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THE SYLLABLE STRUCTURE OF SERI*

Stephen A. Marlett

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1 Introduction

The syllable structure of Seri is the focus of study of Moser and Moser 1965, and is also briefly discussed in Marlett 1981 and Marlett and Stemberger 1983. None of these works, however, adequately describes the important features of the Seri syllable. In this paper I begin to rectify this situation by presenting a more detailed discussion of this aspect of the Seri language. While various theoretical issues are discussed, my main objective is to provide a comprehensive understanding of Seri syllable structure and facts which are relevant to it. In some cases I argue that certain data support a particular structure over another, but in some cases alternative treatments may also be compatible with the facts. These facts are relevant to a number of issues, including the sonority hierarchy, the internal structure of syllables (especially the nucleus), the representation of long vowels, the representation of round consonants, the CV tier, the relationship of stress to syllabification, and the distinction between the syllable structure of inflected words and uninflected words.

In the first several sections below I discuss primarily patterns which can be found in monomorphemic words. The syllable structure of

such words, while more complex than many other languages, is still relatively restricted. Sect. 7 summarizes these facts. In Sect. 8 I take up inflected words. Unlike many other languages where inflected words generally have the same syllable structure as uninflected words, in Seri these derived words have radically different syllables. Affixation is responsible for all four-segment onsets and codas, and for almost all three-segment onsets described in previous studies. Various constraints and restrictions which are developed for uninflected words turn out to be irrelevant.

2 Consonants and vowels

The segmental inventory of Seri is given in (1).

(1) Consonants	Stops	p	t	k	k ^w		
	Fricatives	f	s	ɬ	ʂ	x	W X x ^w
	Nasals	m	n				
	Glides			y			?
	Vowels	i	e	a	o		

In addition to the consonants listed here there is a voiced lateral, which is almost nonexistent in the present-day language,¹ and a flap *r*, which is limited to loanwords.² I do not deal with these in the following study. The symbol *f* represents a bilabial voiceless fricative, *ʂ* a voiceless retroflexed alveopalatal fricative, *W* a voiceless spirantized *w*, and *X* a voiceless uvular fricative.³ The round consonants *k^w*, *W*, and *x^w* have an extremely limited distribution due to some fairly transparent historical developments. They are therefore basically ignored in what follows, except in Sect. 3.4 and 5.3, in which their distribution is described.⁴ Glottal stop is listed as a glide since it patterns with the sonorants, as shown below.

With respect to the vowels, the symbol *e* represents a low front vowel [ə]; its frequency in words is much lower than the other vowels. The language allows a vocalic segment to occupy two vowel positions: i.e., Seri has long vowels. This analysis, which is different from that of Moser and Moser 1965, is discussed in Sect. 4.1 below.

Stress generally occurs on the first syllable of the root and is discussed in Sect. 4.2. However, I write it below whenever it is not on the first syllable of the word.

3 Onsets

3.1 Syllables without onsets

Although syllables without onsets are much rarer than those with onsets in Seri, they do exist.

In (2) I present words which begin with a vowel, divided according to the stress pattern and vowel length. Long vowels do not occur in unstressed syllables (see Sect. 4.2 below for details regarding stress and this constraint); therefore there is no sixth pattern V:CV. The parenthesized elements indicate that words of this type are found only with a morpheme boundary following the vowel.

(2) Monosyllabic words

VC...

ak 'the'

ix 'different'

oX 'thus'

V:C...

a:Xt 'plant (sp.)'

e:x 'strength'

i:kx 'coarse sand'

o:ɬ 'organpipe cactus (sp.)'

Bisyllabic words

VC̣...

ašox 'star'

(i-tak)⁵ 'his/her bone'

Ṿ:C...

a:mo 'far'

e:nim⁶ 'knife'

(i:-stoX) 'their breath'

o:šXɬim 'itching rash'

VCṾ...

(a-sā:k) 'his son'

(i-ɬit) 'his/her head'

otāk 'toad'

A word such as **koai** (NOM-D-delouse) might at first glance appear to be an example of a word containing a non-initial syllable without an onset. Nevertheless, in the analysis presented below, as in Moser and Moser 1965, syllables without onsets occur only word-initially. This word is analyzed as involving a single syllable with three vowel positions. Evidence for this analysis is presented in Sect. 4.3.

3.2 Simple onsets

Any consonant (excluding the round ones from discussion, as indicated in Sect. 2) may occur in a simple (i.e. single segment) onset. The fricatives **f**, **ɬ**, and **x** are very rare as word-initial onsets, but they occur with greater frequency word-medially. (I make note of the skewed distributions that I have observed, but my analysis does not necessarily deal with all of them.) Word-medial consonant clusters are taken up in Sect. 6. (The glosses for the words in (3) are included in the appendix.)

(3)	CV̌...	CV...	...VCV̌	...V̌CV
p	pak	paɬit	Xapɔ:	?epem
t	tis	taxisɬ	potá:	iti
k	ke:ɬX	kotɔpis	?akimet	sɬe:kox
f	fe:ɬ	---	koffkx	i:fa
s	set	saná:kx	kasámikt	?aso
ɬ	---	ɬana:kx	paɬit	Xe:ɬe
ʃ	ʃa:p	ʃaká:m	aʃɔ:k	aʃox
x	xoene	---	paxá:s	ko:xox
X	Xepe	Xaʃá:p	moXíma	iXox
m	mo:sni	moXíma	tamáix	?eme
n	nop	naxɔ:	koné:	no:ni
?	?ast	?amé:n	?aʔɔ:t	ka?a
y	ye:n	yatá:m	koyɔko	Xpeyo

3.3 Complex onsets

Complex onsets exist in Seri, although they are very much less common than simple onsets. (Remember that we are dealing with monomorphemic words here.) The attested word-initial onsets are given in (4), but most of them occur in only a few monomorphemic words (often less than three). Complex onsets which begin with **X** are a bit more common, especially **Xp**, **Xt**, and **Xn**. (As we will see later, many other clusters are commonly found when affixation is involved.) The cluster **sk** occurs in the prefix **ska-**, but not elsewhere. Complex onsets always consist of non-identical consonants. **f** and **?** do not occur in complex onsets within a single morpheme (with the exception of the first person singular intransitive prefix **?p-**, which is discussed in Sect. 8.2).

The examples in the columns in (4) all display the complex onsets of stressed syllables. The same onsets in unstressed word-initial syllables are much rarer, understandably so since words of this stress pattern are also much rarer; examples are given below each table. (Glosses are given in the appendix.) (Word-medial consonant clusters are discussed in Sect. 6.) As these tables imply, no complex onset has a glide or a nasal as the first segment. This fact is important and I return to it later.

Word-initial three-segment onsets occur in only two monomorphemic words: **ptkamm** 'lobster' and **Xpkiniɬ** (nickname).

(4) Word-initial complex onsets

a. Stop as second segment

	-p	-t	-k
p-	*	pta:kt	
t-		*	
k-	kpo:t	ktam	*
s-	spitx	stak	ska-
š-			škaXt
ɬ-			
x-			xkoa
X-	Xpašx	Xti:p	Xkokni

In unstressed syllables: ktamó:, Xpaká:fk, Xtamá:ixa

b. Fricative as second segment

	-s	-š	-ɬ	-x	-X
p-	psa:k				pXa:?om
t-		tšɬi?		txamoxa	
k-	ksai				
s-	*		sɬe:		
š-		*			
ɬ-			*		ɬXe:kox
x-				*	
X-			Xɬoɬo	Xxi:	*

In unstressed syllables: tšikáktox

c. Sonorant as second segment

	-m	-n	-y
p-		pna:kox	pyoke
t-	tm-		
k-	kma:m	knaxox	kyaXa
s-		sna:šX	
š-		šnapX ^w ɬ	
ɬ-			
x-			
X-		Xnois	

In unstressed syllables: kmaxí:k, Xna?á:iɬ

It should be noted that there are no complex onsets such as **pp** and **tt** cited above. A Seri onset cannot consist of identical elements morpheme-internally. And just as a single consonantal segment in Seri

cannot be associated with two consonant positions in the onset, it cannot be associated with two consonant positions in rhymes, or even intra-syllabically. In other words, there are no geminate consonants. (But see Sect. 8.1.)

Some facts with respect to complex onsets in Seri are not predicted by current theories of the syllable which explicitly incorporate a universal sonority scale. A fairly detailed scale is proposed in Selkirk 1984, for example, but I will assume here a version which refers only to major classes: Obstruents < Nasals < Liquids < Glides < Vowels. Harris (1983) appeals to such a scale to rule out certain disallowed onsets in Spanish, on the assumption that the syllable typically increases in sonority as one moves from the edge toward the nucleus. An onset consisting of two obstruents is considered marked by this scale, since "in the unmarked case the left-to-right order of [+consonantal] segments in onsets is obstruent-nasal-liquid" (p. 21). The onset obstruent-obstruent does not occur in Spanish. It does occur in Seri, however, as we have already seen.

The universal sonority scale correctly predicts that nasal-nasal and nasal-obstruent onsets should not occur in Seri. I extend this prediction to naturally exclude all sonorant-obstruent and sonorant-sonorant onsets. Therefore the only fact about Seri syllable onsets that is marked, and which therefore needs to be explicitly allowed for, is the existence of obstruent-obstruent onsets.⁸

3.4 Round consonants

Round consonants occur only rarely in word-initial onsets of monomorphemic words. This is understandable since round consonants apparently arose historically from the loss of an *o* (see Sect. 5.3), and this loss apparently happened in a very restricted fashion pretonically. The only clear examples are the following: *k^vset* 'plant (sp.)', *k^vtep* 'plant (sp.)', *k^všašni* 'plant (sp.)', *k^vlei* 'parrot', *k^vsek^vta* (place name).

4 Nuclei

As stated in Sect. 2, Seri has four vowels which occur both 'long' and 'short'. The vowel *e*, the low front unrounded vowel, is less common than the others. Long vowels, and also clusters of identical vowels, are simply phonetically longer in duration than short vowels. Restrictions on long vowels are discussed below.

4.1 Long vowels

Long vowels in Seri must be represented generally as in (5a) rather than as in (5b). That is, long vowels are a single vowel on the segmental tier but occupy two vowel slots on the CV tier. We know this from the way in which such segments interact with the phonology and morphology, as I show presently.⁹

The evidence for (5a) is considerable. For example, there is a general rule that deletes a root-initial short low vowel when it follows another vowel. This is shown by the forms in (6).

- (6) k + aitom --> kaitom (NOM-speak)
 t + aitom --> taitom (RL-speak)
 po + aitom --> poitom (IRR-speak)
 si + aitom --> siitom (IRR-speak)

This deletion rule does not apply to long low vowels, as the forms in (7) show.

- (7) k + a:ix --> ka:ix (NOM-undulate)
 t + a:ix --> ta:ix (RL-undulate)
 po + a:ix --> pa:ix (IRR-undulate)
 si + a:ix --> sa:ix (IRR-undulate)

Thus the rule deleting a low vowel must refer to 'short' vowels only. If long vowels were generally represented as in (5b), the statement of the deletion rule would be complicated considerably. This same complication would also have to be repeated elsewhere. Other facts which establish this point are discussed in Marlett 1981 and Marlett and Stemberger 1983.

Generally only vowels may be associated with V positions in Seri. Syllabic nasals occur in a very restricted environment. These are discussed in Sect. 8.4.

4.2 Stress and a restriction on complex nuclei

The nature of primary stress placement in Seri is relevant to ensuing discussion. On the word level, stress generally occurs on the leftmost syllable of the root. The presence of various kinds of affixes does not affect the placement of stress. Some verbs and many nouns, however, display stress patterns which are at odds with this generalization. In the case of verbs, this is generally due to the lexicalization of a prefix-root combination. In the case of nouns, this is generally due to the lexicalization of a noun-noun compound. Nevertheless, the following observation is true in all cases:

- (8) An unstressed syllable cannot contain a complex nucleus.

(The matter of the syllabification of vowel sequences is discussed below; (8) is correct only if my analysis of such is adopted.)

As far as word-level phonology is concerned, a complex nucleus is found only in the primary stressed syllable of the word. Or, to state it in reverse, stress is never assigned to a syllable with a simple nucleus if the root contains a syllable with a complex nucleus.

Stress is therefore assigned to the leftmost syllable of the root unless another syllable in the root contains a complex nucleus (or if stress is lexically marked). In nouns such as **Xpeyo** 'sailfish' and **sle:kox** 'heron (sp.)' stress is assigned to the leftmost syllable by the general rule. In nouns such as **Xap6:** 'sea lion' and **paxā:s** 'squid' stress is assigned to the second syllable because stress could not be assigned to the first since another syllable has a complex nucleus. In nouns such as **moXfma** 'yesterday' and **kot6pis** 'shellfish (sp.)' stress must be simply assigned by counting the first syllable as extrametrical, or by marking it in the lexicon.¹⁰

Given the stress assignment rule and/or generalization (8), we expect to find structures such as those in (9a) and not those in (9b).

(9) a. [+stress]

Examples:

k6anʔa 'tarantula'

nā:pXa 'buzzard (sp.)'

b. [+stress]

* t6paix

* kīta:s

But (8) is not simply a static generalization. A rule simplifying certain complex nuclei in the absence of stress is also needed, both at the word level and the phrase level. Some prefixes arguably have long vowels in underlying form, but do not have long vowels in phonetic form. In compounds, only the rightmost member retains primary stress, and a long vowel in the other member must shorten. In unstressed clauses, long vowels shorten. Therefore a rule such as (10) is needed: Two V slots on the CV tier are collapsed into one if they are associated with a single vowel (represented by **x**) and occur in an unstressed syllable.

(10)

```

      Nu      Nu
     / \    |
    V  V  --> V
     \ /      |
      x        x
  
```

in unstressed syllables

Generalization (8), rule (10), and the stress rule lead me to take the position here that roots such as **-oa:ix** 'hang free' and words such as **kai:** 'mature' are monosyllabic structurally (and also phonetically in most cases), as shown in (11a), rather than being polysyllabic, as in (11b-d). (See Clements and Keyser 1983:29-30.) This is also the analysis assumed in Moser and Moser 1965. (I ignore here the internal structure of these syllables.)

I do not base this analysis primarily on the phonetic data, although it is certainly true that a word such as **kai:** 'mature' is not perceived as bisyllabic, despite the stress on the **a** and the length of the vowel **i**. It is also true that vowel clusters are not pronounced on separate beats in Seri songs. But the facts which I have already presented above also support this analysis. First, a polysyllabic analysis such as (11b) would create problems for stress assignment. If **kai:** is two syllables, then stress should be assigned to the long vowel—but it is not. Second, if (11b) is correct, then generalization (8) is not true. Third, if (11b) is correct, then rule (10) is wrong. The facts which these rules and generalizations describe would have to be accounted for in more complicated ways. The other structures in (11) do not have these problems associated with them.

Other evidence supports (11a). The only position in which a vowel is not preceded by a consonant in Seri is (1) in word-initial position

and (2) in words such as **koanta** 'tarantula' and **k-oa:ix** (NOM-hang:free). The first group can be accounted for by the following constraint on underlying forms in Seri:

(12) Syllables without onsets occur only word-initially.

The second group is automatically accounted for under my analysis of them, by being eliminated. If all contiguous vowels are caught up into the same syllable in Seri, as in (11a), then **koanta** has only two syllables and they both have onsets; they do not violate (12).

Suppose we assume instead that a syllable nucleus can contain only one V, as in (11c). Constraint (12) can no longer be stated. We must then allow for syllables without onsets in (a) word-initial syllables, (b) the syllable following the stressed syllable, and (c) the second syllable following the stressed syllable **if** the first syllable following the stressed syllable had no onset, etc. Constraint (12), whatever its place in the phonology of Seri, is clearly preferable.

4.3 A restriction on vowel clusters

Sequences of a high front vocalic segment followed by a distinct nonconsonantal segment are generally associated with the syllabic skeleton CV. By all available tests morphemes beginning with **yo**, **ya**, and **ye** act as consonant-initial roots. (See Marlett and Stemberger 1983 for various facts which are relevant here, such as suppletive allomorphy dependent on syllable structure and the rule deleting vowels before vowels.) Such morphemes are common, but morphemes beginning with the sequences **ia**, **io**, and **ie** are nonexistent, with one exception -- the root **-ia:m** [-ea:m] 'wide' (see below). Morphemes beginning with the sequence **ii** (a vowel sequence, not a long **i**), **are** attested in Seri.¹¹

The negative morpheme structure condition can be stated as (13).

(13) No morpheme begins with a vowel sequence, the first member of which is **i** and the second member of which is not **i**. Exception: **-ia:m**.

But as it turns out, this constraint can apparently be subsumed under a more general constraint on vowel sequences. The vowel sequences **ia**, **io**, and **ie** do not occur except across morpheme boundaries. (They do occur in such derived sequences as **ionam** 'his hat' (< **i-aonam** 3POSS-hat). The constraint is given as (14):

(14) No morpheme contains a vowel sequence, the first member of which is **i** and the second member of which is not **i**. Exception: **-ia:m**.

The only problem is the cluster which is phonetically [ea]. A regular phonological rule converts **i** to **e** before **a**. This is seen happening when the prefix **i-** occurs before roots of certain types (see note 12). This rule could account for the phonetic shape of **-ia:m**, which behaves by

phonological tests as beginning with a non-low vowel. (That is, with respect to suppletive allomorphy and phonological rules, the verb does not begin with a low vowel, but with a non-low vowel.) There are other examples of [ea]. One is [eaš] 'eelgrass', which might actually be bimorphemic, underlyingly /i-aaš/, with the third person possessor prefix. In such a case it would not violate (14). Or it might be underlyingly /eaš/, and thus not violate (14). The word [sea:to] is a loanword from Spanish **chivo** 'goat'. If it is underlyingly /sea:to/, it does not violate (14). At any rate, such examples are very rare.

Other attested vowel clusters are given below. Besides these there are a few instances of geminate vowel clusters. Since these sound phonetically just like 'long' vowels, they are identifiable only by morphophonemic alternations (see notes 9 and 11). In the examples of word-medial clusters below, I have tried to exclude word-final vowels since there is a tendency to lengthen vowels in this position, making the contrast between long and short hard to discern. Since word-initial clusters are very rare,¹² the examples in (15) are all word-medial, except where noted. I exclude words from this list which are derived via a morphologically conditioned ablaut process, even though the cluster is still internal to the root.

(15) Monomorphemic vowel clusters

a. Two short vowels

ai	tamāix	'gray-colored clay'
ao	?a-onam	'hat' (< /?a-aonom/)
oa	koaft	'whirlwind'
oe	koept	'quail'
oi	t-oit	(RL-dance)

b. Long plus short

a:a	i-t-a:a	(OM-RL-call)
a:i	sa:ix	'wasp (sp.)'
a:o	t-a:oɪ	(RL-pleated)

c. Short plus long

ai:	i-t-ai:X	(OM-RL-go:from)
ee:	i-t-anée:x	(OM-RL-roll:up)
oa:	t-oa:n	(RL-turbid)
oe:	i-t-apōe:x	(OM-RL-harvest:eelgrass(pl.))
oi:	t-moi:x	(RL-circular)
ii:	i-t-aknfi:Xo	(OM-RL-pour:out)

d. Short plus long plus short

oa:i	t-oa:ix	(RL-hang:free)
------	---------	----------------

5 Codas

5.1 Simple codas

Any consonant may appear in a word-final simple coda, except **y**, although **f** is rare. **x** and **ʈ** are extremely common in unstressed word-final syllables, whereas **p**, **k**, and **s** are rather rare.

(16) Simple codas

Stressed syllable

ʔap	'mule deer'
Xat	'hail'
tok	'there'
i:f	'his/her nose'
tis	'harpoon point'
a:ʃ	'his/her grandfather'
a:ʈ	'his/her spouse'
ʃi:x	'plant (sp.)'
ʃi:X	'thing'
am	'her father'
ye:n	'his/her face'
tʃi?	'fish (sp.)'

Unstressed syllable

-aXop	'carry on pole'
simet	'bread'
i?ik	'seed, pit'
iyas	'his/her liver'
XomXéʃiʃ	'plant (sp.)'
ʃi:ʃiʈ	'plant (sp.)'
ʃamix	'palm (sp.)'
ʔakiX	'where'
yaʃim	'its fin'
moXon	'fish (sp.)'
-a?	(focus)

The only example in which the glide **y** occurs in a coda is the loanword **ka:y** 'horse' (which is homophonous with the native word **k-a:i** (NOM/OM-make)). Except for this example, it is clear that whenever a vocalic segment occurs in a coda, it is attached to a V position in the syllabic skeleton rather than to a C position. The evidence for this comes from an insertion rule which applies, for example, when the declarative clitic **-ʔa** follows a consonant. Some examples without insertion are given in (17a), and examples with insertion are given in (17b). The examples in (17c) show that the morphemes in question do not have a final C.

(17)	a. V + ʔa	po:	po:-ʔa	'wild pig'
		ke:	ke:-ʔa	'bird (sp.)'

b. C + ?a	?ap	?ap-i?a	'mule deer'
	ʃi:k	ʃi:k-i?a	'bird'
	ka:W	ka:W-i?a	'plant (sp.)'
	ʃa:?	ʃa:?-i?a	'sun'
	ka:y	ka:y-i?a	'horse'
c. Vi + ?a	?ai	?ai-?a	'wind'
	?apá:i	?apá:i-?a	'Papago'
Vo + ?a	ka:o	ka:o-?a	(NOM-pass)

The restriction can be stated as in (18).

- (18) No coda has a C position associated with a vocalic segment. (Exception: **ka:y** 'horse')

Given this constraint, we have a reason for analyzing long vowels as a single segment attached to two V positions and not as a segment attached to a V and a C position. The latter would be in violation of constraint (18).

5.2 Complex codas

Complex codas are extremely common, although they are often derived by means of a rule of Syncope (discussed in Sect. 5.3.) Consonant sequences in the coda generally follow the universal sonority scale; thus obstruent-nasal and obstruent-glide clusters do not occur. There are two exceptions to this scale in Seri codas. As in onsets, clusters of obstruents in codas are freely permitted. In addition, some sonorant-sonorant clusters are permitted. Sequences of sonorant followed by obstruent are permitted by the sonority scale and also occur. Notice that **f** does not occur as a noninitial member of a complex coda. (Glosses to the words in (19) are included in the appendix.)

- (19) Word-final two-consonant codas

a. Stop as second consonant

Stressed syllable

	p	t	k
p	*	-Xopt	-Xto:pk
t	-atp	*	-i:tk
k	-ka:kp	pta:kt	*
f	-oafp	koaft	-a:fk
s		?ast	-no:sk
ʃ	Xto:ʃp	košt	?aXá:ʃk
ɬ	-iɬp		-a:iɬk
x	-koxp		itaxk
X	-o:Xp	a:Xt	-iXk

m	itámt	akó:mk
n	?ant	?onk
?	-oké?t	

Unstressed syllable: ko:taɬk -a:ɬaxk

b. Fricative as second segment

Stressed syllable

	s	š	ɬ	x	X
p	kops	-Xapš	?apɬ	-yanópx	ksipX
t	-o:ts	aitš	-atɬ	-atx	šatX
k	taks	šakš	-atókɬ	sa:kx	?akX
f		-kafš		-ifx	
s	*		-masɬ	Xa:sx	-asX
š		*	-apXášɬ	šo:šx	-kašX
ɬ			*		?aɬX
x				*	
X		?aXš	-iXɬ		*
m	i?fms	iki?fmš	simɬ	-atá:mx	-amX
n	-tins	inš	-?anɬ	ya:nx	
?	i?s	-ifá?š		-amf?x	

Unstressed syllable:

?apats -me:sotš -a:katx Xpasf:tikɬ

As in onsets, no geminate consonants are allowed. Also unattested morpheme-internally is a sequence of the velar fricative and another fricative. A surprising fact is that **m** cannot occur in a complex coda (or onset) with **p**. This prohibition extends also to three-consonant codas (see below). The cluster **np** does not occur in two-consonant codas either, but it does in three-consonant codas.

Unlike in onsets, however, nasal-nasal clusters (specifically **mn**) occur in codas, although these are not common. Two examples are **ptkamm** 'lobster' and **kmotómm** (NOM-weak). Since these are violations of the sonority hierarchy, they must be explicitly allowed for.

Three consonant clusters in codas are also fairly common.

- (20) Word-final three-consonant codas (all are in stressed syllables unless otherwise noted)

a. Stop-Stop-Fricative

ptx	-aptx	'wide'
ptX	-a:ptX	'gather'
tkš	atkš	'her younger sister'
ktš	-aktš	'sift'

Unstressed syllable: ktx -akšesaktx 'prepare
wood for burning (pl.)'

b. Stop-Fricative-Stop

pɪk	-ašápɪk	'paralyzed in legs'
tɪk	-Xatɪk	'flat and thin (pl.)'
kɪk	-apókɪk	'take shell off turtle (mult.)'
pxk	-akápux	'hurry to do'
txk	ka:txk	'grasshoppers'
pXt	-a:pXt	'gather eelgrass'

c. Stop-Fricative-Fricative

pXɪ	-kapXɪ	'sour'
tXɪ	-itXɪ	'break into pieces'
psɪ	ke:psɪ	'crab (sp.)'
tsx	-matsx	'brag'
ksx	-iksx	'immature (fruit)'
ksX	-aksX	'awake'
pšx	sɪenápšx	'blue heron'
pšX	-apšX	'torn out'

d. Fricative-Stop-Fricative

spX	-aspX	'winnow'
XpX	-aXpX	'mad at'
ftx	-noftx	'curved'
stx	istx	'its leaf'
škš	aškš	'his younger brother'
škɪ	-aʔfškɪ	'gather fish testes'

e. Fricative-Fricative-Stop

fɪk	-afɪk	'knee'
šɪk	-iʔišɪk	'dirty'
Xɪk	-i:Xɪk	'convex (pl.)'
sxk	-isxk	'have body lice'
šxk	-ašxk	'leave piled up'

f. Fricative-Fricative-Fricative

fšX	-a:fšX	'fast'
šXɪ	-a:šXɪ	'cough'

g. Fricative-Stop-Stop

skt	-akδeskt	'prepare wood for burning'
škt	-oiškt	'go (pl.)'

h. Sonorant-Stop-Fricative

npX	-a:npX	'return home'
mtx	-ašámtx	'make adobes'
ntš	entš	'knives'
ntX	?antX	'base'
nkɿ	-ankɿ	'pitted'

i. Sonorant-Fricative-Fricative

nɿX	-inɿX	'return empty-handed'
mšx	?amW i?ikδ:mšx	'tape worms'
nšX	-anšX	'spin thread'
?šX	-a:?šX	'sneeze'

j. Sonorant-Fricative-Stop

mɿk	-atámɿk	'notched (pl.)'
nɿk	-aXónɿk	'loosen (pl.)'
mxk	-amxk	'take, bring'
nxk	-monxk	'wavy'
?ɿk	-amf?ɿk	'plane smooth (pl.)'

Unstressed syllable: mxk ataɿXfkomxk 'his
brothers-in-law'

Some, but not all, of the gaps are accounted for by previously stated conditions. It is not clear whether any of the remaining gaps (such as the lack of three-consonant clusters ending in **p**) are particularly interesting, however.

5.3 Round Consonants in Codas

Number in nouns and verbs is often indicated by a change in the form of the root, either in addition to or in lieu of an affix. One of the most common root changes is the loss of the vowel in the post-tonic syllable. The environment for the rule today is clearly morphological, and very idiosyncratically so. Some examples showing this rule, which I call Syncope, are given in (21).¹³ Notice that Syncope sometimes applies in the derivation of the singular form, sometimes in that of the plural.

(21)	singular	plural	UR of root
	se:poɬ	se:pɬ-ox	'bush (sp.)' /se:poɬ/
	moxépe	moxép-tox	'saguaro cactus' /moxépe/
	?ast	?asat-ox	'stone' /?asat/
	?apɬ	?apaɬ-ox	'tongue (abs.)' /?apaɬ/
	o:t	o:to-ɬka	'coyote' /o:to/
	Xti:p	Xti:po-ɬk	'shellfish (sp.)' /Xti:po/
	koepɬ	koepit-ox	'quail (sp.)' /koepit/

When an **o** is the target of the Syncope rule and there is a back consonant (**k**, **X**, or **x**) in its immediate environment, the **o** is not lost, although the V position is. Rather, the **o** remains and attaches to the back consonant, giving rise to the round consonants. The distribution of round consonants is therefore understandably extremely restricted. A few examples are given below. (Other morphological changes are ignored.)

(22) $\begin{array}{ccccc} C & V & C & V & C \\ | & | & | & | & | \\ X & e & k & o & \text{ɬ} \end{array} \rightarrow \begin{array}{cccc} C & V & C & C \\ | & | & | & | \\ X & e & k & o \end{array} \quad \text{Xek}^W \text{ɬ} \text{ 'wolves'}$

$\begin{array}{ccccc} C & C & V & C & V \\ | & | & | & | & | \\ k & \text{ʃ} & a & X & o \end{array} \rightarrow \begin{array}{cccc} C & C & V & C \\ | & | & | & | \\ k & \text{ʃ} & a & X \end{array} \quad \text{kʃaX}^W \text{ (NOM-talk)}$

$\begin{array}{cccccc} C & V & V & C & V & C & C \\ | & | & | & | & | & | & | \\ k & a & ? & o & x & k & \end{array} \rightarrow \begin{array}{ccccc} C & V & V & C & C & C \\ | & | & | & | & | & | \\ k & a & ? & o & x & k \end{array} \quad \text{ka:}^W \text{Wk (NOM-squat)}$

Round consonants in word-final codas include those shown in (23) (see the appendix for glosses). While most of them are derived (historically, at least) via Syncope, I do not claim that all of them are, although that may be the case.

(23) a. Final position, preceded by vowel:

ka:W
-ipaW
kpataW
-ak^W
ka:X^W

b. Final position, preceded by consonant:

-amW
 -e:sW
 inɔ:ʔk^W
 -i:pk^W
 ktamk^W
 anX^W
 -isX^W
 -omtX^W

c. Penultimate position, preceded by vowel:

kakāWk [kakāWk^W]
 Xek^Wɿ
 -ik^Ws
 ʔaX^Wɿ

d. Penultimate position, preceded by consonant:

ka:ʔWk [ka:ʔWk^W]
 -i:pWk [-i:pWk^W]
 to:tWk [to:tWk^W]

e. Antepenultimate position:

-ik^Wsx

The rounding of the final **k** in words such as **kakāWk** in (23c) is correctly described by a late rule. In fact, I take this rounding as postlexical (in the theory of Lexical Phonology (Mohanan 1986)). A completely productive rule which (under conditions which have to do with the presence of certain adverbs) inserts **a** between two post-tonic consonants reveals that it is **k** rather than **k^W** when **a**-Epenthesis applies.

(24)	Word	After a -Epenthesis	
	ʔast	ʔasat	'stone'
	Xe:k ^W ɿ	Xe:k ^W aɿ	'wolves'
	kakāWk	kakāWak *kakāWak ^W	'bird (sp.)'
	ka:W	---	'bush (sp.)'
	kšaX ^W	---	(NOM-talk)

6 Word-medial consonant clusters

The word-medial consonant clusters in (25-28) are attested. Although I cannot claim that these lists are exhaustive, they are fairly complete and serve to illustrate the possibilities. Morpheme boundaries are not indicated here. The only morpheme boundaries which occur between the clusters in question are those which pertain to singular/plural and singular/multiple action morphology (see the

beginning of Sect. 5.3). This morphology is as complex for verbs as singular/plural morphology is for nouns; it is discussed in detail in Moser 1961 and Marlett 1981. The verbs in the list are cited in the subject nominalized form, although this is not indicated in the gloss. For example, the verb form **kiksim** in (26a) is underlyingly /k-i-akas-tim/. (The sequences which result from the introduction of prefixes are discussed in Sect. 8.1.) In the following lists I also indicate by means of "I" (for initial) or "F" (for final) those clusters which occur word-initially and word-finally, respectively, as established above (ignoring stress).

(25) Two consonant clusters, stop as second segment

Stop-Stop

Following a stressed vowel:

tp	F	ko:tpam	'sardine'
kp	I,F	katikpan	'work'
pt	I,F	kaptax	'open (mult.)'
kt	I,F	ki:kto	'pregnant (mult.)'
pk	F	kapka	'rain'

Fricative-Stop

Following a stressed vowel:

fk	F	i:fkox	'noses'
sp	I	ko:spox	'spotted'
st	I,F	ka:stax	'spread'
sk	I,F	kaskim	'row'
št	F	kaštaš	'wheat'
šk	I,F	kaškim	'go'
Xk	I,F	kiXkim	'throw'

Following an unstressed vowel:

Xt	I,F	kiXtô:š	'scar'
tk	F	ka:kaŋka	'dress (mult.)'
xk	I,F	ka:taxkim	'provoke'

Sonorant-Stop

Following a stressed vowel:

mk	F	kimkaxk	'want (pl.)'
?t	F	ki:?tox	'be (pl.)'
?k		ka?ka	'exist'

(26) Two consonant clusters, fricative as second segment

Stop-Fricative

Following a stressed vowel:

ks	I,F	kiksim	'chew'
pš	F	katōpša	'urinate (woman) (pl.)'
tš	I,F	ka:otši	'choke (pl.)'
pɬ	F	kopɬim	'bird (sp.)'
tɬ	F	katɬa	'be afraid'
px	F	kakāpxom	'shellfish (sp.)'
pX	I,F	kipXox	'blow'
tX	F	katXo	'many'

Following an unstressed vowel:

kɬ	F	kaʔiʃakɬox	'gather fish testes (pl.)'
----	---	------------	----------------------------

Fricative-Fricative

Following a stressed vowel:

Xš	F	kkoXša	'babysit (pl.)'
sx	F	kasxox	'row (pl.)'
šx	F	kkašxa	'bite (pl.)'
šɬ	F	kišɬax	'leave piled up (mult.)'
šX	F	ka:išXa	'bring, take (pl.)'

Following an unstressed vowel:

sɬ	I,F	kasɬēpek	'delouse (head lice)'
sX	F	isXāp	'top of his/her head'
ɬX	I,F	ataɬXɪ:kɔm	'his brother-in-law'

Sonorant-Fricative

Following a stressed vowel:

mš	F	ki:mšo	'want'
nX		kakō:nXot	'help carry'

(27) Two consonant clusters, sonorant as second segment

Stop-Sonorant

Following a stressed vowel:

pn	I	kopni	'paper wasp'
tn		kitni	'touch against'
kn	I	kakni	'bird (sp.)'
py	I	kakāpyas	'talk jerkily'

ty		kʔatyaxk	'stretch out (pl.)'
ky	I	yekyar	'cowboy'

Following an unstressed vowel:

tm	I	atmáʔax	'his/her aunt'
km	I	akmáʔax	'his niece/nephew'

Fricative-Sonorant

Following a stressed vowel:

fn		i:fnix	'his/her nostril'
ʃn	I	kka:ʃni	'bite'

Following an unstressed vowel:

sm		kasménexa	'make arrow shaft'
ʃm		aʃmɪ:	'his/her uncle'
sn	I	kasná:pit	'disturb'

Sonorant-Sonorant

Following a stressed vowel:

ʔn		ka:ʔnix	'tremble'
----	--	---------	-----------

(28) Word-medial three-consonant clusters

Following a stressed vowel:

ʃtk	F	kaʔfʃtkox	'tie up'
tXt	F	kkatXta	'bite'
sʃk	F	kko:sʃka	'sprinkle'
tʃk	F	kamáXatʃka	'cause to be a drab color (pl., mult.)'
kʃk	F	kapf:kʃkam	'look behind (pl.)'
tXt		kkotXta	'malodorous'
pXt	F	ka:pXtoj	'gather eelgrass (pl.)'
XpX	F	kiXpXax	'quiver'
ʃXt	F	kiʃXtim	'cause rash'
k ^w sX		kak ^w sXax	'long, tall'
k ^w tx		ʔayák ^w txox	'anklebones (abs.)'

Following an unstressed vowel:

tkm		atkmaxé:m	'her brother-in-law'
Xtk	F	kkaskaXka	'share (pl.)'
ʔxk		kaʔxkɔi	'fall (pl.)'

Given the fact that Seri has both syllable-initial and syllable-final clusters, established by their occurrence word-initially

and word-finally, it may be asked how word-medial clusters are syllabified. It is obvious that these sequences cannot be wholly identified either with those which occur syllable-initially or those which occur syllable-finally. I assume that the syllable division is between the two consonants.

The syllabification of three-consonant clusters is more difficult, however. In **kaʔiʃkox**, the first example in (28), is the syllable division between the **ʃ** and the **k**, or is it between the **k** and the **x**? The distribution of the consonants to this point does not seem to provide any help. There is, however, one important fact which may be used to argue for one syllabification over another, and it also indicates that syllabification is stress-sensitive in Seri: The phoneme **m** has a lenis allophone of nasalized **w** in one specific situation. Alternation evidence supports this analysis. Compare the allomorphs of the negative prefix in the following words:

- (29)
a.	t-ataX	'did he go?'	(RL-go)
	t-[m]-ataX	'didn't he go?'	(RL-NEG-go)
b.	yo:taX	'he went'	(DIST-go)
	yo-[m]-ataX	'he didn't go'	(DIST-NEG-go)
c.	i-t-aʔo	'did he see it?'	(OM-RL-see)
	i-tk-[w]-aʔo	'didn't he see it?'	(OM-RL-NEG-see)

The lenis allophone also occurs in the words in (30).

- (30)
kma:m	k[w]a:m	'woman'
kmaxi:k	k[w]xi:k	'women'
kmike	k[w]ike	'Seri, person'

This allophone does not occur in the word in (31), however. The allophone [m] appears.

- (31) i-t-ákmox itak[m]ox (OM-RL-put:long:thing(pl.))

Assuming that the **k** and **m** belong to two separate syllables in the word **itákmox**, I suggest that the phonetic rule leniting **m** must refer to a tautosyllabic velar stop. But if this is true, then the syllabification of the word in (32), as shown, is different from that in (31) because the lenis allophone occurs in the word in (32).

- (32)
ak[w]áʔax	[+stress]
'his nephew/niece'	
	a kma ʔax

In the case of a three consonant cluster in (33), the **k** must be syllabified with the **m** since the lenis allophone occurs.

- (33) atk[ʷ]axé:m [+stress]
 'her brother-in-law'
-
- a t kma xe:m

The conclusion I draw from these facts is that the medial sequence **tkm** is syllabified somewhere before the **k**, and that the medial sequence **VkmV** is syllabified immediately before the **m** if the second vowel is unstressed and immediately before the **k** if it is stressed. Speaking more generally, then, onsets in Seri are maximized (to some limit perhaps) in stressed syllables but not in unstressed syllables.

7 Syllable overview: Uninflected words

Drawing on the facts discussed above, we can make certain claims about syllables in words which do not involve affixation. It appears that it is important to analyze word-initial and word-final syllables separately from word-medial syllables, and stressed syllables from unstressed syllables.

The Onset of a Seri syllable usually has one or two consonants. In word-medial position, it has at least one. The two word-initial cases in which the onset has three are not covered by (34).

- (34) Onset: C_0^2 If word-medial: at least one

The Nucleus of a Seri syllable has between 1 and 3 vowel positions. Multiple vowel positions are permitted only in stressed syllables.

- (35) Nucleus: v_1^3 If unstressed: only one

The coda of a Seri syllable has between 0 and 3 consonants. Word-medially the maximum is one.

- (36) Coda: C_0^3 If word-medial: at most one

8 Derived words

Affixation in Seri results in a number of consonant clusters which do not occur morpheme-internally. A significant number of these clusters are allowed to surface, but sometimes phonological rules apply to prevent them from occurring. In this section I discuss both the new consonant clusters and also the rules which 'fix up' a cluster which is not permitted.

8.1 New clusters

There are several affixes which, upon attaching to verbs, interact with the previously discussed constraints on Seri syllable structure in interesting ways because they consist of consonants only or have allomorphs consisting of a single consonant. These affixes (whose

allomorphs shown do not include changes in point of articulation) are given in (37). (Noun morphology is not included here since those affixes do not interact in any interesting way.)

(37)	Prefixes	si- ~ s-	IRR	m-	2sSUB
		mi- ~ m-	PROX	m-	NEG
		ko- ~ k ^w -	3OBL	tm-	ABIL
		t-	RL	?-	1sSUB (transitive)
		k-	NOM	?p-	1sSUB (intransitive)
	Infix	-ko-	PL		
	Suffix	-X	UT		

The first observation is that affixes not involving a sonorant consonant attach freely to almost any syllable (syllables with sonorants are discussed in Sect. 8.2-4 below). This gives syllable onsets and codas which are one or two segments longer than those which occur in the root. Identical consonants may be juxtaposed by this means.¹⁴ Some of these are given in (38) in the surface form. (The pronunciation of a cluster such as **tt**, whether word-initial or word-medial, is as a long **t** -- that is, as a **t** with the closure prolonged.)

(38)	Four-consonant onset:	k ^w -t-šXok (3OBL-RL-hack:off)
	Three-consonant onset:	k-šXok (NOM-hack:off)
		t-Xtamt (RL-abundant)
		k-pko:yo (NOM-taste/PL)
		(< root -pi: + infix -ko-)
	Complex onset with ?:	k-?e:ɬ (NOM-red)
	Complex onset with f:	k-fikx (NOM-cover)
	Identical consonants juxtaposed:	t-toknix (RL-round)
		k-kap (NOM-fly)
		s-samix (IRR-rolled:up)
	Four-consonant coda:	i-t-amxk-X (OM-RL-bring-UT)

8.2 Resyllabification

The **i** of the prefixes **i-**, **mi-** and **si-** is lost under certain conditions, including before consonants (see Marlett and Stemberger 1983). When this happens, the **s** attaches to the onset of the following syllable, but the **m** cannot, since such an adjunction would be in violation of the sonority hierarchy used by Seri. In some cases, this creates no problem since it can form the coda of the preceding syllable, as the derivation in (39) of **ɪpi**: 's/he tasted it' (OM-PROX-taste) shows.

Likewise, an unattached sonorant which results directly from affixation may attach itself to the preceding word if the sonorant occurs word-initially. This is illustrated in (41) for **ʃo mte:** 'what (lit. 'how') did you say?' (2sSUB-RL-say) and **ʃo ?pte:** 'what did I say?' (1sSUB-RL-say).

8.3 o-insertion

In some cases an **o** is inserted before an unattached word-medial sonorant (which happens to always be a nasal). This is illustrated in (41) for **tompənEX** 's/he can run' (ABIL-run), **sonkap** 's/he will not fly' (IRR-NEG-fly'), and **momsisi:n** 's/he is pitiable/loveable' (PROX-pitiable).

The rule is given as (42). The condition included on the rule prevents the rule from overapplying; an *o* is not inserted in this position if the first consonant is part of a person prefix. This condition could be dispensed with by specifying the levels at which the rule applies, as is done in Lexical Phonology. (I use the notation of a bar above the consonant to indicate that it is not attached to any syllable.)

Marlett and Stemberger (1983) claim that Seri has rule (45), which apparently is the correct default rule for filling an empty V position:¹⁷

(45) **i-Insertion:** An **i** is associated with an empty V position.

In the situations illustrated by (44) the V has appeared to the left of the unattached sonorant. I now examine a situation in which the rule places a V to the **right** of a stranded sonorant.

Syncope (see Sect. 5.3) sometimes leaves an unattached nasal, as shown in the change between the first column (the underlying form) and the second column (the singular punctiliar stem) of (46). Recall that this situation is one violation of the sonority scale which Seri does not tolerate. V-Insertion applies to correct this situation.

(46)	Underlying	Intermediate	Surface
	-ne:pen -->	-ne:pn -->	-ne:pni 'stooped'
	-moton -->	-motn -->	-motni 'burn'
	-a:?anx -->	-a:?nx -->	-a:?nix 'tremble'
	-akonx -->	-ak ^w nx -->	-ak ^w nix 'shake'

In this case, the rule places the V to the right of the stranded sonorant, rather than to the left. If the rule inserting V here is the same as the rule inserting V in (44), then we have a mirror-image rule which makes crucial reference to the location of word stress. If the unincorporated consonant is pretonic, the V is inserted before it; if the consonant is posttonic, the V is inserted after it.

V-Insertion can be stated as in (47). It applies postlexically since it inserts a V only if the sonorant consonant cannot be incorporated in the rhyme of a preceding syllable, even if that syllable occurs in the previous word.

(47) **V-Insertion:** An empty V position is inserted when there is an unincorporated sonorant consonant (its exact position depending on the location of the stressed vowel).

Appendix: Glosses of examples not glossed in text

-a:fk	'hit hard'
-a:i:k	'undulate (mult.)'
-a:katx	'put out'
-ak ^w	'kill'
-a:taxk	'leave behind (pl.)'
-amf?x	'plane smooth'
-amX	'say'
-amW	'anus'
-apXašɬ	'run into'
-asX	'count'
-atā:mx	'notched'
-atɬ	'afraid (pl.)'
-atɔkɬ	'cut (pl.)'
-atp	'spit'
-atx	'trunk of body'
-e:sW	'barefoot (archaic)'
-ifā?š	'sob'
-ifx	'have indigestion'
-ik ^w s	'spiny'
-ik ^w sx	'shake out'
-iɬp	'sniff'
-ipaW	'straighten (mult.)'
-i:pk ^w	'make pounding sound'
-i:pWk	'make pounding sound (pl.)'
-isX ^w	'hide'
-i:tk	'drip'
-iXk	'melt (pl.)'
-iXɬ	'grab'
-kafš	'snap at'
-ka:kp	'hit to remove what's inside'
-kašX	'break (intrans.)'
-koxp	'bolt, jump'
-masɬ	'yellow (pl.)'
-me:sotš	'untouched (pl.)'
-no:sk	'toothed'
-oafp	'bounce off'
-oké?t	'bouncy'
-omtX ^w	'straight'
-o:taɬk	'ants'
-o:ts	'hiss'
-o:Xp	'white'
-tins	'scrape'

-Xapš	'congeal'
-Xopt	'extinguished'
-Xto:pk	'stay overnight'
-yanɔpx	'fist'
-ʔanɬ	'ten'
aitš	'his/her uncle'
akɔ:mk	'his younger sister'
a:mo	'far'
anX ^W	'much'
asa:k	'his son'
ašɔ:k	'her nephew/niece'
ašox	'star'
a:Xt	'plant (sp.)'
fe:ɬ	'duck (sp.)'
i:fa	'peninsula'
i:kx	'coarse sand'
ikiʔfmš	'ringworm'
iɬɬt	'his/her head/hair'
inɔ:ʔk ^W	'bay'
inš	'his/her spinal cord'
i:stoX	'their breath, soul'
itámt	'his/her sandal'
itaxk	'his/her bones'
iti	'on'
iXox	'cactus fruit (stage)'
iʔfms	'fringe'
iʔs	(part of idiom)
kakáWk	'bird (sp.)'
kasámikt	(NOM-jealous)
ka:X ^W	'belonging to another person'
ka:W	'bush (sp.)'
kaʔa	'fish (sp.)'
ka:ʔWk	(NOM-squat)
ke:ɬX	'paddle'
kma:m	'woman'
kmaxí:k	'women'
knaxox	(place name)
koaft	'whirlwind'
kofíkx	(NOM-D-cover)
koné:	'grass (sp.)'
kops	'glowworm'
košt	'cricket'
kotɔpis	'shellfish (sp.)'
ko:taɬk	'ants'
ko:xox	(NOM-short)
koyɔko	'dove'

kpataW	'fish (sp.)'
kpo:t	'fish (sp.)'
ksai	'hairbrush'
ksipX	'glue'
ktam	'man'
ktamk ^W	'men'
ktamδ:	(NOM-fierce)
kyaXa	'saguaro cactus (stage)'
ɬanā:kx	(place name)
ɬXe:kox	(place name)
mo:sni	'sea turtle'
moXfma	'yesterday'
naxδ:	'fish (sp.)'
no:ni	'butterfly larva (sp.)'
nop	'mountain lion'
pak	'some'
paɬfɪt	'head of deer for dancing or hunting'
paxā:s	'squid'
pna:kox	'mangrove'
potā:	'larva'
psa:k	'hunger'
pta:kt	'plant (sp.)'
pXa:ʔom	'three (counting)'
pyoke	'starfish (sp.)'
sa:kx	'shellfish (sp.)'
sanā:kx	(place name)
set	'bird (sp.)'
simɬ	'barrel cactus (sp.)'
ska-	(first person plural imperative)
sɬe:	'heron (sp.)'
sɬe:kox	'heron (sp.)'
sna:ʃX	'plant (sp.)'
spitx	'plant (sp.)'
stak	'pumice'
ʃakā:m	'unmarried girl'
ʃakʃ	'shellfish (sp.)'
ʃa:p	'roadrunner'
ʃatX	'tiny thorns'
ʃkaXt	'young (archaic)'
ʃnapX ^W ɬ	'plant (sp.)'
ʃo:ʃx	'burlap bag'
taks	'plant (sp.)'
tamāix	'gray-colored clay'
taxɪsɬ	'fish (sp.)'
tis	'harpoon point'
tm-	(abilitative)

to:tWk	'cholla cactus (sp.)'
tši?	'fish (sp.)'
tšikáktox	'cardinal'
txamoxa	'fish (sp.)'
xkoa	'plant (sp.)'
xoene	'plant (sp.)'
Xapó:	'sea lion'
Xa:sx	'whale (sp.)'
Xašā:p	'peacock'
Xek ^W ɿ	'wolves'
Xe:ɿe	'fog'
Xepe	'sea'
Xkokni	'cactus (sp.)'
Xlolo	'fish (sp.)'
Xna?ā:iɿ	(place name)
Xnois	'dirt, refuse'
Xpakā:fk	'crab (sp.)'
Xpasɿ:tikɿ	'ground squirrel (sp.)'
Xpašx	'graphite'
Xpeyo	'sailfish'
Xtamā:ixa	'tortoise (sp.)'
Xti:p	'shellfish (sp.)'
Xto:šp	'plant (sp.)'
Xxi:	'gourd'
ya:nx	'poisonous sap'
yatā:m	'mountain pass'
ye:n	'his/her face'
?akX	'somewhere'
?akɿmet	'small lizard (gen.)'
?aɿX	'rather'
?amē:n	'family'
?ant	'land'
?apats	'Apache'
?apɿ	'tongue (abs.)'
?aso	'net'
?ast	'stone'
?aXā:šk	'arrows'
?aXš	'dog, pet'
?aX ^W ɿ	'shellfish (sp.)'
?a?ó:t	'door'
?eme	'camp'
?epem	'whitetail deer'
?onk	'duck (sp.)'

Notes

*Seri is spoken in northwestern Mexico by about 600 people.

I thank Diana Archangeli, G. Hubert Matthews, Mary B. Moser, Joseph Stemberger and two anonymous *IJAL* reviewers for their valuable comments on an earlier draft of this paper. They are absolved of responsibility for remaining inadequacies. I especially profited from the use of the prepublication copy of the Seri dictionary which Mary B. Moser is currently preparing. This dictionary is based on data collected by Mrs. Moser and her late husband Edward Moser since 1951 under the auspices of the Summer Institute of Linguistics.

The following abbreviations are used: ABIL--abilitative, abs--absolute, Co--coda, D--detransitivizer for unspecified object, DIST--distal, gen--general term, IRR--irrealis, mult--multiple action, NEG--negative, NOM--nominalizer, Nu--nucleus, OM--object marker, pl, PL--plural, PROX--proximal, RL--realis, sp--species, UR--underlying representation, UT--unspecified time, 2sOBJ--second person singular direct object, 3OBL--third person oblique, 1sSUB--first person singular subject, 2sSUB--second person singular subject, ó--syllable.

1. Words with this voiced lateral include the following:

alo kik^ws (dialectal variant of xto^oto kik^ws) 'mullet (sp.)'
 -lao 'gobble up'
 lams 'fish (sp.)' (archaic)
 laXf:ktim (place name)
 Xalá: 'bird (sp.)'
 Xpaléme⁺k 'shellfish (sp.)'
 -oalaxk 'leave behind, detransitivized, pl.'
 -i:ola 'puffed out'
 -oalala 'flap'
 itXalóms 'short antenna of lobster'

With the exception of a few Spanish loanwords, this list may be exhaustive for current Seri.

2. Words with *r* include the following:

Seri	Spanish	English
ro:k ^w	loco	crazy
?o?ra	burro	donkey
ret	reata	lariat
kaskaréra	escalera	ladder
koksar		Mexican (origin unknown)
tear	diablo	devil
pa:r	padre	priest
-apré:nt	empeñar	lend
-apásirox	pasear	take a stroll, ride
matar		(plant name) (origin unknown)

mer6:n	mel6n	melon
siir	silla	saddle
o:ro	oro	gold, money, dollars
to:tar		chicken (origin Uto-Aztecan)
yekyar	vaquero	cowboy

3. While the discussion in Sect. 5.3 suggests that **W** may in fact be the rounded velar fricative **x^W** phonologically (although not phonetically), I will continue the transcription **W** in the tradition of previous publications on Seri phonology.

4. Moser and Moser (1965) included nasalization and **as** phonemes. These are both derived from underlying **m** in my analysis.

5. The underlying form of **itak** is /i-atak/, and that of **i:stoX** is /i-astoX/.

6. The word **e:nim** 'knife' is the only example of a monomorphemic bisyllabic word beginning with stressed **e**. It is a loanword, probably cognate with Papago **wainomi** 'metal'.

7. Moser and Moser (1965:62) report that in some cases there is open transition between consonants:

Voiced open transition occurs between members of the sequences **?t mk mn nk nx** when these sequences occur immediately following a stressed vowel: **kiʔt** [kiʔ^ht] 'to hiccough'. With some speakers, close transition occurs in all other types of consonant sequences. With still other speakers, voiceless open transition occurs in sequences consisting of stop plus stop (except **? plus other stop**) and stop plus nasal. Close transition occurs in geminate clusters.

It must be emphasized, however, that any such open transition is extremely slight. The articulation of clusters is generally very close. I know of no differences between the articulation of common clusters and less common clusters. Finally, I wish to make clear that consonants in these clusters (and others in the language, except the one discussed in Sect. 8.4) are not syllabic.

8. If we were to specify the universal sonority scale in more detail, mentioning manner or place of articulation, Seri contains a large number of marked onsets and codas.

9. I do not mean to say that there are no sequences of identical vowels, since I do want to allow for such sequences when the length is extra long. The verb root **-sii:x** which occurs in the verb **-sii:x-im** 'move' has two vowels phonologically, although it is simply one long vowel phonetically. The verb undergoes an ablaut rule to form the plural stem, which is **-sia:i-am**. Similar facts (although in the reverse) are observed in the verb 'wash one's hands', which is **-onfa:-X** in the singular and **-onfi-ta-x-k** in the plural. The infixation of **-t6-**

in the formation of some plural forms also gives evidence for geminate vowel clusters. Compare **-i:ɲ** 'go (sg.)' and **-i-tɔ-i:x** 'go (pl.)'; **-a:a** 'call (sg.)' and **-a:-tɔ-a-t** 'call (pl.)'. Similarly, the verbs **-ai:X** 'leave' and **-ai** 'tell', which begin with a short low vowel and enter into the morphophonemic alternations which are typical of such roots (see (6)), undergo an ablaut rule to form the plural stems, which are **-aa:X-ox** and **-aa:-m**, respectively. The latter forms, although they have very long vowels phonetically, also enter into the morphophonemic alternations which are typical of roots beginning with short low vowels. The verb **-aa:ɪ** 'order' is another example. I know of only two verbs which demonstrably contain a sequence of short identical vowels phonologically: **-aa** 'know' and **-ee** 'give'. Compare the paradigms below with those in (6-7):

k-iy-a	(NOM-OM-know)	k-iy-e	(NOM-OM-give)
i-t-aa	(OM-RL-know)	i-t-ee	(OM-RL-give)
i-po-a	(OM-IRR-know)	i-po-e	(OM-IRR-give)
i-siy-a	(OM-IRR-know)	i-siy-e	(OM-IRR-give)

10. Stress is sometimes (but not always) perceived as being on the second vowel if the first vowel is nonlow. For example, in **koanta** the **o** has less stress than **a**. I take this as resulting from a phonetic gliding rule and not relevant to the matter of primary stress assignment.

11. Roots with the sequence **if** include **-aknfi:Xo** 'pour out', whose plural form is **-akn[e]a:ɪXim**, and **-a?xfit** 'fall', whose plural form is **-a?x[e]a:tim**. Pluralization of these, and other, stems involves the ablaut of the second **i** to **a**.

12. Monomorphemic word-initial vowel clusters are almost nonexistent. The word [eaʃ] may be one monomorphemic example, although the actual vowels involved suggest a possible bimorphemic source historically, as noted above. This is the case for other attested examples of word-initial vowel clusters. For example, the third person possessive prefix **i-** on the root **-aa:x** 'vertebra' results in a word-initial vowel cluster: [ea:x]. The imperative form of intransitive verbs whose roots begin with **a** or **o** take a zero allomorph of the imperative morpheme, plus ablaut (if applicable). The imperative form of **-otx** 'arise' is **atx**, for example. An intransitive verb root beginning with a vowel cluster will therefore display an initial vowel cluster in the imperative form: **-oit** 'dance', **ait** 'Dance!'.

13. This rule is obviously what historically produced the large number of complex codas. Moser and Moser (1965) noted that, given the number of segments which can potentially occur in the onset, nucleus, and coda of a syllable, one might expect to find syllables of the form CCCCVVVVCCCC, which nevertheless do not occur. They attribute the nonoccurrence of such syllables to a matter of syllable weight. They state (p. 52), "A heavy build-up of the pre-vocalic margin precludes a like build-up of the post-vocalic margin and vice-versa. Likewise, an expanding vowel nucleus is paralleled by a proportionately decreasing content of the

combined consonant margins." In my opinion, the explanation is to be found elsewhere. First of all, onsets may be disregarded in general because the addition of morphemes (which are responsible for onsets consisting of more than two consonants) is not influenced by the weight of the rest of the syllable. The addition of suffixes is also not affected by the weight of the syllable. Second, many of the consonant clusters in codas arose historically due to the operation of Syncope (this section), which never applies when the stressed nucleus has more than two vowel positions. In light of these facts, we would not expect to find a morpheme containing a rhyme of the shape VVVCCCC.

14. The prefix **?p-**, which does occur before the prefix **po-** does not yield the sequence [i?ppo], but rather [i?po]. A rule of Degemination is obviously operating between unstressed syllables.

15. This possibility was suggested to me by Joseph Stemberger. As he suggests, this analysis makes certain predictions about the relative length of the nasal in this position. I have not been able to check out this prediction, however.

16. In these examples there is not any doubt about how many Vs should be inserted. But there are two cases in which more than one result is possible, **a priori**. One involves **o**-Insertion (as well as **k**-Insertion--see below), and the other V-insertion.

```
a.  /?p +si + m+ msisf:n/      ---> i?pskmomsisi:n
    'I will not be pitiable'    -/-> * i?pskomomsisi:n
    (lsSUB-IRR-NEG-pitiable)
```

b. /m + mi + XapW/ ---> mimXapW [miŋXápW]
'you are trembling' -f-> *imimXapW
(2sSUB-PROX-tremble)

Each of the incorrect derivations involves the application of the same insertion rule in two places in the word. In the case of the word **i?pimpanEX** in (44b) this produced the correct result, but in these instances it produces the wrong result. The incorrect derivation could be blocked by specifying that the relevant rules apply iteratively in a certain direction. Cole (1987) suggests that o-Epenthesis is a cyclic rule; this would account for the way it applies in (a) above.

k-Insertion, which is discussed in Marlett 1981 and Marlett 1984:233, is given below:

$$\emptyset \rightarrow k / [+segment] \quad \begin{matrix} C \\ [+cor] \end{matrix} \quad \text{---} \quad m +$$

17. Given this rule, the epenthesis rule needed for the forms in (17b)

then could be stated simply as shown below, applying only to enclitics. The rule does not need to specify the content of the V which is inserted.

Enclitic V Insertion:

$$\begin{array}{ccc} \text{C} & \text{C} & \\ | & | & \\ \alpha & ? & \end{array} \Rightarrow \begin{array}{ccc} \text{C} & \text{V} & \text{C} \\ | & & | \\ \alpha & & ? \end{array}$$

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