TIMELINE COMPARISON OF TWO MOTH ERADICATION PROGRAMMES

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From the joint paper

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Orgyia thyellina - White Spotted Tussock Moth – (WSTM)		*Teia anartoides* - Painted Apple Moth (PAM)
Widespread outbreak of WSTM in Auckland's Eastern Suburbs confirmed on 17th April after discovery by a resident. Known to have been present for at least 5 months – local unconfirmed reports indicate presence noted in Autumn 95. [14,16] Ministry of Forestry (MOF) becomes the lead agency as WSTM known to be a forest pest. The first survey teams in place 18th April. Large number of all live stages found on properties within 7sq km. One week later on April 23rd a meeting of the Initial Response Group (IRG) is held. Decision on action held over until identity confirmed and results are available of initiated feeding trials using late instar larvae. [14, 10, 9] The Forest Research Institute (FRI) establish a project team to provide technical support to the MOF operation. [9, 10]	96 April 99	Painted Apple Moth found by resident in mid-April in a residential / industrial area in Glendene, Auckland. Brought to attention of an entomologist in early May, and confirmed by Ministry of Agriculture and Forestry (MAF). [3, 12, 13] An Australian species, PAM is considered a greater threat to NZ than WSTM due to its known appetite for a wide range of host trees including Acacia, Eucalyptus, Sophora, Leptospermum scoporuim and Pinus radiata. Forest Health News 85 notes that information on PAM's biology and the damage they cause is 'remarkably sparse'. [3, 12]
Tussock Moth colony established in quarantine at FRI-Rotorua. Feeding trials initiated using early instars. By mid-May second IRG meeting held. Meeting includes MOF & FRI staff and representatives from Auckland City Council, Dept of Conservation, Forest Owners Assoc and Ministry of Agriculture. It is noted that results of feeding trials may not be available until early July. [14] All egg masses are preserved and monitored in the field. The isolated hatching of half the eggs in a single egg mass expected to have been overwintering or diapausing, is discovered end of May. Urgent meeting of officials convened by MOF. [9, 10, 14] The first draft of an Environmental Impact Assessment (EIA) completed at end of May. [14] Three options identified for Government response : do nothing, biological control or attempt eradication.	96 May 99	Widespread intensive outbreak of PAM confirmed by on 5th May. All life stages found - Eggs, caterpillars and winged male adults – leading to conclusion that it had been present in NZ for at least one year. [12] De-limiting survey undertaken in the second week of May of 1300 sites within 1km radius of outbreak. No surveys done beyond. 7 sites detected with live PAM stages. All egg masses, pupae and wingless females found are destroyed by MAF monitoring staff. As initial containment measure, localised ground spraying is carried out on host trees, buildings and shipping containers with Chlorpyrifos, followed later with Deltamethrin. [12] New state-of-the-art research, quarantine and insect rearing facilities opened at FRI Rotorua by the Minister for Biosecurity. Rotorua scientists say that its construction, driven by the WSTM lessons, will help them "identify and control pests such as the WSTM and the PAM". [13]

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Following discussions with FRI staff a WSTM pheromone development project is initiated with Stephen Foster of Hort Research. [19] FRI had made contact with Japan and USDA experts.	96 May cont 99	Offers of assistance to MAF for pheromone development from John Clearwater (Successful WSTM pheromone developer) and from FRI – Rotorua for host feeding trials. (Neither taken up). [7] Local orchardists complain they had not been approached by MAF and only heard about the outbreak via the media. [13]
Cabinet notes that an eradication programme would involve aerial and ground sprays of *Bacillus thuringiensis* var.*kurstaki* (Btk) They agree to draft new RMA regulations to exempt Btk. [14] Public information flyers about the WSTM are sent to residents via local newspapers, and an 0800 'bugline' set up by mid June. Information handouts completed and the WSTM project is named Operation Ever Green (OE). [14, 13] Initial report from FRI on feeding trials confirms Rosaceae family most at risk from WSTM.	96 June 99	First of the follow-up surveys in mid-June and late June find live material on 8 new sites, together with live material on one previously identified and treated site.
Final meeting (3rd) of the IRG held early July which agrees unanimously that eradication should be attempted if feasible, and a Science Panel be established to give independent advice to ministers. [14] Science Panel's first meeting 12th July. Briefings from the Ministry of Health (MoH) outlining public health aspects of an eradication programme Briefing from MOF noting co-operation with FRI on feeding trials and advocating ground spraying as a viable alternative option. Briefing from Department of Conservation (DoC) and meeting with Minister of Forestry who outlined public consultation group being set up. Panel advises the Minister that on the evidence an eradication was feasible. [10] EIA of Aerial Btk spraying published [2]	96 July 99	The second part of the June follow-up survey completed 2nd July. Number of sites where live material has been found now totals 15. It is reported that a MAF Technical Group has convened 'Mid 99' to provide advice and peer review of the PAM eradication programme. Department of Conservation (DoC) is not invited until 1 year later. [12] *(Requested minutes of the group from MAF in early January 2001 have not been received by date of publication) HB*

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Cabinet agrees end of July that MAF conduct an eradication programme in the spring, and approves an increase of $4.6m in appropriation. It also agrees a study to examine and monitor health effects of the operation. [14]	96 July Cont. 99	
It was noted early August that there was no further progress on finding a pheromone, but freshly emerged females would be available for Stephen Foster shortly. [10] The Community Advisory Group is set up and has its first meeting in early August. First Public meeting held in Parnell, Auckland in late August. [14, 13] The FRI Technical Support Team strongly rejects suggestions from the Science Panel to Ministers in early August that in the event aerial spraying could not go ahead, that ground spraying alone was a possible eradication option. Science Panel subsequently agrees and confirms recommendation to Ministers. A limited health monitoring programme is accepted and a Health Risk Assessment of Btk is produced at the end of August. ✔	96 Aug 99	HortResearch team of Dr Max Suckling & Dr Stephen Foster contracted by MAF to identify a PAM pheromone. No contact made with the WSTM team led by Dr John Clearwater. [12, 7] Follow up survey 2 in late August detects live PAM on one previously identified site and 2 new sites are detected bringing total number of infested sites to 17.
Cabinet approves on Sept 16th additional funding for the use of DC6 aircraft for aerial spraying. [14] Ground surveys to identify non-infested buffer zones around the 'hot zone' of infested sites had identified a new site in a large area previously thought free. A FRI pheromone report mid-September notes that Stephen Foster's work on the pheromone looked promising, but John Clearwater confirms at end of September that tests of commercially available pheromone have proved negative in trials. [10]	96 Sept 99	Weekly checks of known infested **Glendene** sites commence mid-September. Spraying and removal of host trees continues. Live material continues to be found. Of 16 properties treated by spraying and tree removal – 3 still producing caterpillars. [8] MAF Director of Forest Biosecurity - Dr Ruth Frampton confirms there is no need for a more intensive eradication programme and there will be no aerial spraying. [13] New outbreak discovered by a resident late September in residential/industrial area in **Mt Wellington** approx 15 km from first outbreak. Large number of egg masses and caterpillars found on 3 properties within 300m radius. [13, 8]

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Early morning aerial spraying of Btk commences in early October in an extended area of 4,000 hectares. (4 runs by DC6, and 4 by helicopter over smaller uninhabited areas). Ground spraying of 190 known infested properties begins mid October. Vegetation restrictions in place in spray zone. First meeting on October 7th.of the Operational Science Group (OSG)- set up by the CEO of MOF. [4] Cabinet decision to commission an independent review of the WSTM programme. General concerns about management effectiveness as well as specific concerns about the eradication programme. [14] John Clearwater is endorsed by the OSG mid-October to carry out parallel research on the WSTM pheromone identification in collaboration with Gerhard Gries of Simon Fraser University. FRI instructed to supply material. Pheromone progress report requested from HortResearch. [9] Pheromone alternatives as a fall back position are considered including live or wingless females and John Clearwater would progress cage studies. [9]	96 Oct 99	De-limiting 1km radius survey of 1200 **Mt Wellington** properties in early October finds 11 infestations. Chlorpyrifos sprayed on host trees on infested properties, together with building surfaces, equipment & containers. Selected host trees removed as control measure. MAF says there is no evidence of any link between the two outbreaks – but Forest Research questions this, stating that both populations are of similar size and age in spite of the 6 month discovery gap. [3, 13] Live and dead material continues to be found in **Glendene** outbreak with 2 (unconfirmed) new sites. Weekly checks find live material on 5 previously identified sites and old material on 2.
One very small 5th instar WSTM larva found well outside infested zone by staff in a South Auckland nursery. Full scale search around the property fails to find anything else. Pythrethrum sprayed as precautionary measure. Clients who had purchased recently from the company followed up. [9] Vegetation checkpoints manned by police on local roads in the area to enforce the restrictions on vegetation removal. [13, 9] Aerial spraying of Btk continues - reducing from 4,000 hectares to 1,000 hectares by end of month. (4 runs by DC6, and 4 by helicopter	96 Nov 99	Old and new material continues to be found in weekly checks on previously identified sites in **Glendene.** Old material is found in **Mt Wellington** throughout November. Control continues with Deltamethrin spraying and tree removals. Follow up surveys in both areas in late November discovers 2 new outbreaks in **Glendene** and one in **Mt Wellington**, together with new infestations and old material on previously identified sites. The Soil & Health Association complains that public interest groups have not been consulted

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over smaller uninhabited areas). [9] OSG identifies a serious security breech when virus infected material is shipped from Tamaki campus to Lincoln. Note that the incident identifies the need for independent biosecurity audit. Field cages assembled at Tamaki for working experiments and the first deployment of field traps was expected 2nd week of December. [9] It is reported end of November that although pheromone progress is being made no useful synthetic is in sight. The three researchers carrying out different approaches are asked to share their results to hasten progress. [19, 9] Ground searches find late instar larvae on at least 11 of the 40 sites looked at intensively in the centre of the infested area. [9]	96 Nov cont	99	over the PAM campaign and demand that Chlorpyrifos spraying should cease due to its toxicity. MAF decline, citing no involuntary public exposure so no public consultation was necessary. Trees were removed instead when spraying too close to areas used by people. [13, 17, 18.] Letter to The Minister of Biosecurity from John Clearwater requesting re-assignment of pheromone research funds to the WSTM team. Additional request for live material for passage to Canada, and the transfer of PAM cultures to the purpose built FRI quarantine facilities at Rotorua. (All requests denied) [7] Dr Ruth Frampton, Director, Forest Biosecurity is optimistic that eradication has been achieved. [13]
Last aerial DC6 spray on 6th December. Total of nine runs in all. Final helicopter re-sprays of bush and gullies by the 9th. All 14 sites where live caterpillars found are re-visited post-spray. Only one find made in a highly infested bush treated intensively with pyrethrum which returns 2nd and 4th instars. One 4th instar found in a surrounding property. It was noted that larvae were very small and showed little or no feeding. [9] Field traps with female moths deployed on 275 properties by mid December. One male moth trapped on Christmas Eve in the centre of the infestation zone. By end of December a total of 13 had been trapped on 8 properties. [9]	96 Dec	99	No follow-up survey conducted in December for either outbreak. Live and old material continues to be found in weekly checks in **Glendene** on previously identified sites. Three sites return live material and one site with old. Total number of identified sites now total 21. There is one weekly check in **Mt Wellington** in late Nov/early December which finds old material on one previously identified site. Total number of identified sites now total 12.
By early January 30 male moths have been trapped on 19 properties. Ground spraying resumes in mid January followed by the first helicopter spray one week later in reduced 1.5 sq km area. Biosecurity measures lifted except for buffer zone around new reduced spray zone of 1000 properties in Kohimarama, and several streets in	97 Jan	00	Mid-January follow up surveys on both outbreaks identifies 4 new infested sites in **Glendene**. New outbreaks on previously identified sites confirmed on 1 site in **Glendene** and 2 in **Mt Wellington**. [13, 8] There is one weekly check in **Glendene** in

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Meadowbank and Mission Bay where lone moths were trapped. A virus severely reduces the female moth rearing population at FRI. Satisfactorily diagnosed and contained, but there will be a critical drop in production. A second colony is established in HortResearch Mt Albert, Auckland to reduce possibility of entire colony loss. Would also answer risks now being raised publicly about en route security in the transfer of live material from Rotorua for traps. [9] Trapping system halted in late January - 68 first generation male moths caught to date, with none caught in a one week light trap in the hot zone in mid January. Noted they were newly hatched. Intensive surveys throughout the month fail to find any other material. Environmental Impact Assessment and Health Risk Assessment of Mimic underway as an alternative (persistent) pesticide where Btk may not be effective. [5, 9]	97 Jan 00 Cont.	late January which finds live material on one previously identified site. There are no further checks in **Mt Wellington** that month.
Ground spraying increases to 300 odd properties at weekly intervals with full strength Btk. 4 aerial sprays in February. Discussions ongoing with alternative sprays. OSG strongly recommends that any decision to use Mimic be deferred until effectiveness of Btk known via pheromone monitoring. Opposing concerns being raised regarding the use of Mimic. [9, 13, 16] Increased public concern about health issues over prolonged spray regime. Resident's group formed and meet informally with OEG staff. MOH says there will be no review of the HRA. [13, 16]	97 Feb 00	There are no February follow-up surveys in either outbreak. The five weekly checks in **Glendene** identify 1 new site with live material, and old material on 3 previously identified sites. Two weekly checks in **Mt Wellington** identify live material on 2 new sites and one previously identified. Old material is found on 1 previously identified site.
Confirmation from feeding trials that the WSTM was more voracious than first thought with a widening diet. The OSG continues to emphasise that Btk has	97 Mar 00	Mid March follow up survey in **Mt Wellington** returns nil finds of any material. Mid March follow up survey in **Glendene** identifies 4 new infested sites. 2 containing

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not been shown to have failed, and a case cannot be made yet for the introduction of Mimic into the eradication strategy. John Clearwater reports that pheromone development is progressing in Canada. [9] The shortage of female moths means only 6 traps in use in the middle of the hot zone, but by end of March 300 traps now deployed. One healthy second generation male moth trapped on a previously known infested site. Ground searches fail to find any material. 4 aerial sprays in March. [9] Last meeting of the Science Panel in late March. [9, 14]	97 Mar Cont. 00	live material and 2 old. Old material is also discovered on 1 previously identified site. The three March weekly checks confirm 3 new sites with live outbreaks Total number of infested sites in **Glendene** now total 33.
An early end is called to all ground and aerial spraying which finally stops in mid-April. Total of 23 aerial sprays. Public concern increases with the possibility of resumption of aerial spraying in the spring. Two well attended public meetings take place, and residents form a society (STOP) to try and have health concerns taken seriously, and to halt any resumption of the spray programme in the spring. [16, 13] Report to MOF from Public Health - Health Risk Assessment of the use of MIMIC. Recommends its use only as targeted spraying with detailed records being kept of properties involved. [5] By April 17th (the anniversary of the discovery) 308 caged female traps are in the field. The operation is working 6 days a week. Six male moths trapped in Kohimarama in late April. (**These will prove to be the last sighting of the White Spotted Tussock Moth)**	97 April 00	Weekly checks in **Glendene** confirm 2 new sites with live outbreaks, together with 7 new live infestations on previously identified sites, and one with old material. There are no follow-up surveys in either outbreak. John Clearwater obtains independent overseas funding for pheromone development. Offers his team's expertise and requests research material. No reply received. [7]
Publication of the Review of the WSTM Eradication Programme. Review highly critical of the science input and the lack of consideration for sprays other than Btk. Review assumes that the eradication	97 May 00	2 new sites with live material were identified in **Glendene**/**Avondale** during the early May follow up survey. New live PAM life stages on previously identified sites were discovered on 3 properties during the survey and 4 in the

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programme has failed. Recommended immediate action to vigorously continue host preference trials and pursuit of a synthetic pheromone. A full survey for overwintering eggs was necessary to determine future actions. [14] Announcement of successful identification by John Clearwater's team of a WSTM synthetic pheromone. [13] Caged female trapping continues – no moths caught in May, and intensive ground surveys fail to find any other material. Apart from the male moths trapped, no WSTM material has been discovered since December 96.	97 May cont 00	following weekly checks. PAM has now been identified on 37 'properties' of the 1350 sites. It was noted that checks on known infested sites in **Kelston** are yet to be reported. Vegetation removal continues along an extensive riparian margin in **Glendene** John Clearwater approaches the Minister of Biosecurity for assistance with his attempts to obtain research material for his fully funded offer of Pheromone development. [7] Live material was found on one known infested site during the May follow up survey in **Mt**. **Wellington**, and 2 new sites with old material were discovered. The following weekly check revealed live stages on one previously identified site. Vegetation removal continues in the **Mt Wellington** Bertrand Reserve – one of the 16 known infested sites.
Minister of Biosecurity, Simon Upton reassures Resident's Group that they will be consulted before any necessary spraying is done. Survey teams continue intensive searches in the infested area for any egg masses or other material with nil results. Trapping concludes on June 17. No moths caught since I in March and 6 in April – total number trapped is 75.	97 June 00	Weekly checks in **Glendene** during June revealed one live male pupa on a known infested site, together with 6 sites with old material. It is now 7 weeks since live material has been detected in the **Kelston/Avondale** suburbs area of this outbreak. No live material has been collected in June from the 16 known infested **Mt Wellington** sites. MAF request further Government funding for the development of a pheromone trapping system. [13, 8]
MOF releases Discussion Paper for public submissions on possible strategic options for the spring of 97. The Paper accepted that although intensive ground searches had found no sign of any life	97 July 00	It is reported that HortResearch lab trials into the identification of a pheromone are progressing, with successful identification of two of the pheromone components. HortResearch confirm the attractiveness of these two components for male moths. [8]

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stages since December 96, it is probable there is a residual overwintering population. Based on that the Paper outlined seven options. These range from no action, through control measures only, to combinations of spray and trapping eradication strategies.[15] Ground searches of more than 300 properties to destroy egg masses returned nil results.	97 July cont 00	The Minister of Biosecurity replies end of July to John Clearwater's approach for assistance with pheromone research material. Is advised there is a limited supply of reared pupae, but if excess become available MAF will supply. [7] MAF carries out 'simplified' cost benefit analysis (CBA) using FRI's CBA for WSTM Conservative estimate that the potential impact of PAM cost was $47.6 million over next 20 years. The conservation estate impact was uncertain. [12] The **Mt Wellington** follow-up survey in early July found empty pupal cocoons at two new locations. Follow up surveys and weekly checks in July in **Glendene** revealed one new site with live material and two with old. Previously identified sites revealed live stages on 2 sites together with old material on 9. Dr Frampton says eradication methods not working near river due to weaker chemicals being used. Pheromone traps needed to delimit area because a drop in pest numbers makes it more difficult to spot them and less chance of spraying the right spot.
Concerns raised with Auckland Healthcare about reported clusters of miscarriages and premature births in the spray area. Confirmation of a new health assessment report being undertaken, and a working forum with residents input. [16, 13] Synthetic pheromone trials concluded in Japan prove that artificial attractant is six times more effective in attracting male moths than the female moths themselves. [13,] Joint public meeting of MOF/STOP in mid August considers 3 spring options for the eradication programme. An alternative option put forward by STOP was adopted by the meeting of no aerial spraying – but conditional ground spraying (no Mimic) and a significant	97 Aug 00	Report to The Minister of Biosecurity from Soc. Targeting Overuse of Pesticides (STOP) concerned about the failure of MAF 's eradication programme. The Report details concerns about spray choice, lack of pheromone progress and failure to involve Operation Ever Green expertise. Recommendations to review the award funding for pheromone research, establishment of PAM culture at FRI Rotorua, and the urgent setting up of an independent review. [1] The Government agrees further funding for a new 2 year eradication programme. MAF believes eradication of PAM will be completed by June 2001 at a cost of $1.473

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trapping programme. [13, 16]	97 Aug Cont 00	million, with monitoring for a further year to confirm eradication costing $281,000. No funds allocated for host feeding trials on indigenous plants in spite of recommendations from DoC and MoRST. [12] Two live pupa found in **Glendene** on an Acacia tree during vegetation removal in early August and the follow up survey in late August revealed 6 new sites with live PAM. Two were on sites previously identified in March and May 2000. Known infested sites now number 44. [8] No material found in **Mt Wellington** August.
Release of new Health Risk Assessment of possible options of second phase which concludes there was no risk from the Btk spray. Resident's group, STOP responds that 275 adverse health reports submitted by the Society have been ignored. [6, 16, 13] Announced that any decision on future spraying will be made by MOF in January 1998 after a mass trapping programme with the new synthetic pheromone. There will be no aerial spraying	97 Sept 00	Live material was found on 2 new sites adjacent to previously identified sites in **Glendene.**. Live material was found on three known sites including one old site in **Kelston.** This included one live pupa in a drum due to be moved off site under conditions of the Restricted Place Notice. Nothing was found in Avondale. [8] No material found in **Mt Wellington** in September. Moth rearing efforts stepped up with the establishment of a second colony at Hort Research in Lincoln, following reports of disease in the breeding colony. [12]
Cage work pheromone testing is transferred from the Tamaki campus into the spray zone.	97 Oct 00	One live pupa was found on a new site in **Mt Wellington** during October 2000. In **Glendene** during October weekly checks revealed live material on one new and one previously known site. The follow up survey also found live material on one new and one old site.
10,000 traps assembled at end of the month for trapping. MOF staff will begin placing and baiting the traps in the 1.5km infested zone. The fortnightly checking will be done by nine	97 Nov 00	No material found in **Mt Wellington** in November 2000. Old material was found at one known site in

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specially trained residents. [13]	97 Nov Cont 00	**Glendene** in November. A problem with two pathogens in the HortResearch rearing colony is reported to have been resolved. John Clearwater offers field cage to carry out a trapping system service, and requests pupae for pheromone development. MAF cannot supply as need to prioritise for live moth trapping and pheromone work already initiated. HortResearch fail to obtain field trial confirmation of the attractiveness of their two identified pheromone components. Pursuit and identification of further components is underway.[7, 8]
High Density trapping programme begins using synthetic pheromone. No moths caught in December.	97 Dec 00	The early December follow up survey in **Mt Wellington** found one new site with old material. Total number of infested sites now number 20. Apart from the single male moth caught the following week, there has been only one live find since early May 2000. [8] In the **Glendene/Kelston/Avondale** area, no live material found during the weekly check in early December on the known infested sites in– but one 4th instar larva was discovered on a new site in Kelston as a result of publicity in a newspaper article. **The first pheromone trapping system is deployed at the beginning of December. 153 traps baited with female moths are set up in both areas from 1-4th December and are all recovered by 9th December.** Of the 63 traps in **Mt Wellington** – only one damaged moth caught. The 90 traps in **Glendene & Avondale** catch 74 males in 35 traps. MAF notes that the population was highest in Glendene and the location of caught males suggests the population remained centred along the riparian margin. 10 traps are subsequently placed in the **Glendene & Avondale** riparian margin of Wairau Creek from 11-17 December. 3,9,8 &

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	97 Dec 00 cont	2 moths caught 12-15 December respectively. A further 7 males caught in the same 10 traps during 16-17 December. A further 10 traps placed on the riparian margin catch 16, 7, 6, and 0 moths between 19-22 December. A follow up survey during the trapping programme commences in **Glendene** on Dec 11. 6 new sites are identified along the riparian margin– five with live material. One new infested site is identified during the 18-24 weekly check. As of the end of December 2000 – (20 months since the initial outbreak), the total number of infested sites in **Glendene/ Kelston/ Avondale** numbers 56. Publication of a Review of the Management of Biosecurity Risks to the Environment by the Parliamentary Commissioner for the Environment. Case study of the PAM which illustrated a number of concerns including failing to consult with expert and experienced people involved in the WSTM campaign, lack of communication with and involvement of stakeholders, insecticide choice, spraying procedures and timing of pheromone development. [12] It was noted that MAF intend to commission an independent Review of the programme in 2001. [12]
No moths caught in January.	98 Jan 01	A further 20 traps are placed on January 8th in **Glendene** and **Avondale** along the riparian margins of Wairau Creek and the Whau river. 47 males caught in 5 traps in **Avondale** and 102 from 15 traps in **Glendene**. From 9-12 January total traps yield 64, 38, 34, and 13 moths.

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	98 Jan 01 cont.	MAF confirm results suggest the emergence of a new generation, and that the attractiveness of the caged female steadily declines – with the first 3 days being the most effective. 20 traps are placed in same location in **Avondale** and **Glendene** from 15 –19 January. Catches number 19, 10, 7, 6 and 7 moths. MAF notes that rain on 15th & 16th and moth phenology probably account for lower catches. By the 26th January the traps yield another 18, 8, 9, 11 and 4 respectively. 90 Traps are placed Jan 25 to Feb 1 on same sites as December in **Avondale** and **Glendene**, plus 10 new sites on the margin of the surveyed area.No live material was found in the January weekly checks. **Mt Wellington** remains clear of all material throughout January, and no moths are caught in the 63 traps deployed in late January at the same sites as in December. **A new outbreak is confirmed by MAF with the discovery of a late instar PAM larva found in mid January by a resident in Titirangi - 5 kilometres from Kelston.** No direct connection has been found to the original infestation and searches of the immediate area return nil finds. [8] **25 traps are deployed in late January. 3 moths are caught in 2 traps between January 30 and February 2nd.** A new component blend of pheromone material has been developed by HortResearch but laboratory confirmation of its attractiveness has not been obtained due to artificial diet problems in both HortResearch colonies resulting in poor quality male moths and infertility. Synthetic lures, and female moth gland extract will be field tested shortly in **Glendene** alongside female traps. [8]

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Operation Ever Green will be successfully wound up in June 1998 as the 6500 artificial pheromone baited traps are checked and collected for the last time. No moths have been trapped since April 97 one year after the outbreak was discovered. **A reduced trapping programme of between 300 – 400 pheromone baited traps will be placed in the Greater Auckland area in the summer.** **All vegetation restrictions are lifted and the vegetation collection site closed.** **After public pressure a long-term health register commences of everyone living within the spray zone.** [13, 16]	98 Feb 01	Results of the traps deployed at the end of January and beginning of Feb in **Glendene** and **Avondale** reveals 23 moths caught to the 2nd - 23 on the 5th and 10 moths between the 6th and the 9th. No further moths are trapped in **Titirangi** between 5th and the 9th. The total number of male moths caught in the **Glendene** outbreak area to date is now 374 – with additionally - one damaged male in **Mt Wellington** and the 3 in **Titirangi**. Weekly checks between the 5th and 9th find larvae on one previously known infested site in **Kelston. Mt Wellington** is still clear.

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