Abstract
This article offers an overview of the phonological typology and analysis of the Wakashan languages, namely Haisla, Heiltsukvla (Heiltsuk, Bella Bella), Ooweykala, Kwak’wala (Kwakiutl), Nuu-chah-nulth (Nootka), Ditidaht (Nitinah), and Makah.

Like other languages of the Northwest Coast of North America, these have many consonants, including several laterals, front and back dorsals, few labials, contrastive glottalization and lip rounding, and a glottal stop with similar distribution to other consonants. Consonant-vowel sequences are characterized by large obstruent clusters, and no hiatus.

Of theoretical interest at the segmental level are consonant mutations, positional neutralizations of laryngeal features, vowel-glide alternations, glottalized vowels and glottalized voiced plosives, and historical loss of nasal consonants.

Also addressed here are aspects of these languages’ rich prosodic morphology, such as patterns of reduplication and templatic stem modifications, the distribution of Northern Wakashan schwa, alternations in Southern Wakashan vowel length and presence, and the syllabification of all-obstruent words.

1. Introduction
The Wakashan language are spoken in what are now British Columbia, Canada, and Washington State, USA. The family comprises a northern branch—Haisla, Heiltsukvla, Ooweykala, and Kwakwala—and a southern branch—Nuu-chah-nulth, Ditidaht, and Makah—that diverge significantly from each other, but are internally very similar. They are endangered, being spoken natively by about 350 people, out of ethnic populations of about 23,000 whose main language is English. At the same time, most are undergoing active revitalization, with about 1,000 semi-speakers and learners (First Peoples’ Language Map).

In this article, I summarize their segmental and prosodic phonology, drawing attention to phenomena that are typologically unusual, or have inspired significant theoretical interest.

The words in (1) convey an idea of Wakashan sound patterns. I abbreviate Haisla as X, and other languages by the first letter of their English name. Data are in orthography, alongside a meta-alphabetic transcription in italics (see appendix B).

(1) X ìhàq’a  hàqwa wawèś  wawès q’àsa ṣ’âsa îxîs  tìaxòls
H hāq’va hâqwa qvûqs q’wúq’es qvâsê q’âsà îx tìx
O ḱ.aq’va ḱq’wa qvuq’vs q’wúq’vs qvâsâ q’âsà îx tìx
K ìl’kw’  hâqwa nqge kwasâ q’wâsa îtaqâla tìxâla
N nîhk’ nîhuk nuq’ii nuq’éi qihâk qihâk taqii ìqâsì:
D ḱ.iq’uk ḱîxk’ duq’i? duq’i? ḱâxqâk ḱâxak taqii taqii ìqâsì:
M ḱ.iq’uk ḱîxk’ duq’i? u duq’i? qîxqâk qîxqâk taqii taqii ìqâsì:
‘red’ ‘mountain’ ‘weep’ ‘path’
Many aspects of Wakashan phonologies are general to the Northwest Coast of North America, including large consonant inventories with several laterals, front and back dorsals, few labials, contrastive glottalization and lip rounding, and a glottal stop /ʔ/ with similar distribution to other consonants. Word shapes are characterized by large obstruent clusters and a lack of hiatus, and word-building by rich reduplication patterns.

Other aspects are less common. These include word-level tone, pharyngeal consonants, historical loss of nasals, words without vowels or resonants, glottalized vowels, and voiced glottalized plosives. Wakashan prosodic phonology features pervasive alternations in vowel length and presence, and modifications of stems according to prosodic templates.


Readers will find comprehensive bibliographies in Pillino (1894), Adler (1961), and Davis and Wojdak (2007), and online at the Wakashan Linguistics Page, Bach’s Checklist, Stonham’s Bibliography, and the site of the Yinka Déné Language Institute. Audio of Haisla, Kwakwala, Nuu-chah-nulth, and Ditidaht is available online at First Voices.

I begin in section 2 by laying out the consonants and vowels of Wakashan languages, with some discussion of unusual contrasts, and historical nasal loss. Then in section 3, I address intersegmental processes like vowel-glide alternations, consonant mutations, and positional neutralizations.

I turn in section 4 to prosodic phonology, including syllable structure, the distribution of Northern Wakashan schwa, and the initial disyllable in Southern Wakashan. Section 5 is concerned with reduplication and templatic morphology, and section 6 concludes.

Last, I provide appendices on names for Wakashan people and languages (appendix A), symbols and transcription (B), and consonant mutations (C).

### 2. Segments

#### 2.1 Northern Wakashan consonants

As is typical on the Northwest Coast, Wakashan languages exhibit many consonants with little allophonic variation. This inventory is typical of Northern Wakashan:

\[(2) \text{Northern Wakashan consonants}\]

- **aspirated plosives**: \(p\), \(t\), \(k\), \(k^{\prime}\), \(q\), \(q^{\prime}\)
- **glottalized plosives**: \(\dot{p}\), \(\dot{t}\), \(\dot{k}\), \(\dot{k}^{\prime}\), \(\dot{q}\), \(\dot{q}^{\prime}\)
- **voiced plosives**: \(b\), \(d\), \(\lambda\), \(\dot{\lambda}\), \(\dot{\lambda}^{\prime}\), \(g\), \(g^{\prime}\)
- **fricatives**: \(\dot{\imath}\), \(\dot{s}\), \(\dot{x}\), \(\dot{x}^{\prime}\), \(\dot{\chi}\), \(\dot{\chi}^{\prime}\)
- **plain resonants**: \(m\), \(n\), \(l\), \(y\), \(w\)
- **glottalized resonants**: \(\dot{m}\), \(\dot{n}\), \(\dot{l}\), \(\dot{y}\), \(\dot{w}\)
- **long resonants (Haisla, Oowekyala only)**: \(\langle m^{\prime}\rangle\), \(\langle n^{\prime}\rangle\), \(\langle l^{\prime}\rangle\)
I indicate here the regular palatal coarticulation of the unrounded front dorsals /k̩ kʰ ɡ̩ x̩/, but omit it elsewhere. Regarding long resonants, see 2.3.

Stops and affricates pattern together as plosives, and with fricatives as obstruents, while nasals, approximants, and glides pattern together as resonants (Boas 1947, Sapir and Swadesh 1939). Dorsals can be front /k ɡ ʃ/ or back /q ɢ x̩/, and support contrastive lip rounding.

Plosives are further augmented by aspiration, glottalization, and voicing, and resonants by glottalization. Fricatives and plain plosives are typically aspirated, while the ‘voiced’ plosives /b d ɬ ɡ ɡʷ ɢ ɢʷ/ can be phonetically voiced, but are frequently voiceless unaspirated.

Glottalized plosives are ejectives, while glottalization on resonants ranges from creaky voice to full glottal closure. Resonants are generally pre-glottalized, especially in syllable onsets, but glottalization on nuclear and coda resonants is medial or final (Grubb 1977, Lincoln and Rath 1980, Howe and Pulleyblank 2001).

There is some question as to whether aspirated or voiced plosives are less marked, or ‘plain’. Some call the voiced series plain on phonetic grounds, because they lack strong voicing (Vink 1977, Lincoln and Rath 1980, Bach 1989). But Howe (2000) argues on phonological grounds that the aspirated series is plain.

First, voicing and glottalization are active in the phonology, such as in consonant mutations, whereas aspiration is not (see 3.5). Second, the aspirated plosives, together with fricatives, have the freest phonotactic distribution (see 4.1, 4.3).

Third, neutralization processes spirantize aspirated plosives to fricatives, while voiced plosives only devoice (see 3.4). If neutralization involves loss of featural contrasts, this indicates that the aspirated plosives are more similar to the laryngeally neutral fricatives.

### 2.2 Southern Wakashan consonants

Southern Wakashan consonant systems diverge by several developments both from the northern languages, and from each other (Boas 1891, Sapir 1911, 1938, Sapir and Swadesh 1952, Swadesh 1953, Haas 1969a, Jacobsen 1969b, 1979c, 2007, Gamble 1977, Fortescue 2007). In this chart, brackets indicate phonemes that are marginal in one or more languages:

(3) Southern Wakashan consonants

<table>
<thead>
<tr>
<th>Type</th>
<th>Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirated plosives</td>
<td>/p t ʰ ɾ c ɾ č ĕ ̆ k ̆ kʷ q qʷ/</td>
</tr>
<tr>
<td>Glottalized plosives</td>
<td>/p̩ t̩ ɾ̩ ɾ̩ ɾ̩ č̩ ĕ̆ ̆ k̆ k̆ k̆ q̆ q̆/</td>
</tr>
<tr>
<td>Voiced plosives</td>
<td>/b d/</td>
</tr>
<tr>
<td>Voiced glottalized plosives</td>
<td>/b̩ d̩/</td>
</tr>
<tr>
<td>Fricatives</td>
<td>/l s ʃ x xʷ ɾ̥ ɾ̥ ɾ̥ ɾ̥ ɾ̥ ɾ̥ ɾ̥ ɾ̥ ɾ̥ ɾ̥/</td>
</tr>
<tr>
<td>Plain resonants</td>
<td>/m̩ n̩ l̩ y̥ w̥/</td>
</tr>
<tr>
<td>Glottalized resonants</td>
<td>/m̩ n̩ l̩ y̥ w̥/</td>
</tr>
</tbody>
</table>

General across Southern Wakashan are the merger of historical voiced and aspirated plosives into a single aspirated series, and the development of palatals /č ɺ ʃ̩/ from unrounded front dorsals *k ɺ ɡ ʃ. Yet instances of /k ɺ ɡ ʃ/ remain, some reflecting rounded *kʷ ɺʷ ɡʷ ʃʷ. Unlike in the northern languages, southern /k ɺ ɡ ʃ/ have no palatal coarticulation.
Other changes distinguish southern languages from each other, including the loss of /l l/ in Nuu-chah-nulth, the development of pharyngeals /ħ/ (Jacobsen 1969b, Carlson and Esling 2003) and new voiced plosives /b b d d/, and loss of glottalized resonants in Makah with concomitant lengthening of a preceding vowel:

(4) *χχʷ *qqʷ *l l *m m n n *y y w w

N h h l l i n n m m n n y y w w
D χχʷ l l /q qʷ/ b b d d y y w w
M χχʷ l l b b d d y y w w

Southern glottalized resonants are always pre-glottalized. Only Ditidaht allows them in codas:

(5) N wiiyá D wiiý M wíry(a) ‘never’
N mamałn D babład M babalid, babaldi- ‘white person’

Although changes have made some sounds marginal in particular languages, the original sounds survive in corners of the vocabulary through borrowing, through language contact, or because a change is still in progress:

(6) N ʔalx̣ak ‘muddied (water)’ ʔanisic, ʔalisic (name)
D ʔiqiuwuws ‘Caycuse River’ liyoom, liyooʔaq ‘(the) devil’
M naʔni ‘grizzly bear’ mačłatx ‘Muchalaht person’

A much discussed case is the change from nasals to voiced plosives in Ditidaht and Makah, as nasalless languages are typologically rare (Thompson and Thompson 1972, Kinkade 1985). However, Ditidaht retains /n n/ in a few words with diminutive meaning:

(7) N ñiic — — — — čimîtuu — —
D niič ?iniiq ?inuux ?inič činiʔu? naʔn̓aʔ piʔn̓u
M diʔc ?idiʔq — — ?idic čiʔitawi dəʔdiʔsqʷaʔ —
‘short’ ‘few’ ‘small’ ‘short time’ ‘squirrel’ ‘robin’ ‘kitten’

In most other core vocabulary, original nasals have become plosives, though Ditidaht generally preserves them in borrowed words, and Makah sometimes does so:

(8) N maʔas nuuk mituuni muusmuus saantii naana, naani
D baʔas duuk mituulii muusmus saantii naanii
M baʔas dukuʔ bituʔiʔ bursburs saʔďiʔ naʔniʔ
‘house’ ‘song’ ‘Victoria’ ‘cow’ ‘Sunday’ ‘grizzly bear’

Other developments are the typologically rare pharyngeals /ħ/ and voiced glottalized stops /b d/. Of these, /ħ/ is least problematic for analysis, clearly patterning with fricatives under mutation, and in its free phonotactic distribution (see 3.5, 4.1).
The other pharyngeal /ʕ/ is less well understood. Phonetically, it is described as a pharyngealized glottal stop (Sapir and Swadesh 1939), a pharyngealized epiglottal stop (Carlson et al. 2001), or a glottalized pharyngeal glide (Shank and I. Wilson 2000, I. Wilson 2000). See also Rose (1979), Colarusso (1985), Werle (2007), I. Wilson (2007).

Phonologically, /ʕ/ is the synchronic realization of hardened /ʔʔ/, and has phonotactics similar to the glottal stop /ʔ/. Both of /ʕʔ/ are transparent to vowel umlaut and metathesis, and do not trigger pre-adducted presence in Ditidaht repetitive forms. See 3.1, 3.5, 4.3.

Some represent Ditidaht /b d/ as /ʔbʔʔd/ sequences, presumably because voiced glottalized plosives are crosslinguistically rare (Swadesh and Swadesh 1933, J. Thomas and Hess 1981, J. Powell 1991, Fortescue 2007, Jacobsen 2007). However, several points favor their representation as single segments (Gamble 1977, Werle 2007).

Phonetically, southern /b d/ are resonant-like in being fully voiced, and /b d/ are pre-glottalized like resonants, rather than post-glottalized like obstruents. Phonologically, /b d/ act like unitary segments, rather than /ʔʔC/ sequences. First, /b d/ harden to /b d/. Second, /b d/ must be postvocalic, whereas /ʔ/ need not be. Third, true /ʔbʔʔd/ sequences are always (9), and other /ʔʔC/ sequences sometimes (10) divided by a vowel, whereas /b d/ are not (11).

(9) D hiilaksʔub ‘headdress’ hitacxʔid ‘wife’
(10) D čuucqšuʔʔp ‘wash dishes’ čuucqsʔup = s ‘I’m washing dishes’
(11) D dačsaab ‘Show it!’ dačsaab = s ‘Show me it!’

Last, some speakers reduce /b d/ to /ʔ/ in casual speech, but do not reduce /ʔʔC/.

2.3 Vowels

Wakashan vowel systems are not exceptionally large, and exhibit significant allophonic variation. Some analyses further reduce mid vowels, diphthongs, and some long vowels to other vowels, or take northern alternations between vowels and glides, and between schwa and zero, to show that these languages lack purely vocalic phonemes altogether (see 3.1, 4.3).

All Wakashan languages have the basic vowels /i a u/, plus either mid vowels /e o/, or diphthongs /ai au/. The northern languages have schwa /ə/. In some languages, vowels are augmented by length, and in Owekeyala by glottalization:

(12) Haisla and Kwakwala vowels
short vowels i a u
long vowels (Haisla only) /i/ /a/ /u/
mid vowels e o
schwa /ə/
(13) Heiltsukvla and Oowekyala vowels
- plain short vowels: \( i \), \( a \), \( u \)
- glottalized vowels (Oowekyala only): \( \langle i \rangle \), \( \langle a \rangle \), \( \langle u \rangle \)
- long vowels (Oowekyala only): \( \langle i \rangle \), \( \langle a \rangle \), \( \langle u \rangle \)
- diphthongs: \( ai \), \( au \)
- schwa: \( \partial \)

(14) Southern Wakashan vowels
- short vowels: \( i \), \( e \), \( a \), \( u \)
- short /o/ (Ditidaht, Makah only): \( \langle o \rangle \)
- long vowels: \( i: \), \( e: \), \( a: \), \( o: \), \( u: \)

The symbols /i e a o u/ represent a range of phonetic vowels. Figure 1 sketches all seven vowel systems by allophones, grouping noncontrastive qualities to convey roughly how each language apportions its vowel space:

Haisla | Heiltsukvla | Oowekyala | Kwakwala
---|---|---|---
\( iy \), \( iy \), \( i \), \( u \), \( o \), \( u \), \( \partial \), \( \partial \)

Nuu-chah-nulth | Ditidaht | Makah
---|---|---
\( \langle i \rangle \), \( \langle i \rangle \), \( \langle i \rangle \), \( \langle e \rangle \), \( \langle a \rangle \), \( \langle o \rangle \), \( \langle u \rangle \), \( \langle a \rangle \), \( \langle o \rangle \), \( \langle u \rangle \)


Haisla and Kwakwala are characterized by open /i u/, and Nuu-chah-nulth by open /u u/. Ditidaht and Makah stand apart by their low canonical /æ/ and back /ɑː/, respectively [æ:] and [ɑː], while in other languages [æ] is an allophone of /a/. Generally speaking, long vowels are tenser (more peripheral) and stable, and short vowels laxer and prone to allophony.

Articulatory clashes between vowels and consonants are resolved by vowel allophony, the greater integrity of consonants serving to maintain the great number of consonantal contrasts.
Back dorsals, pharyngeals, and sometimes glottals have the strongest effects, especially on high /i u/, causing them to open, to diphthongize toward [ə a], or both.

In the southern languages, vowel quality is influenced also by stress and coda consonants. Tseshaht Nuu-chah-nulth /i a/ may have the lax allophones [ɪ ʌ] in closed, unstressed syllables (Stonham 1999). Ditidaht and Makah short vowels are canonically lax [i ɛ ə o u], but are tenser [i æ ə ɔ ʊ] before glottalized resonants, and before tautosyllabic glides and /ʃ ʔ/.

Most fluid is schwa. Phonologically featureless (see 4.3), it is typically [ə ʌ] in Haisla and Kwâk̓ wala, but varies widely in all northern languages, tending toward [i ɪ] next to /y/ and front unrounded dorsals, [u ʊ] by /w/ and rounded dorsals, [ɔ] by back dorsals, and [ə] by /h ʔ/.

Only Heiltsukvl a and Oowekyala have the true diphthongs /ai au/—that is, two vowels to one nucleus. Other apparent diphthongs are allophones, or monophthongs plus glides. Coda glides in Ditidaht and Makah are consonants, not contributing to syllable weight, nor alternating with vowels, nor shortening preceding vowels:

(15) D ɬakaaw ɬuuy kiwteel, kibteel tayeey
M ɬakəw ɬuɬ kiwtaɬ, kibtaɬ takaɬ
‘poor’ ‘medicine’ ‘horse’ ‘senior brother, cousin’

Some vowel contrasts are marginal, or depend on analysis. Except for /a/, long vowels and resonants are rarer in Haisla than in Oowekyala, and are analyzable as sequences of identical segments (Lincoln and Rath 1986, Emmon Bach, p.c.):

(16) X çəala çəla O çəala çəla ‘tide’
X təls təɬs O təɬs təɬs ‘high bush cranberry’
X səms səɬs O səms səɬs ‘mouth’

Further, it is not obvious whether Oowekyala glottalized vowels are phonemically glottalized /i ʌ/ (Lincoln and Rath 1980, Hilton et al. 1982, Howe 2000), or simply plain vowels followed by glottal stop /iʔ aʔ ʊʔ/:

(17) O ɬəs ‘far out at sea, seaward’ xviota xw̓ iita ‘stick out, raise’
O ɬəs ‘animal fat, blubber, grease, oil’ xviisa xw̓ iisa ‘make whipping motion’

Some arguments are indicative, but ambiguous. First, while /i ʌ/ repel stress, similarly to the syllabic glottalized resonants /ľ m̌ ň/, this is true of /Nʔ/ and /əR’/ sequences across Northern Wakashan (see 4.2). Second, /i ʌ/ can result from hardening, but Ditidaht hardening similarly yields postvocalic /ʔ/ (see 3.5):

(18) O ɬəsla kʷəsəla /kʷə-slə/ ‘sitting on ground (outdoors)’
D ?ustaʔs /ʔust-’as/ ‘on ground (outdoors)’
More convincing is that /i à ú/ have similar phonotactics to the unitary segments /l m n/. First, they are only short, whereas plain vowels and syllabic resonants can also be long. Second, they are possible only as the first syllabic sonorant in a word.

3. Segmental phonology

3.1 Vowel interactions

Next I will discuss some important phenomena that happen in and between segments, beginning with those involving vowels. These are of two broad kinds, consisting in resolutions of hiatus, and interactions across the non-oral consonants /l m n/.

General across Wakashan is a complete lack of hiatus—that is, any two syllable nuclei are separated by at least one onset. Languages resolve potential hiatus by fusion, gliding, diphthongization, epenthesis, or deletion.

The various resolutions of hiatus observed in the northern languages depend on vowel height and ordering. Most consistent is gliding, whereby /i u/ become /y w/ before another high vowel or syllabic resonant, often accompanied by schwa insertion:

(19) X  
O  
H  
K  

The interpretation of orthographic i, u as /y w/ depends on analysis (Bach 1975). First, /y w/ are pronounced as such in Kwakwala, though they are closer to [ij uw] in other languages. Second, the putative /a/ fails to attract stress (see 4.2).

Gliding is taken to show, further, that the pairs /i y/ and /u w/ are single phonemes. More controversial is Lincoln and Rath’s (1980, 1986) proposal to collapse /a h/, according to which Haisla, Heiltsukvla, and Oowekyala would lack purely vocalic phonemes altogether.

Resolutions of high vowels with /a/ are more variable. In Kwakwala these consistently fuse into one surface vowel, regardless of their order. In other northern languages, rising-sonority sequences /ia ua/ are resolved by gliding, while falling-sonority sequences /ai au/ fuse in Haisla, but diphthongize in Heiltsukvla and Oowekyala:

(21) X  
H  
O  
K  

In the southern languages, gliding and diphthongization are unattested. Nuu-chah-nulth consistently deletes one or the other of vowels in sequence, favoring either the first root vowel if it is involved, or according to the scale $u > i > a$:

(22) X  
H  
O  
K  

‘get water’ ‘wind, draft’ ‘snow’ ‘five’
Ahousaht Nuu-chah-nulth sometimes resolves hiatus with epenthetic /ʔ/ or /y/ (Kim 2003d).
In Ditidaht and Makah, fusion is the norm, frequently involving contraction of two vowels across a glottal stop /ʔ/ (23) or pharyngeal /ʕ/ (24):

(23) D /dač-(q)uʔaʔl/ dačooʔl M /dač-uʔaʔl/ dačʔoʔl ‘see’
D /čaayidiʔ-ʔatx/ čaayideʔttx M /čaaydiʔ-ʔatx/ čaaydeʔttx ‘Chinese’
D /ʔu-ʔidux/ ʔuuduxx M /ʔu-ʔidux+R/ ʔuʔuduʔx ‘look for’

(24) D /ciq-!aq/ ceʔqaʔ ‘public speaker’
D /du-q-!aq/ doʔqaʔ ‘songmaster’

Related to fusion is umlaut, whereby /a a/ become /e e/ when separated from a following /i i/ by one of /ʕ/ ʔ/. With other sequences, umlaut is not regular:

(25) N teʔ-ʔiʔ ta-piʔ. waaʔiʔt haʔuk miʔak hiʔak
D teʔ-ʔiʔ ta-piʔ. weeʔiʔt haʔuk buʔak xiʔiʔuk
M teʔ-ʔiʔ — waaʔqiʔ haʔuk buʔak xiʔuk
‘sick’ ‘get sick’ ‘frog’ ‘eat’ ‘burn’ ‘crawl, slither’

Because mid vowels /e o/ often derive from /i a u/ by fusion or umlaut, there is some question as to whether mid vowels are phonemic. Haisla /e o/ may be analyzable as consistently deriving from /ai au/, based on alternations, and because they attract stress, and are long in a way similar to /a/ (Emmon Bach, p.c.). Kwakwala /e o/ are also often derived, but this is not always apparent (Boas 1947, Bach 1975, Lincoln and Rath 1980).
Some southern mid vowels might be phonemic. First, they are found in a few roots:

(26) N kackeʔeeta, keʔeeckata ‘hop’ D weʔekʔ. ‘still’
M koloʔo ‘wild currant’ D oʔoʔ ‘better, more than’

Second, long /e o/ are meaningful rather than predictable in vocatives and emphatics, resulting from ablauted /i a u/ (Jacobsen 1978, 1994, 1997). On the other hand, short /e/ results mainly from umlaut, while short /o/ is usually clearly derived.

3.2 Consonant interactions
In contrast to vowel interactions, which are rich across Wakashan, processes resulting from contact between consonants are almost exclusive to the northern languages. Some of the more common are contraction of /ss/ to /c/ (27), dissimilation of /š/ to /tʃ/ (28), and, at least in Oowekyala, contraction of consonants of similar place (29).
(27) X /ʔuñas = s guk/ ‘ʔuñak gux’ /ʔuñas gux/ ‘big house’
H /kũus = su/ kũcũ kũcũ ‘you do not’
(28) H /cʰał = su/ ʔyválcũ ʔałdcũ ‘you stop’
K /maʔt-sm/ maʔtsám maʔt-cəm ‘two round ones’
(29) O /gax-χs/ ga-χs ga-χs ‘come aboard’
O /xʷl-χyas/ xvl-χias xʷl-χyas ‘fire on roof’

Most northern languages also contract /tl/ ts/ to /k/ c/. Oowekyala is an exception, as shown by near-minimal pairs, and by reduplication of root-initial consonants (30). Heiltsukvla distinguishes /ts/ from /c/ only root-initially (31).

(30) O cla cəla ‘cut through water’ tsla tsəla ‘pushing’
O ʔi-ʔa ʔi-ʔa ‘black bear (PL)’ ti-ʔa ti-ʔa ‘soak dried fish (PL)’
O wač wač ‘dog’ ʔvats ʔəts ‘crowded on field’
(31) H cá-csa cá-csa ‘pour liquid out (PL)’ ti-tsa ti-tsa ‘push (PL)’

By contrast, the southern languages maintain such contrasts as affricates /c č/ versus plosive-fricative sequences /ts tʃ tl/ (32), round dorsals versus dorsal-/w/ sequences (33), and single versus double obstruents (34):

(32) N lacuča ‘not recognize’ tutuutš ‘thunderbird’
D kʷiscač ‘go somewhere else’ kʷistsawaʔtx ‘ghost’
D kiiʔkii ‘breaking open sea urchins’ hihihtakʔitl ‘shoulder’
M sitši ‘strike match’ sitši ‘split’
(33) M bukʷak ‘blue’ bukwač ‘deer’
M čič:iš ‘get scared’ hitaعطاء ‘daughter’
(34) D čaqabs ‘tree bark’ caqqawis (place name)
D ḟaššii ‘name’

3.3 Rounding neutralizations

Wakashan languages neutralize rounding on dorsal consonants in several positions. Rounding is contrastive on non-final, prevocalic dorsals not in contact with /u/ (35). But following /u/, dorsals neutralize to rounded (36).

(35) K gənusl ənuʔ ‘night’ N xʷakak ‘swollen’
K ʔwaʔal gʷala ‘finished’ N ʔaʔakʷaʔl ‘eight’
(36) O waka-kala waka-kala ‘sound of barking’ D baaqa-qapł ‘like to eat what’
O tu-kvala tu-kʷala ‘sound of footsteps’ D ʔuu-qʷapł ‘like to eat’

Almost as regular is the opposite neutralization. In most languages, dorsals neutralize to unrounded preceding /u/ (37), with scattered exceptions. Only Heiltsukvla and Oowekyala maintain a strong rounding contrast in this context (38).
Southern Wakashan languages further exhibit rounding neutralization before consonants other than /h/, and at the ends of words (39). But Ditidaht and Makah maintain rounding to reflect a lost /u/, or where the restoration of a lost vowel would create a canonically contrastive environment (40).

The boundary between word and clitics is sometimes like a word edge with respect to rounding. That is, even if other conditions are met, clitic boundaries block neutralizations triggered by /u/, and fail to block delabialization at a word edge:

Less well understood is the proper analysis of cases where neutralizations conflict—that is, where dorsals both follow and precede /u/, or, in the south, follow /u/ before a consonant or word edge. Rounding in such cases is variously reported in the literature, and seems to vary by degrees both within and across languages, amounting to a kind of neutralization.

## 3.4 Positional neutralizations

Peculiar to the northern languages are neutralizations of obstruent voicing, aspiration, and continuancy in positions defined partly in terms of syllable structure. But languages differ in triggering environments, affected consonants, and degrees of neutralization.

By spirantization (‘deocclusivization’), underlying plain plosives become homorganic fricatives when parsed in syllable codas. Inside words, it is regular across Northern Wakashan (42). Word-finally, it is most regular in Haisla, and variable in other languages, though more likely when another word follows (43).
Spirantization varies also by place. It is most consistent with dorsals /k kʷ q qʷ/, less with /l, cl/, and least with /p t/, which have no corresponding fricatives. Only in Heitsukvl and Oowekyala, /t/ becomes /l/, and Oowekyala /p/ becomes /m/ or /n/:

(44) X kʰnc-a kʰnc-a ‘steam’ kʰnc-disa kʰnc-disa ‘steam in pot’
H pnút pənút ‘fill bottle’ pnúl-ćúá pənúl-ćuwá ‘empty bottle’
O kp-a kp-a ‘tuck’ km-stut km-stut ‘tuck in opening’
K həntl-a həntl-a ‘shooting’ həntl-həntl-a həntl-həntl-a ‘shoot repeatedly’

Similarly to rounding neutralizations, spirantization can consist in variation that amounts to the loss of a plosive-fricative contrast. Before /s/, back dorsals in Haisla and Kwakwala generally spirantize, while front dorsals may neutralize to plosives:

(45) X dhksám ɬaksám ‘cinquefoil roots’ yəx’sm yəx’ɬsm ‘cedar bark basket’
K iksukw ʔiksukʷ ‘beautiful’ həxsis həxsis ‘swollen feet’

Another coda neutralization is devoicing, whereby underlyingly voiced plosives become similar or identical to aspirated ones. In most languages, the neutralization is absolute, but in Kwakwala, devoiced and aspirated plosives remain distinct:

(46) H yápxd = i yápxd = i ‘the absent one sent’ yápxt yápxt ‘sent’
K ɡwápwa ɡwápwa ‘have child’ migwat migwat ‘seal’

Initial devoicing in Oowekyala shows, moreover, that devoicing happens not only codas, but in any position not followed by a syllabic segment (pgʷanm):

(47) O /bɡʷ/. /pɡvanm pɡʷanm bi-pɡvanm bɪpɡʷanm ‘person (SG, PL)’
O /dɪkʷ/. /zɪkva dɪkʷa zi-ckva dɪckʷa ‘push with feet (SG, PL)’

Deaspiration affects plain and voiced plosives in Haisla. After fricatives, these take on an intermediate quality most like their voiced versions, illustrated here with the suffix /-ɡaŋ/:

(48) X ṣaŋ-ɡaŋ ṣaŋ-ɡaŋ ‘overworked’ ṣaŋ-ɡaŋ ‘too much’
X ḡaas-ɡaŋ ḡaas-ɡaŋ ‘out of breath’ ḡaas-ɡaŋ ‘too good’

3.5 Consonant mutations

Some suffixes and clitics induce mutations in preceding sounds. Mutations are of two types, hardening (‘glottalization’) and softening (‘weakening’, ‘lenition’, ‘mutation’, ‘voicing’). Roughly, these induce glottalization and voicing, respectively. See appendix C.
Mutations offer clues to the featural representations of segments, having significantly different effects on plosives, fricatives, and resonants. They are analyzed either as fusion of a consonant with glottal stop or /h/ (Rose 1976, P. Wilson 1977), or as floating features (Howe 1996, 2000, Kim 2003d, Kim and Pulleyblank 2009).

Northern hardening and softening are fairly uniform across languages, and associated only with suffixes. While plain plosives glottalize under hardening (\(\dagger\)) and voice under softening (\(\circ\)) (49), plain resonants only glottalize (50), and fricatives change in idiosyncratic ways (51).

(49) X /bk\~w/!\(\ddot{k}\)ala/ \(\text{bk}^\sim\text{a}la\) \(b\ddot{e}k\~w\text{-}\text{ala}\) ‘speak’

K /wnq\~i/ \(\text{wang-}i\) \(\text{wang-i}\) ‘deep on floor’

(50) O /tu-!inux\~w/ \(\text{tw}^{-}\text{inux}\) \(\text{taw}^{-}\text{inux}\~w\) ‘good at walking’

H /\~wi/ \(\text{wi}\~\) \(\text{we}\~\) ‘hide indoors’

(51) X /homs\~ilas/ \(\text{hmz-il\~\as}\) \(\text{h\~m\~k}\~\text{il\~s}\) ‘restaurant’

H /blx\~(k)ala/ \(\text{Bl\~v-}\text{\~a}la\) \(\text{b\~sl\~w-}\text{\~\a}la\) ‘speak Nuxalk’

O /max\~a\~ci/ \(\text{mn-}\text{\~a\~ci}\) \(\text{m\~n-}\text{\~a\~ci}\) ‘drum’

K /\~cul\~mya/ \(\text{\~is\~u\~l-}\text{\~m\~ya}\) \(\text{c\~u\~l-}\text{\~m\~ya}\) ‘black-cheeked’

Northern mutations, plus gliding, yield complex alternations among stem-final /c e \(\ddot{k}\) s y \(\dot{y}\) i/ and /x\~w/ /\~w/ /\~w/:

(52) stem plus neutral suffix stem plus softening suffix

H \(\dot{p}\~\text{c-s}\) \(\dot{p}\~\text{c-s}\) ‘bent to ground’ \(\dot{p}\~\text{i-kv}\) \(\dot{p}\~\text{i-kw}\) ‘bent’

H \(\dot{p}\~\text{u-s-a}\) \(\dot{p}\~\text{u-s-a}\) ‘swell’ \(\text{pu-i}^{-}\text{\~n\~k\~v}\) \(\text{p\~w\~l}\~\text{n\~k\~v}^\sim\text{e}la\) ‘rise gradually’

K \(\dot{\~q}\~\text{\~l-s-a}\) \(\dot{\~q}\~\text{\~l-s-a}\) ‘oily’ \(\text{\~k\~l\~i-kw}\) \(\text{\~q\~l\~i-kw}\) ‘sunk in water’

K \(\dot{y}\~\text{\~\a\~x-w-a}\) \(\dot{y}\~\text{\~\a\~x-w-a}\) ‘dance’ \(\text{\~y\~u\sim-n\~k\~w\~la}\) \(\text{\~y\~u\~i-k}^{-}\text{\~n\~k\~w\~la}\) ‘dance along’

Southern mutations are more varied, and more often realized as /\?/, especially after vowels, which cannot glottalize as glides as in the north. The southern languages also have several hardening clitics (53), but only Makah has developed softening clitics (54):

(53) N /ha\~l\~i-\(\text{!a}\~\lambda/\) \(\text{ha\~l\~i=}\text{?a}\~\lambda\) ‘invite to participate now’

D /\~\lambda\~\text{a}uu-\(\text{!a}\~\lambda/\) \(\text{\~\lambda}^{\sim}\text{\~\a=}\text{?a}\~\lambda\) ‘the other’

(54) M /\~\text{\~q\~i-d\~i\~\lambda=}\text{!i}^{-}\text{q}/\) \(\text{\~q\~i-d\~i\~\lambda=}\text{?i}\~\lambda\) ‘the dog’

M /ti\~\text{\~u-p=}\text{!i}^{-}\text{q}/\) \(\text{ti\~u-p=}\text{?i}\~\lambda\) ‘the octopus’

Recapitulating diachrony, mutations that yield glottalized resonants in other languages induce pre-resonant lengthening in Makah (55). Similarly, hardening of /q q\~w/ in Nuu-chah-nulth and Ditidaht yields /\?/, or, in Ditidaht, /\? q\~w/ after consonants (56) (see 2.2).

(55) N /\~\text{\~c\~a\~x-w-}!\text{a}\~\lambda/\) \(\dot{\text{c\~a\~x-a}q\~\lambda}\) ‘spear inside’

M /\~\text{\~p\~u-s-}!\text{t\~a}u/\) \(\dot{\text{\~p\~u-y-at}}\) ‘rest after work’
Following already voiced or glottalized consonants, mutations may induce no change, or be realized as glottal stop, sometimes with preceding schwa.

4 Prosodic phonology

4.1 Syllables

I now turn to phenomena that provide evidence for prosodic constituents like syllables, feet, and prosodic words. Little work has been done on intonation and other aspects of higher prosodic structure, but see Hofmann (1984), Stonham (to appear).

Wakashan syllable structure is both simple and typologically unusual. The facts that hiatus is unattested, and that in most languages every word begins with exactly one consonant, indicate that onsets are simple and obligatory. Conversely, the attestation of medial and final clusters indicates that codas can be complex (Sapir and Swadesh 1939, P. Wilson 1978):

[57] X hitlktni hitlktni ‘right hand’ glt galt ‘long, tall’
K amkstud ?amkstud ‘close off’ bagwns bagwns ‘visitor’
N čuhsmtp ‘old spruce’ tukaqiml ‘seal skin float’
D hiičq̓s?aa ‘headlamp’ hihitacqst ‘hip’

Medial and final clusters are in principle of any length, but are more restricted in Haisla and Kwak̓wala, which limit cluster-medial consonants to fricatives. Other languages allow cluster-medial aspirated plosives, and Oowekyala allows medial glottalized plosives.

Several facts indicate that large clusters are codas, rather than appended to words or other constituents. First, clusters frequently begin with a resonant, resembling the crosslinguistically typical sonority sequencing of syllable margins. Second, most languages forbid initial clusters, whereas appended consonants are commonly found both initially and finally.

Third, northern coda spirantization applies cluster-medially, pointing to a complex coda (58). Fourth, southern repetitive aspect reduplicates entire monosyllabic roots—including cluster-final CVCC roots—but only the first CV of polysyllables (59). See 3.4, 5.2.

[58] O /alkʷ-/ ’alkvä ?alkʷ-a ‘blood, bleed’
O /alkʷ-/ ’alkvä-čwa ?alkʷ-čwa ‘bleed heavily’

[59] M /sitk/ sitk-šiʔ siṭk-siṭk ‘wag tail (PERF, REP)’
M /wasaq/- wasaq-šʔ wa’-wa’asq ‘cough (PERF, REP)’

Whereas the southern languages allow only vocalic nuclei, Heiltsukvyla and Oowekyala also parse the resonants /l m n/ as nuclei, when they are not vowel-adjacent (60). But in Haisla and Kwak̓wala, such resonants are reliably pronounced with preceding schwa:
Lincoln and Rath (1980, 1986) analyze non-prevocalic resonants as syllabic across Northern Wakashan, and any preceding schwas as phonetic. Indeed, such resonants are moraic, rarely follow full vowels, and are copied in CV reduplication (Zec 1988). Non-prevocalic nasals in Nuu-chah-nulth are similarly moraic, and follow only short vowels, but are not CV reduplicated, and are analyzed as codas (Stonham 1990, Shaw 1992). See 4.2, 5.2.

Heiltsukvla and Oowekyala are exceptional also in allowing initial clusters (61), as well as words without sonorants of any kind (62).

4.2 Word prominence

Patterns in word prominence provide further clues to prosodic structures, especially to feet, and to moras through their role in syllable weight. In most languages, word prominence is largely predictable, and tends toward the beginning of the word. Moraic segments—those that contribute to syllable weight and attract stress—are full vowels in the north, long vowels in the south, and plain coda resonants. Obstruents and glottalized resonants are never moraic.

Kwâkâwala stresses the first heavy syllable, or the last syllable if all are light (Bach 1975, Lincoln and Rath 1980, S. Wilson 1986, Zec 1988):

(63) K bâbagwâm bâbagʷəm ‘boy’ gâdâkw gədâkʷ ‘homemade’
K bagwánâm bagʷánam ‘man’ gagâlâm gâgâl̓ám ‘ermine’
K gwâlxsâm gʷâlxsâm ‘rain gear’ hâbâxtlâxse’ həbox̣áxsxe? ‘beard’

(64) K gâlisud gâlčud ‘crawl into’ ga’llnâkwala gəl̓hâkʷəla ‘crawl along’
In the analysis of Lincoln and Rath (1980) and Hilton et al. (1982), Owekyala stresses the second plain syllabic sonorant (Ṽ, Ṛ) of the word if it immediately follows the first, and otherwise the first (65). Glottalized syllabic resonants are never stressed (66).

(65) O cía cayá 'get water’ wáta wáta 'pull’
O dná daná 'pull rope’ kínav xínav ‘crab’
O dgm dgm ‘buoy line’ xýya xýya ‘decorate’

(66) O dngx dngx ‘sea’ il il ‘dead’

Prominence is contrastive only in Haisla and Heiltsukvla. Haisla stress is intensity or low tone (Ṽ) (Vink 1977, Lincoln and Rath 1980, Bach 1989), while Heiltsukvla words have zero to three high toned syllables (Kortlandt 1973, 1975, Rath 1981, S. Wilson 1987):

(67) X ġálas ġálas ‘lizard’ ‘ix’ika ?ix’ika ‘swing hammer’
X ġálas ġálas ‘quitting time’ ‘ix’ikä ?ix’ikä ‘eat balanced diet’

(68) H wátásu wátásu ‘you pull’ il il ‘dead’
H wátasú wátasú ‘be pulled’ cqń cqń ‘dirty face’
H hádání hádání ‘black cod’ lágvustíwá làg*ustíwá ‘go upward’

In the southern languages, primary stress is on the first or second syllable of the word. Long vowels contribute to syllable weight, but coda nasals in Nuu-chah-ulth are the only consonants that do so (Sapir 1924, Jacobsen 1979b, S. Wilson 1986, Stonham 1994a, 1999, Davidson 2002, Waldie 2003, Werle 2007).

All southern languages stress the first syllable if it is heavy (#HL, #HH), and the second if it is heavier than the first (#ΛH). But Nuu-chah-nulth gives two initial light syllables trochaic stress (#ŁL), while Ditidaht and Makah prefer iambic stress (#ΛL):

(69) N #ŁL íútúhcac’eu ‘Head-at-each-end’ #HL čímsmiit ‘Son of Bear’
N #ŁH háyúuyipśiį ‘obtained ten’ #HH ?iḥtuup ‘humpback whale’
D #ŁL hawłíy ‘ready’ #HL dúusaq ‘sort of, so-so’
M #ŁH ?uséʔił ‘Ozette’ (place) #HH yúq’a ‘also, too’

A few other patterns are reported, including consistent peninitial stress for some Makah speakers (Jacobsen 1979b), variable stress in #LL and #HH words in Ahousaht Nuu-chah-nulth (Waldie 2003), and secondary stress (Stonham 1994a, Waldie 2003, Werle 2007).

4.3 Vowel presence, absence, and length

Across Wakashan, vowels alternate in length, with schwa, and with zero. While some alternations are morphologically conditioned (see 5.2), others are phonological, either improving prosodic structures, or licensing laryngeal features on adjacent consonants.

All northern languages insert schwa between an obstruent and onset resonant, to improve syllable contact ($q^\text{apela}$). But whereas schwa is the default nucleus in Haisla and Kwakwala, Heiltsukvla and Oowekyala tolerate anuclear syllables (see 4.1).

Vowel presence also serves to license voicing and glottalization. All northern languages require voiced sounds to be prevocalic, or to devoice ($\lambda/\chi$, see 3.4). Heiltsukvla also inserts schwa to make glottalized consonants prevocalic ($p/\lambda$).

In Howe’s (2000) analysis, schwa serves as a default nucleus, to improve syllable contact, to make onsets less sonorous than nuclei, and to license glottalization, but is otherwise absent because its featurelessness is inherently marked. By contrast, southern vowels are featureful (see 2.3, 3.1), and are absent for other reasons.

Southern Wakashan short vowels alternate with zero across forms and languages. While Nuu-chah-nulth has the greatest incidence of short vowels, there is much medial and final absence in Makah (Jacobsen 1971), Ditidaht (Swadesh and Swadesh 1933, J. Thomas and Hess 1981, Werle 2007), and Kyuquot Nuu-chah-nulth (not shown, see Rose 1981):

Conversely, Ditidaht and Makah exhibit vowel presence where Nuu-chah-nulth does not. In Ditidaht augmentative presence, vowel presence in suffixes following monosyllabic stems makes words disyllabic (72). Similarly, previously monosyllabic roots have been augmented in Makah into LH disyllables by a copy vowel, by root vowel shortening, or both (73).

In Werle’s (2002, 2007) analysis, southern final absence improves prosodic words by making them consonant-final, while medial absence avoids unfooted syllables. Augmentative
presence, on the other hand, targets the initial disyllable. While in Ditidaht this merely makes words minimally disyllabic, Makah augmentation creates a canonical LH iambic foot.

The initial disyllable is relevant also to southern variable-length vowels /V/. These are long if in a first or second syllable, but short in third or later syllables, and are attested both in roots (74) and in suffixes (75). By contrast, persistently long vowels /V/ are long in all positions (76) (Sapir and Swadesh 1939, Jacobsen 1979c, Klokeid 1996).

(74) N /caqiːc/ caqiic ‘twenty’ /caqiːc+R/ ca-caqic ‘twenty each’
(75) M /ʔu-daːk/ ʔu-daːk ‘have’ /baʔas-daːk/ baʔas-dak ‘have house’
(76) D /biibidak/ biibidaak ‘terrible’ /qakač-čiːl/ qakač-čiːl ‘three days’

Pre-adducted presence also interacts with the initial disyllable, and is unique in making marked consonants postvocalic, and in grouping resonants with voiced and glottalized obstruents as a class of adducted (or ‘glottalic’) consonants. It is observed only in Ditidaht and Makah, and serves to divide an adducted consonant from a preceding consonant.

But whereas in Ditidaht such vowels are short, and are found throughout the word, in Makah they are long, and appear only in second syllables, creating an initial iamb:

(77) D ės-tuup M ės-tuːp ‘rope’
D his-i-ŷk M his-i-yak ‘axe’
D ũ.iːx-i-čtqk M ũ.iːx-i-čtqak ‘reddish’
(78) D cʊuc-cʊuc M cʊːc-cʊːc ‘scratching (REP)’
D čaːx-a-čaːx M ɬ.ax-a-ɬ.aːx ‘adzing (REP)’ (sic)
D biis-i-biis M biis-i-biːs ‘sniffing (REP)’

Thus, those phenomena that point to a privileged, initial, disyllabic domain in Southern Wakashan include word stress (see 4.2), variable-length vowels, augmentative presence, and Makah pre-adducted presence. To these we will add stem modifications (see 5.2).

Some propose that the initial disyllable is a foot (S. Wilson 1986, Stonham 1990, Kim 2003b, Waldie 2003, Lee 2008). But Werle (2002, 2007) argues that it is another constituent, such as a prosodic word, because the foot-based analysis must suppose marked HL and HH trochees, and because this domain can be trisyllabic, as when variable-length vowels are long in a third syllable, if the second syllable results from pre-adducted presence:

(79) D /luč-daːk/ luč-i-daak ‘married (male)’
M /luč-daːk/ luč-u-daːk ‘married (male)’

4.4 Prosodic clisis

Wakashan languages exhibit rich systems of prosodic clitics—that is, elements with phonological properties intermediate between those of affixes and independent words. While interesting in their own right, clitics also offer clues to the structure of prosodic words.

Clitics (‘word suffixes’, ‘incremental suffixes’) include clause-level inflection, and locative and determiner elements:
(80) K Hekalagada xasalaxdga’.

\begin{align*}
\text{hekala} & = gada & \text{xasalax} & = ga \\
\text{make that noise} & = \text{this} & \text{disappeared} & = \text{this (invisible)}
\end{align*}

They made that noise, these who had disappeared.

(81) D waabteyik ?ii?iičibaaktaqad…

\begin{align*}
\text{waa} & = (b)t & \text{!a} & = \text{yik} & \text{?ii?iičib} & = \text{ak} & = (b)t & = \text{laqad} \\
\text{say} & = \text{PAST} & \text{MOOD} & = \text{HABITUAL} & \text{Elders} & = \text{POSS} & = \text{PAST} & = \text{the (1PL)}
\end{align*}

Our late Elders used to say…

Kwaḵwala clitics have attracted attention for their simultaneous phonological dependence on preceding words, and syntactic connection to following words (Anderson 1984, 2005, Bach 2006, Chung 2007, Nicolson and Werle 2009). But there is as yet little discussion of the properties that distinguish clitics from suffixes (Davidson 2002:252).

Most clitics are dependent on preceding words, though a few are proclitic (Rath 1981, Lincoln and Rath 1986, Lincoln et al. 1990). Clitics resemble suffixes in supporting preceding voiced plosives, and by inclusion in the domain of word prominence. But they differ with respect to mutations and rounding neutralizations, and do not induce stem modifications (see 3.3, 3.5, 5.2). Further research on such differences may shed light on prosodic structures.

5. **Prosodic morphology**

5.1 **Syllable-based morphology**

Besides their role in rhythmic organization, prosodic structures provide a foundation for prosodic morphology. Across Wakashan, roots are word-initial, and affixes overwhelmingly suffixal, but non-suffixal morphology is prosodic, consisting in syllable-based reduplication and infixation, and vowel changes that target either the root, or the initial disyllable.

The few infixes target the coda of the first syllable—typically a CV reduplicant—and often cooccur with suffixal content:

(82) X /buqʷ-/ bû-s-bqʷ-a \quad bû-s-bəqʷ-a ‘sea anemone’
N /liʔ-/ ƛ.ʔi-c-ƛ.iʔ-sul ‘red-eyed’
D /quuʔas/ quu-t-qooʔs ‘people’
M /kʷi-/ kʷi-ƛ.-kʷip-y(a) ‘sharpening (REP)’

Common in Northern Wakashan are vowel changes that alter the nucleus of the root:

(83) X /cs-/ càas-kasla caas-əksala ‘rush off in all directions’
X /kiχʷ-/ kexʷ-ksala kexʷ-əksala ‘run in all directions’
X /guχʷ-/ göxʷ-ksala göxʷ-əksala ‘scatter berries’
O /ts-/ taas-axsala taas-axsala ‘push here and there’
Another phenomenon related to syllable structure is that of disappearing (or ‘ghost’) consonants. These are suffix-initial consonants that appear after vowels, and sometimes after resonants, but not after obstruents:

(84) K /ʔu-(g)jɨt-“iʔ/ u-gwid-’ ‘body of pole, tree’
    K /kłq-(g)it-a/ ᵑk’g-round-’ ‘lick body’
    N /ča-(č)it/ ča-čit ‘water on body’
    N /čaquc-(č)it/ čaquc-it ‘Bubbly-Body’ (name)

5.2 Stem modification

Stem modification consists in various templatic changes to morphological stems that are meaningful in themselves, or are associated with simultaneous affixal content. Modifications include reduplication, changes to root or reduplicant nuclei, and quantitative changes in the initial disyllable.

Wakashan reduplication copies either the first CV, or the first syllable. In Heiltsukvla and Oowekyala, this may amount to simple C and CC copying (see 4.1):

(85) X /c/- c-c čo-c ‘rapids’
    X /bik/- bik-a bik-a ‘lightning’
    O /λ'χw-/ λ-λxχ-ma λ-λ'χw-ma ‘stroke face with flat of hand’
    O /k'q/- kv-kv-q kv-kv-q ‘early dawn’

Reduplication often cooccurs with vowel changes or affixal content:

(86) X /duqw-/ dû-dq°-la dû-dq°-ala ‘see (PL)’
    K /bkw-/ bi-bqw-anam bi-bqw-anam ‘people’
    D /buwač-/ bu-buwač-aatx ‘hunt deer’
    M /pic-/ pi-pic-kuk ‘orange (color)’

Southern Wakashan templates are one of several phenomena that target the initial disyllable (see 4.3). Templates are associated with particular affixes, and may reduplicate the root (+R), as well as lengthen (+L) or shorten (+S) a first or second syllable:

(87) stem template derived form
     N /saya/- +RL+S saa-say-aapi ‘too far off’
     N /ʔaatənul/- +S+S ?ata-ntul-aqaq ‘very thick along length’
     D /tudax/- +R t’q-tudx-akk ‘three-corner grass’
     D /λuϕeeʔčaxšλ/- +L+S λu-ph-eʔčaxšλ ‘becoming summer’
     M /λul/- +L λul-sit ‘still, good, clear water’
     M /λiχ/- +RL+L λi-λiχ-suptaλ ‘canoe race’
6. Summary

In this article, I have offered an overview of the segmental and prosodic phonology of Wakashan languages, drawing attention to several topics of typological interest, such as all-obstruent words (see 4.1), consonant mutations (3.5), word-level tone (4.2), and unusual contrasts like glottalized vowels (2.3) and voiced glottalized plosives (2.2).

I also identified several topics that would benefit from further investigation, in particular the nature of the initial disyllable in Southern Wakashan (4.3), the representation of prosodic clisis (4.4), and whether the northern languages lack purely vocalic phonemes (3.1).
Appendix A: Names for Wakashan people and languages

In this first appendix, I offer some background on the sources of English names for Wakashan languages, both because they are of linguistic interest, and to connect this work to other literature where they are called by different names. Where several names are in use, I have tried to use those preferred by the native communities.

When abbreviating language names, I abbreviate Hai sla as X—after its native name, see below—and all others by the first letter of their English name. When listing languages, I usually give them in order from north to south.

One point of confusion is that the native names for Wakashan languages are distinct from the ethnonyms for the people that speak them. Another is that most modern Wakashan groups are amalgamations of several older villages, so that some unified names—which may be neologisms for entities that previously had no name—are dispreferred by some groups.

The English name Haisla—English pronunciation [ˈhaisla]—comes from the name for the X/ə’isla people of Kitamaat village (not to be confused with the nearby town of Kitimat), who have amalgamated with the X/enaksiala people of Kitlope and Kemano. The language is either X/ə’islak/əla or X/enaksialak/əla, depending on which group is meant.

The name Heiltsukvla [ˈheiltʃukələ] (Windsor et al. 2007)—also Háilzaqv (Windsor Wákas 2007), Háiłzaqvla (Rath 1981, First Peoples’ Language Map of BC), híłzaqw’la (Lincoln and Rath 1986)—is in general use in the community of Bella Bella (Susan Russell, p.c.). Other language names are Bella Bella after the village, or Heiltsuk, Heiltsuq (S. Wilson 1986), after the ethnonym Háilzaqv (Rath 1981), Heiltsuk, Heiltsukv.

Oowekyala [uˈwikjələ], of Rivers Inlet village, is a rendering of native wuikala (Lincoln and Rath 1980), òwikala (Howe 2000). The people of Rivers Inlet are Wuikinuxv, also Oweekeno, Oowekeeno, òwixinuʃʷ, wòwikinuʃʷ (Howe 2000:1, 38).

The now standard Kwak /kwakələ/, replacing older Kwakiutl, refers in a narrow sense to the dialect of the Kwagu’l people of Fort Rupert, but is also used in a general sense for all varieties. The modern ethnonym Kwakwəgʷa/wakʷ ‘Kwakwala-speaking people’ is similarly used in a general sense, though it also derives from that particular ethnonym.

Further, since the Kwakwəgʷa/wakʷ and Nuu-chah-nulth groups are relatively large, comprising villages across Vancouver Island and the nearby mainland, particular communities may prefer more specific names. The dialect of the Liq/əla of Campbell River, Comox, and Cape Mudge, for example, is called Liqʷala (Sewid-Smith 1988). Regarding Kwakwəgʷa/wakʷ subdivisions, see Boas (1966:37-41), Webster (1990), and www.umista.ca.

Similarly, English Nuu-chah-nulth [nuˈtʃənəlθ], replacing older Nootka or Westcoast, is a neologism encompassing numerous communities and dialects (see J. Thomas 1977, Arima and Dewhirst 1990, www.nuu.chah.nulth.org). It is adapted from the native nuučaan/əł ‘mountain range’, which also provides the unified ethnonym nuučaanuʃθ. The language is also called T/əlaqsapa (A. Thomas and Arima 1970, J. Powell 1991), and Quuquuʔaca.

The modern name Ditidaht [ˈditidaf], formerly Nitinaht or Nitinat, is adapted from the ethnonym ditidiʔəʔtx, referring to the people of Nitinaht Lake and the nearby Pacific Ocean coast. The native name for the language is diidiitd. In its general sense, Ditidaht includes the dialect of the Pacheedaht (pthəʔəʔtx) people of Port Renfrew.
The name Makah [məˈkɑː], rendered in the language as maq’a’, derives from their Klallam neighbors’ name for them (Davidson 2002), and bears no resemblance to the native names for the Makah people, q’idiččaʔatłx, and their language, qʷiʔdiččaq.

Last, Wakashan, dating from the time of Captain Cook, is generally accepted as a neutral name for the entire language family (J.W. Powell 1891, Pillino 1894, Jacobsen 1979c, Howe 2000:7). I therefore favor the subordinate designations Northern Wakashan and Southern Wakashan over the now dispreferred Kwakiutlan and Nootkan.

Appendix B: Symbols, abbreviations, and transcription

This second appendix serves as a key to the symbols used in this article, and in particular to the various transcription systems for Wakashan languages. This is warranted, first, by the variety of systems, which presents difficulties to communities, language learners, and linguists alike. Second, in the last few decades most Wakashan groups have adopted one or another system as orthography, which must be balanced against the convenience of generalists.

With these needs in mind, I provide language-particular examples using their respective orthographies, but rely also on a fairly standard meta-alphabet both for general discussion and to clarify the data, especially from the northern languages. Meta-alphabetic transcriptions are distinguished throughout by italics. Where more detailed phonetic transcriptions are warranted, these are in the International Phonetic Alphabet (IPA), and in square brackets.

The orthographies adopted here are those of Haisla Community School (Kitamaat, BC) for Haisla, of Bella Bella Community School (Bella Bella, BC) and Windsor et al. (2007) for Heiltsukvlæ, of U’mista Cultural Society (Alert Bay, BC) for Kwakwala, and of the Makah Language Program (Neah Bay, WA) for Makah. For Nuu-chah-nulth and Ditidaht, I adopt the system used widely in BC School District 70, which includes several Nuu-chah-nulth schools, and Ditidaht Community School (Nitinaht Lake, BC).

Not knowing of any approved orthography for Oowekyala, I have transcribed it like Heiltsukvla. For comparison, I also give here Rath’s system for Heiltsukvla and Oowekyala, which is used in Rath (1981), Hilton et al. (1982), Stevenson (1982), and various materials by Johnson, Smith, and Stevenson (see Howe 2000:9).

In the following charts, I compare these to the meta-alphabet used here, to the IPA, and to the transcriptions of other important sources. One is that favored for Liq’wala, and standard in BC School District 72 (Sewid-Smith 1988). Another is Bach’s Haisla transcription, which differs only in small ways from the orthography. These are set beside the earlier systems of Swadesh and Swadesh (1933), Sapir and Swadesh (1939), and work by Boas and Hunt, and beside the practical orthographies of Bouchard, Grubb (1977), and Arima et al. (2000).

These are some consonant symbols that differ significantly across transcriptions:

<table>
<thead>
<tr>
<th>(88) Consonant symbols</th>
<th>meta-alphabet</th>
<th>International Phonetic alphabet</th>
<th>Haisla</th>
<th>Bach</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>y ί ʎ ʎ ʎ ʎ ʎ ʎ c ć z š č q g χ ʰ ʕ ʔ</td>
<td>j ɟ t İ dl ts dz ŋ tʃ q g χ ʰ ʕ ʔ</td>
<td>y lh th dh c z — — q ź x — —</td>
<td>y lh th dh c z — — q ź x — —</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>(88) Consonant symbols</th>
<th>meta-alphabet</th>
<th>International Phonetic alphabet</th>
<th>Haisla</th>
<th>Bach</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>y ί ʎ ʎ ʎ ʎ ʎ ʎ c ć z š č q g χ ʰ ʕ ʔ</td>
<td>j ɟ t İ dl ts dz ŋ tʃ q g χ ʰ ʕ ʔ</td>
<td>y lh th dh c z — — q ź x — —</td>
<td>y lh th dh c z — — q ź x — —</td>
</tr>
</tbody>
</table>
Heiltsukvl a, Oowe ky a la y ɬ ɬ . c z —— q ɣ ʃ —— ' , ʰ
• Rath (1981) y lh th dh c z —— q ɣ ʃ —— ,
• Liq̕ala y ɬ ɬ . c d —— q ɣ ʃ —— ?
Kwa kw a la y ɬ tl dl ts dz —— k ɡ x —— ,
• Grubb (1977) y lh tl dl ts dz —— k ɡ x —— 7
• Boas and Hunt y ɬ l l s ts dz —— q ɡ x —— e
Nuu-chah-nulth, Ditidaht y ɬ c — ʃ ɛ q — ʃ ʰ ʃ ?
• Sapi r and Swades h (1939) y ɬ c — ʃ ɛ q — ʃ ʰ ?
• Swades h and Swades h (1933) y ɬ ts — c tc q — ʃ — ?
• Bouchard y lh tl — ts — sh ch k — ʃ ʰ ? 7
• Arima et al. (2000) y ɬ ts — sh ch q — ʃ ʰ ?
Makah y ɬ c — ʃ ɛ q — ʃ — ?

Another difference in consonant transcriptions is that some systems omit the predictable glottal stop that precedes vowels at the beginnings of words.

These are some of the various transcriptions of vowels, dorsal rounding, glottalization on plosives (P) and resonants (R), syllabic resonants, and long vowels:

<table>
<thead>
<tr>
<th>Option</th>
<th>Vowel symbols and diacritics</th>
</tr>
</thead>
<tbody>
<tr>
<td>meta-alphabet</td>
<td>ə e o u C̖ P ʾ R R V</td>
</tr>
<tr>
<td>International Phonetic Alphabet</td>
<td>ə e, ə o u C̖ P’ R’ R V</td>
</tr>
<tr>
<td>Haisla</td>
<td>— e o u C̖ P ʾ R R VV</td>
</tr>
<tr>
<td>• Bach</td>
<td>e ai au u C̖ P ʾ R R VV</td>
</tr>
<tr>
<td>Heiltsukvl a, Oowe ky a la</td>
<td>— — — u C̖ P ʾ R R VV</td>
</tr>
<tr>
<td>• Rath (1981)</td>
<td>e, ə — — u C̖ P ʾ R eR</td>
</tr>
<tr>
<td>Liq̕ala</td>
<td>ə e o u C̖ P ʾ R əR</td>
</tr>
<tr>
<td>Kwa kw a la</td>
<td>ə e o u Cw ʾR, R’ əR</td>
</tr>
<tr>
<td>• Grubb (1977)</td>
<td>e eh o u Cw P’ ʾR eR</td>
</tr>
<tr>
<td>• Boas and Hunt</td>
<td>e ə, ə â, ə o, u Cw, C̖ P! ʾR eR</td>
</tr>
<tr>
<td>Nuu-chah-nulth, Ditidaht</td>
<td>— e o u C̖ P ʾ R — VV</td>
</tr>
<tr>
<td>• Sapi r and Swades h (1939)</td>
<td>— ə o Cw ʾP R</td>
</tr>
<tr>
<td>• Swades h and Swades h (1933)</td>
<td>— ə o u Cw ʾR R V</td>
</tr>
<tr>
<td>• Bouchard</td>
<td>— e o u Cw P’ R’ VV</td>
</tr>
<tr>
<td>• Arima et al. (2000)</td>
<td>— e o o Cw P’ R’ V</td>
</tr>
<tr>
<td>Makah</td>
<td>— e o u Cw ʾP — — V</td>
</tr>
</tbody>
</table>

The schwa column for the Haisla, Heiltsukvl a, and Oowe ky a la orthographies is blank because these opt not to write schwa (see 4.3).

As described in 2.3, the meta-alphabet uses the plain vowel symbols /i e ə a o u/ in phonemic transcription, though these correspond to a range of phonetic vowels. In phonetic transcription, I use IPA symbols.

It is also worthwhile to lay out the plethora of vowel symbols used in Boas and Hunt’s work. These are their correspondences to the symbols of other Kwakwala systems:
Correspondents to Boas and Hunt’s vowel symbols

meta-alphabet  
\( i \quad e \quad ə \quad a \quad o \quad u \)

Liq’wala  
\( i \quad e \quad ə \quad a \quad o \quad u \)

Kwak’wala  
\( i \quad e \quad ə \quad a \quad o \quad u \)

* Grubb (1977)  
\( e, ə, ɛ, i, ĩ, ā, ē, ĕ, ì, ă, ă, ŭ, ă, ŭ, o, ū \)

* Boas and Hunt  
\( e, ɛ, े, ी, ī, ा, े, े, a, o, u, ū \)

I have not tried to include every transcription system devised for Wakashan languages, but the foregoing charts represent most of those that one is likely to encounter in the literature. For example, Swadesh and Swadesh’s (1933) transcription serves as a guide to more phonetic versions found in earlier work on Nuu-chah-nulth, such as Sapir (1924).

As for the work of Lincoln and Rath, which accounts for much of what is known about Haisla, Heiltsukvla, and Oowekyala, one finds there a variety of transcriptions, generally approximating one of the transcriptions given above for these languages.

A potentially confusing feature of the Boas and Hunt system is that, in a fashion nearly opposite to other systems, they write /\( x \ x x \)\( χ \ χ \)/ as /\( x· \ x̣w x xw \)—that is, the rounded front dorsal fricative with an underdot, but the back dorsal fricatives with no diacritic. Back /\( g \)/, by contrast, is marked diacritically in their system, as /\( g\)\( /\). They indicate the regular palatalization of the unrounded front dorsals /\( k \ g \ x \)/ with a raised dot, as /\( k· \ g· \ x· \)/.

Despite the variety of transcription systems, only a few symbols are ambiguous, so that one rarely needs to know which system is being used in order to read correctly. Potentially ambiguous consonant graphemes are /\( c \)/ for /\( c \)/ and /\( š \)/, /\( l \)/ for /\( l \)/ and /\( ł \)/, /\( Cw \)/ for /\( Cw \)/ and /\( C̄w \)/, and digraphs like /\( tl \), ts, tc \/. Potentially confusing vowel symbols include /\( e \), o \/) for the high vowels /\( i \), u \/, the variety of representations for mid vowels, and transcriptions of schwa (see 4.3).

The following symbols and abbreviations are also used in this article:
R resonant (consonant)
+R reduplicate the first syllable
REP repetitive aspect
SG singular
SW Southern Wakashan
V vowel
V· surface long vowel (Makah)
V: surface long vowel (meta-alphabet)
V· underlying variable-length vowel
V: underlying persistently long vowel
X Haisla
// phonemic transcription
[ ] phonetic transcription
# word boundary
- affix boundary
= clitic boundary
! hardening mutation
° softening mutation

Appendix C: Consonant mutations


(92) Northern Wakashan hardening and softening

<table>
<thead>
<tr>
<th>target segment</th>
<th>hardens to</th>
<th>softens to</th>
</tr>
</thead>
<tbody>
<tr>
<td>p t c k k&quot; q q&quot;</td>
<td>p t c k k&quot; q q&quot;</td>
<td>b d λ i g g w g w</td>
</tr>
<tr>
<td>m n l y w</td>
<td>m n l y w</td>
<td>m n l y w</td>
</tr>
<tr>
<td>t x x&quot; χ&quot;</td>
<td>l n w w</td>
<td>l n w w</td>
</tr>
<tr>
<td>s</td>
<td>y ~ č</td>
<td>y ~ Ł</td>
</tr>
<tr>
<td>χ</td>
<td>χ</td>
<td>χ</td>
</tr>
</tbody>
</table>
(93) Southern Wakashan hardening

<table>
<thead>
<tr>
<th>target segment before suffixes</th>
<th>before clitics</th>
</tr>
</thead>
<tbody>
<tr>
<td>$p\ t,\kappa,\chi,\ c,\ č,\ k,\ w$</td>
<td>$p\ i,\č,\ č,\ k,\ w$</td>
</tr>
<tr>
<td>$q\ q\ w$</td>
<td>N/D $\varnothing$, M $\ddot{q},\dddot{q},\ w$</td>
</tr>
<tr>
<td>$m\ n\ b\ d\ l\ y\ w$</td>
<td>N/D $\ddot{m},\ddot{n},\ddot{b},\ddot{d},\ddot{l},\ddot{y},\ddot{w}$, M b? d? l? y? w?</td>
</tr>
<tr>
<td>$\ddot{t},\ddot{s},\ddot{s}$</td>
<td>N/D $\ddot{y}$, M $\ddot{y}$</td>
</tr>
<tr>
<td>$\dddot{t},\dddot{x},\dddot{w},\chi\ w$</td>
<td>N/D $\ddot{w}$, M $\ddot{w}$</td>
</tr>
<tr>
<td>$\chi,\ h$</td>
<td>$\ddot{x},\ddot{h}$ (x rare)</td>
</tr>
<tr>
<td>$\dddot{v}$</td>
<td>$\dddot{y}$</td>
</tr>
</tbody>
</table>

To represent mutating properties of suffixes and clitics, I have adapted symbols from Boas, Jacobsen, and Davidson (see 3.5):

(94) Southern Wakashan softening

<table>
<thead>
<tr>
<th>target segment before suffixes</th>
<th>before clitics (Makah only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$p\ t,\kappa,\chi,\ c,\ č,\ k,\ w$</td>
<td>no change</td>
</tr>
<tr>
<td>$c,\ č,\ q\ q\ w$</td>
<td>no change</td>
</tr>
<tr>
<td>$b,\ d, l, y, w$</td>
<td>no change</td>
</tr>
<tr>
<td>$\ddot{t},\ddot{s},\ddot{s}$</td>
<td>$\ddot{y}$</td>
</tr>
<tr>
<td>$\ddot{x},\ddot{h}$</td>
<td>$\ddot{x},\ddot{h}$ (x rare)</td>
</tr>
<tr>
<td>$\dddot{t},\dddot{x},\dddot{w},\chi\ w$</td>
<td>$\dddot{w}$</td>
</tr>
<tr>
<td>$\dddot{v}$</td>
<td>$\dddot{y}$</td>
</tr>
</tbody>
</table>

(95) Symbols for hardening and softening mutations

<table>
<thead>
<tr>
<th>meta-alphabet</th>
<th>hardening</th>
<th>softening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boas (1947)</td>
<td>-!</td>
<td>=!</td>
</tr>
<tr>
<td>Howe (2000)</td>
<td>-!</td>
<td>=</td>
</tr>
<tr>
<td>Swadesh and Swadesh (1933)</td>
<td>-'</td>
<td>=-</td>
</tr>
<tr>
<td>Sapi and Swadesh (1939)</td>
<td>-'</td>
<td>=-</td>
</tr>
<tr>
<td>Rose (1976)</td>
<td>-?</td>
<td>=?</td>
</tr>
<tr>
<td>Jacobsen (1996)</td>
<td>-</td>
<td>=-</td>
</tr>
<tr>
<td>Davidson (2002)</td>
<td>-</td>
<td>=-</td>
</tr>
</tbody>
</table>
Works Cited


First Peoples’ Language Map of British Columbia. maps.fphlcc.ca/fphlcc (1 April 2009)

First Voices, www.firstvoices.ca (1 April 2009)


Stonham, John. *Bibliography of Work on Taalaqsapa*. [www.stonham.ca/nuuchahnulth/references.html](http://www.stonham.ca/nuuchahnulth/references.html) (1 April 2009)


Yinka Déné Language Institute. Bibliographies on British Columbia Native Languages. ydli.org/bcother/bibs.htm (1 April 2009)