A Second Look at Proto-Land Dayak Vowels

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A persistent issue in the comparative study of Land Dayak (Malayo-Polynesian; Western Indonesian; Greater North Borneo) languages is the reconstruction of the Proto-Land Dayak vowel system. Past studies have reconstructed a distinction between "full" and "reduced" vowels in Proto-Land Dayak penultimate syllables. Although full and reduced vowels may be legitimate in certain cases, the evidence for many of the reconstructions is inconsistent with Land Dayak historical phonology, and the issue is in need of a second look. Using the comparative method to identify borrowed vocabulary, the present study proposes an alternative Proto-Land Dayak vowel system, which largely eliminates the full-reduced distinction from the proto-language except in a handful of cases and explains that modern full and reduced vowels are mostly the result of chronologically more recent borrowing (after the breakup of Proto-Land Dayak).

1. INTRODUCTION.[1] Land Dayak is a linguistically diverse yet geographically compact Austronesian subgroup whose member languages are spoken in the border areas of south-western Sarawak, Malaysia and West Kalimantan, Indonesia. Land Dayak languages are traditionally divided into three major groups; Benyadu-Bekati', spoken in northwestern West Kalimantan and southwestern Sarawak, Bidayuh, spoken almost entirely in Sarawak, and Southern Land Dayak, spoken in central West Kalimantan (see Adelaar 1995, Buck 1933, Chong 2008, Reijffert 1956, Rensch et al. 2012, Roth 1896, Smith 2017, Topping 1970). The languages are known for greater-than-average irregularities in reflexes of PMP etyma, for apparently sharing a few words in common with Aslian (Austroasiatic) languages of the Malay Peninsula

(Adelaar 1995), pre-ploded word final nasals (-*pm*, -*tn*, and -*kŋ*, see Adelaar 1995; Blust 1997b; Phillips 2005), and an apparently reconstructable distinction between "full" and "reduced" vowels in the penultimate syllable (Rensch et al. 2012). This paper addresses the latter issue; the reconstruction of full and reduced penultimate vowels to Proto-Land Dayak, as reconstructed in Rensch et al. (2012). According to the Rensch's original proposal, shown below in Table 1, all penultimate vowels displayed a full/reduced distinction.

TABLE 1. PROTO-LAND DAYAK VOWELS ACCORDING TO RENSCH et al. (2012)

	front	central	back
close	*i, *ī		*u, *ū
mid		*ə, *ə̄	
open		*a, *ā	

Table 2 below gives several examples of both full-vowel and reduced vowel reflexes in modern languages, focusing on apparent reflexes of *a and *ā in Benyadu, Singai, Hliboi, Biatah, Bukar, Ribun, and Golik. There are two distinct sets of reflexes in the table. The first set (*tāru, *bātu, *pāgi/māji) reflects PMP *a in the penultimate syllable as *a* in all of the daughter languages shown. The second set (*ănak, *măta, *dăyaʔ) reflects *a as "reduced" vowels, either *a* (Benyadu), *ə* (Singai), *i* (Hliboi), or as some other variant (*ă, o, ɤ*). Rensch et al. (2012) reconstructed a full and reduced series to Proto-Land Dayak based on evidence like that presented in Table 2.

TABLE 2. CONTRASTS IN FULL AND REDUCED VOWELS FROM RENSCH et al. 2012

PLD	Benyadu	Singai	Hliboi	Biatah	Bukar	Ribun	Golik
*tāru 'three'	taru	taruh	taluh	tāruh	tāruh	tahuh	taruh
*bātu 'stone'	batuʔ	batuh	batuh	bātuh	bātuh	botuh	batuh
*pāgi/māji 'morning'	-	pagi	pagi	-	pāgi	maji	magi
*ănak 'child'	anak	ənak	inak	anak	ănak	onoʔ	onak
*măta 'eye'	matuʔ	bətən	bitotn	bătəh	bătəh	motuh	bɤtəh
*dăyaʔ 'blood'	dayaʔ	dəyaʔ	iaʔ	dăyaʔ	dăyaʔ	doyo	doyaʔ

From a historical point of view, the existence of a full/reduced vowel distinction in the penultimate syllable is unexpected for two reasons: 1) the modern Land Dayak languages are stress-final, a pattern which is likely reconstructable to the proto-language. It is typologically unexpected for unstressed vowels to have a greater number of distinctions than stressed vowels. 2) Rensch et al. (2012) reconstructs a full/reduced distinction even for schwa, a vowel that is typically described in comparative works as being extra short, unable to bear stress, less than one mora, or even as a mora-less vowel

(Blust, 2013; Smith, 2018). Furthermore, there is little discussion in the original publication about the precise methods used to reconstruct full-vowels. On these grounds alone, the validity of the original hypothesis should be reassessed. Adelaar (2009) provides a more thorough review of the work as a whole, and has pointed out many of the same shortcommings. He also points out that the publication was written with a strong Sarwakian Land Dayak bias and ignored much of the existing literature on the Land Dayak of Kalimantan and Austronesian comparative lingusitics in general. This paper aims to address these issues, and analyses the validity of a full/reduced distinction in PLD. It is argued that while the reduced vowels in Proto-Land Dayak are the regular reflexes of PMP vowels, full vowels are the source of either 1) borrowing, 2) conditioned reflexes of native vocabulary, or 3) word of unknown origin. By far, it is shown that most of the previously reconstructed full-vowel vocabulary belongs to category 1), borrowed vocabulary which subsequently cannot be reconstructed to PLD. These findings reduce the number of full-vowel reconstructions and limit the full/reduced distinction in PLD to only the low vowel; there were no full high or mid vowels (*ī, *ū, and *ə̄).
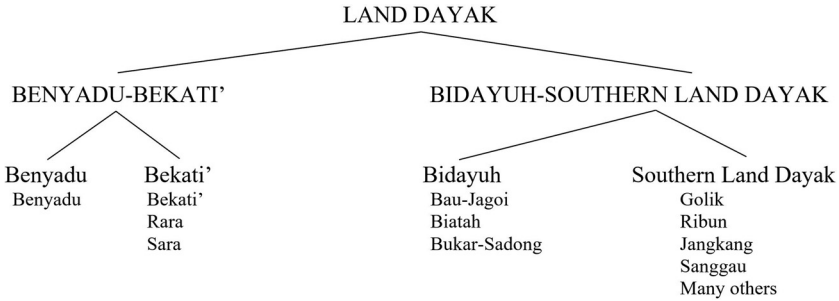
The structure of the paper is as follows: section 2 presents the subgrouping assumptions informing the reconstructions in this paper, and provides an overview of relevant sound changes. Section 3 discusses the original proposal from Rensch et al. (2012) on the full/reduced vowel distinction and offers evidence against most of the proposed full-vowel reconstructions. Section 4 analyzes the remaining full-vowel vocabulary, and describes the processes through which full vowels appeared in a handful of native vocabulary items. A list of reconstructable full-vowel vocabulary is also presented at the end of this section. Finally, section 5 discusses the phonetic quality of Proto-Land Dayak vowels, and offers a hypothesis on the reconstructed vowel quality in both penultimate and word-final syllables.

In the remainder of this paper, reconstructed reduced vowels will be written without a breve diacritic, reflecting the view that reduced vowels are the native, regular reflexes of PMP penultimate vowels and do not need special diacritics, while full vowels will be represented with a longum, *ā, *ī, *ū, and *ə̄.

2. LAND DAYAK INTERNAL SUBGROUPING AND SOUND CHANGE.
Following Smith (2017, 2018a) and Sommerlot (2018), this paper assumes a primary split from Proto-Land Dayak to Benyadu-Bekati' and Bidayuh-Southern Land Dayak.[2] This division plays a crucial role in the reconstruction of Proto-Land Dayak and relative chronology of borrowed

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2. Benyadu-Bekati' includes Benyadu, Rara, Sara, Bakati', and (perhaps) Mali and Be' Aye'. Bidayuh-Southern Land Dayak is split into Bidayuh and Southern Land Dayak. Bidayuh includes three additional internal subgroups, **Bau-Jagoi**: comprising the languages Singai, Gumbang, Bratak, Grogo, Seratong, Serambu, Hliboi, **Biatah**: including Sembaan, Bistaang, Sungkung, Biatah, Anah Rais, Tringgus Raya, Bengoh, Sapug, Tringgus Bireng, and **Bukar-Sadong:** including Bukar, Sadong, Bibengih, Bunan, and Sangking. Southern Land Dayak includes Golik, Kembayan, Jangkang, Ribun, and Sanggau, among others.

FIGURE 1. LAND DAYAK SUBGROUPS

LAND DAYAK

BENYADU-BEKATI'   BIDAYUH-SOUTHERN LAND DAYAK

Benyadu	Bekati'	Bidayuh	Southern Land Dayak
Benyadu	Bekati'	Bau-Jagoi	Golik
	Rara	Biatah	Ribun
	Sara	Bukar-Sadong	Jangkang
			Sanggau
			Many others

vocabulary. Figure 1 ~~below~~ shows the current higher-order internal subgrouping of Land Dayak, adopted from Smith (2017) who justified the subgrouping with both phonological and lexical evidence.

2.1 SOUND CHANGES THAT DEFINE LAND DAYAK. This study does not seek to test the validity of Land Dayak as a subgroup, but to rather discuss the reconstruction of the vowels of Proto-Land Dayak. However, a brief discussion of the evidence for Land Dayak is presented here before moving on to the main argument. Tables 3 and 4 show sound correspondences between both PMP and PLD and between PLD and Proto-Benyadu-Bekati' (PB-B) and Proto-Bidayuh-Southern Land Dayak (PB-SLD), with discussion of the relevant sound changes afterward.

TABLE 3. PMP AND PLD SOUND CORRESPONDENCES

PMP	*p	*t	*c	*k	*q	*b	*d	*j	*z	*g	*m	*n	*ñ	*ŋ	*s
PLD	*p	*t	*s	*k	*ʔ	*b	*d	*d	*j	*g	*m	*n	*ñ	*ŋ	*s

PMP	*h	*l		*R	*r	*w	*y	*a	*i	*u	*ə	*aw	*ay	*uy	*iw
PLD	Ø	*r/-Ø	*Ø-/-h-/-y-	-		*w	*y	*a	*i	*u	*ə	*aw	*ay	*uy	-

TABLE 4. PLD, PB-B, and PB-SLD SOUND CORRESPONDENCES IN RELEVANT PHONEMES

PLD	*ʔ	*b	*d	*j [dʒ]	*g	*h	*r	*R
PB-B	*ʔ	*b/-p	*d/-t	*j	*g/-k	Ø	*r	*h/*y
PB-SLD	*ʔ	*b	*d	*j	*g	Ø	*r	*h/*y
PLD	*y	*a	*i	*u	*ə	*aw	*ay	*uy
PB-B	*y	*a/-uʔ	*i/-iʔ	*u/-uʔ	*a/u	*o	*e	*i
PB-SLD	*y	*ə/-əh	*i/-ih	*u/-uh	*ə	*u	*i	*uy

As noted by Smith (2017), "the most prominent sound change with subgrouping value in Land Dayak" is the shift of *R ([r]) to *h/*y and *l to *r in medial position. Evidence for *R > *h includes reflexes of *uRat 'vein',

which became Benyadu *uhat*, Bekati' *uhat*, Seratong *aat*, Sembaan *hat*, Biatah *uat*, Bistaang *uat*, Bukar *uhat*, Jangkang *uat*, Ribun *uaʔ*. In a few cases *R became *y where it appeared between two low vowels (*aRa). Evidence includes the change PMP *daRaq > PLD *dayaʔ 'blood', evidenced by Benyadu and Bekati' *dayaʔ*, Singai *dəyaʔ*, Biatah and Bukar *dăyaʔ*, Golik *doyaʔ*, and Kembayan *doyoʔ*. PMP *paRa also became PLD *payə 'drying rack above the fireplace'. An apparently native reflex of PMP *baRa in Bekati' *buhu* 'ember', however, indicates that the change to *y was not regular.

The latter sound change, *l > *r, is supported with evidence from nearly all Land Dayak languages. PMP *l shifted to *r in both initial and medial positions, but *l was deleted in word-final position, as evidenced by reflexes of PMP *kapal 'thick' in Benyadu and Bekati' *kapa*, Tringgus Bireng, Bukar, and Bibengih *kăpa*, and Kembayan *kopa*.

The reconstructability of *l > *r has issues, however. In both Hliboi and Sungkung (Bidayuh languages) PMP *l is reflected as *l* in medial position, which may be used to argue that the change *l > *r is parallel in all other Land Dayak languages. However, given the lack of clear directionality in changes between /r/ and /l/, this does not rule out the possibility that the change *l > *r was "undone" in these two languages. Polynesian languages contain well-known examples of this lack of directionality, where Proto-Polynesian *l and *r merged as Proto-Nuclear-Polynesian *l (suggesting *r > *l), only to shift again from Proto-Nuclear-Polynesian *l to /r/ in numerous daughter languages (for example, Māori or Tikopian). The evidence for PLD *r from *l is otherwise overwhelming. Reflexes of *bulu 'body hair' show just how widespread this change is: Benyadu *burutn*, Rara *burutn*, Bekati' *burut*, Singai *burun*, Seratong *burun*, Biatah *buruh*, Tringgus Birung *brun*, Bukar *buruh*, Golik *buruh*, Ribun *buhuh*, and Sanggau *buruh*, opposed to Hliboi *blutn* and Sungkung *bulutn*. Other than the bidirectionality of sound changes from *r to *l and from *l to *r, another important factor informing this study's decision to reconstruct *r is that the change *l > *r is not an areal feature of Western Borneo. Malayic and Central Sarawak languages have had a large impact on Land Dayak. Other areal features, like the backing of *R/*r to a velar or uvular [ɣ/ʀ] and final-syllable vowel breaking are found across subgrouping boundaries in Central Sarawak, Malayic, and Land Dayak (Smith 2017). The change *l > *r, however, is restricted to Land Dayak. If *l > *r were an areal feature, it is unexpected that it be restricted only to Land Dayak.

The phonological evidence for Land Dayak is not as robust as one might hope. The major sound change *l > *r will continue to cause disagreement on the validity of the subgroup. However, Smith (2017) gathered a long list of lexical data as additional support for Land Dayak, to which the reader is referred for more on the subgroup itself.

2.2 BENYADU-BEKATI' AND BIDAYUH-SOUTHERN LAND DAYAK SOUND CHANGES. Smith (2017) argued for a primary division between Benyadu-Bekati' and Bidayuh-Southern Land Dayak based primarily on the full merger of *a and *ə in penultimate syllables in Benyadu-Bekati' but merger of *a and *ə only after non-labial onsets in Bidayuh-Southern Land Dayak. There are, however, additional sound changes which separate the two subgroups. To summarize, Proto-Benyadu-Bekati' closed all open word-final syllables with glottal stop, raised *-a to *-u in the environment *aC_#, and monophthongized *-ay and *-aw as the mid-vowels *-e and *-o respectively. Proto-Bidayuh-Southern Land Dayak on the other hand closed word-final open syllables with *-h, raised *-a to *-ə with no special conditions, and monophthongized *-ay and *-aw as *i and *u. Table 4 shows sound correspondences between PLD, Proto-Benyadu-Bekati' (PBB), and Proto-Bidayuh-Southern Land Dayak (PB-SLD). Each sound change is discussed below with supporting evidence.

PLD *-ay/-aw became Bidayuh-Bekati' -e/-o, Bidayuh-Southern Land Dayak -i/-u. Bidayuh-Southern Land Dayak languages reflect *-aw as -*u* and *-ay as -*i*. Benyadu-Bekati languages reflect them as -*o*, and -*e*. Example reflexes of *-ay include PMP *qatay 'liver', which is reflected as Benyadu *ate*, Rara *ate*, and Bekati' *ate* with a mid-vowel reflex and as Singai *ətin*, Hliboi *ititn*, Sapug *ati*, Bukar *ăti*, Kembayan *oti*, and Ribun *oti* with a high vowel reflex. Example reflexes of *-aw include PMP *babaw 'rat',[3] which became Benyadu *babo* and Bekati' *babo* with a mid vowel reflex, and Gumbang *babu*, Bistaang *bābu*, Bukar *bābu*, and Kembayan *babu* with a high vowel reflex, and PLD *andaw 'day', which became Benyadu and Bekati' *ano* with a mid-vowel, and Singai *əndu*, Hliboi *inu*, Biatah *ăndu*, Bukar *ăndu*, Jangkang *onu*, and Sanggau *onu* all with high-vowel reflexes.

PLD *-V became Benyadu-Bekati' -Vʔ, Bidayuh-Southern Land Dayak -Vh. All Land Dayak languages closed historically open word-final syllables. Benyadu-Bekati closed final vowels with -ʔ, and Bidayuh-Southern Land Dayak with -h. Reflexes of PMP *batu 'stone' show these two syllable-closing strategies: Benyadu *batuʔ*, Bekati' *batuʔ*, and Rara *batuʔ* where the final open syllable was closed with glottal stop and Singai *batuh*, Hliboi *batuh*, Biatah *bātuh*, Bukar *bātuh*, Golik *batuh*, and Ribun *botuh* where the final open syllable was closed with *h*.

PLD *aCa# became Benyadu-Bekati' aCuʔ PMP *a split in Benyadu-Bekati' where it appeared in word-final position. In almost all cases, the open final syllable was closed with glottal stop (except where the -n suffix is used as a marker of inalienability and a few irregular forms). Several etyma retain the vowel itself unchanged, but in other cases, *a is reflected as *u. In the following table, three B-B languages (Benyadu, Bekati', Sara) are compared to three

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3. Blust and Trussel (ongoing) reconstruct several competing forms, including *labaw, *babaw, and *balabaw.

Bidayuh languages (Singai, Hliboi, Ribun). Where two low vowels appeared in subsequent syllables, with the second in word-final position (PMP *-aCa) the final *a was raised to *u in Benyadu-Bekati'. Elsewhere, it did not change or underwent other unconditioned and unrelated sound changes.

TABLE 5. REFLEXES OF *a IN BENYADU-BEKATI'

PMP	Benyadu-Bekati'			Bidayuh-Southern Land Dayak			
	Benyadu	Bekati'	Sara	Singai	Hliboi	Ribun	
*quma	umaʔ	umaʔ	umaʔ	əməh	-	-	'field'
*duha	duaʔ	duaʔ	duaʔ	duəh	uoh	(dukoh)	'two'
*lima	rima	rima	rimaʔ	riməh	moh	himuh	'five'
*dəpa	dapa	dapa	dapa	dəpəh	kipoh	-	'fathom'
*tuba	tubaʔ	tubaʔ	tubaʔ	-	bboh	tibuh	'derris root
*mata	matuʔ	matuʔ	matuʔ	bətən	bitotn	motuh	'eye'
*banah	banun	banun	banun	bənən	binon	bonuh	'husband'
*sawa	saun	saun	saun	səwən	siwotn	osaw (< *a-sau)	'wife'
*baRa	-	buhu api	-	-	boon ipuy	baho	'ember'

Other examples include reflexes of PMP *wada 'to be; exist' which became Benyadu *aduʔ* and PMP *sama 'same' which became Benyadu *samuʔ*. If this change is compared to reflexes of PMP *ə in final syllables, it becomes clear that *a first merged with *ə before raising and backing to /u/: PMP *qali-matək 'leech' became Benyadu *kalimatuk* and Bekati' *kalimatuʔ*, *pusəj 'navel' became Bekati' *pusut*, *asəp 'smoke' became Benyadu *asup* and Bekati' *asup*, reflexes of PLD *bəʔəs 'to sleep' became Benyadu *buus* and Bekati' *buus*, and PMP *siŋəhət 'to sting' became Benyadu *ñuŋut* for example.

There is thus ample phonological evidence supporting a primary division between Benyadu-Bekati' and Bidayuh-Southern Land Dayak. This internal subgrouping will inform the analysis of PLD full-vowels for the remainder of the paper.

3. PROBLEMATIC FULL-VOWEL VOCABULARY. In this section, the reconstructed full-vowel vocabulary from Rensch et al. (2012) is evaluated for regularity in reflexes of diagnostic phonemes, for regularity in reflexes of full vowels, and for reconstructability based on the presence of reflexes across primary branches. The full list of vocabulary is presented below in table 6. Ultimately, it is argued that PLD full-vowel vocabulary can be separated into three groups: (i) Malay borrowings, (ii) words from an unknown source, and, (iii) native words which can be shown to have developed full penultimate vowels under specific conditions. The Malayic vocabulary, as will be demonstrated below, are late borrowings that entered the languages after the breakup of PLD, and therefore not reconstructable to

TABLE 6. RECONSTRUCTED PLD WORDS WITH FULL VOWELS FROM RENSCH et al. (2012)

*jāntuŋ 'heart'	*tānaʔ 'land'	*tāpan 'to winnow'
*būŋa 'flower'	*bātu 'stone'	*āruh 'pestle'
*lāntay 'floor'	*mānuk 'bird'	*jālan 'to walk'
*kāri 'to dig'	*pāgi 'morning'	*jāʔat 'bad'
*sāguʔ 'sago'	*gāyu 'scratch'	*kūbur 'to bury'
*tāru 'three'	*pāsir 'sand'	*māmuh 'to bathe'
*jārum 'needle'	*āsən 'feeling; breath'	*ūlun 'slave'
*sīpak 'to kick'	*ābuh 'ash'	*ābun 'cloud'
*ājal 'to play'	*āsap 'smoke'	*gāram 'salt'
*sarātus 'one hundred'	*sarību 'one thousand'	*lāntiŋ 'raft'
*sīuh 'breast'	*sūsuh 'breast'	*bībih 'lips'
*sūŋi 'river'	*ūhat 'vein'	*tūruk 'dibble'
*kāsiŋ 'urine'	*āsuh 'smoke'	*(s)āwah 'veranda'
*gātuh 'ascend'	*ādip 'alive'	*lādiŋ 'knife'
*lā(ʔ)ut 'sea'	*māyar 'pay'	*bāyar 'pay'
*sāhu(h) 'burn'	*ñāŋan 'light weight'	*ŋārəm 'night'
*pāguh 'good'	*pāndan 'pandanus'	*pāyaʔ 'mud'
*sāyap 'wing'	*rībuʔ 'under'	*jīʔit 'sew'
*tūuŋ 'eggplant'	*sīap 'chicken'	*mīlaŋ 'count'
*kūyuk 'dog'	*tūjuŋ 'eggplant'	*rūjaʔ 'spit'
*sūat 'flower'	*sūkan 'hide'	*bādək 'mucus'
*dīpəh; ñīpəh 'snake'	*jīpəh 'snake'	*mīlih 'to choose'

in table 6

the proto-language. The vocabulary from an unknown source, also demonstrated ~~below,~~ was borrowed early and is reconstructable to PLD. For the most part, however, reconstructed vocabulary with full vowels are thrown out. Additionally, after removing unsupported full-vowel reconstructions it is shown that the PLD vowel system maintained a distinction between full and reduced only with the low vowel (*a). Elsewhere, the evidence for a distinction does not withstand close scrutiny.[4]

Before evaluating the reconstructed vocabulary, however, it is necessary to discuss an important potential formal shortcoming in reconstructing full and reduced vowels to Proto-Land Dayak: an apparent lack of evidence from Benyadu-Bekati', a Land Dayak primary branch.

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4. Rensch et al. (2012:293-295) also attempts to link the appearance of full penultimate vowels with word-final accent at PAN. There are several issues with the hypothesis, including the use of an amalgamation of various reconstructions in an attempt to show some level of correspondence. Land Dayak words are directly compared to Proto-Philippines, Proto Hesperonesian-Formosan, and Proto-Hesperonesian reconstructions, all of which lack consensus support. PAN contrastive accent itself, of course, also lacks consensus support (see Blust [1997a] for more against contrastive accent, Zorc [1983] and Ross [1992] for more in support of the hypothesis). This paper makes no assumption of PAN accent. It is concerned only with the reconstructability of full vowels in the penultimate syllable of PLD using subgroup-internal evidence.

**3.1 IS THERE BENYADU-BEKATI' EVIDENCE FOR A FULL/
REDUCED DISTINCTION?** As noted by Smith (2017), Rensch et al.
(2012) do not clearly argue for any single internal subgrouping. In seemingly
contradictory statements, they first defend the view that Bidayuh and Bekati
share an immediate common ancestor (Rensch et al. 2012:130), which they name
Proto-Bidayuh-Bekati', but later present a tree with three primary divisions:
(i) Bekati', (ii) Bidayuh, (iii) Southern Land Dayak (Rensch et al. 2012:211).
In either case, Rensch et al. judge the reconstructability of the full-reduced vowel
distinction on their own internal subgroupings which place Bidayuh and
Southern Land Dayak in separate primary branches. Full and reduced vowels
are only found in these two groups, and not in Benyadu-Bekati'. This does
not pose a problem according to the authors because of the primary division
between Bidayuh and Southern Land Dayak. However, the more current internal
subgrouping utilized in this paper, as mentioned earlier, places a primary distinc-
tion between Bedayu-Bekati' and Bidayuh-Southern Land Dayak.

Benyadu-Bekati' evidence is thus necessary for reconstructing full vowels.
Although it was not included in Rensch et al. (2012), such evidence may be
found in Mali, a poorly described Land Dayak language spoken along the
Kapuas river. According to Sommerlot (2018), Mali shows phonological
and lexical innovations unique to Benyadu-Bekati'. It monophthongized
word-final diphthongs as mid vowels, for example, in *ate* 'liver' (PMP *qatay)
and *suŋe* 'river' (Western-Indonesian *suŋay). Be' Aye', a dialect of Mali, also
closed final open syllables with glottal stop: PLD *ñipa > *ñipəʔ* 'snake', *siru
> *siruʔ* 'finger nail', and *buru > *buruʔ* 'body hair' (Mali itself has deleted all
final glottal stops, inherited or otherwise). It also reflects the Proto-Benyadu-
Bekati' exclusive lexical replacement innovations that were first described by
Smith (2017): Mali *aŋo* < *aŋhu'long', *rata* < *rataʔ* 'tongue', and *bas* <
*bahas 'face'. This evidence supports including Mali and Be' Aye' in the
Benyadu-Bekati' group. Regarding the full-reduced distinction, both Mali
and Be' Aye' reflect reduced penultimate vowels where the
final vowel is non-low (ə, u, or i). Preliminary analysis of the data indicates
that full penultimate vowels, on the other hand, remain *a* regardless of the
quality of the following vowel, as demonstrated in table 7.

More data is needed to convincingly show both that Mali and Be' Aye' are in
fact Benyadu-Bekati' languages and that the vowel restrictions in table 7 will
continue to play out. With the available data, however, Mali and Be' Aye'
appear to provide positive evidence for a full-reduced distinction across pri-
mary divisions although the most robust evidence remains restricted to
Bidayuh-Southern Land Dayak. If these languages are shown to subgroup
inside B-SLD, however, the current subgrouping model would restrict full
vowel reconstruction to PB-SLD, and would not support reconstruction to
PLD. For the remainder of this paper, however, the status of full-reduced vow-
els will be judged individually for each reconstructed form from Rensch et al.
(2012). Regardless of the presence or absence of Benyadu-Bekati' evidence,

TABLE 7. BENYADU-BEKATI' EVIDENCE FOR FULL AND REDUCED VOWELS

PLD	Benyadu	Bekati'	Mali	Be Aye
*matə 'eye'	matuʔ	matuʔ	butu	bətəʔ
*daun 'leaf'	dautn	daut	duwutn	duwitn
*paʔə 'thigh'	paaʔ	apaʔ	pu	pəʔ
*tarun 'secondary forest'	-	tarutn	torutn	turutn
*laŋit 'sky'	raŋit	raŋit	riŋit	riŋit
*bātu 'stone'	batuʔ	batuʔ	bata	batuʔ
*lāut 'sea'	laut	laut	laut	laut
*tāru 'three'	taru	taru	taru	taru
*mānuk 'bird'	manuk	manuʔ	manuk	manuk

the full-reduced distinction must still be eliminated from the reconstruction with a few notable exceptions.

3.2 REEVALUATING THE LEXICON. Rensch et al. (2012) reconstructed PLD forms with full vowels if they appeared in any of the three main sub-groups. Although there is some ambiguity as to how this earlier publication handled the internal subgrouping of LD, the reconstructions often treat the three subgroups as equidistant. As is argued in this section, however, the majority of the reconstructed full-vowel vocabulary is from Malay and, furthermore, entered the language after the breakup of PLD. This, of course, suggests that Malay vocabulary should not have been reconstructed to PLD in the first place. Malay borrowings can be identified with a number of diagnostic sound changes. These were organized in Smith (2017), and are reprinted here with a few additions and revisions:

1) Closing of open final syllables
   Bidayuh-Bekati' closed open final syllables with glottal stop and Bidayuh-Southern Land Dayak with -*h*. Wherever a word-final vowel was not closed, or where closure is irregular, it can be labeled a loan.
2) Reflexes of PMP *R, *l, and Proto-Land Dayak *r
   PLD shifted *R to *h and *y, and *l to *r. PMP *l is thus the only source of *r in Land Dayak, and there should be no case where *r* in a modern language reflects PMP *R. Irregular or unknown sources of *r* can therefore be labeled as borrowings, as can any case where *l is reflected as *l. Furthermore, in most Land Dayak languages, there are no native sources at all for *l*.
3) Reflexes of PMP *ə in the final syllable
   Most Land Dayak languages reflect schwa in this position as either *u*, or less commonly, *i*. No Land Dayak language reflects schwa as *a* in the final syllable, but all Malayic languages of Borneo do. Wherever a word in a Land Dayak language reflects schwa in a closed final syllable with *a*, that word can be labeled a loan.

4)   Reflexes of PMP *q [Add period]

Land Dayak languages reflect *q as glottal stop or Ø, but Malayic languages have all shifted *q to h. Where *q is reflected as *h* in Land Dayak, it is a borrowing. Examples from word medial and word-final position include reflexes of *paqit 'bitter' which became Benyadu *peet*, Bekati' *peet*, Singai *pəʔit*, Bukar *paʔit*, and Golik *poit*, and *daRaq 'blood' which became Benyadu *dayaʔ*, Bekati' *dayaʔ*, Singai *dəyaʔ*, Golik *doyaʔ*, and Kembayan *doyoʔ*. Some Land Dayak languages have deleted *q altogether in subsequent sound changes.

5)   Reflexes of word-final diphthongs.

Benyadu-Bekati' reflects *-ay and *-aw as -*e* and *o*, and Bidayuh-Southern Land Dayak as -*i* and -*u.* Cases where the diphthongs did not become monophthongs or where monophthongization is irregular are considered borrowings.

6)   Reflexes of word-final voiced obstruents [Add period]

Voiced obstruents are retained in Bidayuh in all positions. Where a Bidayuh language irregularly devoiced final-obstruents borrowing can be assumed.

7)   Reflexes of PMP *mp, *nt, and *ŋk (*NT) clusters.

A final sound change that is of minor importance is the deletion of the nasal in *NT clusters. Bau-Jagoi and Biatah (two subgroups within Bidayuh) reflect such clusters as *T, where other Land Dayak languages retain the clusters. Reflexes of PMP *buntan 'young coconut' clearly demonstrate this. In the Bau-Jagoi subgroup Singai, Gumbang, Bratak, Grogo, Seratong, Serambu have *butan*, Hliboi has *ddetn* (*buntan > *butan > *btan > *bdan > *ddetn*). In the Biatah subgroup Sembaan has *tan*, Sungkung, Biatah, Anah Rais, Tringgus Raya, Bengoh, and Sapug have *butan*, and Tringgus Bireng and Bistaang have *bătan*. Thus, where an *NT cluster is retained in any of these languages, it suggests borrowing.

Much of the reconstructed vocabulary with full vowels can be positively identified as having entered the language after the breakup of PLD using these diagnostics, and the remainder of this section is dedicated to this task.

3.2.1 Unclosed final vowels. As noted earlier, all modern Land Dayak languages closed inherited open final syllables with either a glottal stop (Benyadu-Bekati') or with *h* (Bidayuh-Southern Land Dayak). Rensch et al. (2012) reconstructed the following words with open final syllables to PLD: *sāma 'father', *dāri 'man; male', *pāgi 'morning', *māji 'morning', *tāpi 'shoulder', *pāpi 'shoulder', *sāhu 'burn', *sarību 'one thousand', *sūŋi 'river', and *būŋa 'flower'. Using evidence from Benyadu, Bekati', Hliboi, Biatah, Bukar, Golik, and Ribun, it is demonstrated in table 8 below that these words have irregular reflexes of word-final open syllables. Because

TABLE 8. IRREGULAR WORD-FINAL OPEN SYLLABLES

PLD (Rensch et al.)	Benyadu	Bektai'	Hliboi	Biatah	Bukar	Golik	Ribun
*sāma 'father'	samaʔ	samaʔ	maʔ	sāmaʔ	ămaŋ	omaŋ	maŋ
*dāri 'man; male'	daʔare	are	dali	dāri	dāri	dari	dahi
*pāgi/māji 'morining'	ŋakap	ŋakap	pagi	isan	pāgi	magi	maji
*tāpi/pāpi 'shoulder'	bahu	kawi	kiwitn	kăwin	kăwi	bahu	omu
*sāhu 'burn'	ninuʔ	ñahu	tukŋ	ñau	ñālak	ñ(i)cu	nicu
*sarību 'one thousand'	səribu	saribu	səlibu	-	siribu	səribu	səhibu
*sūŋi 'river'	suŋe	suŋe	piʔitn	suŋi	suŋi	suŋay	suŋi
*būŋa 'flower'	buŋaʔ	buŋa	buŋe	buŋa	buŋaʔ	buŋaʔ	buŋo

open-syllables were closed separately in the two primary branches, irregular reflexes indicate late borrowing and unreconstructability to PLD.

The words in table 8 can be organized into a few groups. The first consists of Rensch et al's reconstruction of *dāri 'man; male', and *sūŋi 'river'. These words have the expected reflexes of *-ay, which monophthongized as *-e in PB-B and *-i in PB-SLD (Golik *suŋay* is a borrowing). The reconstructed forms should therefore be *daʔaray and *suŋay. Note that 'river' is not reconstructed with a full vowel, as PLD penultimate *u from this word is deleted in Benuk and Bistaang *sŋi*, which is characteristic of reduced vowels. The full vowel in Rensch's *dāri appears to have arisen through parallel deletion of *ʔ, which can be reconstructed from Benyadu *daʔare*.

The second category consists of Rensch's reconstruction of *pāgi 'morning', *māji 'morning', *tāpi 'shoulder', *pāpi 'shoulder', *sāhu 'burn', *sarību 'one thousand', and *būŋa 'flower'. These words have either not closed the final open syllable or have irregular closure. Reflexes of both *pāgi and *māji have open syllables in Bidayuh and Southern Land Dayak, which regularly closed final syllables with -h. Rensch's reconstruction of *tāpi and *pāpi is particularly problematic, considering nearly universal support for reconstructing *kawi-n. The apparent reflexes of *tāpi and *pāpi are restricted to Bidayuh and even if that restriction is ignored, they reflect a final open syllable which should have been closed with -h. The final three, *sāhu 'burn', *sarību 'one thousand' and *būŋa 'flower', have open final syllables in both B-B and B-SLD, which again, indicates that they were borrowed. Because closure of word-final open syllables occurred after the breakup of PLD, these reconstructions can be thrown out.

A final reconstruction, *sāma is reflected with reduced vowels throughout the subgroup, including Hliboi *maʔ* and Bukar *ămaŋ* from table 8. It should thus not be reconstructed with a full vowel. The final ʔ and ŋ reflect *-q and *-ŋ, vocative morphemes with wide attestation throughout Malayo-Polynesian (Blust, 2013: 396-397).

3.2.2 Word-final diphthongs. The word-final diphthongs *-aw and *-ay underwent monophthongization in both LD primary branches. Rensch et al. (2012) reconstructed two words with full vowels and word-final diphthongs to PLD: *rāŋkay 'dry', *lāntay 'floor'. Both words have irregular reflexes

of *-ay, which should have become *-e in PB-B and *-i in PB-SLD. Again, because these sound changes occurred after the breakup of PLD, irregular reflexes indicate the unreconstructability of the words.

TABLE 9. IRREGULAR REFLEXES OF WORD-FINAL DIPHTHONGS

PLD (Rensch et al.)	Benyadu	Hliboi	Bukar	Bunan	Ribun
*rāŋkay 'dry'	karikŋ	bidoh	raŋkay	raŋkay	haŋkay
*lāntay 'floor'	lante	lantay	lantəʔ	lantay	lantay

Rensch's reconstruction *rāŋkay, like *tāpi and *pāpi in the previous section, is problematic due to a lack of attestation across primary boundaries, but has also not monophthongised the diphthong where it occurs. Apparent reflexes of *lāntay do have regular monophthongization in Benyadu and Bekati' *lante* but have irregular reflexes in all other languages, where the diphthong is retained.

3.2.3 Reflexes of *NT clusters. Rensch et al. (2012) reconstructed several words with clusters of a nasal plus homorganic voiceless plosive: *jāntuŋ 'heart', lāntay 'floor', lāntiŋ 'raft', *mpāwah 'spider', *rāŋkay 'dry', and *tāmpar 'slap; punch'. In both the Bau-Jagoi and Biatah subgroups of Bidayuh, inherited *NT clusters were reduced to the non-nasal segment.

TABLE 10. REFLEXES OF NASAL-CONSONANT CLUSTERS

PLD (Rensch et al.)	Benyadu	Bektai'	Hliboi	Biatah	Bukar	Golik	Ribun
*jāntuŋ 'heart'	jantoŋ	tamaʔ	jantuŋ	-	-	jantok	jantukŋ
*lāntay 'floor'	lante	lante	lantay	rata:y	lantəʔ	lantəy	lantay
*lāntiŋ 'raft'	rakit	apuk	lantiy	rātiŋ	lantiŋ	rakit	hakit
*mpāwah 'spider'	-	aŋgaʔ	tikaʔ	tăkaʔ	kăkaʔ	rakokaʔ	mpawo
*rāŋkay 'dry'	karikŋ	baduʔ	bidoh	băəh	bădəʔ	badəʔ	haŋkay
*tāmpar 'slap'	nampeleŋ	nampar	napal	-	-	nəmelekŋ	nampah

Hliboi provides evidence for borrowing for three of these words (ignoring the fact that *lāntay has a separate diagnostic, *-ay, which has already been used to rule it out). Hliboi *jantuŋ*, *lantay*, and *lantiy* all retain an /nt/ cluster which is deleted in native vocabulary. The other words are so rarely attested that cognates are not found in the necessary subgroups. Neither Bau-Jagoi nor Biatah have reflexes of Rensch's *mpāwah 'spider', *rāŋkay 'dry', and *tāmpar 'slap; punch'. *mpāwah 'spider' is only evidenced by two languages, Ribun *mpawo* and Rara Bekati' *kampawaʔ*, both of which may be better explained as borrowing from Ibanic languages: Seberuang *səmpawaʔ*, Mualang *əmpalawak*, and Iban (upper Kapuas) *mpəlawaʔ*. *rāŋkay 'dry' has already been thrown out due to the irregular reflexes of *-ay, and *tāmpar 'slap' can be deleted because there is no native source for word-final *r* in Land Dayak.

3.2.4 Native and borrowed vocabulary reconstructed as PLD *r. As already stated, PLD *r reflects PMP *l in native vocabulary. PMP *R had become *h or *y, leaving *l as the only source for PLD *r. In the following table, reconstructed vocabulary with both a full vowel and *r are listed. Some of Rensch's reconstructions do indeed reflect PMP *l, but others appear to reflect *R, which points to borrowing.

Of the reconstructed vocabulary in table 11, the following reflect PMP *l: *āruh, *ŋārəm, *rūja?, *kāri, *tāru, *rību?, which have regular reflexes. The other vocabulary, however, does not reflect *l, and since *l is the only known source of *r in PLD, they are suspected loans. *sarību, *sarātus, and *jārum reflect PMP *R from *sa-ŋa-Ribu, *sa-ŋa-Ratus, and *zaRum respectively. *R became *r* in Malayic languages, and Malay seems like the obvious source for these borrowings. Neither *l nor *r were present in final position, as both had deleted in PLD. This, in turn, suggests that *pāsir, *kūbur, and *māyar/bāyar are also borrowings (*kūbur is further marked as an Arabic-Malay loanword). PLD *gāram is also most likely borrowed from a Malayic source, given the widespread irregularity in attested Land Dayak forms (see also Adelaar 1994:13 fn 18).

TABLE 11. PLD *r

PLD (Rensch et al.)	Benyadu	Bektai'	Singai	Biatah	Bukar	Golik	Ribun
*āruh 'pestle'	aru	aru?	Aruh	āruh	āruh	-	ahuh
*ŋārəm 'night'	ŋarum	ŋarum	ŋarom	siŋārəm	biŋārə?	bəŋarə?	ŋohitn
*rūja? 'to spit'	ruja	ruja?	ŋuja?	ñiruja?	ŋiruja?	ŋərucuh	hucoh
*kāri 'to dig'	ŋari?	ŋari?	-	kāreh	-	ŋkorih	ŋuceh
*tāru 'three'	taru	taru	Taruh	tāruh	tāruh	taruh	tahuh
*jārum 'needle'	-	jarupm	tos	utos	jārum	-	jahikŋ
*sarātus 'hundred'	saratus	saratus	ni? ratus	-	sirātus	səratus	səhatus
*pāsir 'sand'	-	pasir	pasir/sumat	pāsir/sumat	pasir	-	-
*sarību 'thousand'	səribu	saribu	ni? ribu	-	siribu	səribu	səhibu
*kūbur 'to bury'	ŋubur	nama?	kubur	kubur	ŋubur	ŋubur	masah
*gāram 'salt'	-	-	garo?	gāro?	gulo?	-	gaham
*māyar/bāyar 'pay'	-	-	bayar	bāyar	māyar		mayih
*rību? 'under'	sarok	saro?	ribo?	ribo?	ruŋan	ribo?	sigan

3.2.5 Reflexes of *l. Because PMP *l became PLD *r, *l was eliminated from the phoneme inventory. The following cases, however, show reconstructed full vowels with *l. One may try to invalidate the following comparisons by positing that *l is sporadically retained as *l through appeal to the fact that Hliboi and Sungkung have *l* reflecting *l. Hliboi and Sungkung reflexes are *regular*, not sporadic, so using Hliboi and Sungkung in such a way is an apples-to-oranges comparison.

Because *l became PLD *r all of these words must be borrowings. *jālan 'to walk' is clearly Malay because a native word, PMP *panaw 'to walk' is reflected in most modern LD languages. PMP *zalan 'road; path' is also reflected with the original semantics and a native reflex of *l in, for example

TABLE 12. PLD *l

PLD (Rensch et al.)	Benyadu	Bektai'	Singai	Biatah	Bukar	Golik	Ribun
*bīlaŋ/mīlaŋ 'count'	barituŋ	ŋetoŋ	miraŋ	ñitoŋ	milaŋ	ŋitok	milakŋ
*jālan 'to walk'	bajalatn	bajalat	pənu	pănu	pănu	bəjalat	bəjalatn
*ūlun 'slave'	ulutn	ŋansak	urun	urun	ulun	budak	onok buoh
*lādiŋ 'knife'	ladiŋ	ladiŋ	sinaʔ	sindaʔ	-	siketn	sikitn
*mīlih 'to choose'	malihi	malihiʔ	piris	miʔen	milih	pilih	pileh

Bukar *jăran* or Ribun *johan* 'road'. Rensch et al. (2012) also reconstructs *ājal 'to play', which is not included in the above table due to lack of widespread attestation. This word was reconstructed with only two witnesses, Sara *baajal* and Kembayan *ajal*. Regardless, PMP *l was deleted in word-final position, which implies that *ājal is a borrowing.

PLD *mīlih 'to choose' ultimately reflects PMP *piliq. There are two irregularities in this word. First, PMP *l should have shifted to *r, but some Land Dayak languages retain *l irregularly: Bukar *milih*, Sadong *milih*, Bibengih *pilih*, Bunan *pilih*, Jangkang *mileh*, and Ribun *pileh*. While retention of *l unchanged suggests borrowing, the shift of *q to *h* positively identifies the word as Malayic. It can thus be thrown out. The other words are equally problematic, and should all be rejected as valid reconstructions because of the presence of *l.

3.2.6 Other irregularities. Several other irregularities can be identified in various reconstructions. In this section, irregularities in final glottal stop, final-syllable schwa, and word-final voiced stops are discussed together. Table 13 below shows the exact forms and their reflexes in modern languages.

TABLE 13. ADDITIONAL IRREGULARITIES IN REFLEXES OF RECONSTRUCTED FULL-VOWEL VOCABULARY

PMP	PLD	Benyadu	Bektai'	Hliboi	Biatah	Bukar	Golik	Ribun
*sagu 'sago'	*sāguʔ	-	saguʔ	saguʔ	saguʔ	sagu:ʔ	saguʔ	sago
*asəp 'smoke'	*āsap	asup	asup	asuh	āsuh	āsuh	asop	asaʔ
*buka(ʔ) 'open'	*būkaʔ	mukaʔ	mukaʔ	bukaʔ	-	-	mukaʔ	bukoʔ
*lahud 'sea'	*lā(ʔ)ut	laut	laut	laut	rāwət	lāʔut	laut	laot
-	*bədək 'mucus'	-	buduʔ	dok	bədək	-	-	-

PMP *sagu > PLD *sāguʔ The only known source of a regular -ʔ : -ʔ correspondence between Benyadu-Bekati' and Bidayuh-Southern Land Dayak is PMP *-q. The PMP reconstruction of 'processed sago' is *sagu, with an open final syllable. This, in turn, should generate a -ʔ : -h correspondence in the modern languages which supports the conclusion that this form is not native. Any number of Malayic languages may be a source, including Kendayan and Keninjal which both have *saguʔ*, or Seburuang and Mualang which both have *sagoʔ*.

PMP *asəp > ***PLD *āsap**   Regarding *āsap, the Benyadu and Bekati reflexes, *asup*, show regular *u* reflexes of PMP *ə so the PLD form should be *asəp. No Land Dayak language regularly reflects *ə in the final syllable as *a*, so words like Sadong *āsap*, Kembayan *asap*, and Ribun *asaʔ* are all best considered borrowings from a Malayic source, since the Malayic languages of West Kalimantan have all regularly lowered final-syllable *ə to *a.*

PMP *buka/*bukaʔ > **PLD *būkaʔ**   PLD *būkaʔ 'wide; open' has multiple irregularities. Ribun deleted inherited word-final glottal stops in native vocabulary, for example, PLD *dayaʔ 'blood' > *doyo*, *utaʔ 'vomit' > *ŋuto*, and *nanaʔ 'pus' > *nono* but the apparent reflex of *bukaʔ retains the glottal stop in *bukoʔ*. Rensch et al. (2012) also note that Kembayan *bukaʔ* and *mukaʔ* lack the expected change *a > *o* (exemplified in *daRaq 'blood' > *doyoʔ*, *utaq 'vomit' > *utoʔ*). Additionally, there is the issue of the ʔ : ʔ correspondence between Benyadu-Bekati' and Bidayuh-Southern Land Dayak. The irregularities in Southern Land Dayak suggests that the form *bukaʔ entered those languages recently, after inherited glottal stop was deleted. Thus, although Blust reconstructs a doublet *buka/*bukaʔ for PMP 'open', the Land Dayak forms do not appear to reflect *bukaʔ directly. Iban *bukaʔ/mukaʔ* is the most likely source for this word in Land Dayak.

PMP *lahud > **PLD *lā(ʔ)ut**   There is a single reconstruction with a full vowel which reflects a word-final voiced obstruent, PLD *lā(ʔ)ut 'sea' from PMP *lahud 'downstream; towards the sea'. The meanings in Land Dayak forms ('sea' rather than the reconstructed 'downstream; towards the sea') are markedly Malayic. Bidayuh examples show an irregular devoicing of *-d, which should not have changed, for instance, Singai reflects *lahud as *raut* but *qəlad 'wing' as *rad* with no devoicing. The same is true in Bukar *laʔut* and *ăra:d*, Tringgus Bireng *awət* and *ra:d*, and all other Bidayuh languages. This is best described as a Malayic borrowing.

PLD *bə̄dək 'mucus'   Rensch et al. (2012) reconstructed a single proto-form with a full schwa, *bə̄dək 'mucus'. The full-vowel reconstruction is apparently based on a single witness, Tringgus Raya *bə̄dək*, but when reflexes of reduced schwas are compared with *bə̄dək in other languages, the results are unconvincing. Reflexes of *ə̄ are identical to reflexes of *ə in other words where two schwas appear in adjacent syllables, as shown in ~~the~~ table below. Considering the counter evidence, the recorded full schwa in Tringgus Raya is better considered an isolated case. There is no justification for reconstructing a distinctive phoneme with such limited evidence.

3.2.7 Words with reduced reflexes.   Undisputedly native vocabulary with full vowel reflexes are found in Land Dayak. The clearest cases are reflexes of *qahəlu 'pestle' which has full reflexes in Hliboi *aluh*, Sembaan *āruh*, Bengoh *aruh*, Sapug *āruh*, Bistaang *āruh*, and every other Land Dayak language where native reflexes are found. The facts show that where native

TABLE 14. COMPARISON OF * ə AND *ɔ̄

PMP	PLD	Sungkung	Bengoh	Biatah	T. Bireng	T. Raya
*tələn 'swallow'	*tərən	tələtn	tərəːn	tərəːn	trən	trən
	*baʔəs 'sleep'	baʔəs	baʔəs	baʔəs	baʔəs	baʔəs
	*bərəŋ 'circle'	-	bərəŋ	bərəŋ	bərəŋ	bərəŋ
	*bədək 'mucus'	bədək	bədək	bədək	bədək	bədək

vocabulary has full vowels, those full vowels are reflected across the board. With this in mind, cases where Rensch et al. (2012) reconstruct doublets (*ăbun and *ābun for 'cloud', for example) are rejected and the reduced form is considered the only valid reconstruction on the grounds that reduced vowels are native, and native vocabulary takes precidence over borrowed vocabulary in reconstruction. Other cases where full vowels are reconstructed despite the presence of reduced form reflexes in a few Land Dayak languages are also rejected.

PMP *uRat 'vein' > PLD *ūhat   *ūhat 'vein' from PMP *uRat has reduced-vowel reflexes in a number of languages, including Hliboi *at*, Singai *at*, Sembaan *hat*, and Bratak *aat*. The retention of *u in the penultimate syllable in several languages should not come as a surprise, since there are *no known cases* where a PMP penultimate high vowel is lost completely in all modern Land Dayak languages.

PMP *susu 'breast' > PLD *sūsuh/sīsuh   PMP *susu 'breast' has reduced-vowel reflexes in the following cases: Hliboi *suh*, Bengoh *suh*, and Sapug *săsog*.[5] This is enough in itself to reject both *sūsuh and *sīsuh. Section 4.1.2 below, specifically addresses the issue of high-vowel retention in words with two consecutive high vowels.

PMP *Rabun 'cloud' > PLD *ābun   PMP *Rabun 'cloud' has the following reduced-vowel reflexes: Sembaan *ăbun*, Bistaang *bun*, Biatah *ăbun*.

PMP *bibiR 'lips' > PLD *bībih   PMP *bibiR 'lips' has the following reduced-vowel reflexes: Hliboi *bbitn*, Sembaan *bih*, Kembayan *bobia̱h*.

PLD *rībuʔ 'underneath'   PLD *rībuʔ has the following reduced-vowel reflexes: Hliboi *bbuʔ*, Kembayan *robuʔ*, Bengoh *rubo:ʔ*.

PMP *kali 'to dig' > PLD *kālih   PLD *kārih 'to dig', from PMP *kali, has reduced and irregular reflexes in Stass *kureh*, Bistaang *kăris*, Anah Rais *kureh*, Biya *kureh*, Sembaan *kureh*, Tringgus Raya *kureh*, Golik *ŋkorih*. There is also irregularity in full vowel reflexes. For example, an inexplicable word-final -n was added in Hliboi *kalitn* and Tringgus Bireng *karin* and Sanggau has a transparent Malay loan in *məŋgali*.

PMP *haləm 'night; dark' > PLD *ŋārəm. Rensch et al. (2012) list Bekati' *ŋalom* which shows two irregularities, a PMP *l : Bekati' *l*

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5.   There are several cases where words inexplicably innovated a word final *-g, and changed the preceding vowel to schwa, in this case eventually becoming *o*.

correspondence where *l should have become *r*, and a *ə : *o* correspondence where all Benyadu-Bekati' languages reflect *ə as *u* in the final syllable. Other Benyadu-Bekati' evidence, however, shows regular reflexes and the Bekati' form recorded by Rensch et al. may be an isolated case. There are, however, reduced vowel reflexes in Southern Land Dayak: Kembayan *ŋorəpm* and *ŋərəp* (with dialectal variation), Ribun *ŋohitn*, and Jangkang *ŋorupm* and in Bidayuh: Sembaan *kǎrəm*. Because of these irregularities Rensch et al. reconstructed a second form *ŋǎrəm. Following the methods employed in this paper, the full vowel reconstruction is rejected and only *ŋ-arəm is reconstructed to PLD.

PLD *jīpəh; *dīpəh; *ñīpəh 'snake' Rensch et al. (2012) reconstructed three competing words for 'snake', but careful analysis of the distribution of reflexes allows the reduction of synonymic reconstructions. Firstly, reflexes of Rensch et al.'s *jīpəh are restricted to a few languages within the Biatah subgroup, where half of their examples reflect *dīpəh and the other half * jīpəh (Sembaan and Tringgus Raya dīpəh, but Anah Rais and Biatah jīpəh for example). The restriction to a single subgroup within Bidayuh eliminates this word from consideration as a PLD reconstruction. The sporadic attestation suggests that the sequence *di- caused irregular palatalization of the initial segment, giving rise to a few cases of *ji-* in the modern languages.

Finding a suitable explanation for the competing reconstructions *dīpəh and *ñīpəh is less straightforward. Both are found across primary divisions, and are therefore candidates for reconstruction. To further complicate matters, words resembling *dipa* and *nipa* are spread fairly evenly throughout Borneo, making it difficult to argue against reconstructing both without appealing to widespread irregularity. The reflexes themselves, however, do not support a full-vowel reconstruction. Reduced reflexes are found throughout Land Dayak, including Bistaang *jǎpəh*, Bengoh *jpəh*; *jupəh*, Sapug *dupəh*, Golik *ñəpəh*, and Sangking *ñǐpəh*.

3.2.8 Known borrowings. A few reconstructed full-vowel words can be identified as transparent Malay borrowings even without appealing to diagnostic phonemes. These words include known borrowings with widespread distribution in Island Southeast Asia that arose through contact with Malay. They are described in detail below:

*sāyap 'wing' Although there are a few examples of *sāyap in Land Dayak (Rara *sayap*, Bekati' *sayap*, Semandang *sayap*, Sanggau *sayap*) reflexes of PMP *qəlad 'wing' are far more common, with Bidayuh evidence reflecting a word-final voiced stop indicating that the words are native: Singai *rad*, Sembaan *rad*, Bukar *ǎra:d*, Jangkang *irat*, Ribun *(i)hat*. Where *sayap* is found, Malay is the clear source.

*pāyaʔ 'mud' This word is transparently borrowed from a Malayic source (Seberuang *payaʔ*, Malay *paya* 'swamp'), where the original meaning 'swamp' is retained in some Land Dayak languages. The Land Dayak examples include Ribun *payaʔ* 'swamp', Benyadu *payaʔ* 'swamp', Hliboi *payaʔ* 'swamp', Rara *payaʔ* 'padi mud', Singai *payaʔ* 'slippery'.[6]

*sīpak 'kick' Words resembling *sipak* are found throughout Island Southeast Asia, but as Blust and Trussel (ongoing) note in the corresponding entry, these are all borrowings, and *sipak cannot be reconstructed to any higher-order subgroup. There is no reason to assume that the Land Dayak word is native when the word itself is widely borrowed.

3.2.9 Words that are restricted to only one primary branch. Unless outside evidence can be used to argue that a word is a retention, vocabulary that is restricted to only one primary branch of Land Dayak must be removed as a Proto-Land Dayak reconstruction. The remaining vocabulary that is restricted to only one primary branch is discussed in this section, and each is removed from consideration as a valid PLD reconstruction.

*ādip 'life; alive' Several competing reconstructions were made for 'life; alive', including *ādip, with a full vowel irregularly reflecting PMP *qudip. The only case where a modern language shows a penultimate *a* is in Southern Land Dayak: Kembayan *madiap*. There are no other comparisons with penultimate *a*, so the reconstruction *ādip can be confidently removed.

*kūyuk 'dog' PLD *kūyuk 'dog' is restricted to only three languages, with no evidence from Benyadu-Bekati'. The attested forms are: Tringgus Bireng *kūyuk*, Jangkang *kuyuʔ*, Sanggau *kiuʔ*. Without Benyadu-Bekati' evidence, the reconstruction can be removed.

*gātuh 'ascend' PLD *gātuh 'ascend' is restricted to four languages with no evidence from Benyadu-Bekati'. The attested forms are Bukar *gātuh*, Sadong *gātuh*, Bunan *gātuh*, Kembayan *ŋatuh*. Again, without Benyadu-Bekati' evidence, the reconstruction can be removed.

*pāguh 'good' PLD *pāguh 'good' is restricted to the Bidayuh subgroups Bau-Jagoi and Bukar-Sadong, with Golik *paguh* providing the only Southern Land Dayak witness. With no Benyadu-Bekati' evidence it cannot be reconstructed.

PMP *zaqit 'to sew' > PLD *jīʔit. This appears at first to be an irregular development of PLP *a in Proto-Land Dayak, but further investigation reveals that the penultimate high vowel is restricted to Bidayuh. Other native reflexes show that PLD reflected PMP *zaqit as *ñaʔit: Bekati' *ñait* and Rara *ñait*, Ribun *ñoeʔ* and Semandang *ŋa-ñoit* (with fossilized

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6. Also note that Ribun deletes word-final glottal stop in native vocabulary, adding more evidence that this is a borrowing.

homorganic nasal substitution). Thus, Proto-Bidayuh probably underwent an irregular *a > *i sound change, possibly triggered by the preceding palatal consonant, through harmony with the following high front vowel, or both. The change *a > *i cannot, however, be reconstructed past PBID.

*(s)āwah 'veranda' Rensch et al. (2012) reconstructed *(s)āwah 'veranda'. The attested forms are restricted to Bidayuh-Southern Land Dayak. Additionally, the word-initial *s is reconstructed with Kembayan evidence only (Kembayan *sawah*). There is no regular *Ø- : *s- correspondence between Bidayuh and Southern Land Dayak and without Benyadu-Bekati' evidence the word can be thrown out.

*sūat 'fruit flower' PLD *sūat 'fruit flower' is restricted to Bidayuh-Southern Land Dayak, with attested forms in Singai *suat*, Bistaang *suat*, Sembaan *suat*, Bukar *suat*, Kembayan *suat*, and Ribun *suaʔ*. Despite its wide attestation in Bidayuh-Southern Land Dayak, it is not a candidate for reconstruction to PLD because of its absence in Benyadu-Bekati'.

3.3 SUMMARY   OF   REEVALUATED   RECONSTRUCTED VOCABULARY. This section has identified numerous cases where reconstructed vocabulary either contains irregularities in diagnostic phonemes, lacks the necessary attestation across primary divisions for reconstruction, contains reduced vowel reflexes in modern languages, or belong to a set of Malayic vocabulary known for widespread borrowing. The rejected vocabulary is organized below, listing the reconstruction from Rensch et al. (2012) and the irregularity used to justify its removal. Not all of the reconstructed full-vowel vocabulary were removed, however. There remain cases where diagnostic phonemes show regular reflexes, cases where diagnostic phonemes are in conflict with one another, and cases that cannot yet be explained. Those will be discussed in more detail in the following section.

4.   THE REMAINING FULL-VOWEL VOCABULARY. There are three sets of reconstructed vocabulary in Rensch et al. (2012) with full vowels that do not appear to be the product of late borrowing, and therefore remain candidates for reconstruction to PLD. These are: (i) reconstructed full vowels in native vocabulary that may have arisen through conditioned sound change, (ii) words with conflicting reflexes of diagnostic phonemes, and (iii) words with full vowels but no observable diagnostic phonemes which may explain the full-vowel. First, however, the full list of remaining vocabulary is shown in Table 16.

4.1 CONFLICTING REFLEXES. Many reconstructed full-vowel words were thrown out for having irregular reflexes of diagnostic phonemes.

TABLE 15. REJECTED FULL-VOWEL RECONSTRUCTIONS FROM RENSCH et al. 2012[7]

rejected reconstruction	irregularity	rejected reconstruction	irregularity
*lāntiŋ 'raft'	*NT	*rībuʔ 'under'	reduced
*jāntuŋ 'heart'	*NT	*ŋārəm 'night'	reduced
*lāntay 'floor'	*NT; *-ay	*bībih 'lips'	reduced
*rāŋkay 'dry'	*-ay	*ābun 'cloud'	reduced
*būŋa 'flower'	*-V	*sūsuh/sīsuh 'breast'	reduced
*sāhu(h) 'burn'	*-V	*sūŋi 'river'	reduced
*pāgi/māji 'morning'	*-V	*sāmaʔ 'father'	reduced
*tāpi/pāpi 'shoulder'	*-V	*ūhat 'vein'	reduced
*sarību 'one thousand'	*-V; *r (< *R)	*kārih 'dig'	reduced
*sarātus 'one hundred'	*r (< *R)	*ñīpəh/dīpəh 'snake'	reduced
*jārum 'needle'	*r	*(s)āwah 'veranda'	no B-B
*pāsir 'sand'	*r	*gātuh 'ascend'	no B-B
*gāram 'salt'	*r	*kūyuk 'dog'	no B-B
*kūbur 'to bury'	*r	*kāsiŋ 'urine'	no B-B
*bāyar/māyar 'pay'	*r	*dāyuŋ	no B-B
*tāmpar 'slap'	*r	*āsuh 'smoke'	no B-B
*lādiŋ 'knife'	*l	*pāguh 'good'	no B-B
*ājal 'to play'	*l	*sūat 'flower'	no B-B
*jālan 'to walk'	*l	*jīʔit 'sew'	Bidayuh only
*ūlun 'slave'	*l	*jīpəh 'snake'	Bidayuh only
*mīlaŋ 'count'	*l	*ādip 'alive'	SLD only
*lā(ʔ)ut 'sea'	*l; *-d	*sīpak 'to kick'	Malayic
*mīlih 'choose'	*l; *q	*pāyaʔ 'mud'	Malayic
*āsap 'smoke'	*ə	*sāyap 'wing'	Malayic
*sāguʔ 'sago'	*-ʔ	*tīuŋ/tūyuŋ 'eggplant'	Malayic
*būkaʔ 'wide'	*-ʔ	*bə̄dək 'mucus'	*ə̄ = *ə

Others, however, show conflicting reflexes. The words in table 17 below were reconstructed with full vowels and have both regular reflexes of certain diagnostic phonemes alongside irregular reflexes of others. Because some of the diagnostics point to inheritance from PLD, but others to borrowing, these words resist accurate analysis. The best explanation may be early borrowing, but as discussed below, it is not always possible to locate a source.

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7. *NT means that there are irregular reflexes of nasal-voiceless obstruent clusters in the modern language which were used to remove the reconstructed vocabulary. *-ay is used for irregularities in reflexes of final diphthongs, *-V for irregularities in word-final open syllables, *r for irregularities in reflexes of PLD *r (in some cases, where *r was reconstructed to reflect *R), *l for irregularities in reflexes of *l (cases where *l was reconstructed to PLD, even though PLD eliminated *l through regular sound change), *-d for irregular reflexes of *d in word-final position, *q for irregular reflexes of PMP *q, *ə for cases where schwa was irregularly raised to *a, *ʔ for non-native glottal stop correspondences, reduced for cases where modern languages reflect a reduced, not full, vowel, and no B-B for cases where reflexes are restricted to Bidayuh-Southern Land Dayak, Bidayuh only and SLD only where reflexes are restricted to those subgroups, Malayic for words of clear Malayic origin, regardless of the presence or absence of diagnostic phonemes, and *ə̄ = *ə to signify that there was no full schwa, and that the only reconstructed full-schwa lexeme probably had a regular, reduced vowel.

TABLE 16. REMAINING FULL VOWELS WITH NO EXPLANATION

PMP		Benyaduh	Rara	Serambu	Biatah	Bukar	Golik	Ribun
*qahəlu	*āruh	aru	aruʔ	aruh	āruh	āruh	-	ahu
*suRuk	*sūkan	ñarukatn	basukatn	bisukatn	busuka:n	ñuka:n	ñukat	ñukatn
	*ñāŋan	ñahan	ñaan	-	jāŋan	-	ñaŋəʔ	ñaŋan
*təlu	*tāru	taru	taru	taruh	tāruh	tāruh	taruh	tahuh
*tanəq	*tānaʔ	tanaʔ	tanaʔ	tanaʔ	tānaʔ	tānaʔ	tanaʔ	poyo
*kaRaw	*gāyu	nayo	ŋayo	gayu	gāyu	-	ŋoyu	ŋoyu
	*māmuh	mamuʔ	mamuʔ	mamuh	māmuh	māmuh	mamuh	maneʔ
*batu	*bātuh	batuʔ	batuʔ	batuh	bātuh	bātuh	batuh	botuh
*Rabu	*ābuh	kalaput	abuʔ	abuh	āpək	ābuh	obuh	abuh
	*tūruk	-	turuk	turuk	turuk	turuk	-	tuho
*luzaq	*rūjaʔ	ruja	ŋarujaʔ	ŋujaʔ	ñirujaʔ	ŋirujaʔ	ŋərucuh	hucoh
*qasən	*āsən	senat	asukŋ	-	āsən	-	ŋasəkŋ	peŋasan
*manuk	*mānuk	manuk	manuk	manuk	mānuk	mānuk	manuk	monuʔ
*siap	*sīap	siap	siap	siyuk	siok	siok	siop	siaʔ
*zaqat	*jāʔat	jahat	jaheʔ	jaʔat	ărap	biʔek	bek	biaʔ
*paŋudan	*pāndan	-	panatn	-	-	-	-	pandaŋ

TABLE 17. FULL-VOWEL RECONSTRUCTIONS WITH CONFLICTING REFLEXES OF DIAGNOSTIC PHONEMES

PMP		Benyaduh	Rara	Bekati'	Serambu	Biatah	Bukar	Golik	Ribun
*təlu	*tāru	taru	taru	taru	taruh	tāruh	tāruh	taruh	tahuh
*tanəq	*tānaʔ	tanaʔ	tanaʔ	tanaʔ	tanaʔ	tānaʔ	tānaʔ	tanaʔ	poyo
*kaRaw	*gāyu	nayo	ŋayo	ŋayo	gayu	gāyu	-	ŋoyu	ŋoyu

PMP *təlu > PLD *tāru The reflexes in this word give mixed results. There are two major irregularities when comparing the PLD form to PMP. First, not only is PMP *ə irregular in the penultimate syllable, it also became a *full* vowel, despite the fact that schwa was an extra short, stressless vowel. Second, the final open syllable was closed with -h in Bidayuh-Southern Land Dayak, a regular development, but remains open in Benyadu-Bekati' where it should have been closed with glottal stop. These two irregularities alone should warrant dismissing this word as a borrowing, but there are issues with this. First, PMP *l regularly became *r*, a change that is reconstructable to PLD. Second, if this is a borrowing, it is not clear what acted as a source. Most Malayic languages are ruled out, as they have *tiga* or some variation thereof for 'three'. Kendayan could be the ultimate source, as it is both Malayic and retains PMP *təlu as *talu*, with regular lowering of penultimate *ə. If this word is a borrowing, however, it must have entered Land Dayak at an early stage, since *l is regularly reflected as *r* in all relevant daughter languages.

PMP *tanəq > PLD *tānaʔ The regular reflex of schwa in final syllables is *u* in Benyadu-Bekati', and either *u* or *i* in Bidayuh-Southern Land Dayak. Reflexes of PMP *tanəq, however, shifted *ə to a, a development that normally

suggests a borrowing. Although Malay lowered final-syllable *ə to *a*, *-q is reflected as glottal stop, immediately ruling out Malayic as a potential source since *q became *h in Proto-Malayic. There are no reasonable sources for *tānaʔ that both preserve the final glottal stop and raised *ə to a. This word remains unexplained.

PMP *kaRaw > **PLD *gāyu** Apparent reflexes of PMP *kaRaw are problematic for widespread irregularity both between PMP and Land Dayak and between individual Land Dayak languages. Rensch's reconstruction does not recognize the -o : -u correspondence between B-B and B-SLD, which suggests PLD *gāyaw, not *gāyu. As noted earlier, PMP *R is typically reflected as *y between two low vowels. Consequently, *gāyaw could conceivably reflect *kaRaw, with a single irregularity *k- > *g-. This change is attested in at least one other case, PLD *gutu 'louse' which reflects PMP *kutu and voiced initial *k-. However, other words for 'scratch' which closely resemble *gāyaw make confident reconstruction difficult. For example, a competing form, *gāyut is attested across primary divisions in Bekati' *ŋayot* (recorded in Rensch et al. 2012, although *ŋayo* was recorded in Smith 2017), Hliboi *gayut*, and Sungkung *gayot*. These words probably reflect PAN *garuC 'comb', which was reflected in PMP as *garut 'scratch; rub against'. If native, this in turn suggests that PMP *r became PLD *y, in which case, the conditioned change *R > *y / a_a can be restated as a merger of *R and *r where *R appeared between two low vowels. However, additional reflexes of *r are needed before this apparent merger can be confidently defended.

Bukar-Sadong dialects have a word-final *s* and a reduced vowel, for example, Sadong *ŋăyas*, Bunan *găyas*, and Sangking *ŋăyas*. One may propose that these forms reflect any of the numerous competing reconstructions for 'scratch' with a final *s found in Blust and Trussel (ongoing).

4.2 FULL HIGH-VOWELS IN PLD? After removing reconstructed full-vowel vocabulary through comparative analysis of the evidence, only a single full high-vowel reconstruction remains, PLD *rūjaʔ 'to spit' which, apart from the full vowel, regularly reflects PMP *luzaq. There are two problems with reconstructed full high-vowels. First, although there is plausible evidence through Mali and Be' Aye' that PLD *a had full and reduced variants, there is no such evidence for the high vowels. Under the current internal subgrouping, with no Benyadu-Bekati' evidence there can be no PLD reconstruction. Second, even if one were to forgive the lack of Benyadu-Bekati' evidence, the methods used to compare Bidayuh and Southern Land Dayak do not withstand close scrutiny, as shown below.

When comparing full and reduced vowels between Bidayuh and Southern Land Dayak, Rensch et al. (2012: 271-274) reconstruct a reduced high vowel to PLD if there is variation in vowel quality in penultimate high-vowel reflexes in Southern Land Dayak, and a full vowel if there is no variation (if a reconstructed high vowel is retained unchanged in all SLD languages). However,

the presence or absence of variation in high-vowel reflexes is not consistent in any Land Dayak language, including Southern Land Dayak. To make this clear, cases of unambiguously reduced vowels in reflexes of PMP *bulan 'moon' and *quzan 'rain' in Bidayuh can be compared directly to Southern Land Dayak. PMP *bulan has the following reduced reflexes in Bidayuh: Hliboi *blatn* Sembaan *bran* Bistaang *bran*, Tringgus Raya *bran*, and Tringgus Bireng *bran*. In Southern Land Dayak however, the penultimate vowel is reflected as *u* in all languages: Golik *burot*, Jangkang *buratn*, Ribun *buhatn*, and Sanggau *buran*. PMP *quzan has the following reduced or irregular reflexes in Bidayuh: Singai *jan*, Gumbang *jan*, Bratak *ijan*, Grogo *ijan*, Seratong *ijan*, Serambu *ijan*, Hliboi *jitn*, Sembaan *ăjen*, Bistaang *jen*, Saput *ăjen*, and many others. Southern Land Dayak languages reflect *u as *u* in this word as well: Golik *ujot*, Jangkang *ujatn*, Ribun *ujatn*, and Sanggau *ujan*. These two examples show that there is no real correlation between the retention of a high vowel in Southern Land Dayak and that vowel's reconstructability as a full vowel.

The reverse is also true, that although it is often the case that high vowels are reduced in Bidayuh languages, there is little regularity (except for Hliboi, which regularly deleted all non-low vowels, even in words where most other Bidayuh languages did not). The retention of a high vowel in Bidayuh languages does not imply the reconstruction of a full high vowel to PLD. To make this clear, reflexes of *lima 'five' can be compared between Bidayuh and Southern Land Dayak. In Bidayuh, all languages except for Hliboi have retained penultimate *i, and nearly all of those languages reflect *lima as *riməh*, with regular reflexes of all diagnostic phonemes. In Southern Land Dayak *lima often has a reduced reflex: Golik *rəməh* and Kembayan *rəməh* for example. Thus, in Bidayuh, just like Southern Land Dayak, there is no correlation between the retention of a high vowel and that vowel's reconstructability as a full vowel.

Regarding reflexes of PMP *luzaq 'to spit' (PLD *rūjaʔ), we have a case where a full high-vowel is reconstructed due to its retention in Bidayuh and Southern Land Dayak. It has been shown, however, that the retention of a vowel in either subgroup does not imply its reconstructability as a full vowel. Furthermore, some Southern Land Dayak languages have irregularities, where reflexes of *luzaq show an irregular devoicing of PMP *z [ʤ] and inexplicably replaced *q with *h*: Golik *ŋərucuh* and Ribun *rucoh*. Jangkang does have a voiced reflex of *z, but it also has an irregular *q reflex in *ŋorujah*.

All of this, added to the fact that full high-vowels do not have any Benyadu-Bekati' support, provides a sound argument that there was no full and reduced distinction in Proto-Land Dayak high vowels. Any full-reduced distinction that might have existed must be limited to the low vowel. PLD *rūjaʔ, despite its apparent native reflex of PMP *l and *q, as such can be ruled out and replaced with an etymon exhibiting a regular vowel, resulting in PLD *rujaʔ.

4.3 NATIVE VOCABULARY WITH FULL VOWELS. Despite the methodological issues associated with most reconstructed full-vowel vocabulary,

there are cases where natural sound change may explain full vowels in modern languages. In all cases it appears that where *h appeared in the onset of the penultimate syllable of three-syllable words (either root-words or suffixed disyllables) it deleted, and the two adjacent vowels gave rise to full vowels in modern languages. Some of these changes occurred in words that are reconstructable to PLD; others, however, are restricted to Bidayuh-Southern Land Dayak.

TABLE 18. FULL-VOWEL INNOVATION THROUGH *H DELETION IN NATIVE VOCABULARY

Reconstruction	pre-deletion	h-deletion	Rensch et al. reconstruction
*suRuk-an 'to hide'	*suhukan	*suukan	*sūkan
*qahəlu 'pestle'	*ahəlu	*aəlu	*āruh
*tahəp-an 'winnow'	*tahəpan	*taəpan	*tāpan (B-SLD only)
*baqəRu 'new'	*bahəʔu (m)	*baəʔu	*bāʔuh (B-SLD only)

*suRuk-an 'to hide' Rensch's reconstruction *sūkan 'to hide' has reflexes outside Land Dayak which point to earlier *suRuk with suffixation in a number of modern languages reflecting *suRuk-an. Outside evidence includes Kadorih *nasuhuk*, Ngaju *mañahukan*, Bakumpai *mənəhokan*, Asap *ñurukan*, Malay *suruk* 'to crouch down; duck' and *bersurukan* 'to play hide and seek', Proto-Kayanic *suhuk which may be reconstructed with evidence from Ngorek *ñook*, Merap *muhuə̯ʔ*, and Kelai *suk*, and Proto-Kenyah *sook which can be reconstructed with Lebo' Vo' *sook* and Lepo' Tau *ñook* (*R regularly deletes in both).

The Sungkung reflex of *suRuk-an suggests that *h, from *R, was present in PLD. Sungkung has *suhkatn*, where the preaspirated *hk* likely reflects *suhukan, with intervocalic *h intact. Because *R is not reflected as *r* in any Land Dayak language, the Benyadu word *ñarukatn* is best thrown out as a borrowing from a Malayic source given the *R reflex. (Malay forms do occur with the -an suffix as noted above in *bersurukan*.) With the Sungkung evidence, however, PLD *sūkan can be replaced with *suhuk-an from earlier *suRuk-an.

*qahəlu 'pestle' Penultimate onset deletion is clearly observable in reflexes of PLD *āruh, which went through the following stages: PMP *qahəlu > *qaəlu > *aəru > PLD *āru. Several diagnostic phonemes indicate that *āru is native, including the closing of the open final syllable with glottal stop in Benyadu-Bekati' (Rara and Sara Bekati' *aruʔ*) but with *h* in Bidayuh and Southern Land Dayak (Singai *aruh*, Bengoh *aruh*, Bukar *āruh*, Jangkang *aruh*). The shift of PMP *l to PLD *r is also reconstructable to PLD.

*tahəp-an 'winnow' Rensch does not reconstruct *tāpan (and *bāʔuh 'new' below) to PLD because of a lack of attestation across primary branches, and therefore does not appear in the list of reconstructed PLD full-vowel vocabulary. It does, however, reflect PMP *tahəp with regular *h deletion and vowel

coalescence after suffixation: *tahəp > *tahəp-an > *taəpan > tāpan. Rara, a Benyadu-Bektai' language has *nayap* 'to winnow' which is similar to *tahəp, but has irregular reflexes of both *h and *ə (assuming homorganic nasal substitution as an explanation for the initial nasal), so may just be a chance resemblance. Because *tahəp can be reconstructed to PMP with outside evidence, *tāpan may be reconstructed to PLD even without Benyadu-Bekati' evidence.

*baqəRu 'new' In Bidayuh and Southern Land Dayak, PMP *baqəRu is reflected as *baʔuh*, or some variant, with a full vowel. Like *suRukan, *qahəlu, and *tahəpan, the long vowel is explainable as the result of *-h-deletion and subsequent vowel coalescence. With reflexes of *baqəRu, however, an additional step of irregular metathesis is necessary: *baqəRu > *baRəʔu > *bahəʔu > *baəʔu > *bāʔu. Metathesis in this word is irregular, but examples in other subgroups suggest that *baqəRu was prone to metathesis. The proposition of irregualr sound change weakens the analysis, but even if the form is rejected, Benyadu-Bekati' languages have *bahu*, so the full vowel is not reconstructable to PLD at any rate. Adelaar (1992: 387) presented evidence for metathesis of r and h in Kendayan reflexes of Malayic trisyllables, but this could not have acted as a source for *bāʔu, given the native reflex of *q.

4.4 THE REMAINING VOCABULARY. The previous sections have identified reconstructed vocabulary with full vowels that (i) should be removed from the reconstruction, (ii) arose through regular deletion of *h in the onset of the penultimate syllable, and (iii) present contradictory evidence and cannot be accurately judged. This leaves 8 reconstructions with *ā that cannot be explained as having arisen through *h deletion, but cannot be ruled out as reconstructions because of their regularity.

*āsəŋ 'breath' Blust and Trussel (ongoing) reconstruct "Western Malayo-Polynesian" *qaseng 'to breath', which is reconstructed to PLD by Rensch et al. (2012) as *āsəŋ. Evidence for this word is found across primary divisions in Land Dayak: Rara *asukŋ*, Singai *asəŋ*, Biatah *āsəŋ*, Sungkung *masəkŋ*, and Golik *ŋasəkŋ* for example. The word also contains a diagnostic phoneme (*ə in the final syllable) that rules it out as a borrowing from any Bornean Malayic source.

Upon first glance, evidence from other subgroups suggests that the long vowel may have arisen from the deletion of *h (from *R) in the onset of the penultimate syllable of a more ancient three syllable word. Barito languages contain the evidence, where Blust and Trussel (ongoing) list Ba'amang *mana-hanseŋ* and Kapuas (Barito) *na-haseŋ*. They go on to note that "Ba'amang, Kapuas /h/ normally derives from *R, and only rarely reflects *q; its presence in the forms cited here remains somewhat problematic." This implies that if *h* ultimately comes from *R in these Barito forms, then one may reconstruct *Rasəŋ, which, if part of a three syllable word (*aRasəŋ) could concievabley result in Proto-Land Dayak *ahasəŋ with

subsequent *h deletion giving rise to a full vowel. Other subgroups, however, obscure this comparison. Languages with intact reflexes of *R do not agree on reconstructing a three-syllable word. Simalur provides the best counter-evidence, where *R- is reflected as *l* in *latus* 'hundred (in women's speech)' from PMP *Ratus, *luma* 'house' from PMP *Rumaq, and *lusuʔ* 'ribs' from PMP *Rusuk and where *qasəŋ is reflected as *asəŋ*, ruling out an initial *R (Blust p.c. July 20, 2018). Because of this uncertainty, the full vowel in PLD *āsəŋ remains unexplained.

*māmuh 'bathe' Rensch et al. typically reconstructed vowel-final words with a final *h based on Bidayuh and Southern Land Dayak evidence, but because word-final vowels were closed with glottal stop in Benyadu-Bekati', the reconstruction should have an open final syllable. The reconstruction supported in this study is thus *māmu. The full vowel, however, cannot be explained.

*bātuh 'stone' Like 'bathe', this reconstruction should have an open final syllable. It ultimately reflects PMP *batu, with regular reflexes of the final open syllable in all Land Dayak languages. It is therefore a legitimate candidate for reconstruction to PLD although the full vowel, again, remains unexplained.

*ābuh 'ash' PMP *qabu is reflected with a full vowel throughout Land Dayak. Like *māmuh and *bātuh, above, this word should not be reconstructed with a final *h. With that in mind, Land Dayak languages have regular reflexes of the final open syllable, and this word should thus be reconstructed with no available explanation for the development of the full vowel.

*mānuk 'bird' PMP *manuk contains no diagnostic phonemes, and because Malayic languages have *buruŋ*, not *manuk*, it is not likely a borrowing. It is robustly attested in almost all Land Dayak languages and should be reconstructed with a full vowel.

*jāʔat 'bad' PMP *zaqat 'bad' became PLD *jāʔat 'bad'. Technically, this word is restricted to the Bau-Jagoi branch of Bidayuh, and cannot be reconstructed to PLD with internal evidence. Benyadu-Bekati' borrowed Malay *jahat*, Biatah languages reflect *arəp, Bukar-Sadong and Southern Land Dayak both reflect *biʔik. However, because PMP *zaqat can be reconstructed with outside evidence, *jāʔat remains a legitimate candidate for reconstruction to PLD.

*pāndan 'pandanus' PLD *pāndan is a difficult case. It is only attested in Rara *panatn*, Sara *panatn*, Kembayan *panat*, and Ribun *pandaŋ*. These words could reflect PMP *paŋdan with regular nasal assimilation, but could also be borrowings from a Malayic source (Malay *pandan*, Kendayan *panat*). It should be reconstructed because of its attestation across

primary divisions, but it remains a weak case, considering the possibility of borrowing.

* ñāŋan 'light weight' There is more conflicting evidence regarding Rensch's reconstruction *ñāŋan 'light weight'. First, Benyadu-Bektai' forms reflect a medial *h, supporting a reconstruction *ñahan: Benyadu *ñahan*, Bekati' *ñahan*, and Rara *ñaan*. Only Sara *ñāŋan* straightforwardly reflects Rensch's *ñāŋan reconstruction. There is no regular path through which an *h : ŋ* correspondence may have arisen. Cluster reduction may provide an answer, and Kendayan, a Malayic language, provides some interesting evidence. In Rensch et al. (2012:391), the Kendayan word for light is listed as *ñaŋhan*, with an -*ŋh*- cluster.[8] Kendayan is not a Land Dayak language, so it is still unclear what sort of relationship, if any, exists between the Land Dayak words and Kendayan. If the native process of *h deletion were to be used to explain *ñāŋan, it would have to rely on metathesis, given the Kendayan evidence: *ñaŋəhan > *ñahəŋan > *ñaəŋan > *ñāŋan. Although there is some precedent for *h deletion in clusters (reflexes of *baqəRu 'new', which metathesized to PLD *bahəʔu gave Proto-Benyadu-Bekati' *bahuʔ but Proto-Bidayuh-Southern Land Dayak *bāʔuh), there is simply too little evidence to continue down this path of speculation. Until the history of this word is better understood, it is left unresolved here.

After analyzing the data, there are 10 reconstructable items with a full vowel (*ā), which are presented below. Two additional items developed a long vowel in PB-SLD after PLD *h from PMP *R was lost. They are listed as well.

PLD full-vowel reconstructions:
*āru 'pestle
*tāp-an 'to winnow'
*māmu 'to bathe'
*bātu 'stone'
*ābuh 'ash'
*āsəŋ 'breath'
*mānuk 'bird'
*jāʔat 'bad; evil'
*pāndan 'pandanus'
*ñāŋan 'light weight'

Secondary full vowels:
*baqəRu > PLD *bahəʔu 'new'
*suRuk-an > PLD *suhuk-an 'to hide'

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8. A reviewer pointed out that the typical Kendayan word for 'light' is *rehetn*. The form recorded in Rensch et al. may thus be a borrowing or some other non-standard variant.

5. PROTO-LAND DAYAK VOWELS AND VOWEL QUALITY. After dealing with the reconstructed full-vowel vocabulary, a new hypothesis on PLD vowels may be proposed. This section attempts a reconstruction of phonetic qualities for Proto-Land Dayak vowels along with a reduced number of phonemic distinctions.

To better discuss the reconstructed phonetic quality of vowels, phonemic symbols are replaced with more accurate phonetic representations. This only effects words written with a reduced low vowel, ă, which surfaces as a schwa in most languages, and words written with ə, which usually surfaces as a barred i, ɨ (Rensch et al. 2012:135).

5.1 REFLEXES OF VOWELS IN PENULTIMATE SYLLABLES. The development of vowels in Land Dayak is historically position-sensitive. Because of this, and because full vowels were restricted to penultimate syllables only, this discussion is split between reflexes of vowels in penultimate syllable and vowels in word-final syllables. In the following table, the phonetic realizations of PMP vowels are compared in several languages, with discussion after.

TABLE 19. REFLEXES OF VOWELS IN PENULTIMATE SYLLABLES

PMP	PLD	Benyadu	Bekati'	Singai	Hliboi	Biatah	Bukar	Ribun
-	(*ā)	a	a	a	a	a	a	a
*a	*a	a	a	ə	i	ə	ə	o
*ə	*ə	a	a	u; i; a	Ø	u; i; ɨ	u; i; ɨ	u; i
*i	*i	i	i	i; u	Ø	i	i	i
*u	*u	u	u	u; i	Ø	u	u	u

*a PMP penultimate *a has numerous reflexes in modern Land Dayak languages. In Benyadu-Bekati' it is retained as *a*, but in Bidayuh-Southern Land Dayak it is reflected as [ə], [o], and [i]. The B-B evidence suggests that *a was phonetically [a] in PLD, but the reconstruction is not so straightforward. As noted earlier, Mali and Be' Aye', two dialects that share both phonological and lexical innovations with Benyadu-Bekati', differentiate full from reduced *a in the penultimate syllable. To recap, Be' Aye' reflects PMP *laŋit 'sky' as *riŋit* and PLD *tarun 'forest' as *turutn*. Inherited *a harmonized to vowels in the final syllable if they were high, but the full vowel reflexes remain *a* regardless of environment. This is not only true for full-vowel reflexes that have been thrown out because of phonological irregularities, but also in vocabulary that has not been discarded, including reflexes of PLD *bātu (Be' Aye' *batuʔ*) and *mānuk (Be' Aye' *manuk*) that must be reconstructed to PLD because of regularity across primary divisions. Thus, although *ā, *a, and *ə all have the same reflexes in Benyadu and Bekati', they could not have had identical reflexes in the Proto-Benyadu-Bekati' if Mali and Be' Aye' evidence is considered.

*ə PMP *ə generally merged with *a as *a* in Benyadu-Bekati', but this is not reconstructable to PLD, as *ə maintains distinct reflexes in Bidayuh-Southern Land Dayak. There, it is invariably reflected as a high vowel, which implies that in Proto-Bidayuh-Southern Land Dayak the quality of the vowel was *ɨ, and it had been undergoing vowel-harmony effects where it surfaced as *u where *u appeared in the final syllable, and as *i where *i did so.

Because Benyadu-Bekati' merged *ə and *a after the breakup of Proto-Land Dayak it is unclear what should be reconstructed as the phonetic value of penultimate schwa the highest level. As noted below, Benyadu-Bekati' reflects schwa as *u* in final syllables, which suggests that at an earlier stage it had already raised to *ɨ in the final syllable. With this in mind, it can be hypothesized that PLD schwa was pronounced as a high vowel [ɨ]. There is also evidence from a limited number of cases in Benyadu-Bekati' where *ə appears to have resisted merger with *a. Vowel harmony, a process with irregular and complex iterations throughout Land Dayak, prevented the merger of *ə and *a in Benyadu *buus*, from Proto-Land Dayak *bəʔəs 'to sleep', and *buñu* from *bəñu 'lime powder'. If vowel harmony was inherited in these fossilized forms in Benyadu-Bekati' it provides evidence that *ə was pronounced high, [ɨ], since harmony affected high vowels.

*i; *u Except in Hliboi where all high penultimate vowels were deleted, sporadic reduction of high vowels throughout B-SLD, and cases of vowel harmony/disharmony in some Bidayuh languages, the high vowels tend to maintain their features, and are reconstructed to PLD with no changes in quality.

5.2 REFLEXES OF VOWELS IN FINAL SYLLABLES. The following table give phonetic pronunciations of vowels in final syllables. Reflexes of PMP *a are further subdivided into *a in closed final syllables and *a in open final syllables (*-a) where the vowel has merged with *ə.

TABLE 20. REFLEXES OF VOWELS IN FINAL SYLLABLES

PMP	PLD	Benyadu	Bekati'	Singai	Hliboi	Biatah	Bukar	Ribun
*a	*a/*-ə	a; -a/-u	a; -a/-u	a; -i	a; -o	a; -i	a; -i	a; o; -u
*ə	*ə	u	u	ɨ	o	ɨ	ɨ	i; u
*i	*i	i	i	i	i	i	i	i; e
*u	*u	u	u	u	u	u	u	u; o

*a PMP *a is reflected as *a in closed final syllables across all languages and so should be reconstructed as [a] in this position. In open final syllables, however, *a has merged with *ə, where it is reflected as a high-vowel in most languages but as a mid-vowel in some Bau-Jagoi languages.

*ə PMP *ə is reflected as a high vowel in the final syllable in most languages, with the notable exception of Bau-Jagoi where some languages reflect *ə as o. Several languages, Be' Aye', Biatah, and Bukar, reflect *ə as [ɨ], and others

reflect it as either u or i. Where *ə became *u* or *i*, it is argued to have gone through an earlier stage as [ɨ]. It is a high vowel across primary divisions and is thus reconstructed as such in PLD.

*i; *u The high vowels are retained unchanged across all languages and can be reconstructed as such in PLD.

5.3 PLD VOWEL INVENTORY AND PRONUNCIATION. Based on the above evidence, the following PLD vowel inventory is proposed. There were four main vowels (*a, *i, *u, *ə), with a fifth (*ā) likely restricted to only a handful of words, from both native sources and through early borrowing. It is proposed that *ə was pronounced more like [ɨ], given its attestation as a high vowel throughout modern Land Dayak languages. Because of the reduction of penultimate *a in all Bidayuh-Southern Land Dayak languages combined with evidence from Mali and Be' Aye', it is proposed that *a was reduced in Proto-Land Dayak. Its pronunciation may have been closer to schwa in the penultimate syllable, but was reflected as a low vowel in the final syllable. The other vowels had their typical pronunciations.

**TABLE 21. HYPOTHESIZED PHONETIC VALUES
OF PLD VOWELS**

PMP	PLD	Phonetic value (penult)	Phonetic value (ultima)
-	(*ā)	[a]	-
*a	*a	[ə]	[a]
ə/-a	*ə	[ɨ]	[ɨ]
*i	*i	[i]	[i]
*u	*u	[u]	[u]

TABLE 22. PROTO-LAND DAYAK VOWEL SYSTEM

	front	central	back
close	*i	*ə [ɨ]	*u
mid			
open		*a, (*ā)	

6. CONCLUSION. This study focused on the reconstructability of a full versus reduced distinction in the vowels of Proto-Land Dayak penultimate syllables. Such a distinction was originally reconstructed in Rensch et al. (2012) with evidence from Bidayuh and Southern Land Dayak for all penultimate vowels: *ă : *ā, *ī : *ĭ, *ū : *ŭ, *ɔ̄ : *ɔ̆.

Much of the present study focused on evaluating the individual reconstructed full-vowel vocabulary for irregularities in reflexes and diagnostic phonemes, for lack of attestation across subgrouping boundaries, and for other irregularities by which they may be rejected as Proto-Land Dayak vocabulary. After analyzing the reconstructed vocabulary, a core set of

full-vowel reconstructions remains. Some of these have regular reflexes of diagnostic phonemes and a viable path through which full vowels may have developed. This involves the regular deletion of *h (from PMP *h or *R) in the onset of the penultimate syllable of three syllable words leading to a merger of the antepenultimate and penultimate syllable vowels to a full vowel. It is unlikely that full vowel words in modern languages that reflect *R in the onset of the penult had full vowels in PLD however, because evidence suggests that *R was retained as *h in this position, only to be later deleted in subsequent sound change. Full vowel words that reflect PMP *h in the onset of the penultimate syllable (*VhV . . .), however, may represent legitimate full-vowel reconstructions. Other words have conflicting reflexes where definitively Land Dayak sound changes, like the shift of *l to *r*, appear alongside irregular changes. These words continue to pose a problem for reconstructed full-vowel vocabulary. The most likely explanation is very early borrowing, but even then it is difficult to identify a source for these early borrowings and much work remains to be done on the issue.

After reviewing the data, it was shown that only minimal evidence is available in Benyadu-Bekati' for full-vowel distinctions, and that evidence is restricted to the low vowel *a. The other hypothesized full-vowels, *ī, *ū, *ə̄, are not reconstructable for PLD. The PLD vowel inventory was thus *a, *ə [ɨ], *u, and *i, with minimal evidence for a peripheral *ā that may have been restricted to early borrowings and words that reflect *h in the onset of the penultimate syllable in three syllable words. Remaining research may show that certain subgroups within LD further innovated full-vowels in native vocabulary. Bidayuh language in particular often contain the bulk of the full-vowel evidence. However, as most of the forms have been thrown out due to evidence that they were borrowed any attempt to reconstruct a more robust set of full vowels to Proto-Bidayuh, Proto-Southern Land Dayak, or even Proto-Bidayuh-Southern Land Dayak will need to take special care to eliminate potential borrowings from consideration.

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