APPENDIX B

Southern Rubber Boa Habitat Assessment for the Master Storm Water System Maintenance Program

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Summary

As part of the permitting and interagency coordination process on the San Bernardino Master Storm Water System Maintenance Program, habitat suitability surveys for the southern rubber boa were conducted in all San Bernardino County Flood Control District (District) facilities that are within the known range of the species. Green Valley Creek above Green Valley Lake was surveyed and found to be suitable throughout the San Bernardino County Flood Control area of responsibility. Grout Creek above Big Bear Lake was also found to be suitable throughout the managed section below Highway 38 in Fawnskin. Knickerbocker Creek, Rathbone Creek, and Sand Canyon, all tributaries of Big Bear Lake were found to be unsuitable for a variety of reasons discussed below. Van Dusen Creek, a tributary of Baldwin Lake, was also determined to be unsuitable in the section managed by the District.

Management recommendations are made for Green Valley Creek and Grout Creek, the only suitable areas, to avoid take of southern rubber boa during maintenance activities.

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Introduction

On February 19, 2014, biologists from San Bernardino Flood Control District (District) met with the California Department of Fish and Wildlife (Department) biologists to agree on a "Strategy for Estimating Take of Southern Rubber Boa (*Charina umbratica*) in Activities Associated with the District Master Storm Water System Maintenance Program" (Appendix 1). In the Big Bear Basin and in the community of Green Valley Lake, some flood control facilities overlap with potential habitat for southern rubber boa. Based on the agreements and current understanding of the boa habitat needs, surveys of each site were made by Steve Loe, to determine habitat suitability for boas. If suitable habitat was found to be present, to develop minimization and/or avoidance measures for implementation during maintenance activities. This report represents the findings of the habitat evaluation and presents recommendations for avoiding take in Green Valley Creek and Grout Creek, the only channels that were suitable for southern rubber boas.

Methods

The 2014 agreement between the District and the Department (Appendix 1) served as the basis for the habitat evaluation. Its definition of suitable and unsuitable habitat was based on the Los Padres Forest Watch species account (undated), Stewart et al. (2005), and CDFW (1987, 2000, 2001). The Los Padres Forest Watch Species Account was taken directly from the Forest Service species accounts by the US Forest Service (2005b) developed for the San Bernardino National Forest Plan. The most recently developed species account that I could find for the southern rubber boa is provided in Appendix 2. It was developed by the Center for Biological Diversity as part of a petition for federal listing in 2012.

Because so much hazardous fuels work has been done on the San Bernardino National Forest and adjacent communities, new boa locations have been found in recent years. There are some newer documented rubber boa occurrences north and northeast of Baldwin Lake as well as in the Erwin Lake and Gocke Valley area south of Baldwin Lake. These new locations on the eastern end of the southern rubber boa range, and the habitat types found at these locations could potentially affect habitat suitability determinations. I met with the Forest Service to get those locations so that I could compare the new boa location habitats to those found to the west that had been documented for some time and were reflected in the literature. These locations were surveyed to determine the habitat present in the area around the new boa

findings. Maps of the known boa locations in the Green Valley Lake, Big Bear Lake, and Baldwin Lake area were provided by the Forest Service and are included in Appendix 2. Based on the analysis of the recent easternmost known boa locations, a modification of what was considered suitable and unsuitable habitats was made.

The new boa locations north and east of Baldwin Lake and in the Gocke Valley/Erwin Lake area are dryer than described in the "Strategy" and in the literature for southern rubber boa. The locations include habitats that were specifically agreed on as not being suitable such as sagebrush, rabbitbrush, pinyon and juniper. All of these east side locations are in pinyon /sagebrush, pinyon/ live oak, juniper/sagebrush, and sagebrush/rabbitbrush vegetation associations and variations of these. One site, on the east side of Nelson Ridge along Highway 18, is directly at the transition of where Joshua tree begins to show up as a significant component of the vegetation. One main thing that these locations all have in common, including the best southern rubber boa habitat to the west, is the presence of abundant rock outcrops and surface rock.

Using the original habitat descriptions in the literature and "Strategy" along with the updated information on suitable habitat in drier habitats than previously known, each of the flood control channel facilities were surveyed for their habitat suitability for southern rubber boa. Field surveys were conducted between September 23 and November 18, 2015. Some sites were only visited one time (Knickerbocker Creek) and some required multiple visits because of the complexity of suitable habitat and development.

Surveys consisted of site specific evaluations of the channel and associated access roads and levees, as well as an evaluation of the condition of habitats and landscape linkages for up to ½ mile from the flood control channel. The density of housing and commercial development was evaluated in the surrounding area as well as the presence and distribution of important habitat attributes such as snags, logs and other down woody material, as well as surface rock and rock outcrops.

The areas surrounding the channels were evaluated to see if the channels were connected to suitable surrounding habitat or if they were totally isolated by urban development. Southern rubber boas appear to be able to live in association with housing developments where human density is low (3 homes/5 acres) and the other habitat components such as rock outcrops, large down logs, etc. are present in good amounts with wet areas protected. These design criteria were agreed to by San Bernardino County Planning and the Southern Rubber Boa Advisory Committee during the 1980's as design standards for development in boa habitat.

A trip was made to a housing development on Running Springs School Road that had been planned by the County and constructed in an attempt to maintain habitat suitability for boas

using the above design standards. This area, now built out, serves as an example of what would be considered suitable boa habitat within a development. A site visit was made to verify that the development still contained the needed elements to support boas. The habitat where the development standards were applied, still appears to be suitable, and was helpful in evaluating the flood control channels that were all within developed areas.

Aerial photos were used to help in the evaluation of suitability. Potential linkages were identified and then evaluated on the ground to verify conditions observed in the photos.

Site specific channel evaluations included looking at the vegetation cover and distribution, presence of moisture indicating plants, rock outcrops, surface rock, down logs, forest litter and debris, and the abundance of rodent burrows both, in and adjacent, to the channel.

The final determination for the suitability of a channel and associated flood control facilities were based on the site specific suitability of the channel and the connection to adjacent habitat capable of supporting southern rubber boas over the long-term. If the channel itself appears suitable, but so small and isolated by development that it cannot support boas over time, it was not considered suitable. Continued flood control and hazardous fuels treatment (removal of dead and down wood) will be required at these sites as long as people live here, so the habitat quality will not improve. This was considered at all sites in the determination.

Site Analysis

All of the flood control channels that were surveyed had been moderate to severely affected by development and flood control requirements. Once development occurs, flood control measures are required to protect life and property. The long-term protection of life and property will continue to require that the channels be maintained for flood control and therefore, not usually compatible with maintaining high quality rubber boa habitat. Boas do best with abundant snags, logs, down woody material and significant vegetation. Leaving this material in flood control channels can be a safety issue and cause problems with culvert and bridge plugging and flooding. Another factor in these urban areas that reduces the value to rubber boas is the required hazardous fuel removal. The Forest Service and local fire agencies have been making a concerted effort to reduce fuels in and adjacent to the mountain communities to protect life and property. The reduction of fuels will continue to be a priority and will continue to reduce the habitat value, in the developed areas, for boa. This activity will not change in the mountain communities.

The combination of isolation by development and poor quality habitat within and adjacent to the flood control channels, makes all of the facilities, but two, unsuitable. Only Green Valley Creek and Grout Creek are suitable for southern rubber boa.

Green Valley Creek (Photos Appendix 4A)

Flood control facilities are located within the community of Green Valley Lake. Maintenance responsibility starts at the sediment basin at the mouth of the creek where it enters the lake and continues upstream to Lakeside Drive. From Lakeside Drive to Bluebird Drive the channel is privately owned. From Bluebird Drive upstream to the crossing of Green Valley Creek Road the District owns and maintains the facility (See appendix). This area is similar to the known occupied rubber boa habitat we find along Running Springs School Road. In order to improve the analysis of Green Valley Creek, I visited the Running Springs School site to recalibrate my eyes on what the experts considered would be suitable development that could be used by boas.

The National Forest around Green Valley Lake is excellent boa habitat. The boundary is less than ¼ mile to the south of Green Valley Creek in some spots. The habitat between the National Forest and the creek is developed, but the density of houses is limited by the topography and rock. There are a large number of rock outcrops with good cover of mixed conifer forest and montane shrubs. Development on this side of the creek is similar to that observed at Running Springs School road. There is a large amount of surface rock and litter for boas. Residential development on the north side of the flood control channel is denser than on the south side. This results in poor habitat linkage to the undeveloped National Forest habitat on the north. Based on the lack of connectivity to undeveloped habitat to the north, and density of housing, the developed area to the north does not appear capable of supporting southern rubber boa. There are a few rock outcrops close to the creek on the north side of the creek that may be used in the winter in conjunction with the stream habitat and habitat to the south.

It is likely that boas occupy the area, at least seasonally, within and around the flood control channel, based on the proximity of the good boa habitat on the south side of the stream and the generally accepted belief that streams and riparian habitats (where they are present) are important to rubber boas. Habitat is considered suitable throughout the flood control facility and extends to the National Forest upstream of Green Valley Creek Road. The spreading/sediment basin at the mouth of the stream is suitable for boa use in the spring and summer. There is evidence of rodent use on the edges and built up dikes and the sediment basin can function as a natural meadow.

The channel contains moderate to dense stands of willows (an indicator of moisture) in many places, additionally pine, oak and grassy openings are found, all of which are suitable for boas and their prey. The presence of Green Valley Lake road next to the creek, the amount of housing, and the hazardous fuels removal that has to be done detract from the natural value of Green Valley Creek, but it is still likely used by boas.

The density of willows in the flood control channel, in some areas, may be a threat during flooding to some of the homes that are built very close to the stream and to the road crossings.

The District is proposing to clean the basin periodically with equipment. Based on average temperatures for Green Valley Lake, the best time to conduct this maintenance would between November 1 and April 1. Average lows for April 1 are 26 degrees F and the high is 54 degrees (Intellecast.com). November 1, average lows are 28 degrees F and the average high is 59. During this time, the boas are likely in hibernation and deep in the ground within upland rock outcrops or in association with large, down logs. The basins are periodically inundated during storm events and would not have suitable hibernation sites for the boa. By limiting the work to this cold period, take should be avoided in maintaining the basins.

Willows choke the stream above the sediment basin, in some places. The District uses hand crews to clear the channel, as needed, to allow flow passage through the vegetation. b. This work should be done by hand and only between November 1 and April 1. By restricting the work to this time frame, and using hand crews, take can be avoided, impacts are mitigated, and the habitat will still be useable by summer.

Hand crews should receive training specific to southern rubber boa, prior to beginning work, to avoid harassing any individuals that are found while cutting the vegetation.

Grout Creek (Photos Appendix 4B)

Grout Creek is a tributary of Big Bear Lake that enters Big Bear Lake in the town of Fawnskin. The area of District responsibility is from the Highway 38 Bridge down to the mouth of the stream, where it enters the lake. There is excellent habitat on the private land immediately upstream of the bridge and it continues around the entire lake to the west. The vegetation along the channel contains typical mixed conifer forest with moisture loving willows occupying the stream channel and along the lakeshore.

Although the flood control channel has been altered, it still has the attributes that provide habitat for the rubber boa. There are willows, boulders and rock as well as some riprap that has been placed to reduce erosion. There are retaining walls at the lower end of the channel near the mouth. Riprap has been placed along the retaining wall and boas could move through there as they move up or down the stream. Development to the east of the channel is too dense and therefore not suitable for boa. However, on the West side of the channel there is potential for the boas to move between houses and use the channel as the development is only one layer thick along the highway.

The District will maintain this channel by trimming vegetation only. If this work is done in the winter after November 1 and before April 1, there will be no take of southern rubber boa, as

they will not occupy the channel bottom during that time and will be in hibernation in rock outcrops. Historic average lows and highs for November 1 are 28 degrees F. and 59 degrees. On April 1 the average low is 26 degrees F. and the average high is 54. These temperatures are low enough that the boas are likely to be in hibernation.

They should not be in the stream bottom where willows and other vegetation would need to be removed because if they remained there they could be washed out and drowned during winter storm flows.

Hand crews should be trained to watch out for all snakes including rubber boa and avoid harassing them during the treatment.

Knickerbocker (Photos Appendix 4C)

The San Bernardino County Flood Control channel portion of Knickerbocker Creek is not suitable for survival of the southern rubber boa. The creek bottom would be utilized if it were part of a larger area of suitable, occupied habitat. However, it is the most isolated and least likely area for boas to survive of all the areas and channels studied.

The area is between Big Bear Boulevard and the lake and is a small restricted narrow drainage with natural bottom that supports plants such as willows and perennial grasses and forbs. The isolation from any natural potentially occupied habitat renders this habitat unsuitable. The portion of the channel upstream of Big Bear Boulevard is concrete lined and totally surrounded by development.

Rathbone Creek (Photos Appendix 4D)

Rathbone Creek, in its entirety, was determined to be unsuitable due to the isolation from surrounding native habitats and the density of surrounding development and lack of rock outcrops, surface rock, and down logs.

Development has severely isolated Rathbone Creek. The most isolated area is north and west of Big Bear Boulevard. This area empties into sagebrush/rabbitbrush meadow habitat before the stream enters the lake. Analysis of recent boa findings east of Big Bear indicate that if this mouth of Rathbone Creek habitat were connected more directly with larger blocks of other suitable habitat, it could support boas. However, the degree of isolation, the amount of human use, and lack of hibernation sites render this site unsuitable.

Above Big Bear Boulevard, the density of development is not as great; however, the developed area is still dense enough and large enough to preclude use by boas. This area is made even more unsuitable for boas due to the almost total lack of ground cover left on the developed

lots. This is a result of very thorough hazardous fuel removal by the residents and fire protection agencies. There are few surface rocks and virtually no rock outcrops that are important for thermoregulation and hibernation.

Sand Canyon (Photos Appendix 4E)

San Canyon is similar to Rathbone Creek, in that it is very isolated by development. There are multiple layers of residential development and the forest floor has been kept very clear of snags, down logs and other woody debris through hazardous fuels work. Surface rock or rock outcrops are completely lacking.

In addition to the isolation and lack of ground cover on the surrounding developed lots, the drainage itself is very low quality habitat for boas. It is very dry compared to the stream downstream of the golf course, and it is functioning more as a dry wash than an intermittent stream with associated riparian vegetation. The bottom of the drainage has been maintained with heavy equipment to improve the flow of water keeping it bare.

Based on the isolation and the poor quality of habitat in and surrounding the drainage, Sand Canyon is not considered suitable for rubber boa.

Van Dusen (Appendix 4F)

Van Dusen Creek above Baldwin Lake is not suitable for southern rubber boa. Immediately below Paradise Road where the flood control channel ends, the habitat becomes suitable and is connected to a known large area of habitat north of Highway 18. Van Dusen Creek through the development where the District has responsibility is too isolated and of such poor quality habitat that it is not suitable. There are virtually no down logs or woody debris around the channel and surrounding homes and only a few smaller rocks. There are no rock outcrops, large surface rocks or large logs for hibernation or thermoregulation. The drainage is so barren and surrounded by homes that there is no reason for boas to venture up or down the drainage from suitable habitat to the east or west. The drainage is surrounded by dense housing quite some distance above Highway 18, so there is not a suitable connection to the suitable habitat upstream.

REFERENCES

Adkins Giese, C.L., D.N. Greenwald and T. Curry. 2012. Petition to list 53 amphibians and reptiles in the United States as threatened or endangered species under the Endangered Species Act. Before the Secretary of the Interior, July 11, 2012.

Alten, G.R., and G. Keasler. 1978. Southern rubber boa study, Mt. Pinos Ranger District, Los Padres National Forest. Report prepared for the U.S. Department of Agriculture, Forest Service, Los Padres National Forest, Goleta, California. 38 p.

Belt, G.H., J. O'Laughlin, and T. Merrill. 1992. Design of forest riparian buffer strips for the protection of water quality: Analysis of the scientific literature. Policy Analysis Group Rep. 8. Idaho Forest, Wildlife, and Range Exp. Stn., Univ. of Idaho, Moscow, ID.

California Department of Fish and Game. 2000. The status of rare, threatened, and endangered animals and plants of California.

California Dept. of Fish and Game. 2001. Draft Survey Guidelines for Southern Rubber Boa.

California Dept. of Fish and Game. 2011. State and Federally Listed Endangered and Threatened Animals of California, *available at* http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/TEAnimals.pdf (last visited Oct. 7, 2011).

California Dept. of Fish and Game. 2002. California Wildlife Habitat Relationships System, Life History Account – Rubber Boa, *available at* http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx

Center for Biological Diversity. 2012. Petition to list 53 amphibians and reptiles in the United States as threatened or endangered species under the Endangered Species Act. Available at http://www.biologicaldiversity.org/campaigns/amphibian_conservation/pdfs/Mega_herp_petition_7-9-2012.pdf .

Collins, J. T., and T. W. Taggart. 2009. Standard common and current scientific names for North American amphibians, turtles, reptiles, and crocodilians. Sixth edition. The Center for North American Herpetology, Lawrence, Kansas. iv + 44 pp.

Crother, B.I., J. Boundy, J.A. Campbell, K. de Quieroz, D. Frost, D.M. Green, R. Highton, J.B. Iverson, R.W. McDiarmid, P.A. Meylan, T.W. Reeder, M.E. Seidel, J.W. Sites, Jr., S.G. Tilley, and D.B. Wake. 2003. Scientific and standard English names of amphibians and reptiles of North America north of Mexico: update. Herpetological Review 34: 198-203. 195

Crother, B. I. (editor). 2008. Scientific and standard English names of amphibians and reptiles of

North America north of Mexico, with comments regarding confidence in our understanding. Sixth edition. Society for the Study of Amphibians and Reptiles Herpetological Circular 37: 184.

Erwin, D. B. 1964. Some findings on newborn rubber boas, *Charina b. bottae*. Copeia 1964: 222-223.

Hoyer, R. All About The Rubber **Boa** (*Charina bottae*) Information Portal http://www.rubberboas.com.

Hoyer, R. F. and G.R. Stewart. 2000. Biology of the Rubber Boa (*Charina bottae*), with Emphasis on C. b. umbratica. Part I: Capture, Size, Sexual Dimorphism, and Reproduction. Journal of Herpetology. 34: 354-60.

Hoyer, R. F. and G.R. Stewart. 2000. Biology of the Rubber Boa (*Charina bottae*), with Emphasis on C. b. umbratica. Part II: Diet, Antagonists, and Predators. Journal of Herpetology. 34(3) 348

Hudson, G. E. 1957. Late parturition in the rubber snake. Copeia 1957: 51-52.

Intellecast.com. Green Valley and Fawnskin historical temperature averages. Accessed November 2015.

Jennings, M.R.; Hayes, M.P. 1994. Amphibian and reptile species of special concern in California. Final report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA, under contract 8023. 255 pp.

Keasler, G.L. 1981. Rubber boa survey for the San Bernardino National Forest. San Bernardino National Forest, San Bernardino, CA. 26 p.

Keasler, G.L. 1982. Eastern San Bernardino Mountain southern rubber boa survey. Report prepared for the U.S. Department of Agriculture, Forest Service, San Bernardino National Forest, San Bernardino, California; 22 p. and 2 maps.

Loe, S.A. 1985. Habitat management guide for southern rubber boa *(Charina bottae umbratica)* on the San Bernardino National Forest. San Bernardino National Forest, San Bernardino, CA. 9 p

Morey, S. and H. Basey. 2002. Life history account for rubber boa, *available at* http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=19&ved=0CGsQFjAIOAo&url=http%3A%2F%2Fnrm.dfg.ca.gov%2FFileHandler.ashx%3FDocumentVersionID%3D17981&ei=_S45T8uaOI3kggeazP3nBQ&usg=AFQjCNG2ESIz-GnIcs3X3CHHswIapA85Cw

View downstream from the Highway 38 bridge. Fair habitat, narrow, but potentially occupied due to excellent habitat upstream and along highway 38 as it circles Grout Bay to the South. Housing density fairly high, but only one layer along the highway with lots of rock and rock outcrops with excellent stands of willow along the lake and some willow below the Hwy.38 bridge.

View from the lower end of the flood control channel just before the mouth of the drainage in Big Bear Lake looking upstream. Small section channelized with retaining walls. Adjacent to excellent willow stands at the lake edge and riprap at the base of the retaining walls could hold boas seasonally and provide for movement through the channelized area.

Mouth of Grout Creek with concrete grade control bottom and start of retaining wall. Note the good riprap habitat downstream as the channel merges with stands of willows on the west side of Grout Bay.

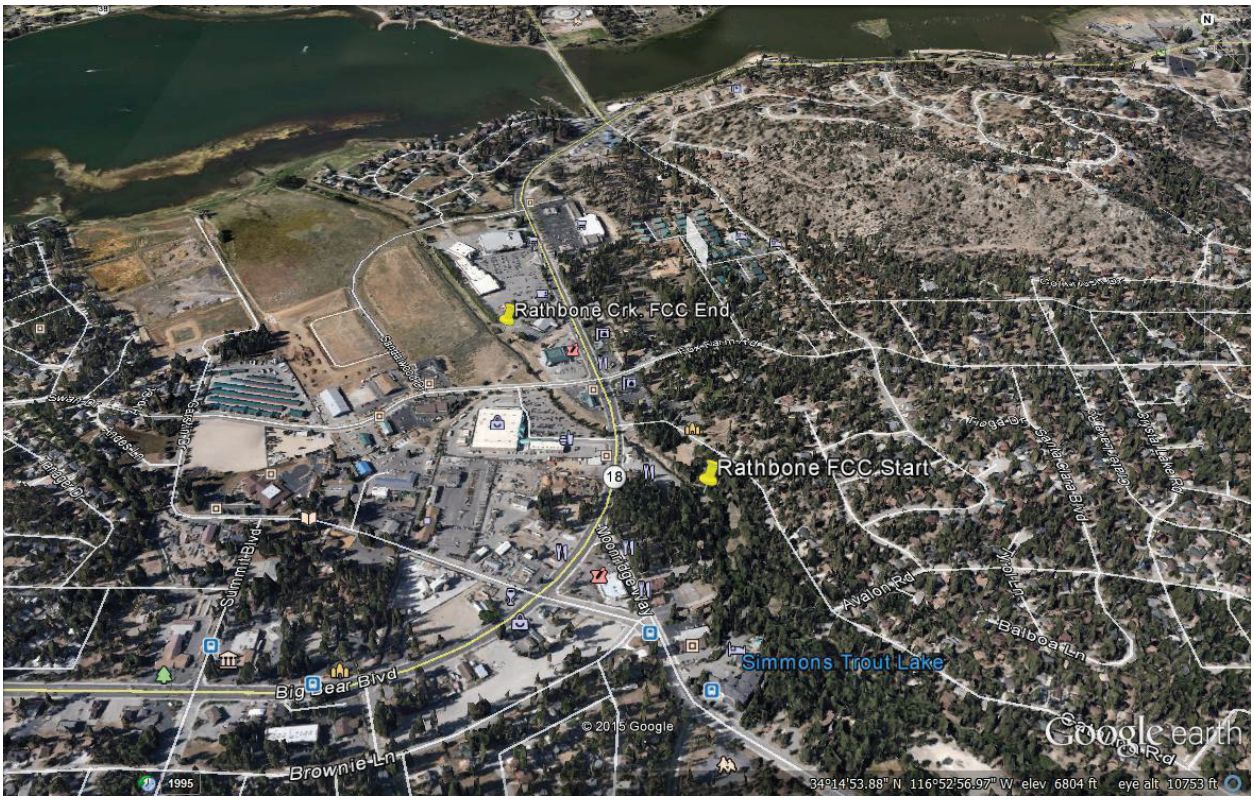
Knickerbocker 10-28-15

Knickerbocker Creek is the most isolated by development of all the flood control channels.

Big Bear Blvd looking to lake. Short, very narrow stretch of degraded willow riparian habitat from BB Blvd. to high water mark of Big Bear Lake. Riparian habitat would be suitable for seasonal use if there were adjacent suitable uplands. This habitat is extremely isolated because it is surrounded by high density development with no connection to suitable habitat for some distance. Creek is in concrete channel upstream of BB Blvd for quite a distance. This habitat would not support boas without a connection to undeveloped habitat.

From bridge at mouth of creek to Big Bear Blvd. Even though there is some willow riparian habitat, it is too isolated and small to be used by southern rubber boas.

Rathbone Creek 10-23-15



Rathbone Creek is isolated from suitable southern rubber boa habitat by dense housing and commercial development.

Meadow looking south, or upstream at East levy. Habitat typical of sagebrush/rabbitbrush habitat in the basin. If it connected to other, larger blocks of suitable habitat, it would be suitable for boas.

From end of levy looking North as drainage enters the meadow. Again, potential habitat if it wasn't so isolated by development.

Levy along Rathbun below Fox Farm Rd. showing businesses, parking lots etc. immediately to east.

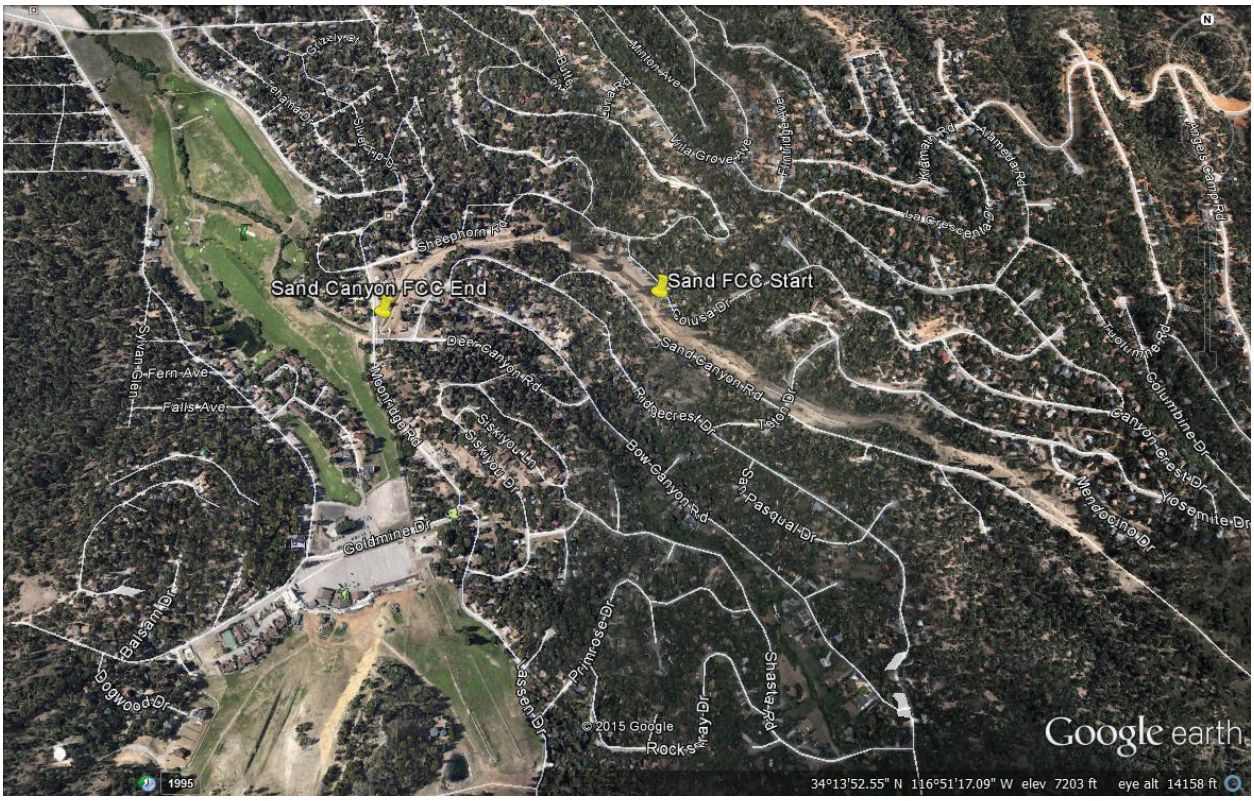
Rathbun between Fox Farm and BB Blvd. Note parking lot and cars and businesses surrounding this. Other side of stream is large parking lot.

K Mart Parking lot on southwest side of Rathbone Creek. Note the grocery cart. Again, habitat would be suitable if not so isolated by development, Big Bear Blvd. etc.

Some of the best habitat on the stream upstream from BB Blvd. above the start of the SB Co. Flood Control channel. This habitat could be occupied if it was connected to a larger block of natural habitat with down logs, rocks and rock outcrops. All of this habitat above BB Blvd. is surrounded by multiple layers of fairly dense housing with very little rock and down woody debris. There are no rock outcrops or area with large logs and woody debris for boas to winter in.

Upland adjacent to Rathbone Creek above BB Blvd. and the start of the flood control channel showing how clear most areas are being kept for fire protection. This habitat could also be used by boas if it was connected to better habitat with rock, down logs etc..

Sand Canyon



Multiple layers of development surrounding the flood control channel.

Sand Canyon Crossing of Moonridge immediately above the Golf Course. Note the good stand of willow. Willows do not extend above Moonridge into the maintained flood control channel. Above Moonridge, the channel becomes more dry wash type rather than willow riparian.

Lower end of Sand Canyon Flood Control Channel. Very little down woody debris such as logs etc.. Very little surface rock and no rock outcrops.

Shot of drainage upstream from the lower end of the flood control channel. Typical of this lower section near Sheephorn. Creek is more like a dry wash than it is downstream of the golf course where it becomes willow riparian. Drainage has been periodically maintained with heavy equipment. There is very little willow indicating a pretty dry streambed. Habitat is marginal, but could support boas if connected to larger blocks of suitable habitat.

Upper Section of Sand Canyon flood control channel maintained by SB Co. off of Calusa. Marginal habitat with dry wash characteristic, little vegetation and rock and no down woody debris (logs etc.). Relatively flat ground with dense development surrounding that precludes rubber boa use.

Upper Section of Sand off of Colusa looking downstream. Areas with vegetative cover like this could be used by boa if it was connected to other larger blocks of suitable habitat. This habitat is so isolated by housing that it is not capable of supporting boas.

Teton Street (1/4 mile above SB County maintenance responsibility) looking up into City of Big Bear Lake flood control channel. Fair habitat, but still very surrounded by dense, multiple layer dense housing making it unsuitable..

View downstream from Teton St.. Riprap would be suitable, but beyond that gets very barren again. This habitat downstream of this point is all surrounded by multiple layer dense housing with very sparse groundcover. SB Co. Flood Control maintenance starts approximately ¼ mile downstream of this point.

Van Dusen Creek

Van Dusen flood control channel is surrounded by dense development.

Mouth of Van Dusen Creek below Paradise on undeveloped land. Not SB Co. Flood Control responsibility. Excellent rocky habitat north of Highway 18 (1/2 mile to the North) and potentially occupied sagebrush, rabbitbrush, and juniper habitat with willows along the drainage.

View of habitat along highway 18, below Gold Mountain. Excellent habitat with lots of rock outcrops, talus slopes and good cover. Suitable habitat extends to the sagebrush/juniper flats below Van Dusen Creek at Paradise.

View downstream of Paradise at the mouth of Van Dusen. Willow, sagebrush, and rabbitbrush. Suitable habitat that is connected to the great habitat on the slopes and bottom of Gold Mountain ¼ mile to the North.

Paradise looking upstream. Note the lack of any real rock of any size, no down logs or other woody debris to use for cover. Very dry and wash like. Multiple layers of dense houses line both sides of Van Dusen Creek throughout the SB Co. flood control area.

View upstream from end of Hugo St. Notice how barren it is. There is virtually no cover for boas in this area.

Downstream from Hugo.

View downstream at Sequoia. Few willows at the crossing, but generally very barren and surrounded by multiple layers of dense housing.

View upstream of Sequoia. Note how barren and still surrounded by dense housing. There is nothing to attract boas to this location. They need good cover.

View looking downstream at Greenway. A few willows, but generally very bare and surrounded by dense housing.

Upstream at Greenway above the SB Co. maintenance responsibility. Habitat is still pretty barren and isolated from suitable habitat of a size that could support boas.