Added to California Rare Plant Rank 2B.2 of the CNPS Inventory on January 30, 2018

Rare Plant Status Review: *Tidestromia eliassoniana* ~~*lanuginosa*~~
Proposed Addition to California Rare Plant Rank 2B.2, G5 / S2

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Background

Tidestromia lanuginosa (Nutt.) Standl. is an annual herb in the Amaranthaceae known from the Mojave Desert in California, and widespread across southwestern United States, south to Mexico. It is included in *The Jepson Manual* (Henrickson 1993), *The Jepson Manual, Second Edition* (Costea 2012), and *Flora of North America* (Kenneth and Clemants 2004). *Tidestromia lanuginosa* is identified from *T. suffruticosa* var. *oblongifolia* (the only other *Tidestromia* species known to occur in California) in being annual (vs. subshrub) and in lacking buds at the stem base (vs. buds generally present at stem base in *T. suffruticosa* var. *oblongifolia*) (Costea 2012). The specific epithet "*lanuginose*" means woolly or downy coming from the wooly stems.

In 2010, I. S. Pino and T. J. Motley reviewed and tested recent molecular phylogenetic work within the genus *Tidestromia* using nuclear (ITS), chloroplast (rpl16, trnL-F), and morphological data, while also examining the role that ecological conditions have had on the speciation of the genus. The results of their study fully resolved *Tidestromia* and required the treatment of all infraspecific taxa as distinct species, while also requiring nomenclatural taxonomic changes. This resulted in Pino and Motley (2010) recognizing the subspecies of *T. lanuginosa* (*T. lanuginosa* subsp. *eliassoniana* and *T. l.* subsp. *lanuginosa*) and naming them as full species:

> "*Tidestromia eliassoniana* was considered a subspecies of *Tidestromia lanuginosa* Standl. However, new molecular data indicate that *Tidestromia eliassoniana* and *T. lanuginosa* do not belong to the same clade.
>
> The original description of *T. eliassoniana* did not include pollen grain information. An evaluation of the subfamily Gomphrenoideae indicated that pollen is important to define taxa at higher level. Pollen ornamentation, the form of trichomes on stems and leaves, stem color, geographic distribution, and molecular data are now evidence to consider this taxon as a distinctive species, distributed in SW of United States and NW of Mexico." (Pino and Motley 2010).

Tidestromia lanuginosa sensu *The Jepson Manuals* (Henrickson 1993, Costea 2012) and *Flora of North America* (Kenneth and Clemants 2004) does not include infraspecific taxa. *Tidestromia lanuginosa* sensu Pino and Motley (2010) is known from the southeastern United States (excluding California) through Mexico, with a disjunct population in the Dominican Republic, and *T. eliassoniana* is known from Utah, California, Arizona, New Mexico, and Chihuahua, Baja California Sur, Sonora, and Sinaloa.

Tidestromia eliassoniana (*T. lanuginosa*) occurs in sandy and gravely areas in Mojavean desert scrub at an approximate elevation of 655 to 2,105 meters, and is reported in *The Jepson Manual, Second Edition* (Costea 2017) to flower from July through October. All vouchers from California that have had their identity confirmed were collected in October, yet J. Andre (pers. comm. 2017) agrees with *The Jepson Manual* blooming period, indicating that as a summer annual, it will respond quickly to summer rain which can occur in early summer. He has also seen it in Arizona and New Mexico in mid-summer at 110 degrees Fahrenheit in full bloom, indicating that it can also bloom in the Mojave Desert in California during summer heat. Associated species include *Larrea tridentata, Ambrosia dumosa, Amaranthus fimbriatus, Bouteloua barbata, Encelia frutescens, Boerhavia coulteri, Ericameria, paniculata, Brickellia incana, Echinocactus polycephalus*, and *Echinocereus engelmannii* (GMDRC6302, GMDRC6303, RSA518431; Consortium of California Herbaria 2017 [as *T. lanuginosa*]).

Tidestromia eliassoniana is known from approximately four occurrences in California; three within the Mojave National Preserve, and one from the Whipple Mountains located on BLM land. James Andre (pers. comm. 2017) previously questioned the validity of the voucher from the Granite Mountains (*B. Pitzer et al. 1495*, RSA518431; Consortium of California Herbaria 2017 [as *T. lanuginosa*]) due to being unable to find the plant in follow up searches, but has more recently been able to examine the specimen directly and confirmed its identity as *T. eliassoniana* (*T. lanuginosa*). The two occurrences in Blind Hills (*J. Andre 29099* and *29114*, Consortium of California Herbaria 2017 [as *T. lanuginosa*]) do not seem to be associated with any disturbance and are found in a habitat consistent with those found in neighboring states, and are therefore most likely native populations (Andre pers. comm. 2017). One record from Chino Hills, Los Angeles County (*G. Rink 10592*, Consortium of California Herbaria 2017 [as *T. lanuginosa*]), is likely a misidentification; not only is it a very disjunct record, but it occurs with species that are consistent with chaparral woodland, which is not the native habitat type that *T. eliassoniana* ~~*lanuginosa*~~ normally inhabits. Another record was identified as *T. eliassoniana* (*T. lanuginosa*) from a turkey pen in Stanislaus County (*P. S. Allen 394*, Consortium of California Herbaria 2017 [as *T. lanuginosa*]), and is noted to be "probably introduced in feed mixture". Both records should be annotated to determine whether they are truly *T. eliassoniana* ~~*lanuginosa*~~. According to James Andre (pers. comm. 2017), it's quite plausible for *T. eliassoniana* ~~*lanuginosa*~~ to turn up in the Castle Mountains, Castle Peaks or Dead Mountains regions of eastern California, but so far it has not been discovered in these regions.

Tidestromia eliassoniana (*T. lanuginosa*) is unranked and considered native throughout most of the southwestern United States, but is considered critically imperiled (S1) in Utah and Louisiana, and is considered an exotic species in Illinois (NatureServe 2017).

According to James Andre (pers. Comm. 2017) the three occurrences located in the Mojave National Preserve are not directly impacted by any significant threats, such as solar or wind energy development, but are all within areas that are heavily overgrazed. Therefore, a threat rank of .2 seems most warranted, especially when considering the paucity of occurrences known from the state.

Based on the available information, CNPS and CNDDB recommend adding *Tidestromia eliassoniana* ~~*lanuginosa*~~ to California Rare Plant Rank 2B.2 of the CNPS Inventory. If knowledge on the distribution, threats, and rarity status of *T. eliassoniana* ~~*lanuginosa*~~ changes in the future, we will re-evaluate its status at that time.

Recommended Actions
CNPS: Add *Tidestromia eliassoniana* ~~*lanuginosa*~~ to CRPR 2B.2
CNDDB: Add *Tidestromia eliassoniana* ~~*lanuginosa*~~ to G5 / S2

Draft CNPS Inventory Record
Tidestromia eliassoniana (Sánch. Pino & Flores Olv.) Sánch. Pino ~~*lanuginosa* (Nutt.) Standl.~~
Eliasson's woolly tidestromia
Amaranthaceae
CRPR 2B.2
San Bernardino
~~Nevada,~~ Arizona, Utah, ~~Colorado, Texas, Oklahoma, Kansas, South Dakota, Illinois, Louisiana, Missouri,~~ New Mexico~~, Pennsylvania~~; Baja California, Sonora, Mexico
Whipple Mts (121C) 3411434, Blind Hills (175D) 3411573, Van Winkle Spring (176D) 3411575
Mojavean desert scrub / rocky to gravelly volcanic flats, clay; elevation 655-2105 meters.
Annual herb. Blooms July - October.
Threatened by overgrazing. See *Novon* 12(3):401–406 (2002) ~~*Journal of the Washington Academy of Sciences* 4(3):70 (1916)~~ for original description, and *Taxon* 59(1):46 (2010) for revised nomenclature.

Literature Cited
Consortium of California Herbaria. 2016. Data provided by the participants of the Consortium of California Herbaria. Regents of the University of California, Berkeley. Website http://ucjeps.berkeley.edu/consortium/ [accessed 29 November 2017].

Costea, M. 2012. *Tidestromia.* Pp. 168-170 *in* Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (eds.), The Jepson manual: vascular plants of California, second edition. University of California Press, Berkeley, CA.

Henrickson, J. 1993. *Tidestromia*. Pp 134 *in* The Jepson Manual: Higher Plants of California. University of California Press, Berkeley.

Kenneth, R. and S. Clemants. 2004. *Tidestromia*. Pp. 439-443 *in* Flora of North America Editorial Committee (eds.), Flora of North America North of Mexico, Vol. 5. New York and Oxford.

NatureServe. 2017. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Website http://explorer.natureserve.org/ [accessed 29 November 2017].

Pino, I. S. and T. J. Motley. 2010. Evolution of *Tidestromia* (Amaranthaceae) in the deserts of the southwestern United States and Mexico. *Taxon* 59(1): 38-48. (Revised nomenclature.)

Pino, I. S. and H. F. Olvera. 2002. New taxa and a new combination in *Tidestromia* (Amaranthaceae) from North America. *Novon* 12(3): 399-407. (Original description.)

Standley, P. C. 1916. Botany—*Tidestromia*, a new generic name. Journal of the Washington Academy of Sciences 4(3): 70.