

NZ FOREST RESEARCH INSTITUTE LTD
WORK PLAN/CONTRACT COVER SHEET

WORK PLAN Pingao: Sustained Yield Harvesting

CONFIDENTIALITY*

(N, C, or S)

N

CONTRACT Yes Department of Conservation

WORK PLAN/CONTRACT NO.
DOC P 1103

DIVISION: Forest Technology

RESOURCE CENTRE: Indigenous Forest Management

EXPT. NO.:

CODE:

91 | 92 / 95 | 96

Financial Year
No.

1 | 4 | 1

Resource Centre

TITLE:

Pingao: Sustained Yield Harvesting

KEYWORDS (5):

pingao, traditional-use fibre, sustainable harvesting,
dunelands, Whanganui

OBJECTIVES:

refer attached work plan

CONTRACTS ONLY:

CLIENT: Department of Conservation

CLIENT CONTACT PERSON: Dr R. M. Sadlier; Dr P. G. Simpson

CATEGORY: -

Written Quote

Memorandum of Agreement

Other (specify)

VALUE:\$ (excl. GST)

Total Value

Value to FRI

REVIEW DATE:

PROPOSED DURATION:

Commence: 1 / 7 / 1991 Completion: 30 / 6 / 1996

NZ FRI STAFF INVOLVED:

Project Leader: Dr J. W. Herbert

Collaborator: D. O. Bergin

* N = Non-confidential.
C = Confidential.

RESEARCH INVESTIGATION FORM

DEPARTMENT OF CONSERVATION

CONSERVATION
TE PAPA ATAWHAI

DoC Use ONLY

(WP Ref: RECFORM2.FRM) OC/KO/Budget Code
DoC Investigation No.
SPEC GROUP No:

Requirements		DoC Contact	
Permits	Yes/No		Survey/Research
Animal Ethics Act	Yes/No		Conservancy/National
Management Plan	Yes/No		Immediate/Anticipated
Other	Yes/No		

POLICY DIVISION CONTACT OFFICER(S):

(S&R use)
**PLEASE COMPLETE ALL SECTIONS BELOW
AND SUBMIT TO:**
Contracts Coordinator,
Science and Research Division, DoC,
PO Box 10-420, WELLINGTON
(Street Address: 58 Tory St)
Fax Number (04) 4713 279

CAS/OTHER DoC STAFF CONSULTED:

NAME(S): H. Keys, W. Shaw, T. Stephens,
C. Ogle, G. Walls, P. Simpson
E. Manuera

SIGNATURE(s): Attached: W.B. Shaw signed

CAS: on behalf of all CAS's.

OTHER:

1. **TITLE:** (expressed in a descriptive & explicit manner: maximum of 60 characters)

Sustained yield harvesting of pingao.

2. **INVESTIGATION LEADER/SUPERVISOR:** (person responsible)

John Herbert/David Bergin

3. **CO-WORKERS/STUDENTS** (If applicable):

4. INSTITUTION/CONTRACTOR

Name: Forest Research Institute

Phone No: (073) 475-899

Postal Address: Private Bag 3020, Rotorua

Fax No: (073) 462-270

Agency Project Code (Optional):

MoRST Output Code (if known): 25.29

5. **JUSTIFICATION** (Why does DoC need this work?)

The requirements of Maori people for pingao for traditional weaving purposes (tukutuku, kete, potae) is far in excess of the sustainable yield. Most local stands, and even the major traditional sources of pingao fibre, at places such as Himatangi, Raunai-Kotiata (Paneke

5. continued

Community Development and Training Trust 1990) the Northland Coast (pers. obs.) and other areas (Walls, 1990) are in decline. This coincides with a resurgence of interest in traditional weaving skills. Being a fibre for which there is no substitute it is vital that existing populations are maintained or extended for new generations of weavers. The causes of the decline are many but for many populations there is no doubt that inappropriate harvesting methods are contributing to the decline. In the past the harvesting of pingao was governed by Tikanga Maori but now much harvesting is indiscriminate (Paneke Trust, 1990; pers. obs.) and even exploitive. Even amongst weavers of pingao there is wide variation in the preferred ways of harvesting and commonly used methods are apparently damaging to the plants. Certainly, the effects that different harvesting methods have on plants, and the quantity of useful fibre produced have not been tested and documented. The work proposed is a logical extension to an almost completed and successful project examining management scale methods for establishing populations of pingao.

The proposal directly addresses DOC Key output 6.2: Management of non-tourism as recreation leases, licenses and concessions (b) Harvested materials, Taonga; 6.2b Issues, Research goals and Research topics.

Key references:

Denny, Jill 1991: Development, for environmental protection and enhancement, of the south Piha beach Waitakere City Council: Application for Resource Consent.

Herbert, A. and Oliphant J. (compilers) 1991. Pingao: The Golden Sand Sedge. Nga Puna Waihanga.

Herbert, J. and Bergin, D. 1991: Experimental rehabilitation of dunelands with pingao. Forest Research Institute Contract Reports FWE 91/23 (DOC Investigation No. S4070/557.

Paneke Community Development and Training Trust Inc., 1990. Pingao and kakaho on the Manawatu/Rangitikei coast.

Walls, G. 1990. Pingao. Cultivation, provenance and planting trials. Botany Division, DSIR, Havelock North. Internal Report.

6. OBJECTIVES (What will the investigation achieve? Specific targets to be met and date of completion of each).

1. To test the effects of at least two contemporary methods of harvesting on established pingao plants. (June 1994)
2. To quantify the amount of useable fibre obtained from the different harvesting methods. (June 1994)
3. To test whether the season of harvesting affects the plants response, and fibre quality. (June 1995)
4. To make recommendations on harvesting methods for pingao most appropriate to sustaining the resource. (June 1995)

7. DESCRIPTION OF METHOD (How will the data be collected/analysed?)

Siting of the trial, and the number of plants tested will depend on establishing a working relationship with Kaitiaki. Possible trial sites include Waikato Heads and Manawatu coast.

1. At least 25 shoots will be harvested (in summer 1993) and the results evaluated for each of 3 treatments.

7. continued

2. In treatment A. the whole of the terminal growing shoot will be removed by cutting. This is the most common contemporary method of harvesting.
3. In treatment B. leaves will be clipped from the terminal growing shoot but the growing point and a sheath of protecting leaves will be left intact.
4. In treatment C. the wrenching method will be attempted but if as in our past experience, it proves impossible to cleanly separate the leaves from the stem this treatment will not be persisted with.
5. The response and condition of the growing shoots will be assessed in spring and autumn.
6. The quantity of useable fibre produced by each method will be evaluated with the assistance of a weaver.
7. By July 1994 the "harvesting method" part of the trial will be complete and a "season of harvesting" trial will be initiated. It is anticipated that harvesting will be undertaken in summer, autumn, winter and spring and plant response evaluated over 6 to 12 months. 25 plants will be harvested in each season, on one site, using the most appropriate harvesting method.

8. **OUTPUTS** (What will DoC receive e.g. Maps, reports, advice, handbooks, guidelines? Give date of completion for each output).

1. Final report on effects of "harvesting method" by 30 June 1994.
2. Final report on effects of "season of harvest" by June 1996.
3. Ongoing advice on request for DOC managers and staff.
4. Article(s) in appropriate IWI newspapers by June 1995.
5. Dissemination of information through Nga Puna Waihanganga and other appropriate contacts with users (throughout).

9. **TIMING:** Proposed date for:

START 1/1/93

REVIEW 1/4/94

FINISH 1/6/96

10. **STUDY LOCATION:** Give place(s) and DoC conservancies (e.g. Canterbury, Southland) where field work will be done.

Possible sites include Waikato Heads (Waikato Conservancy), Whanganui or Manawatu coasts (Whanganui Conservancy)

METHOD

[for shoot types refer Fig. 1 on field recording proforma]

Weaving material will be harvested in three different ways. The techniques and details of harvesting follow:

- (a) Cutting. This is the common contemporary method. Whole leaf clusters (shoots) containing some weavable material are severed below the leaf mass with a cutting tool. A large quantity of unusable material (too small, discoloured, too old, or too brittle) is collected which has then to be discarded. Two cutting treatments are tested: end terminal shoots [Type 3] and side shoots [Type 1, 2] refer Fig. 1 on plot sheet.
- (b) Wrenching. This is probably the traditional harvesting method. The base of the leaf cluster is held in one hand whilst the central part of the shoot containing the weaving material is bent sharply through 90°. This 'cracks' the immature rhizome to which the leaf bases are attached. The 'broken off' portion of the shoot containing weaving material and juvenile leaves is pulled away from the 'mature' portion of the rhizome leaving old leaves and sometimes juvenile shoots attached to the end of the severed rhizome. This technique requires considerable practice; in particular the weaving quality material needs to be pre-selected and the 'break' point calculated in order that the leaf bases (up to 75 mm or more long) of weavable material do not remain attached to the residual rhizome. A considerable quantity of unusable juvenile leaf material is collected but old leaves and sometimes juvenile shoots remain attached to the residual rhizome. This treatment will be applied to side shoots (Types 1 and 2) only.
- (c) Clipping. This method is used only occasionally. The best quality weaving leaves are individually selected and clipped from the shoot. There is no waste material, the growing point remains intact and juvenile shoots are undamaged. Leaves will be of potential weaving quality if they have at least 200 mm of leaf length greater than 4 mm width. This treatment will be applied to side shoots (Types 1 and 2) only.

Note: Only one treatment, the commonly used cutting method will be applied to 'Type 3' terminal shoots. Because of the high proportion of curved leaves encountered in terminal shoots, most leaves are rejected as unsuitable for weaving. However, it is important to both quantify the quality of leaf material for weaving and to demonstrate shoot response to at least the most commonly used harvesting method.

2
SAMPLING

1. Twenty-five leaf clusters (shoots) will be sampled for each treatment.
2. Side shoots (Types 1 and 2, Fig. 1 field recording proforma) will be treated as follows:

Number	Treatment
25 25 25 25	Control Cutting Clipping Wrenching

3. Terminal/end clusters (shoots) (Type 3, Fig. 1 field recording proforma) will be treated as follows:

Number	Treatment
25 25	Control Cutting

4. 150 leaf clusters (shoots) of good size and vigour will be selected for treatment. No more than 20% of the leaf cluster on any single plant or 'patch' will be treated. Each selected leaf cluster will be pegged (labelled 50 x 25 peg) and the rhizome secured to the peg with plastic tape.
5. Side shoots will be selected in 25 groups of 4 (= 25 'blocks') and terminal shoots in 25 groups of 2 (= 25 'blocks'). Selected shoots may not be contiguous.
6. For each of the 25 blocks of side shoots one treatment – control, clipping, cutting or wrenching – will be allocated randomly to each shoot/leaf cluster.
7. For each of the 25 blocks of terminal shoots treatments – control, cutting – will be allocated randomly.

Because the site is uniform sub sampling to accommodate site variation is not required.

MEASUREMENTS

Field Material

Past experience and experimental work indicates the most useful measure of treatment response for pingao is the production of new or juvenile side shoots.

Treatment response will therefore be based on the growth response (elongation) of existing juvenile shoots and/or the formation of new shoots.

The response of the treated leaf cluster will be assessed in spring/summer and autumn following treatment. This is possible only for treatments control, clipping, wrenching (because cutting actually removes the whole leaf cluster).

The response of the nearest leaf cluster to the treatment cluster (back along the rhizome toward the plant origin) will be assessed in the same way. This is appropriate for all treatments.

Shoot formation along the rhizome between the treatment and nearest neighbour clusters will also be monitored. This is appropriate for all treatments.

Detail provided on the field recording proforma makes clear the measurements required and the measurement parameters

Harvested material

All harvested material will be labelled and returned to FRI, Rotorua for sorting and measuring. A skilled weaver will be employed to categorise harvested material into weavable and reject fibre.

For weaving material total leaf length and useable length (to minimum 4 mm width) will be recorded. Reject fibre will be categorised as too coarse, defective colour, too small, curved and other (includes browsed, split, insect damaged). Total leaf length for all categories will be recorded. The number of juvenile shoots is recorded for each leaf cluster. Refer to IFM Pingao Harvesting – leaf assessment proforma for detail.

Following measurement, weaving quality material will be returned to Whanganui iwi via Mr Henry Bennett.

Trial, locality, work plan No.

leaf assessment

PINGAO HARVESTING

Collection Date

- Notes.
1. Useable weaving length to 4mm width
 2. length in cm
 3. Other includes browsing, splitting, insect....

lot Plant No.	TREATMENT CODES	leaf No.	WEAVING		REJECT				Curved (length)	Juvenile shoots
			Total length	Useable length	Coarse (length)	Colour (length)	Small (length)	Other (length)		
		1								
		2								
		3								
		4								
		5								
		6								
		7								
		8								
		9								
		10								
		11								
		12								
		13								
		14								
		15								
		16								
		17								
		18								
		19								
		20								
		21								
		22								
		23								
		24								
		25								

Plot No.

- 1 = Sentoft
- 2 = Tangimoana
- 3 = Himatangi

Plant No.

= no. of plant in sample

Treatment

- 4 = Wrenched
- 5 = Cut

FINANCE DETAILS

NOTES:

- (a) Full costs should be shown. Other funding sources than DOC should be shown if known or planned.
 (b) Do NOT include GST.
 (c) The DOC financial year runs from 1 July to 30 June.
 (d) DOC reserves the right to recover equipment purchased using DOC funds on completion of the investigation.
 (e) Identify any revenue which may/would become payable to DOC from your investigation activities.
 (f) DOC does not commonly fund investigations longer than 3 years.

	Financial Year 1992-93	Financial Year 1993-94	Financial Year 1994-1995	Financial Year 1995-96	Financial Year 1996-97
Scientific Staff input (person/hours) (S&R only)					
Scientific Staff Salary/wages	7,600				
Travel	1,200				
Equipment	300				
Overheads	5,600				
Other	200				
TOTAL COST TO DOC (excluding GST)	14,900	13,000	13,000	14,000	
Other Funding Sources (list)					
GRAND TOTAL FOR INVESTIGATION (excluding GST)					
REVENUE payable to DoC					

- i. Are other funding sources provisionally or definitely available? (give details)
 nil
- ii. What other agencies or DoC divisions/conservancies have been approached for funding or logistic support? (give details):
 none
- iii. Explain any revenue potential:
 nil

RESEARCH INVESTIGATION FORM

DEPARTMENT OF CONSERVATION

CONSERVATION
TE PAPA ATAWHAI

DoC Use ONLY

(WP Ref: RECFORM2.FRM)

OC/KO/Budget Code
DoC Investigation No.
SPEC GROUP No:

Requirements	Yes/No	DoC Contact	
Permits	Yes/No		Survey/Research
Animal Ethics Act	Yes/No		Conservancy/National
Management Plan	Yes/No		Immediate/Anticipated
Other	Yes/No		

POLICY DIVISION CONTACT OFFICER(S):

(S&R use)

PLEASE COMPLETE ALL SECTIONS BELOW
AND SUBMIT TO:Contracts Coordinator,
Science and Research Division, DoC,
PO Box 10-420, WELLINGTON
(Street Address: 58 Tory St)
Fax Number (04) 4713 279

CAS/OTHER DoC STAFF CONSULTED:

NAME(S): H. Keys, W. Shaw, T. Stephens,
C. Ogle, G. Walls

SIGNATURE(S):

CAS

OTHER



1. TITLE: (expressed in a descriptive & explicit manner: maximum of 60 characters)

Sustained yield harvesting of pingao.

2. INVESTIGATION LEADER/SUPERVISOR: (person responsible)

John Herbert/David Bergin

3. CO-WORKERS/STUDENTS (if applicable):

4. INSTITUTION/CONTRACTOR

Name: Forest Research Institute

Phone No: (073) 473-899

Postal Address: Private Bag 3020, Rotorua

Fax No: (073) 462-270

Agency Project Code (Optional):

MoRST Output Code (if known): 25, 29

5. JUSTIFICATION (Why does DoC need this work?)

The requirements of Maori people for pingao for traditional weaving purposes (tukutuku, kete, potae) is far in excess of the sustainable yield. Most local stands, and even the major traditional sources of pingao fibre, at places such as Hikmatangi, Raumai-Kodara (Pareke

25 February 1992

Teno Koe Honi

PINGAO - SUSTAINABLE HARVESTING METHODS

Thanks for sending the pingao proposal down and seeking my comments. I can assure you of interest in the subject, but not necessarily adequate expertise. I have provided Eru Manuera with a copy (Kaupapa Atawhai, Policy) and I have talked with some colleagues.

I support the proposal and agree with your justification. I have myself seen inappropriate harvesting, engendered sometimes I think by the naked joy of seeing the plant. The requirements will obviously increase in future and it surprises me really that adequate knowledge is still lacking.

1. This leads to my first comment. I do not think that the anatomy and morphology is adequately understood. I may be wrong but I know of no study of root anatomy, stem and leaf anatomy and various morphological features of development, branching and reproduction. Perhaps I'm biased but I think adequate ecological and horticultural understanding rests of knowing the plant itself. You may disagree and know of other relevant studies, but if not, I would welcome your thoughts about such a study (that I could even do myself!) The point is that your objective to understand plant response to different harvesting methods should, I think, benefit from fundamental knowledge that is lacking, but would be available if undertaken in 1992-3.
2. Do you mean harvesting 25 whole plants, or just shoots. If whole plants then 25 per season (= 100 plants) is a lot, perhaps too many from natural stands.
3. There is some concern that this study deals with natural stands as opposed to restored populations. As you note, the propagation experiments are now nearing completion. One could argue that sustainable harvest should be from cultivations, not primeval stands. I do hope that the information generated does not lead to unreasonable focus on natural stands or reduced interest in establishing cultivated plants. Perhaps I misunderstand, and if so, perhaps you could make the matter clearer in the proposal.
4. Naturally the information will be immediately implemented by the users, rather than by DOC (the 'owners' of the information in terms of funding the contract). This may mean that the Kaupapa Atawhai managers have a special role to play, and an output in that direction may be appropriate.

Shannel
Complains
little known.

5. Costs - the total cost has raised eye-brows. I don't know what can be done about it, but I think careful appraisal is needed.

I hope these thought help. Again, all I have spoken to support the project, with some cautionary provisions.

I'll be in Rotorua on March 10 to 12 (Cabbage tree and riparian meetings, respectively), so see you then. Perhaps I could come and stay! See you soon.

Piripi

24 February 1992

Philip Simpson
Tory Street
Fax: 471-3279

Sustained Yield Harvesting of Pingao.

Tena koe Philip,

This proposal could be tricky if (as it states) a working relationship with kaitiaki is not established. Seeing that this submission is closely linked to work they are currently doing, presumably this working relationship is already in place. There are two points I would like to make:

- * First, there could be a feeling that the information gained or gleaned from tangata whenua will be appropriated and taken away from their possession;
- * Second, there may be an inadvertent slight to some person (or whanau or hapu or iwi) if a method of harvesting pingao (which has been practiced from time immemorial) is identified as contributing to the decline in stock.

The proposers would strengthen their case (in my eyes at least) with assurances that they are cognisant of Maori protocol and that the working relationship they seek to establish will be consistent with those dynamics.

Objective 1 speaks about contemporary methods of harvesting which I take to mean current methods. I recommend retention of the word contemporary for it removes the likelihood of misunderstanding as my second point infers. Otherwise it looks OK to me, although the funding requested may have to be revisited. Is John familiar with our Kaupapa Atawhai network?

Kia ora

Eru Manuera
Eru Manuera

PINGAO RESEARCH INVESTIGATION PROPOSAL

Comments were sought from Dr Phillip Simpson who replied and sought further comment from Eru Manuera. Their comments are appended.

The comments made by Eru Manuera are important and relevant. We have discussed the matters raised by Eru and they have, I think, been resolved to our mutual satisfaction.

With respect to the points raised by Dr Simpson, brief response is as follows:

1. I agree entirely that morphological studies will assist in explaining the behaviour of pingao after harvesting. It is a study worth carrying out and I support Dr Simpson's interest. There is a possibility that such a study could lead to a harvesting method not already in use. However, the critical issue being addressed in this project is totally pragmatic; harvesting is an ongoing and widespread activity and my aim is to identify the least damaging contemporary method and promote it irrespective of the morphological and anatomical explanations.
2. 25 shoots - this is made clear in the methodology.
3. The main issue here could be debated at length (i.e. the question of sustainable harvest from natural - but doubtfully primeval - populations). The intention is not to encourage increased exploitation of natural stands but to identify a method where, if harvesting is to be carried out, the adverse impacts on the population are minimised. Artificial plantations would be useful for this kind of work. However, I know of no restored populations in the North Island of a size or maturity suitable for this project. Further, all current harvesting continues to be in natural populations and we believe it appropriate to target such populations at this stage of our work. The possibility of using an artificial population for the "season of harvesting" part of the study is a real one and will be kept in mind.

The number of shoots - 25 per treatment - is the minimum required for statistical purposes and is a tiny proportion of the quantities routinely harvested by users. In using such small numbers, with no replications, there is a risk that a single winter storm could destroy a seasons experimentation. However, it's a risk that must be taken in order to minimise the harvest size.

4. Adequately covered in Output 5.
5. Standard costs for FRI experimental work. There is more travel and considerably more consultation (with Kaitiaki - and user groups) in this project than in most others.

Law 14
3. 8. 92.

Pungao Sustained Yield

