1. Introduction
This report represents preliminary observations and generalization of sound symbolism in Zenzontepec Chatino (ZEN). Before the PDLMA summer 2009 field season, the ZEN-SYMB database had 33 entries from the sound symbolism workshop during the PDLMA 2007 season. That was material gathered in 2 hours with Tranquilino Cavero Ramírez in the afternoon on the day of the workshop. Troi Carleton had not marked any material in her database as sound symbolic, and she had apparently not done the task. This report contains many but not all of the 400-500 items of sound symbolic material gathered during the 2009 field season with Tranquilino.

2. The levels of the ZEN sound system
There are three slightly distinct but somewhat overlapping levels of the ZEN phonological system: the native system, the broader system including influence and loans from Spanish, and the sound symbolic system, which includes both tame and wild symbolic material. In this section each of these will be described and exemplified in turn.

2.1. Native non-symbolic phonological system
The basic native phonological system of ZEN includes the following elements.

Consonants: /t ty ky k kw tz ch s x n ny l ly y w 7 j/
Vowels: /i e a o u /
Nasalization /&/ (only contrastive on /i a u/)
Length /:/ <vv>
Tones: /ø_/ (!) (unmarked, Mid, High)

Syllable canon (C_1)C_2V:(&)(7)
C_1 must be a glottal /7 j/, or a nasal /n/ realized homorganically to C_2.
If C_1 is a glottal, C_2 is a resonant; and if C_1 is a nasal, C_2 is an obstruent.

Distributional restrictions
1. translaryngeal vowel harmony requires that in sequences of V_17V_2 or V_jV_2,
\[ V_1 = V_2 \]
1. /o/ only occurs in root final syllables (non-compounds), unless it is mirrored back to the penultimate syllable by translaryngeal vowel harmony
2. /\&/ only occurs in root final syllables
3. /\7/ in coda position only occurs in root-final syllables or on clitics
4. rounded vowels do not occur after labial consonants /w, kw/
5. /ty ny ly/ occur only after /i/ or after where there was once an /i/. Within words /t n l/ are always pronounced [ty ny ly] after /i/
6. /s/ and /ch/ with few exceptions do not occur before /i/, because of an earlier sound change: \( tz \geq ch / _i \); and \( s > x / _i \).

2.2. **Spanish-origin (or rare native) non-symbolic material**
Due to contact with Spanish, additional segments are added to the inventory and certain of the distributional restrictions on native sounds are violated.

Consonants: /p b m r/
2C Clusters /tr sn st sty wr my tw/
3C Clusters /str/

Distributional additions in Spanish-influenced material:
1. /o/ can occur in non-final syllables of roots \( toro_ \geq toro \)
2. /l/ and /\l/ can occur syllable finally \( myelku_ \geq miercoles \)
3. round vowels can occur after labial consonants \( sewu_ \geq sebo \)
4. palatalized Cs can occur after vowels other than /i/ \( pa_lya! \geq pala \)

2.3. **System of sound symbolic material**
ZEN, like most languages, has both tame sound symbolic material and wild sound symbolic material. Tame symbolic material does not deviate drastically from the sound system that includes native vocabulary and Spanish loans. Some patterns that fit the native sound system are used quite extensively in imitating sounds. A few of these patterns are examplified below:

Some of the basic sounds of hitting surfaces are very tame phonologically. They fit into the frame (n)tV7. It is the quality of the vowels that reflects the composition of the material of the surface that is struck.
If the surface is wood, the vowel is /o/.

\[
\begin{align*}
to7 & \quad \text{'sound of hitting wood or a bucket'} \\
      & \quad \text{'sound of knocking on a door'} \\
      & \quad \text{'sound of a calf's feces hitting the ground' (not wood)} \\
to7\ ri7 & \quad \text{'sound of splitting a board or firewood with an axe'}
\end{align*}
\]

If the surface is the ground or cement, the vowel is /u/.

\[
\begin{align*}
tu7 & \quad \text{'sound of hitting the ground or cement with a fist or tool'} \\
      & \quad \text{'sound of a mango falling to the ground'} \\
tu7\ tu7\ tu7 & \quad \text{'sound of children running} \\
      & \quad \text{'sound of a frightened person's heart' (not the ground)}
\end{align*}
\]

If the vowel is /a/, the surface is metal.

\[
\begin{align*}
ta7 & \quad \text{'sound of hitting stone or metal'}
\end{align*}
\]

All of the basic sounds above are unmarked for tone, that is, they are permeable to the rightward spreading of a preceding high tone.

Building on the basic tV7 template but remaining well within the native phonotactics of ZEN, certain sounds are represented by adding prenasalization to the initial \( t \).

\[
\begin{align*}
ntu7\ ntu7 & \quad \text{'sound of plucking a bird's feathers'} \\
nto7\ nto7 & \quad \text{'sound of flicking one's check'} \\
      & \quad \text{'sound of the heel of a shoe'} \\
nta7 & \quad \text{'sound of hitting a goard'} \\
      & \quad \text{'sound of hitting (some)one's head'} \\
nti7\ nti7\ nti7 & \quad \text{'sound of a clock ticking'} \\
      & \quad \text{'sound of tapping fingernails'}
\end{align*}
\]

To that ntV7 shape, if we allow /tz/ or /ty/ in addition to /t/ and include vowel nasality, the following sounds are represented.
tzu7 'sound of hitting a bed'
za7 'sound of a punch in the shoulder'
tze7 'sound of walking on dry leaves'
tzetze7 'sound of a gourd used as a rattle'
ntze7 'sound of a rattlesnake's rattle'
ntze7 ntze7 'sound of peeling vegetables', 'sound of sharpening a machete'
tyo7 'sound of a kiss'
tzi7 'sound of kissing a baby'
tzu7 'another sound of kissing a baby'
[ntzeeH] 'sound of a drummer's cymbal crash'

Some sounds of thuds or sloshing have the general shape chV(:)7.

che&7 'noise in general'
cha&7 'sound of punching mud'
cha&7 cha&7 'sound of walking in mud', 'sound of washing clothes',
      'sound of wet shoes walking'
cha&7 nta7 'sound of chopping meat with a blow'

The affricate /ch/ occurs in similar sound symbolic words. In the following list, note that one
includes a syllabic nasal <n|>, and another, creaky voice <v'>.

n|chi7 n|chi7 'sound of forcing something into something'
nchi7 nchi7 nchi7 'sound of opening a door'
nchi7 nchi7 'sound of a wooden cart'
nchi7 nchi7 'sound of new huaraches'

Sounds of hitting glass, breaking, or clinking tend to have fairly tames shapes and generally
include the clusters /tr/, /ntr/, /tzr/.

tri7 'sound of cracking an egg'
tri_7 'sound of a bottle breaking', 'sound of hitting glass'
      'sound of plates breaking when they fall to the ground'
tra7 'sound of a rock rolling among trees'
trii9 'sound of a bottle breaking'
tzra7    'sound of a plate breaking'
tra a'nta7 xoo`::    'sound of water or rain falling'
n/tra7 raa`7    'sound of a tree breaking and falling'
tri: ntze7 tri: ntze7    'sound a shaking a can with pebbles in it'
tri7 tri7 tri7 tri7 tri7    'sound of a mouse eating maize'
ntri7    'sound of breaking a pencil'
ntruntu7 ntruntu7    'sound of one's back cracking'
ntruntu7    'sound of biting something hard'
ntrunti7 ntrunti7 xi!i:    'sound of soup in a bag'
tru7 tru7    'sound of cutting a cord with a knife'
tru tru tru    'sound of grinding corn on a grindstone'

Labial sounds are used quite consistently in sounds of booming, popping, or crashing, at times preceded by a homorganic nasal and/or followed br /r/.

brou:n sa!a`: brou:n sa!a`:    'sound of a mountain landslide'
broum    'sound of quails lifting off in flight'
brom brom brom    'sound of a train coming'
mpro&7    'sound of one rock knocking into another'
mpo&7 mpo&7    'sound of a bouncing basketball'
mpuu&    'sound of a punch in the back'
mpom mpom    'sound of a drum'
po7    'sound of a balloon popping'
po&7    'sound of a punch in the stomach'
[bro!o_W bro!o_W]    'sound of closing a door'
[ntro`u_:: n]    'sound of a guitar'

Similar to this group are a few words of bubbling and dripping.

mpru7 mpru7    'sound of bubbles in thick sauce boiling on a fire'
mpi7 mpi7    'sound of water dripping into a cup or bowl'
mbru7 m/bru7 m/bru7    'sound of bubbles underwater'
Not many sound symbolic expression include velar stops, which the native system is loaded with /k ky kw/, but a few are as follows.

- `nku!&7` 'sound of swallowing'
- `nkroo_7` 'sound of disemboweling an animal'
- `nkwa_7` 'sound of a punch in the mouth'
- `[kgh7 kgh7]` 'sound of drowning' (<gh> is a uvular fricative)

Another fairly coherent group of sounds is found in the pattern jlaV(:)7, where V is /a/ or /o/, and the sounds refer to those made by flops, plops, wet things... and some other stuff.

- `jloo7` 'sound of something heavy plunking in the water'
- `jla7` 'sound of a wet t-shirt hitting the floor'  
  'sound of fruit falling into the garbage'  
  'sound of water lapping under a rock at the edge of the water'  
  'sound of a coconut falling in mud'  
  'sound of a slap in the cheek'  
  'sound of a punch in the jaw'
- `jla7 jla7 jla7` 'sound of flip-flops'
- `jlo7 jlo7` 'sound of a horse's balls knocking when he's running'

A similar example, but with scwha <3> is found.

- `[k3r3 jlo7 k3r3 jlo7]` 'sound of water boiling'

Another sound pattern related to water includes /s/ or /x/ folowed by the vowel /a/. These tend to fall more within the realm of wild sound symbolic material.

- `sa!a_ ::` 'sound of a splash when something drops into the water'
  'sound of water in one's ear'
- `xaa7 xaa7` 'sound of rowing in water'
- `[xA: :: ::]` 'sound of a cow peeing'
- `[xa!a_H]` 'sound of a taralla falling in the water'
2.4. **Addition of new sounds in fairly tame sound symbolic material**

The velar nasal /ŋ/, written here as <9>, is restricted to word-final position. This segment is used to refer to sounds of chinking or ringing when occurring next to the high front vowel /i/, and to cracking or popping sounds when near /o/.

- *dili:9 dili:9 dili:9* 'sound of a small bell'
- *trii9* 'sonido de romper una botella'
- *drii!n* 'sound of a ring hitting the ground'
- *nyil9 nyil9* 'sound of coins hitting the ground'
- *proo_9* 'sound of a mosquito flying'
- *poo9* 'sound of a firecracker', 'sound of stomping to frighten someone'

In this data, we see the addition of the clusters /pr/ and /dr/, which is not very exceptional since the Spanish influenced system already includes /tr/. If we permit the inclusion of the slightly wild, extra long [x::] and a voiceless vowel [I], the following two items can be added to the above list of ringing and chinking sounds.

- *ti:9 x:: ti:9 x::* 'sound of washing dishes'
- *drl:9* 'sound of a telephone ringing'

Due to the extra long nasal in the following example, it probably pertains to wild symbolic material, but its sounds and meaning make it fit somewhat in the group above.

- *[trii!n: :: bo&7]* 'sound of metal hitting metal'

The trilled r, IPA [ɾ], written here as <rr>, is not found in loans from Spanish that are even somewhat nativized, because it is borrowed as the simple tap [ɾ], <r>. The trill is found in several sound symbolic expressions, although it is hard to otherwise generalize over them and call them a coherent class like the others so far. Some of them a bit more wild in that they include voiceless vowels, written in capital letters.

- *rru& rru&* 'sound of a donkey eating grass'
- *rr17 rr17 rr17* 'sound of a donkey's fart', 'sound of ripping cloth'
- *rr17 rr17 rr17* 'sound of tree branches rubbing in the wind'
Spanish words that contain(ed) the voiceless labio-dental fricative [f], <f>, that are somewhat nativized in ZEN have the sequence /jw/, which is a consonant cluster that is found in native words. However, /f/ occurs word initially in sound symbolic expressions.

Another class of sounds that seems to form a group are interjeccions used in human communication. Some are quite similar to their English counterparts, but due to the presence of glotal stops, nasal vowels, and tone in Chatino, these interjections are fairly tame phonologically.

A similar sound that is not an interjection is the following.
Moving into more wild sound symbolism, voiceless vowels occur in the representation of many sounds.

[chU chU chU] 'sound of searching for something among papers'
[chU: :: :] 'sound of water running from a faucet'
[\sU:: :] 'sound of wood burning'
[WU::] 'sound of blowing out a candle'
[tz"U::j] 'sound of water dumped on a fire'
[tzI7 tzI7 tzI7] 'sound of the leafcutter ant'
[jA: :: &] 'sound after one drinks a cup of good mezcal'

Clicks are fairly frequent in the representation of sounds, and they are also of the more wild type of symbolic material, especially because they tend to not occur with vowels, so do not form syllables.

[t! t! t! t!] 'sound of a puppy nursing', 'sound of a gecko'
'sound made by a beetle in the water after one grabs it'
'sound of a crawfish when it lets out foam'

[t! t!] 'sound of gutting a tomato'

[t!] 'sound of spitting', 'sound of saying "hurry up!"
[y! y! y! y!] 'sound of a dog drinking water'

[ty! ty! ty!] 'sound of a pig eating'

2.5. The expression of animal sounds and bird calls
As in the rest of the data shown so far, much of the sound symbolic material relating to animal calls, cries, and songs is fairly tame. There are several that contain wholly or in part the name of the animal which produces them. This is especially true for birds. It is hard to tell in some cases whether it is the imitation of the call or the name of the animal that is more primary.

ki!tyu! jwii ki!tyu! jwii 'song of the bird ki!tu,jwi!j' 'gu"icho' 'kiskadee'
tiruwi7 tiruwi7 'song of the bird tiruwi7 (no Spanish gloss known)
Many other sounds that animals produce are fairly tame, and most of them include repetition of short sequences.

'cry of the ocelot' kwi\_chi! jo!
'sound of the green frog nkw\_a!7
'sound of a borrego mpee\_7
'sound of nchii_7 nka\_ta!, a small cricket'
'sound of the kwekwa7, 'whip-poor-will'
'sound of pii, a turkey chick'
'sound of kwiche&, a quail'
'sound of the mpii, a tiny, fingernail-sized, frog'
'song of kwii7, a lark(?) (Sp) calandria
'sound of a parrot, Spanish loro'
'sound that vultures make'
'male owl's song'
'song of a lady owl'
'sound of a small chick' (the Spanish sound borrowed)
'sound of a rooster' (perhaps the native version of kikiriki)
'sound of the toad kwiti\_7 se\_ne!'
'song of the large woodpecker'
'sound of a baby mouse'
'sound of an opossum'
'another sound of an opossum'
'sound of a hen after laying an egg'
'call of a parakeet'
'sound of a bat'
'sound of a raccoon' (gh is a uvular fricative)
'sound of a cricket'
'song of a magpie'
'sound of a spotted fly'
'sound made by a mule ready to kick'
'the cry of the chachalaca'
'sound of a dog barking'
'sound of flapping of wings'
ko_to!7 ko_to!7 'sound of a donkey's ears when it shakes its head'

Other sounds made by animals fall more clearly within the realm of wild symbolic material, and most but not all of these refer to movements of animals as opposed to cries or calls.

[x:::::::::] 'sound of a snake moving'
[che`H che`H che`H che`H] 'sound a vulture makes when it is going to rain'
[jwi! 7i! 7i! 7i! 7i!] 'sound a horse makes when it sees a mare'
[jyu!&:::::::::] 'sound of a vulture flying'
[jfi!:: :: ::] 'sound of a cicada'
[mb37 mb37 mp37] 'sound goats make when chasing jennies'
[mmm7 mmm7 mmm7] 'sound of a bull when he wants a cow'
[jj3 jj3 jj3] 'sound of a hen before laying an egg'
[ti!!wk ti!!wk ti!!wk] 'sound of a scared chicken'

3. Incorporating sound symbolic material in the grammar

As in most Zapotecan languages, sound symbolic material is not productively incorporated into the morphosyntax of ZEN. However, both wild and tame sound symbolic material can be inserted into sentences just as in English examples such as the following:

(1) "clunk clunk" went the chest when it fell from the truck

Examples of sound symbolic material within sentences in ZEN is shown in examples (2)-(3). The sound symbolic material in these cases is tame, nto7 and cha&7, fitting entirely the native phonotactics and phonological system of the language.

(2) "nto7 nto7" -ra nkw-ene nkay-o7o& lo7o_ tu7wa
"nto7 nto7" -? CPL-oi*rse CPL-hit RN.with mouth.3SG
""nto7 nto7" was heard when (it) hit (pecked) with it's beak (the bird)'

(3) "cha&7 cha&7" -ra nt-ene nte-xu_7u! -a!&7 ji7i_& na kixe_&7 yaka
"cha&7 chan7" -? HAB-oi*rse PRG-cortar -1SG RN ART hierba palo
""cha&7 cha&7" is heard when I'm cutting the bush with my machete'
In example (4), *tra7*, fits the phonotactics of moderately nativized loans from Spanish, although its initial /tr/ cluster is not in the native sound system. Two loans that have this sequence word-initally are in the database: *tree_* & 'tren'; and *triwu*, 'estribo'.

(4)

```
"tra7" -ra nkw-ene nka-ki_te!&7 -a!&7 ji7i_& na ya n-chake_&
"tra7" -? CPL-o*i*rse CPL-snap -1SG RN ART CL HAB-quemarse
"tra7" was heard when I broke the firewood'
```

The same strategy is used to include wild sound symbolic material in a sentence. Example (5) illustrates this.

(5)

```
[Wx: ::] nt-ene -ra nku-ta!a_7 na kiti_
[Wx: ::] HAB-o*i*rse -? CPL-rajarse ART papel
'[Wx: ::] was heard when the paper tore'
```

In the previous examples, the particle -ra is glossed as 'unknown' at this point. Originally, I thought it might be an element that marks the symbolic quotes to ground them into the sentences. However, preliminary further investigation suggests that the particle may be used to report what someone has seen or heard to listeners who were not present when the matter at hand occurred. It may therefore be a sort of evidential particle used to report first-hand knowledge.

The sound of people playing and splashing in the water is "*champo&7 champo&7". They say that it makes a nice sound that is like the sound of breaking open squash. So in the example sentence below the a lexical item *nt-u-la7a chojo ntoo tyu* appears, which means literally 'they break squash in the water'.

(6)

```
"champo&7 champo&7" nt-ene nt-u-la7a chojo ntoo tyu_ 
"champo&7 champo&7" HAB-o*i*rse HAB-CAUS-quebrarlo calabaza cara agua
"champo&7 champo&7" is heard when they break squash in the water'
(the sound is heard as they splash around in the water playing)
The sound symbolic material does not always occur in sentence initial position, as the following example illustrates. It is in initial position in the main clause, but follows an adverbial dependent clause.

(7)  lo_ nu  nte-la!wki  tya_  "k3r3 jlo7 k3r3 jlo7"  nt-ene  
    when  PRG-boil  water  "k3r3 jlo7 k3r3 jlo7"  HAB-be.heard  
    'when the water is boiling, it makes the sound "k3r3 jlo7 k3r3 jlo7"

In the above examples, the verb nt-ene, 'to be heard', or other aspectual forms of it, is the most common. However, as seen in example (8), the verb -7ne, 'to do it' can also be used.

(8)  "kata7 kata7"  -ra  nka-7ne  lu7we  lo_nu  n-chaa  
    "kata7 kata7"  -ra  CPL-to_do_it  wing  when  PRG-irse  
    '"kata7 kata7" sounded the wings when (they) went (flapped)'

4. Conclusions

In conclusion, the structure of sound symbolic words matches the phonotactics of the language quite well in many cases, and there seems to be an extensive vocabulary corresponding to the crack, pop, flop, slosh, ching, ring, boom, thud, etc of English. The sound symbolic material falls loosely into groups depending on the nature of the materials making the sounds. Animal calls and cries sometimes contain the names of the animals that produce them, and animal movements tend to be repetitions of short, tame, phonological material. Interjections used in human communication come fairly close to fitting the native phonological system of the language. Sound symbolism is not integrated morpho-syntactically in Zenzontepec Chatino, but representation of sounds, whether tame or wild, can be inserted into sentences.