

# Phonemic Inventory of Marshallese, and some General Properties

Sara Blalock Ng

15 December, 2017

# 1 Overview

Marshallese, also known as Ebon, is an Austronesian language spoken in the Marshall Islands. The language boasts approximately 53,000 speakers worldwide, and has entertained interest from scholars due to some notable features of its phonology (Simons and Fennig 2017).

## 2 Consonant Inventory

Marshallese exhibits a fairly robust consonant inventory, especially in comparison to the rather sparse phonemic inventory of vowels (see Section 3). While the major analyses of the language share most of their inventory in common (after accounting for differences in transcription), there are notable contentions.

Table 1 gives a phonemic inventory of consonant phonemes in Marshallese. Note that all the consonants in this table also have a long (geminate) form in the inventory.

Table 1: Consonant Phonemes of Marshallese

		Primary Place of Articulation							
		Bilabial		Alveolar			Palatal	Velar	
		Palatalized	Velarized	Labialized	Velarized	Palatalized		Labialized	
Manner	Stop	p <sup>x</sup>	p <sup>j</sup>	t <sup>x</sup>	t <sup>j</sup>			k	k <sup>w</sup>
	Nasal	m <sup>j</sup>	m <sup>x</sup>	n <sup>w</sup>	n <sup>j</sup>	n <sup>x</sup>		ŋ	ŋ <sup>w</sup>
	Trill			r <sup>w</sup>	r <sup>j</sup>	r <sup>x</sup>			
	Lateral			l <sup>w</sup>	l <sup>j</sup>	l <sup>x</sup>			
	Approximant						j	ɥ	w

### 2.1 Rounding vs. Palatalization

Where there exists two phonemic segments with the same place and manner of articulation, Abo (1976) posits two forms on the segment, one rounded and one unrounded. These are transcribed with superscript w and ɥ, i.e. the segment /r/ in their inventory has phonemic forms /r<sup>w</sup>/ and /r<sup>ɥ</sup>/. Note that these diacritic forms with /ɥ/ correspond most closely with the unmarked form of the segment in standard IPA transcription. Willson (2003), Bender (1968) and Hale (2000) support a system wherein some consonantal segments can be velarized, palatalized, or labialized. Thus, /r<sup>w</sup>/, /r<sup>j</sup>/ and /r<sup>x</sup>/ are all contained in the consonant inventory. In addition, Bender (1968) notes that “the labialized velars and liquids contrast with their non-labialized counterparts only before front vowels.” Zewen (1977) agrees that some consonant segments can be palatalized, but does not maintain a three-way contrast.

I choose to adopt the system found in Choi (1992), as this description of the consonant system follows from modifications made to the sketch in Bender (1968) based on acoustical evidence.

## 2.2 h vs. uʔ

The original analysis of the consonant inventory in Bender (1968), includes the phoneme /h/ within its set of 22 consonant phonemes. Choi (1992) criticizes this generalization, arguing that where Bender uses /h/, the phoneme /uʔ/ is more appropriate. By treating the phoneme as an approximant, it becomes possible to create an analysis of possible syllable structures and vowel lengthening using intervocalic approximants as a possible configuration. Willson (2003) adopts Choi's convention, as do I.

## 2.3 Gemination

Choi (1992) notes that all of the consonant phonemes can also appear as geminates. However, contrastive length only appears in limited context. Bender (1968) shows that gemination can occur within morphemes. Willson (2003) additionally asserts that gemination cannot occur in word-initial position. This conflicts with many of the transcriptions given in Abo (1976). For example, the words *leʔok* 'to give away' and *lleʔok* 'to be changed' are given with the phonetic forms [leyʔaq] and [l:eyʔaq]. The [q] in these examples is based on a different transcription system than the standard I present. Both analytic positions are in contrast to Zewen (1977), who asserts that only vowels have distinctive length in Marshallese. Abo (1976) provides phonemic transcription for *ura* 'person killed and buried with a deceased chieftain' and *urra* 'dialectical variant of *kōjjaromrom*' as [wir<sup>w</sup>auʔ] and [wir<sup>w</sup>:auʔ], respectively. (What they judge as phonemes also occasionally conflicts with the analysis I adopt, as can be seen in these examples). While consonant length is not discussed at length in any of these analyses, I believe that the analysis in Choi (1992) offers reasonably compelling evidence for the inclusion of geminates in the inventory. Furthermore, the description of syllabification in Bender (1968) shows that there do not exist consonant clusters in onset positions, so the first pair of examples provides clear evidence that these consonants are indeed geminates and not adjacent identical segments.

## 2.4 Allophony

Consonantal allophony is rare in Marshallese. Choi (1992) notes three occasions where allophony may occur. They state that intervocalically, Marshallese stops may be partially voiced. Word finally, they lack release. Choi notes that the phoneme /tʃ/ has allophones [tʃ], [tʃ̥], and [tʃ̥̥], which occur in free variation.

## 2.5 Near-Minimal Sets

The following tables contain some minimal or near-minimal sets for the given phonemes at each manner of articulation. Geminates are not included in these sets, however it can be shown that there are environments in which contrastive length can occur (see above). Because of co-articulatory constraints (e.g. [u] only appears with low vowels), near minimal pairs are not available for all segments with each manner of articulation.

Table 2: Non-Velar Stops

Transcription	Gloss
t <sup>j</sup> ep <sup>j</sup>	‘to return’
t <sup>j</sup> Λp <sup>x</sup>	‘work shift’
t <sup>j</sup> Δt <sup>x</sup>	‘few, some’
t <sup>j</sup> ip <sup>j</sup>	‘cheek’
t <sup>j</sup> at <sup>x</sup>	‘deep water’
t <sup>j</sup> et <sup>j</sup>	‘snapper fish’

Source: (Choi 1992)

Table 3: Velar Stops

Transcription	Gloss
kun <sup>x</sup>	‘to build’
k <sup>w</sup> uun <sup>x</sup>	‘to extinguish’

Source: (Willson 2003)

Table 4: Nasals

Transcription	Gloss
n <sup>j</sup> ej	‘that (close to you)’
n <sup>x</sup> Δj	‘snapping sound’
n <sup>w</sup> o	‘that’
ŋej	‘when’
ŋen <sup>j</sup>	‘to’
ŋeŋ	‘dry and brittle’
m <sup>j</sup> εa:n <sup>j</sup>	‘pandanus leaf’
m <sup>x</sup> a:n <sup>j</sup>	‘front’

Source: (Abo 1976)

Table 5: Trills and Laterals

Transcription	Gloss
r <sup>j</sup> ik	‘to be small’
ʃik	‘ocean side (of an atoll)’
r <sup>x</sup> ujkin <sup>j</sup>	‘riggings of boats’

Sources: (Zewen 1977), (Abo 1976)

Table 6: Approximants

Transcription	Gloss
jiw	‘the’
ji	‘at, in, on’
jiɛu	‘Where?, How?’

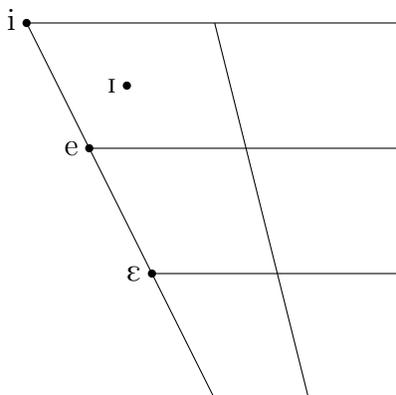
Source: (Abo 1976)

### 3 Vowel Inventory

#### 3.1 Inventory

Most sources cite either three or four vowel phonemes in Marshallese. These phonemes differ in only height and tongue root position, with 12 possible allophones occurring in surface representation varying in their backness and rounding (Willson 2003). Willson’s four phoneme system is compelling within the context of the Autosegmental approach which they take. Choi (1992), in contrast, argues that tongue root position is not a contrastive mark of phonemes in Marshallese, and prefers a three phoneme system of /HIGH/, /MID/, and /LOW/. Bender (1968) speaks to the possibility of such a three phoneme system, but also represents the four phonemes, including segments which vary in their high and tongue root position. In addition, Hale’s 2000 posits the same four-phoneme system as Willson (2003). While Zewen (1977) also asserts a four-phoneme system, the phonemes they choose are significantly different than the other sources. By majority agreement, I include a four-phoneme system, shown in Figure 1. The phonemes themselves are representative of the most common transcriptions among these authors, although individual representations are varied across the literature.

Figure 1: Vowel Phonemes of Marshallese



### 3.2 Influence of Consonantal Place

Table 7 gives an overview of allophonic vowel families in Marshallese.

Table 7: Phonemes and their Allophones

Phoneme	Allophones
/i/	[i, ɯ, u]
/ɪ/	[ɪ, ʏ, ʊ]
/e/	[e, ɛ, ɔ]
/ɛ/	[ɛ, a, ɔ]

Allophony in Marshallese is describable with two rules. First, phonemes are realized as their back, rounded allophones (u, ʊ, o, or ɔ, respectively) adjacent to labialized consonants. Second, phonemes are realized as their back unrounded allophones (ɯ, ʏ, ɛ, and a) adjacent to velarized consonants (Willson 2003). This is summarized in Rules 1 and 2 below:

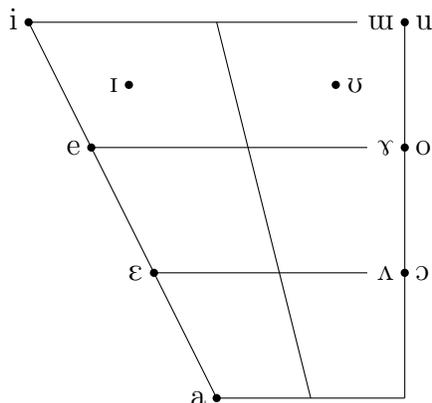
$$\text{Rule 1: } V \longrightarrow \left[ \begin{array}{l} +\text{back} \\ +\text{round} \end{array} \right] / ([ +\text{labial} ]) \text{ \_\_\_\_ } ([ +\text{labial} ])$$

$$\text{Rule 2: } V \longrightarrow [ +\text{back} ] / ([ +\text{velar} ]) \text{ \_\_\_\_ } ([ +\text{velar} ])$$

The order of segments in these rules must be allowed to vary, i.e. the velarized or labialized consonant can be to the left or the right of the vowel. This is because Marshallese allows CV, VC and CVC clusters (Bender 1968).

Figure 2 contains the vowel allophone inventory for Marshallese.

Figure 2: Allophones of Marshallese



There is some question as to whether the set of allophones contains a set of central unrounded vowels or back unrounded vowels. Bender (1968) prefers the central allophones analysis, but Choi (1992), Willson (2003), and Hale (2000) use back vowels in their allophonic inventories. The latter analysis is provided in Figure 2. Additionally, vowels in surface form

can be long or short, with length being contrastive in certain environments (like in CVC words). For example, [jok] ‘alight’ contrasts with [jo:k] ‘ashamed’ (Bender 1968).

Interestingly, Bender (1968) gives near-minimal pairs for all of the vowel allophones. However, they also condition this data, saying that vowel-final words exhibit exceptional behaviors in the phonology. A sample is reproduced in Table 8. For the purposes of this language, it is useful to classify [a] and [ʊ] as back vowels.

Table 8: Minimal Set for Allophones

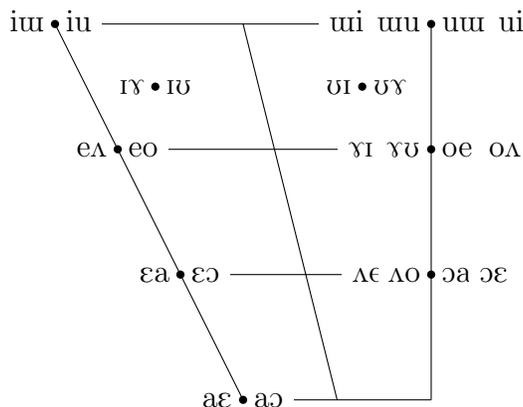
PHONEME	FRONT		BACK UNROUNDED		BACK ROUNDED	
/i/	[mi]	musical syllable	[mu]	‘peer’		
/ɪ/	[mɪ]	‘fortress’	[mʌ]	‘elastic’	[mʊ]	‘healed’
/e/	[me]	‘which’				
/ɛ/	[mɛ]	‘breadfruit’	[ma]	‘but’	[mɔ]	‘taboo’
/i/	[ki]	‘key	[au]	‘dying’	[tu]	‘gizzard’
/ɪ/	[kɪ]	‘porpoise’	[aʌ]	‘my’	[tʊ]	‘get off’
/e/	[ke]	question particle	[aʌ]	‘swim’	[to]	‘channel’; ‘cord’
/ɛ/	[kɛ]	‘these’	[aa]	‘but’	[tɔ]	‘sugar cane’

In this table, for words containing adjacent vowel segments, these are vowel sequences and not diphthongs.

### 3.3 Possible Diphthongs in Inventory

Willson (2003) asserts that a set of 24 diphthongs exist in the allophonic inventory, arising from sympathetic coarticulation with adjacent consonants. Specifically, a diphthong occurs when a vowel is between two consonants whose secondary places of articulation are different. The diphthong is seen as a way of transferring from one place of articulation to the other. The set of diphthongs is given in Figure 3.

Figure 3: Possible Diphthongs in Marshallese



## 4 Suprasegmentals

### 4.1 Syllables

Zewen (1977) identifies the following syllable patterns in Marshallese: V, CV, VC, and CVC. They also note 2-syllable words are the most common, with common sequences included CV-CVC and CVC-CVC. For 3-syllable words, Marshallese favors the sequence CV-CVC-CVC. Willson (2003) asserts that for polysyllabic sequences containing adjacent consonants, consonant sequences which are not homorganic are prohibited. This affects the possible CVC-CVC and CV-CVC-CVC sequences, as well as other less common polysyllable sequences.

### 4.2 Intonation and Stress

Marshallese does not have inflectional or derivational tone. However, changes in pitch and intensity comprise the intonational system of the language.

Zewen (1977) notes that while stress in Marshallese is not as distinctive as some languages (e.g. Germanic languages), incorrect stress nevertheless creates ungrammatical structures in the languages. Table 9 summaries the rules they give which are free form morphological constraints, with example transcriptions (phonemic, with secondary place of consonants not shown).

Table 9: Rules for Stress

#	Rule	Examples
1	In separately spoken words, primary stress can occur on the 3 <sup>rd</sup> final syllable.	/'lɛkɛtip/ <i>to make angry</i> /'nɛŋinmij/ <i>to be sick</i> /'jɛkele/ <i>north-easterly trade wind</i>

2	In separately spoken words, primary stress can occur on the penultimate syllable.	/me'lele/ <i>to understand</i> /ri'pipit/ <i>to be bruised</i> or /ri'pitipit/
3	In separately spoken words, primary stress can occur on the final syllable	/ke'te/ <i>wind</i> /ki'jek/ <i>fire</i> /e'εŋ/ <i>north</i> /ji'p:iin/ <i>morning</i>
4	Stress is never on the 4 <sup>th</sup> final syllable	
5	3-syllable words have initial stress unless there is a “long” syllable. In that case, the “long” syllable takes the stress. (Length is defined by Zewen as inherent to vowel quality, not gemination.)	/'ekεjet/ <i>to judge</i> /'jekεri/ <i>coconut syrup</i> vs. /jere'εn/ <i>to waste</i>
6	2-syllable words have initial stress when both syllables have the same length. When the final syllable is long and the initial short, the stress goes on the final syllable.	/'mεjεj/ <i>to be clear of underwood</i> /ne'pεr/ <i>to praise</i> vs. /kεrε/ <i>woman</i> /jele/ <i>to know</i>

Source: (Zewen 1977)

While the example [ri'pitpit] seems to violate rule 2, Zewen notes that syllables created by vowel epenthesis are ignored in placement of stress. Thus they will not affect the stress of the word they are epenthesized into, nor will they ever have primary stress.

In addition, Zewen provides examples of how stress patterns affect borrowed words in Marshallese. They note that long English words with stress on the 4<sup>th</sup> final syllable are often borrowed into Marshallese with stress on the penultimate syllable, to prevent violation of rule 4. Thus in Marshallese we find [εksə'saizɪz] (*exercises*) and [tεri'tɔri] (*territory*) in the lexicon (Zewen 1977).

Intonation in Marshallese is a combination of pitch and intensity, and is correlated with segmental length (Bender 1969). Willson notes that sentence level rising intonation marks subjects in word-final position 2008. They also argue that rising intonation is also often accompanied by a pause or break in the sound signal. Berbusse and Grama (2011) conducted an intonational analysis of recorded Marshallese using the ToBI labeling scheme. They identify several general tunes used in the language, summarized in Table 10.

Table 10: Tune Types in Marshallese

Tune Name	Tune (ToBI labels)
Basic Declarative	<b>H* L-L%</b>
Yes/No Question	<b>H* H-H%</b>
“Holding the floor”	<b>L* H-H%</b>
Back Channeling (female speaker)	<b>L* H-H%</b>
Back Channeling (male speaker)	<b>H* L-L%</b>

Source: (Berbusse and Grama 2011)

Additionally, Zewen (1977) identifies three general intonational tunes: the Falling Intonational Patter (FIP), the Level Intonational Pattern (LIP), and the Rising Intonational Pattern. They state that the terms rising, level and falling refer to both pitch and volume. Table 11 provides example glosses as categorized by Zewen.

Table 11: Intonation, with Glosses

Tune	Sentence
FIP	He is going to Rita. The ship left forom Kajkaki. I (it was me who) said it. Who gave it?
LIP	When it became evening, both went fishing again. The woman said, “That bird is mine.” He cried because his mother was away.
RIP	Where are you going? Is he sick? Tomorrow? For whom is he working

## References

- Abo, Takaji, B.W. Bender, A. Capelle, and T. DeBrum. 1976. *Marshallese-English Dictionary*. University of Hawaii Press.
- Bender, Byron W. 1968. 'Marshallese phonology.' *Oceanic Linguistics* 7(1):16-35.
- Bender, Byron W. 1969. *Spoken Marshallese: An intensive language course with grammatical notes and glossary*. University of Hawaii Press.
- Berbusse, Laura and J. Grama. 2011. 'Marshallese intonation: ToBI as a tool for language documentation.' 2nd International Conference on Language Documentation and Conservation. Honolulu, HI, February 2011.
- Choi, John D. 1992. 'Phonetic underspecification and target interpolation: An acoustic study of Marshallese vowel allophony.' *UCLA Working Papers in Phonetics* 82.
- Hale, Mark. 2000. 'Marshallese phonology, the phonetics-phonology interface and historical linguistics.' *The Linguistic Review* 17(2-4):241-258.
- Simons, Gary F. and Fennig, C.D. (eds.). 2017. *Ethnologue: Languages of the World*, Twentieth edition. Dallas, Texas: SIL International. Online version: <http://www.ethnologue.com>.
- Willson, Heather. 2003. 'A brief introduction to Marshallese phonology.' Ms., UCLA.
- Willson, Heather. 2008. 'Subject positions in Marshallese' Doctoral dissertation, University of California, Los Angeles.
- Zewen, Francois X.N. 1977. 'The Marshallese language: A study of its phonology, morphology, and syntax.' Thesis, *Veroffentlichungen des Seminars fur Indonesische und Sudseesprachen der Universitat Hamburg* 10.