2004).

Table 1. National infestation summary

ID	Description	Status	ID	Description	Status
Northern Cape York = 36 ha					
1	Torres Strait Islands	C	4	Temple Bay	D (50%)
2	NPA—camp ground	C	5	Portland Road/Chilli Beach	D
3	Escape—Shelbourne Rivers (Jardine River National Park)	B	6	Old mission site—Cape Direction/Hemming Range	B
Lower Cape York = 44 ha					
7	Jeannie River	C	10	Hopevale—north shore	D
8	Cape Flattery/Starcke	D	11	Cooktown and Walker Bay	E
9	Elim—Cape Bedford	D	12	Weary Bay	D
			13	Wujal Wujal (dump site)	A
Wet Tropics (by shires) (2050 ha*, additional surveys 45 ha**) = 2095 ha					
14	Cairns regional = 1390 ha	G	17	Cassowary Coast—Innisfail, Mission Beach, Tully = 627 ha	G
15	Yarrabah = 15 ha**	G			
16	Tableland regional = 33 ha	C	18	Hinchinbrook = 30 ha **	C
Other infestations = approx. 5 ha					
19	Townsville—Bushland Beach = 1 ha	C	21	Nambour = 2 ha	D
20	Mackay = 1 ha	C - 2009	22	Brisbane Botanical Garden = 1 ha	B
National distribution assessment 2009 = 2180 ha					
Past sites—treated/eradicated					
NSW (Dorroughby); Qld (Woodford 2004, Nambour 1971, Mackay 1962, 1995); NT (Charles Darwin University and northeast Arnhem Land)					
<p>Legend: A = Not surveyed, B = No control, C = Initially treated and no seeding plants, D = Control progressing (% area treated?), E = Eradicated and no seedling regrowth, F = Eradicated (historical data), G = Multiple classes</p>					

Cape York Peninsula has 12 outbreaks totalling 80 ha with the northern peninsula area (NPA) infestation of 2 ha the closest incursion to the west coast. This source, combined with the potential propagule spread on ocean currents, places the Gulf of Carpentaria on high alert for surveillance. Reports are that all trees located on the Torres Strait Islands have been controlled and monitoring of these areas will need to be ongoing.

The National Coordinator attended the April CYPAG meeting and highlighted the strategic importance for controlling many WONS species on Cape York Peninsula, while seeking feedback on the initial pond apple management map and the eradication vision of 2021.

Shires listed in Table 1 consist of multiple infestations, with the core areas in Cairns and Cassowary Coast Regional Councils. Table 2 below identifies Wet Tropics infestations by the new amalgamated local government. Data is from the adaptive management manual (Holloway 2004).

Table 2. Wet Tropics infestation summary (core areas)

Shire	Catchment	ha	Shire	Catchment	ha
Tableland Regional	Barron River	32	Yarrabah*		15*
	Davies Creek	1	Hinchinbrook*		30*
Cairns Regional	Baileys Creek (est. at 300 ha in 2009)	264	Cairns Regional	Canal/Alice River	941
	Daintree River	28		Mulgrave River	26
	Mossman River	20		Norries Creek	3
				Russell River	69
			Trinity Inlet	39	
	Totals	312		Shire total	1078
					1390
Cassowary Coast	Big Maria Creek	25	Cassowary Coast	North Maria Creek	33
	Ella Bay	3		Stone Creek	3
	Liverpool Creek	11		Sth Johnstone River	90
	Mission Beach	20		South Maria Creek	8
	Moresby Creek	34		Victory Creek	10
	Ninds Creek	125		Murray River	235
	Nth Johnstone River	28		Tully River	2
	Totals	246		Shire total	381
					627
Summary totals		591			1504
Wet Tropics total area			2095 ha		

* Yarrabah and Hinchinbrook are additional areas to Holloway's (2004) information.

The information in the tables above provides a national list of pond apple infestations and areas for further stakeholder communication and reporting on follow-up management plans.

In many cases, initiating control at any one infestation increases the affected area due to extended survey work. The review of the adaptive management manual will allow for updates to areas infested in the Wet Tropics, both new and old recordings.

The majority of local governments in the Wet Tropics have monitoring and demonstration sites to help evaluate control and promote awareness of what can be achieved. FNQROC has coordinated this work with funding assistance from the WONS program. Photo monitoring sites are used to aid data collection, which is then recorded on a central registry database.

Control options

Bio-control for pond apple is not likely to be pursued given the number of closely related species in Australia. This places a critical importance on maintaining the current integrated control options (mechanical, chemical, fire and rehabilitation). Registered herbicide use is target-specific and can achieve good results while limiting additional adverse environmental damage. To allow this, permits are obtained from the Australian Pesticides and Veterinary Medicines Authority. The current Queensland-only permit (PER8297) for a range of herbicides is valid until June 2010. QPIF will submit an application to renew this permit.

Goal 4: Coordinate management

The pest advisory groups and the national coordination of the Far North Queensland Pond Apple Working Group that formed with the commencement of the Blueprint for the Bush initiative have continued to facilitated state and regional management. FNQROC was engaged to conduct a workshop to initiate the review of the adaptive management manual. Compiled in 2004, this manual has been valued by stakeholders in identifying areas for protection, pond apple biology/ecology and control techniques.

This report recommended research in the following areas:

- mapping, modelling, and field surveys
- disturbance (native vegetation)—amount suitable for pond apple invasion
- water dispersal of seed
- animal dispersal of seed.

In June 2009, 25 people representing 11 stakeholder groups attended a review workshop that discussed progress on the above research gaps (mapping and dispersal methods) and future direction. Based on the main areas of the manual, all aspects of management were covered, including:

- ecology
 1. seed production, germination, longevity and dispersal
 2. habitat preference, indicator species, rare and threatened species
- mapping
 1. field and predictive
 2. current distribution—1 km grid mapping
- planning for a control program
 1. prioritisation, sub-catchment scale, timing of control
 2. monitoring and follow-up
- control techniques
 1. control techniques and approach, the concepts
 2. aerial detection methodology—field operatives.
 3. access issues, field operatives
 4. management approach, rehabilitation post-control.

Feedback on the strategic plan vision

The interest shown at this workshop showed there is a diverse group of stakeholders committed to the targets of the strategic plan.

Funded project successes were discussed in view of the long-term vision of eradicating pond apple by 2021. The limited ability of key stakeholders to widely engage with landholders and implement control work, and the lack of consistent resources to help provide incentives for this process, were identified as barriers for eradication. The group believed, based on

current progress and the dependence on funding support, that eradication within this timeframe is currently beyond the scope of stakeholders.

Re-establishment of the NPAMG was outlined by the National Coordinator with discussion on appointing a chairperson and benefits towards weed management at the local to national levels. Depending on the outcome of the WONS review process, it was agreed that the NPAMG would re-form with consideration of past members and the following organisations and jurisdictions—QPIF, FNQROC, local government, CSIRO, community, nursery/rare fruits, recreational fishing groups and correspondence from Northern Territory and New South Wales representatives.

Efficiencies between pond apple and hymenachne coordination were achieved with a Nambour infestation inspection made possible by the National Coordinator while travelling to attend a hymenachne field day at Gayndah. Contact was made with QPIF staff at the research station where two small dams were infested and custard apple research is still being conducted. Source delimitation was determined based on this associated research; however, a regional survey and awareness campaign was recommended to help identify additional outbreaks and the strategic importance and impacts of this weed.

FNQROC continues to help facilitate key components of pest management—mapping, planning and public education in partnership with other leading pond apple stakeholders in QPWS, Terrain NRM, the Department of Environment and Resource Management (DERM) and QPIF.

Terrain NRM conduct a range of projects and pond apple management is entrenched, following the Blueprint for the Bush project, as an ongoing requirement. All Wet Tropics shires are supported annually; each shire is allocated \$43 000 from base-level funds.

Achievements

Additional key achievements and funded projects for 2008–09 include:

- Initial national distribution and management map created.
- Aerial survey of east coast of Cape York Peninsula completed.
- Chairperson and National Coordinator maintain support for WONS programs, attending both federal and state meetings.
- Management provide referrals and advice for project applications under the Caring for Our Country funding program.
- Queensland-based WONS chairpersons formed a working group for the draft Queensland Biosecurity Strategy.
- Distributed 120 resource kits (full range of products) to help raise stakeholders/ community awareness.
- Pond Apple Adaptive Management Manual Review Workshop held in June 2009.

WONS funding support.

1. field days/workshops

- Laura Wetland Event (May 2009)—\$2500
- Marine and Coastcare Workshops, Cooktown (June 2009)—\$2500

2. research

- Two researchers attend the Victoria Weed Society, Modelling Forum (April 2009).
- QPIF continues ecology studies.

3. education and awareness

- Far North Queensland project demonstration and monitoring sites—\$2000
- production of Central Queensland weed booklet—\$2000
- development of national awareness products—25 banners (\$3800)/WONS booklet.

Completed funding support—DWM

Three DWM contracts with the Department Agriculture, Fisheries and Forestry concluded this year with final investments made on a combined funding allocation from July 2006 to June 2009 of \$614 130 (including GST). These agreements included national coordination (\$462 330) and education and awareness projects for both pond apple (\$83 050) and hymenachne (\$68 750).

An additional old NHT project fund was also expended, with investments of approximately \$41 000 made towards hymenachne research forum costs, CSIRO mapping and James Cook University prioritisation projects. This research could potentially also assist pond apple management in the future with some of this funding used for pond apple awareness.

Appendix 1. References

ARMCANZ (2001) *Weeds of National Significance pond apple (Annona glabra) strategic plan*, National Weeds Strategy Executive Committee, Launceston.

Holloway, I (2004) *Adaptive management: pond apple control in the catchments of the Russell Mulgrave and Tully-Murray River Systems*, Wet Tropics Management Authority, Cairns.

Doak, A (2006) *Pond apple management: control methods and case studies*, Brisbane, Queensland Department of Natural Resources, Mines and Water.

Cobon, R (2008) *Review of progress towards implementation of the pond apple strategic plan 2007-2008*, Townsville.

Sydes, T (2009) 'Adaptive management', Pond apple workshop minutes, FNQROC, Cairns.

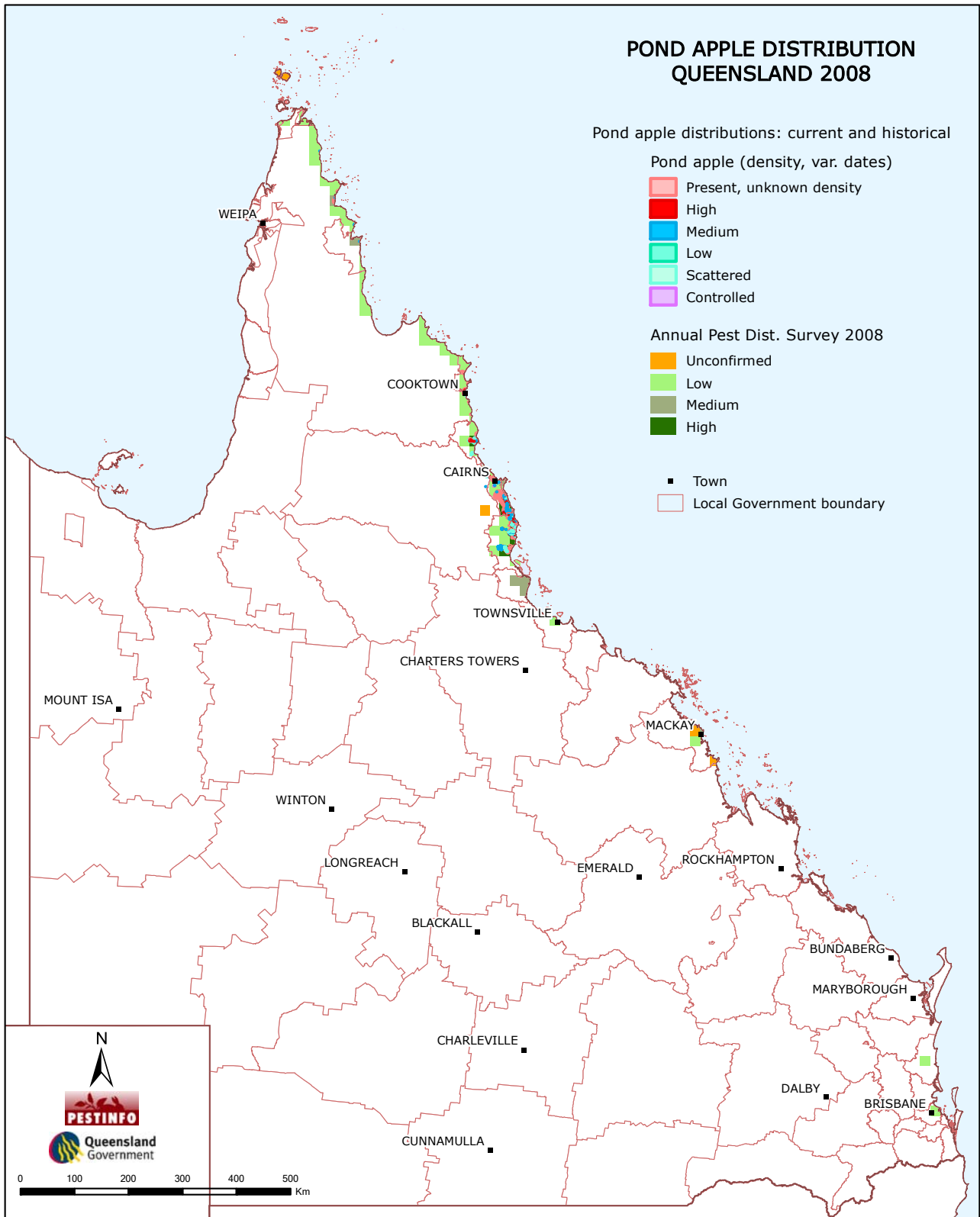


Limited access into pond apple infestations—Temple Bay, Cape York Peninsula (Photo: Cape York Weeds and Feral Animal Group, Cooktown)



Pond apple aerial survey—Fritz Creek, Bloomfield region (Photo: Cape York Weeds and Feral Animal Group, Cooktown)

Appendix 2. Queensland (national) distribution map



Appendix 3. Expenditure statement for coordination of pond apple and hymenachne— detailed expenses for 2008–09 funding

Note: Planned budget details (highlighted in green) are in line with the Amendment Deed, which includes unspent funds remaining at the conclusion of WONS Coordination and Support Pond Apple and Hymenachne (previously acquitted Activity ID 49508). Actual expenditure (highlighted in yellow) for 08-09 is provided for Activity ID 56428 only in this table—see table below for details on the unspent funds remaining at the conclusion of WONS Coordination and Support Pond Apple and Hymenachne. Recipient contributions (highlighted in blue) represent minimal contributions by QPIF and other stakeholders.

2008–09		Planned budget as per Amendment Deed signed 25 February 2009 (Activity ID 56428 plus unspent Commonwealth funds remaining at the conclusion of Activity ID 49508—WONS Coordination and Support Pond Apple and Hymenachne)		Actual Expenditure Activity ID 56428	
Employees & positions held	Recipient's contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's contributions expended (without GST)	Commonwealth funds expended (without GST)	
Coord. salary & on-costs		\$91,500.00			\$105,485.80
Management, admin. support, research officers			\$262,500		
State/territory community, CSIRO other groups	\$240,500		\$37,500		
A	Total employment costs	\$240,500	\$91,500	\$300,000	\$105,485.80
	Operating cost items	Recipient's contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's contributions expended (without GST)	Commonwealth funds expended (without GST)
	Travel & meeting expenses	\$38,500	\$20,586	\$20,000	\$25,331.01
	General operating costs	\$12,000	\$4,500	\$15,000	\$10,540.06
	Awareness and education activities			\$8,000	
	Seminar/conference	\$10,000	\$1,000	\$10,000	\$1,850.01
	Hymenachne research forum, remote sensing project, mapping support		\$34,000		
	JCU hymenachne prioritisation project pilot study		\$33,000		
B	Total operating costs	\$60,500	\$93,086	\$53,000	\$37,721.08
C	Total cost (without GST) (A + B)	\$301,000	\$184,586	\$353,000	\$143,206.88
D	GST (10%)	\$30,100	\$18,459	\$35,300	\$14,320.68
E	Total cost (including GST)	\$331,100	\$203,045	\$388,300	\$157,527.56

Note: Planned budget details (highlighted in green) are in line with the Amendment Deed, which includes unspent funds remaining at the conclusion of WONS Coordination and Support Pond Apple and Hymenachne (previously acquitted Activity ID 49508). Actual expenditure (highlighted in yellow) for 08-09 is provided for Activity ID 56428 only in this table—see table below for details on the unspent funds remaining at the conclusion of WONS Coordination and Support Pond Apple and Hymenachne. Recipient contributions (highlighted in blue) represent minimal contributions by QPIF and other stakeholders

2008–09	Planned budget as per Amendment Deed signed 25 February 2009 (Activity ID 56428 plus unspent Commonwealth funds remaining at the conclusion of Activity ID 49508—WONS Coordination and Support Pond Apple and Hymenachne)		Actual expenditure unspent Commonwealth funds remaining at the conclusion of Activity ID 49508—WONS Coordination and Support Pond Apple and Hymenachne)	
Employees & positions held	Recipient's contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's contributions expended (estimate only) (without GST)	Commonwealth funds expended (without GST)
Coord. salary & on-costs		\$91,500.00		\$0
Management, admin. support, research officers			\$262,500	
State/territory, CSIRO, other groups	\$240,500		\$37,500	
Total employment costs	\$240,500	\$91,500	\$100,000	\$0
Operating cost items	Recipient's contributions (without GST)	Funds paid by the Commonwealth (without GST)	Recipient's contributions expended (without GST)	Commonwealth funds expended (without GST)
Travel & meeting expenses	\$38,500	\$20,586	\$20,000	\$1,885.66
General operating costs	\$12,000	\$4,500	\$15,000	\$326.51
Awareness and education activities			\$8,000	
Seminar/conference	\$10,000	\$1,000	\$10,000	\$0
Hymenachne research forum, remote sensing project, mapping support		\$34,000		
JCU hymenachne prioritisation project pilot study		\$33,000		\$32,965.00
Total operating costs	\$60,500	\$93,086	\$53,000	\$35,177.17
Total cost (without GST) (A + B)	\$301,000	\$184,586	\$353,000	\$35,177.17
GST (10%)	\$30,100	\$18,459	\$35,300	\$3,517.71
Total cost (including GST)	\$331,100	\$203,045	\$388,300	\$38,694.88